Encouraging the Development of Deeper Learning and Personal Teaching Efficacy: Effects of Modifying the Learning Environment in a Preservice Teacher Education Program

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Acknowledgments

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Abstract

Through the development and implementation of modified learning contexts, the current study encouraged undergraduate teacher education students to modify their approaches to learning by reducing their reliance on surface approaches and progressively adopting deeper approaches. This outcome was considered desirable because students who employed deep approaches would exit the course having achieved higher quality learning than those who relied primarily on surface approaches. It was expected that higher quality learning in a preservice teacher education program would also translate into greater self-confidence in the management of teaching tasks, leading to improvements in students’ teaching self-efficacy beliefs.

Altered learning contexts were developed through the application of action research methodology involving core members of the teaching team. Learning activities were designed with a focus on co-operative small-group problem-based learning, which included multiple subtasks requiring variable outcome presentation modes. Linked individual reflection was encouraged by personal learning journals and learning portfolios. Students also provided critical analyses of their own learning during the completion of tasks, from both individual and group perspectives. Assessment methods included lecturer, peer and self-assessment, depending on the nature of the learning task. Often these were
integrated, so that subtasks within larger ones were assessed using combinations of methods.

Learning approach theorists (Biggs, 1993a, 1999; Entwistle, 1986, 1998; Prosser & Trigwell, 1999; Ramsden, 1992, 1997) contend that learning outcomes are directly related to the learning approaches used in their development. They further contend that the approach adopted is largely a result of students’ intent, which in turn, is influenced by their perception of the learning context. The present study therefore aimed to develop an integrated and pervasive course-based learning context, constructively aligned (after: Biggs, 1993a, 1996), achievable within the normal constraints of a university program, that would influence students’ adoption of deep learning approaches. The cognitive processes students used in response to the altered contexts were interpreted in accordance with self-regulatory internal logic (after: Bandura, 1986, 1991b; Zimmerman, 1989, 1998b). Longitudinal quasi-experimental methods with repeated measures on non-equivalent dependent variables were applied to three cohorts of students. Cohort 1 represented the contrast group who followed a traditional program. Cohort 2 was the main treatment group to whom the modified program was presented. Cohort 3 represented a comparison group that was also presented with the modified program over a shorter period.

Student data on learning approach, teaching efficacy and academic attributions were gathered from repeated administrations of the Study Process Questionnaire (Biggs, 1987b), Teacher Efficacy Scale (Gibson & Dembo, 1984) and Multidimensional-Multiattributional Causality Scale (Lefcourt, 1991). In addition,
reflective journals, field observations and transcripts of interviews undertaken at the beginning and conclusion of the course, were used to clarify students’ approaches to learning and their responses to program modifications.

Analyses of learning approaches adopted by Cohorts 1 and 2 revealed that they both began their course predominantly using surface approaches. While students in Cohort 1 completed the course with approximately equal reliance on deep and surface approaches, students in Cohort 2 reported a predominant use of deep approaches on course completion. The relative impact of the modified learning context on students with differing approaches to learning in this cohort were further explained through qualitative data and cluster analyses. The partial replication of the study with Cohort 3, across the first three semesters of their program, produced similar effects to those obtained with Cohort 2.

The analyses conducted with teaching efficacy data indicated a similar pattern of development for all cohorts. Little change in either personal or general dimensions was noted in the first half of the program, followed by strong growth in both, in the latter half. While a relationship between learning approach usage and teaching efficacy was not apparent in Cohort 1, developmental path and mediation analyses indicated that the use of deep learning approaches considerably influenced the development of personal teaching efficacy in Cohort 2.

The current research suggests that value lies in the construction of learning environments, in teacher education, that enhance students’ adoption of deep learning approaches. The nature of the task is complex, multifaceted and context specific, most likely requiring the development of unique solutions in each
environment. Nevertheless, this research demonstrates that such solutions can be developed and applied within the prevailing constraints of pre-existing course structures.
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Since Marton and Saljo’s original phenomenographic research (Marton & Saljo, 1976a, 1976b), a considerable amount of investigation into learning approaches used by students in higher education has been undertaken over the last 25 years. This research has been considered important because of the qualitatively different learning outcomes identified for students who use differing approaches to learning. It has also been important because the context dependence of the students’ adoption of these approaches requires the identification of contexts that enhance or inhibit desired learning approaches.

If universities are to be successful in their mission to produce graduates who can engage in critical reflection and create unique solutions for the novel circumstances demanded of their professions, then it is incumbent on universities to provide an environment that encourages, rather than inhibits the development of analytical skills. The identification of approaches to learning and the contexts that support them are an important step in the realisation of this goal, since some approaches are linked with the development of critical analysis, while others appear to inhibit that process.

Marton and Saljo identified two major approaches adopted by the students they studied, which they labelled the surface approach and the deep approach respectively. Further investigations conducted by Biggs, (1987a) and separately
by Entwistle and Ramsden, (1983) established a third approach which Biggs identified as the achieving approach and Entwistle and Ramsden labelled the strategic approach. These latter approaches appear largely similar in their characteristics and will be referred to collectively as the achieving approach.

Surface approaches are seen as being motivated by the learner’s desire to meet minimum requirements with minimum effort. The use of surface approaches results in study behaviours that enable students to reproduce material in a required form without analysis or integration, leading to low quality learning outcomes. Deep approaches, on the other hand, are characterised by an intention to understand the material being studied. Resultant behaviours include the active integration of new information with old, or with information derived from other sources. High quality learning outcomes, including the development of analytic skills, are expected with the use of deep approaches to learning (Biggs, 1993a; Entwistle, 1998; Marton & Saljo, 1997; Ramsden, 1992). Achieving approaches are seen as being motivated by the learner’s desire to gain high grades. Thus study behaviours are heavily moderated by assessment requirements, but are generally highly structured and efficient. Learning outcomes may vary depending on the requirements of the assessment task. Understanding and integration of learned material may occur, but these outcomes are seen as incidental in an achieving frame. The purpose of the achieving approach is to excel through higher grades rather than necessarily to learn (Biggs, 1989, 1993a).

Biggs, (1993a, pp 75-76) asserts that the deep approach is the “... only one which is task-centred and task-appropriate ...”. The surface approach is inadequate in his view, because its purpose is to avoid failure while minimising effort, and the
achieving approach is inadequate because learning is not its central purpose “... Cheating also serves that end”.

Students’ adoption of particular learning approaches appears to be affected by a number of internal characteristics interacting with a number of contextual features within an ecological frame. Students’ intention in engaging in the learning environment is important, since the intention forms part of the characteristics that differentiate the approaches. Hence, those who intend to understand and integrate material will be more likely to engage in a deeper approach compared with those who wish simply to pass with minimum effort (Entwistle, 1998; Marton & Saljo, 1997). Students’ past successes and failures also affect their choice of approach, with those behaviours leading to success in the past, in environments perceived as similar, being more likely to be repeated in the new learning context (Marton, Dall’Alba, & Beaty, 1993). Thus students who have successfully navigated the requirements of secondary school and matriculation examinations may continue to practise the study behaviours they found useful in their recent school experience, once they enter university (Ramsden, Bowden, & Martin, 1988).

Since achievement is rewarded through competitive university entry requirements, many students may begin their university careers with high achieving motivation (Gordon, Lim, McKinnon, & Nkala, 1998b; Regan & Regan, 1995a) and continue the study behaviours they previously engaged in, which resulted in the requisite achievement. Differences in this regard have been identified between mature-aged students and those who have progressed to university directly from school, with those of mature age tending to adopt deeper approaches from the outset of their university careers (Regan & Regan, 1995a; Richardson, 1994b; Vermunt, 1996).
The nature of the learning environment seems also to be very important in students’ adoption of particular approaches to learning (Biggs, 1993a; Entwistle, Entwistle, & Tait, 1991a; Ramsden, 1987). The learning environment may allow students a greater opportunity to learn in some ways rather than others: it may enhance or interfere with a student’s preferred method; it may reward an approach with higher grades; and it may impart messages about which approaches to learning are valued over others. In these ways the learning context may complement or contradict the approach students are predisposed to use, on the basis of their internal motivation and past experience (Clarke, 1996; Clarke & Dart, 1994; Dart, 1994).

Methods of assessment appear to be of particular importance in encouraging the adoption of certain learning approaches (Biggs, 1995, 1996; Entwistle & Entwistle, 1992; Nightingale, 1997) and may especially influence students who begin with high achieving motivation. A student who wishes to achieve well may adopt whatever learning strategies are perceived as necessary to bring about the desired achievement (Marton & Saljo, 1997). Where the assessment task calls for the memorisation of factual information, such as some multiple choice examinations, students who desire to achieve may spend considerable effort attempting to remember this information, often in elaborate ways (Ramsden, 1992; Scouller & Prosser, 1994). Other assessment items, which call for the exposition of argument, would require different study methods emphasising the understanding and integration of ideas. Thus students, who begin their university careers with the intention of adopting one approach to learning, may change their approach in response to contextual features of the course, such as assessment practices.
Other contextual features, which appear to influence students’ choice of learning approach, include such factors as the number of contact hours, level of workload, number and type of assessment items and their weighting. The greater the workload pressure, the more likely students will adopt surface approaches simply in order to manage the output (Clarke, 1995; Entwistle & Entwistle, 1992; Entwistle et al., 1991a; Nightingale, 1997). The curriculum focus and instructional strategies used, including the lecturers’ perceptions of the learning environment and their conceptions of teaching affect students’ choice of learning approach, with constructivist orientations leading to increased use of deep approaches and transmission orientations inhibiting this process (Prosser & Trigwell, 1997, 1998; Trigwell & Prosser, 1996b; Trigwell, Prosser, & Taylor, 1994). The level of choice available, opportunity for collaboration and discussion, and factors associated with lecturers’ rapport with students and enthusiasm for the subject material affect students’ learning approaches. Greater opportunities for discussion and the exposition of argument in an atmosphere in which students feel free to express their views inhibits surface approach usage and improves the use of deep approaches (Biggs, 1989; Clarke, 1996; Entwistle, 1991; Jackson & Prosser, 1989; Ramsden, 1994; Trigwell & Prosser, 1991a).

The interaction between dispositions and contextual features in the choice of learning approach is a complex one and may be subject to an individual’s self-regulatory mechanisms (Bandura, 1991b; Zimmerman, 1998a, 1998b). In such a model, students’ personal goals, specific intentions, prior experiences, self-efficacy beliefs and other influences, would have direct effects on students’ study behaviours, but would also have an indirect effect by colouring their perceptions of the learning environment. The degree to which the new learning environment is
perceived as similar to prior settings may encourage students to adopt learning approaches which have yielded success in the past. The degree of difference perceived in the new environment may encourage, perhaps tentatively, the adoption of alternate approaches.

There are many combinations of internal and contextual factors in this model, which could lead to individual permutations. For example, a mature-aged student who enters a university course with the goal of high achievement and the intention of gaining a full understanding of the material, may perceive a multiple-choice examination as anxiety provoking because of low self-efficacy induced by insufficient recent experience with this form of assessment. To reduce anxiety, this student may adjust his/her study behaviours to focus on the memorisation of declarative information. A feeling of dissatisfaction may result because of the student’s failure to meet the original intention, even though the broad goal of high achievement may be met. Another student who achieved entry to university predominantly through the use of surface methods at school, may be highly satisfied with the multiple-choice examination, especially if open-book. This student may believe he/she can achieve a passing grade through the application of minimal effort by practising the use of the text’s index and glossary, rather than needing to understand the material in detail.

Quite different outcomes for each of these individuals would be obtained if the assessment system required deeper approaches to learning, such as those proposed by Biggs (1995, 1996). The alteration of this one contextual feature however, may not have uniformly desirable effects (Clarke, 1996; Entwistle, 1994; Entwistle & Tait, 1990). A student, for example, motivated by high achievement orientation
with high self-efficacy in formal examination settings through the use of efficient study methods, may find a co-operative group problem-based assessment task threatening. The perceived threat may emanate from low self-efficacy in similar settings, from minimal past experience with similar tasks, or from reduced control due to the shared responsibility for the task’s outcome. Coupled with the student’s high desire to achieve, the anxiety produced may be sufficient to interfere with the goal of inducing deeper learning practices. Similarly, a student motivated by surface learning orientation may be able to avoid much task engagement by relying on other group members. A student motivated by deep learning orientation may find functional aspects of the task, such as subtask delineation or time pressure, actually interfere with the development of a deep understanding of the topic.

Thus the interplay between internal self-regulatory mechanisms and external contextual features is seen as a complex interaction in determining students’ choice of learning approaches and the efficiency of their application. The complexity of this relationship is regularly reported in the literature dealing with approaches to learning (Biggs, 1993a, 1993c; Entwistle, 1991, 1994; Marton et al., 1993; Marton & Saljo, 1976b; Ramsden, 1987) and would be predicted by an interpretation of the mechanisms underlying learning approaches in accordance with social cognitive theory (Bandura, 1986, 1991b).

Using this frame then, the task of facilitating the adoption of deeper approaches to learning by students in university settings becomes a complex one involving much more than the simple manipulation of assessment requirements or the implementation of problem-based learning models. Though these and a number of
other contextual modifications have been demonstrated to influence students’ choice of learning approach (for example: Biggs, 1996; Boulton-Lewis, 1995; Eklund-Myrskog, 1997; Gordon & Dunshea, 1996; McKinnon, Gordon, & Lim, 1996; Newble & Hejka, 1991; Trigwell & Prosser, 1991a), influencing students to adopt deeper learning practices and to maintain this approach throughout their course of study involves the consideration of many competing factors (Ramsden, 1997).

According to Biggs (1989), Entwistle, Entwistle and Tait (1991a) and Ramsden (1994), the pursuit of teaching methodologies that encourage the adoption of deep approaches to learning should be a fundamental goal of universities. This is especially important in the light of research (Ramsden et al., 1988; Regan & Regan, 1995a) indicating that many students enter universities employing high levels of surface study behaviour, even though motivated in the most part by achieving goals. It appears that the experience of the secondary school system, in particular the process of matriculation, may encourage study behaviours akin to surface approaches for many students and discourage the use of deep approaches. Unless these students perceive sufficient differences between the requirements of secondary school and those of universities, then their strategic use of surface strategies to achieve at university may continue.

Encouraging the use of deep approaches to learning may be particularly important in the preservice education of teachers. There is some evidence to suggest that student teachers who use surface strategies in their role as learners may be more likely to see teaching as the transmission of information (Christensen, Massey, Isaacs, & Synott, 1995). Christensen et al, further identified that student teachers
who use deep approaches to learning may be more likely to take constructivist views when in the teaching role. Student teachers who predominantly rely on surface strategies as learners may therefore be likely, in the role of teacher, to reproduce contexts that encourage surface learning on behalf of their students. Thus a cultural reproductive cycle of surface learning may be fostered, unless student teachers are encouraged to adopt deep learning approaches in their preservice years. It certainly seems that the current school system may encourage surface learning from many of its students (Ramsden et al., 1988), that many school teachers have surface-level perceptions of their own learning (Boulton-Lewis, 1996), and that a high proportion of teacher education students display predominantly surface learning strategies on entry to university (Christensen et al., 1995; Gordon, Lim, McKinnon, Nkala, & Parker, 1995).

Evidence is available from the higher education sector that lecturers’ conceptions of the teaching process determine, to a substantial degree, the teaching contexts they establish (Prosser & Trigwell, 1997; Trigwell & Prosser, 1996b). The learning environment established by lecturers who hold differing views of the teaching process also impact on the learning approach adopted by students (Trigwell, Prosser, & Waterhouse, 1999). This research has identified that lecturers who view teaching from a constructivist frame and see its purpose as the encouragement of conceptual change on behalf of their students, are likely to have a higher proportion of students who adopt deeper approaches to their learning. Conversely, lecturers who see the central purpose of teaching as the transmission of information are likely to have a higher proportion of students who adopt surface approaches to their learning.
If these findings are extrapolated to the school sector, then the notion of a reproductive cycle can be proposed. Such a cycle would comprise students exiting the school system with high surface orientations to study which, with the exception of a maturation effect (Marton et al., 1993; Vermunt, 1996), remain relatively unchanged throughout their university careers. These students, on graduating from teacher education programs then enter the teaching profession with predominantly transmission views of teaching leading them to construct learning environments that encourage their students to adopt surface approaches to learning. Evidence provided by Dart and his colleagues (Dart et al., 1999) suggests that school students’ approaches to learning may be affected by their perception of the learning environment in a similar way to that proposed by Trigwell et al. (1999).

The current study represents an attempt to intervene in this cycle by encouraging the adoption of deep approaches to learning and discouraging surface approaches in a teacher education program. A second purpose in encouraging the adoption of deep approaches to learning by preservice teacher education students is the anticipated effect such an approach may have on the enhancement of the students’ self-efficacy for teaching.

Since Bandura’s original conceptualisation of the self-efficacy construct (Bandura, 1977), and Ashton, Webb and Doda’s (1983) identification of teacher self-efficacy as a determining factor in teaching competence, a considerable amount of research has confirmed the centrality of the construct in teacher effectiveness (Bandura, 1997; Pajares, 1996; Tschannen-Moran, Woolfolk-Hoy, & Hoy, 1998). This research has demonstrated that teachers with high self-
efficacy beliefs are likely to engage in a wide range of more productive teaching practices than teachers with low self-efficacy.

Teaching is a problematic activity often requiring novel solutions to be generated for novel problems in novel circumstances. According to social cognitive theory (Bandura, 1986, 1997) people with high self-efficacy beliefs related to specific tasks, show greater willingness to engage in the tasks, persist longer in the face of difficulties, perceive difficulties as less threatening, use a variety of problem solving strategies and hence have a greater likelihood of success with the task. These basic tenets of self-efficacy theory have been repeatedly identified in the professional behaviour of teachers in classrooms. Teachers’ self-efficacy for teaching behaviours affects, among other things, their choice and structuring of learning activities; their response to students’ attempts in learning tasks; their control orientations and control behaviours; their use of classroom discussions and innovative teaching practices; their responses to children who are difficult to teach; their preparedness to include children with disabilities; their level of stress and their satisfaction with the teaching profession (Bandura, 1997; Pajares, 1997; Ross, 1998; Soodak & Podell, 1993; Tschannen-Moran et al., 1998). As a consequence of these behavioural differences, teachers’ self-efficacy has important formative effects on children’s developing conceptions of their own academic self-efficacy (Schunk & Zimmerman, 1997; Zimmerman, 1995).

Critical components in the efficacy formulation of teacher effectiveness include the perception by teachers with high self-efficacy that all students are teachable, including those who are difficult to teach (Soodak & Podell, 1993). This perception leads to the application of adaptive problem-solving behaviours and
persistence with identified solutions, leading to higher levels of success (Ashton & Webb, 1986). Teachers with a low sense of self-efficacy are more likely to attribute difficulties in teaching to student failure and make fewer, more tentative, innovations to ameliorate the difficulties (Dembo & Gibson, 1985; Gibson & Dembo, 1984).

Teacher education programs that facilitate the development of deep learning approaches may be better able to produce students with the kind of problem solving capabilities that sustain their self-efficacy when in the teaching role. Indeed Ashton (1984, p.31) concluded that “[a] potentially powerful paradigm for teacher education can be developed on the basis of the construct of teacher efficacy”, and suggested a number of modifications to teacher education programs to enhance preservice teachers’ self-efficacy beliefs. These modifications included many of the methods recommended for the promotion of deep learning approaches, especially the development of analytical problem-solving methods from meaningful, context based learning.

This constructivist view of the learning process is shared by social cognitive theorists (eg: Schunk & Zimmerman, 1997) and learning approach theorists (eg: Biggs, 1993a). Furthermore, learning approach theorists (eg. Marton & Saljo, 1997) assert that the capacity to develop analytical problem-solving skills is considerably enhanced through the use of deep approaches to learning and restricted by the use of surface approaches.

Surface approaches, by their nature, are focused towards memorisation and reproduction of course material. In teacher education this may also involve
modelling of teaching methods from practicum supervisors. The reproduction of
memorised or modelled teaching behaviour in other classroom contexts may not
be problematic in itself, but when difficulties arise the memorised material may
not generate the appropriate solutions. The neophyte teacher would then need to
rely on his/her analytical problem-solving skills to identify an appropriate novel
solution to the problem. Students who predominantly follow a surface approach to
learning would be less likely to identify adequate solutions in these circumstances.
Their sense of teaching efficacy would be threatened and likely to be reassessed at
lower levels. Students who predominantly follow a deep approach to learning
would be better placed to resolve these difficulties as they arise, since their
problem-solving skills are nurtured as part of this approach. Consequently their
sense of personal teaching efficacy may well be enhanced through the successful
resolution of difficult situations. Thus it is argued that the encouragement of deep
learning approaches amongst preservice teachers would provide suitable
conditions to facilitate the growth of teaching self-efficacy.

Investigations into the application of alternative teaching methodologies across
disciplines, largely based on a number of student centred approaches, have
variously demonstrated promising outcomes in terms of observed performance,
knowledge integration, metacognition, positive acculturation, analytical problem-
solving, internal control orientation and high self-efficacy (see for example: Batts
& Wilkes, 1993; Biggs, 1996; Hofer, Yu, & Pintrich, 1998; Jackson & Prosser,
1985; Pollard, 1993; Sumison, 1996; Tang, 1998; Trigwell & Sleet, 1990). These
outcomes would appear to be highly desirable from preservice teacher education
courses (Wideen, Mayer-Smith, & Moon, 1998).
To date however, with few exceptions, these intervention studies have been limited to single semester, pre- and posttest quasi experimental designs, in single universities, without integration into the course as a whole (see Hattie, Biggs, & Purdie, 1996; Hofer et al., 1998). They have usually examined one effect in isolation only, such as learning approach or teaching self-efficacy, without connecting the constructs or examining multiple dimensions. Longitudinal, prospective, course-based intervention studies have been called for to examine the effectiveness of interventions designed to promote deep learning (Entwistle, 1991) and self-efficacy (Pajares, 1996, 1997). The current study seeks to address these issues and attempts to clarify the relationship between learning approach and teacher self-efficacy by developing effective methodologies and applying these pervasively throughout the length of the students’ undergraduate program, to improve the quality of teaching and learning within the context of preservice teacher education.

The literature consistently reports that while discouraging surface approaches is generally achievable with minor contextual manipulations such as the modification of assessment requirements, the process of encouraging deep approaches is patently difficult to achieve (Entwistle et al., 1991a; Marton & Saljo, 1997; Ramsden, 1997; Trigwell & Prosser, 1991a). It is suggested that the source of this difficulty is located in the complexity and reciprocal interaction of components within the learning environment (Biggs, 1993a, 1993b; Entwistle, 1986; Entwistle et al., 1991a) ultimately impacting on students’ subjective perception of learning requirements and the requirements of assessment tasks (Ramsden, 1992). These perceptions would inform students’ self-regulatory mechanisms (Pintrich & Garcia, 1994; Vermunt, 1998; Zimmerman, 1998a).
creating individual and at times, unexpected outcomes (Marton & Saljo, 1997; 
Ramsden, Beswick, & Bowden, 1986).

Because of the complexity of these processes and the reported difficulty in 
promoting deep learning practices, a multifaceted intervention strategy was 
designed to influence students directly, through the modification of subject 
requirements and teaching methods, and through the development and 
reinforcement of constructivist approaches to teaching employed by the lecturing 
staff. The interactions between components within the learning environment were 
conceived as being consistent with those represented by Biggs’ (1993a) ‘3P 
model’ with interventions designed to impact primarily through presage and 
process, to indirectly influence outcomes at the product stage. The development of 
evolving intervention techniques was guided by the principle of constructive 
alignment (Biggs, 1996) embedded within a social constructivist frame (Oxford, 
1997; Simons, 1991), and with particular emphasis on collaborative and reflective 
processes. Explicit goal-setting and feedback mechanisms were implemented to 
facilitate student self-regulation of learning (Zimmerman, 1994, 1998a) as a 
pervasive feature of the program. An action research paradigm (after Kember & 
Gow, 1992; Kember & McKay, 1996; Zuber-Skerritt, 1993) was implemented 
with core lecturing staff in the program as the main vehicle for the development 
and progressive implementation of interventions throughout the students’ course 
of study.

Specifically the current study evaluated the effect of implementing course-wide 
teaching and learning practices, which were expected to initially reduce students’ 
reliance on surface learning approaches, while progressively enhancing deep
learning approaches in conjunction with personal teacher efficacy beliefs, across the students’ course experience. The study used a longitudinal, quasi experimental design, across three cohorts of early childhood teacher education students who acted as contrast, treatment and comparison groups respectively. Repeated measures of learning approach and teacher efficacy beliefs acted as the principal dependant variables.

Prospective teachers experiencing a course that develops deeper learning approaches and enhances teaching self-efficacy are more likely, in accordance with the literature dealing with these variables, to be empowered, reflective critical thinkers with an acceptance of collaborative processes, who develop and persevere with innovative practices and produce higher learning outcomes in their own students. The literature regularly reports (Ashton & Webb, 1986; Wideen et al., 1998; Woolfolk & Hoy, 1990) that traditional teacher education programs fail, on the whole, to produce teachers who demonstrate these qualities.
CHAPTER 2

Learning Approaches in Higher Education

2.1: The Development of Professional Competence
The report of the Australian Senate Standing Committee on Employment
Education and Training (1990) entitled Priorities for reform in higher education
(known as the Aulich report) was critical of the way universities prepared students
for entry into professional fields and emphasised the need to improve the quality
of university teaching as a major goal of higher education reform. The criticisms
contained in the Aulich report are in line with concerns expressed internationally
about the quality of university education (Daly, 1994; Gibbs, 1994) and also
identified by others with a broader focus (Lave & Wenger, 1991; Nightingale &

Concerns about university education are centred on the creation of reflective
professionals who are expected to resolve novel problems in their field of eventual
practice (Schön, 1987; Senate Standing Committee on Employment Education
and Training, 1990). The potential for professionals to apply creative solutions to
novel problems in novel circumstances is a recurring theme in the literature as a
dimension for distinguishing those of varying professional competence (Klein &
Hoffman, 1993, p.206). Proficiency in professional fields may need to be
developed from immersion within the profession in some form of apprenticeship
or induction process as Farnham-Diggory (1994) describes because of the
importance of the tacit knowledge acquired through acculturation into the profession.

The learning environment required may however, depend on the characteristics of the tasks to be learned and the types of knowledge required for successful performance of the task. Presumably different professions call upon different knowledge components to varying degrees and potentially different levels of artistry (in Schön’s terms) for proficient performance. Indeed most professions comprise a multiplicity of tasks for which varying degrees of declarative, procedural and conditional knowledge would be required.

While it is not expected that universities produce graduates who display expert levels of performance immediately on graduation, there is a community expectation that their performance is at least competent on exit from preservice courses (Preston & Kennedy, 1995; Reynolds, 1992), and that they are adequately prepared for future growth in expertise through a desire to continue their learning during their professional careers through professional self-development.

According to the Aulich report these community expectations of the higher education system were not being adequately met across a broad range of professions.

_The Committee believes that Australia is producing graduates who, all too frequently, are not familiar in any disciplined sense with the society in which they are going to practise their chosen profession, who are not critical, analytical, creative thinkers, whose education does not provide the basis for adequate flexibility, who are not sufficiently attuned to the need for ‘lifelong’ learning, and who are not good communicators. In short, we are producing highly trained_
technicians who are undereducated in the broader sense of the term
(Senate Standing Committee on Employment Education and
Training, 1990, p. 3).

The Aulich report identified a number of issues dealing with the context of higher
education as sources of the problems identified. These included overly specific
content-oriented curricula in most professional courses; staffing issues that
encouraged research as the primary focus for employment and advancement;
inappropriate teaching methodologies that focused on the transmission of
information; assessment methods that encouraged reproduction of information;
and minimal attention or reward for teaching effectiveness. Indeed the quality of
teaching was seen as a primary factor in producing or inhibiting the desired
outcomes of higher education.

Following the publication of the Aulich report, the quality of teaching in higher
education has become a national priority in Australia (Baldwin, 1993), with
facilitative structures being established (Anderson, 1993) and national discussion
and debate encouraged (Baldwin, 1993; Nightingale & O’Neil, 1994). Similar
outcomes have been mirrored internationally (Daly, 1994; Gibbs, 1994). This
overt focus on the quality of university teaching has led institutions to investigate
and implement structural changes in their organisations to encourage improved
teaching and learning processes (Kember & McKay, 1996; Newble & Hejka, 1991;
Ramsden, 1993c; Yerbury, 1993). Much of the movement toward
improvements in quality learning at universities has been informed by the
research in the field of inquiry described by learning approach theory (Gibbs,
1994; Ramsden, 1993b). The theoretical orientation and research basis for
learning approach theory is examined in the following and subsequent sections.
2.2: Learning Approach Theory
Considerable research has been undertaken in the last 20 years in an effort to address many of the issues related to teaching and learning in higher education highlighted by the Aulich report. One such line of research has attempted to improve learning outcomes through the modification of learning environments, with the purpose of impacting on the approach students take to their learning. Learning approach theorists (see for example: Biggs, 1987a, 1993a, 1995, 1993; Entwistle, 1997a; Entwistle et al., 1991a; Entwistle & Ramsden, 1983; Marton et al., 1993; Ramsden, 1992, 1994) posit that learning outcomes bear a direct and substantial relationship to the approach students adopt in the pursuit of that learning (Biggs, 1989; Dahlgren, 1997; Entwistle & Waterston, 1988; Marton & Saljo, 1997). They further contend that the approach adopted is a result of the student’s intent (Biggs, 1989; Marton et al., 1993; Ramsden, 1993c; Van Rossum & Schenk, 1984; Vermunt, 1996), which in turn is largely influenced, among other things, by the context of the learning environment (Biggs, 1996; Dart, 1994; Entwistle et al., 1991a; Prosser & Trigwell, 1997; Ramsden, 1997; Trigwell & Prosser, 1991a).

Explanatory structures have been developed to describe the interrelationships of the various contextual elements that comprise learning environments (Biggs, 1988b, 1993a; Entwistle, 1986; Entwistle et al., 1991a; Holliday, 1995; Newble & Hejka, 1991). These include intra-individual characteristics such as ability, cognitive style, motivation and personality (Biggs, 1993a; Entwistle, 1986); features of faculty structures and institutional culture such as staff-student ratios, relative institutional support for teaching and formal grading requirements (Biggs, 1993b; Prosser & Trigwell, 1997; Ramsden, 1994, 1997); with teaching processes,
such as content, structure, assessment procedures and opportunities for discussion, playing a central role (Biggs, 1993a; Entwistle et al., 1991a; Nightingale & O’Neil, 1994). These characteristics of the learning environment are conceptualised in an interactive ecological frame (after Bronfenbrenner, 1976, 1979) and are seen as impactful insofar as they determine students’ perceptions of the learning task (Biggs 1993b, 1993c; Entwistle, 1994; Marton et al., 1993; Marton & Saljo, 1997; Regan & Regan, 1995a; Svensson, 1997; Trigwell & Prosser, 1991a; Vermunt, 1998; Wideen et al., 1998).

Lecturers’ intentions as teachers are influential among these contextual characteristics (Gow & Kember, 1993; Kember & Gow, 1994; Prosser & Trigwell, 1997; Ramsden, 1992; Ramsden et al., 1988; Trigwell & Prosser, 1996b; Trigwell et al., 1994), because of lecturers’ considerable control over important determining features such as assessment procedures (Biggs, 1995, 1996; Booth, 1993; Entwistle & Entwistle, 1992; Entwistle, 1994; Nightingale, 1997), but also because of their control of structure, sequence and pitch, the mode of presentation, choice of learning materials (Alexander & Murphy, 1997; Clarke, 1995, 1996; Entwistle et al., 1991a; Entwistle & Tait, 1990; Jackson & Prosser, 1989; McKinnon et al., 1996; Ramsden, 1993a), and the learning objectives set (Biggs, 1996). Indeed Wideen et al (1998) emphasise that lecturers’ intentions and other structural requirements have inhibited or interfered with program modifications aimed at improving quality learning, especially in teacher education. They report Zeichner and Gore (1990, cited in Wideen et al., 1998, p.133) as suggesting that:
... innovative courses are nullified by the structural fragmentation and competing agendas that typify traditional programs of teacher education.

It is argued here that the learning approaches adopted by students in response to their perceptions of the learning environment are of particular importance in teacher education, because approaches to learning have been linked with students’ conceptions of approaches to teaching (Boulton-Lewis, 1996; Christensen et al., 1995; Dunkin, Precians, & Nettle, 1994; Gibbs, 1994). The approach adopted by students in their learning may, to a large extent, determine the learning environment they establish as future teachers, which would impact on the learning approach consequently adopted by their students. Hence a form of cultural reproduction would be established (Gordon et al., 1998b; Wideen et al., 1998). Furthermore, since teaching involves complex behaviour, regularly requiring the teacher to generate novel solutions to novel problems in novel circumstances, the principles of reflective practice (Schön, 1987) need to be established through the application of learning approaches that facilitate their development (Biggs, 1993a, 1993b, 1996; Janssen, 1996; Prawat, 1992).

The research on student learning approaches has essentially identified a number of interactive contextual variants that impact on students’ adoption of alternate approaches to learning and consequent learning outcomes. Principally, the collective findings of this body of research favour a shift from the traditional transmission approach to teaching in universities, which fosters a reproduction orientation or surface learning approach, to a meaning oriented constructivist approach to teaching, which encourages a transformative goal or deep approach on behalf of the learner (Biggs, 1993a, 1996; Harris & Graham, 1994; Hoban,

2.3: Development of Learning Approach Theory

2.3.1: The Gothenburg Studies:
Since Marton and Saljo’s (1976a, 1976b) landmark research, investigations into the learning approaches of university students have proliferated. Marton and Saljo used phenomenographic methodology to differentiate two approaches to learning. They noted that some students predominantly used a reproduction orientation to information in text, while others used a meaning orientation as their principal focus. They labelled these approaches: surface-level and deep-level processing respectively (Marton & Saljo, 1976a, p. 7). The terms surface approach and deep approach were however later accepted by these authors (Marton & Saljo, 1997) to emphasise the malleability of learning approaches and to maintain consistency of nomenclature with other researchers (Biggs, 1993b; Entwistle, 1991; Ramsden, 1992).

While these labels referred to the intention and the process students undertook in a learning task (reading a passage from text), each approach led to qualitatively different learning outcomes which Marton and Saljo categorised in a four-point hierarchy. A clear relationship was established between the learning approach used and the quality of learning outcome attained. During an immediate recall assessment, only those who reported the use of deep approaches attained the higher level outcomes and none of these students attained low quality outcomes. Most students who reported the use of surface approaches however, attained low quality outcomes (Marton & Saljo, 1976a, p. 10).
Further experimental manipulation of this procedure by Marton and Saljo (1976b) demonstrated that the students modified their level of processing in accordance with their perception of the task demands as established by the type of assessment items to which they were exposed. Later repeated corroboration of these findings in naturalistic contexts has established assessment procedures as a central issue influencing students in their choice of learning approach (Biggs, 1995; Trigwell & Sleet, 1990; Van Rossum & Schenk, 1984).

Marton and Saljo’s (1976a, 1976b) initial work and subsequent findings by others (Biggs, 1993a; Entwistle et al., 1991a; Ramsden, 1992) have led learning approach theorists to conclude that: students process text in predominantly two different ways, either with a meaning orientation (deep approach) or a factual reproduction orientation (surface approach); these approaches bear a direct relationship with the quality of learning outcomes favouring deep approaches; deep approaches allow higher quality long-term retention; and the approach adopted by students is responsive to perceived task demands established largely through assessment procedures.

Two incidental findings of Marton and Saljo’s (1976b) studies are relevant to the current study. Firstly, many students anticipated that assessment items would focus on the surface attributes of the passage. Consequently fewer than expected students needed to adjust their processing strategy when surface responses were called for. Marton and Saljo (1976b) postulated that these students’ experience in the school system had taught them that assessment typically requires the reproduction of information. In response to this perception, the students had established surface-level processing as their default approach. They suggested that
alternative assessment methods that encouraged deep-level processing may be necessary to help students “... refocus their attention on the underlying meaning of what they are required to study” (Marton & Saljo, 1976b, p. 125).

Secondly, some students from the group who responded to questions aimed at fostering deep-level processing, did so in a surface-level fashion. These students actively sought to identify and remember main ideas and reproduce them for the assessment. They learned the requirements of the task and applied a cued process in what Marton and Saljo (1976b, p. 124) considered a “technified” approach. These students may comprise the group later identified by Biggs (1987a, 1988b, 1993a) as using an “achieving approach”, or by Entwistle and Ramsden (1983) and Entwistle (Entwistle, 1986; Entwistle et al., 1991a) as following a “strategic approach”. Marton and Saljo contend that these students complicate the matter of encouraging deep-level processing. Modifying the assessment processes would not be sufficient to encourage deep-level processing on their behalf. They suggest that for this group “... a more prolonged, and perhaps more explicit, redirection of attention may be necessary” (Marton & Saljo, 1976b, p. 125). Similar findings were reported by Ramsden, Beswick and Bowden (1986) when they attempted to teach students skills consistent with a deep approach. These students adapted their study behaviour in a strategic way to enable them to better target what they perceived as the requirements of the assessment tasks. Thus unintended use of surface approaches was encouraged.

Marton and Saljo used phenomenographic methodology (Entwistle, 1997a; Marton, 1981; Prosser, 1993) with small sample sizes (approximately 20-40 students) in one Swedish university and measured their responses to single tasks
over a short term, under minimally altered conditions, outside the context of their normal courses. While their studies were groundbreaking insofar as they established a new line of research, the establishment of external validity for the notions of deep-level and surface-level processing was required of others who followed. Fuller descriptions of the processes themselves, their intra-individual status, their situation and responsiveness to context, and their propensity for modification, were also requirements of future research.

2.3.2: The Lancaster Studies:
Combining the work of Svensson (1977) and Marton and Saljo (1976a, 1976b), Entwistle and Ramsden (1983) clarified the terminology relating to deep and surface processing, as referred to by Marton and Saljo, and holistic and atomistic approaches as referred to by Svensson. Entwistle and Ramsden believed that the term “processing” did not adequately imply the pursuit of an intention, which was seen as a key discriminating factor in Marton and Saljo’s studies (Marton & Saljo, 1997, p.47). They preferred Svensson’s use of the term “approaches”, since it also implied that the study strategy was not an internalised trait of the student, but a matter of individual choice in response to perceived contextual and task demands (Entwistle & Ramsden, 1983, p.21). Thus the modified terms “deep approach” and “surface approach” were used by Entwistle and Ramsden to describe student approaches to learning.

Entwistle and Ramsden’s (1983) research also attempted to accommodate Pask’s (1976) notion of serialist and holist learning styles, which included the identification of learning pathologies. One essential difference between Marton and Saljo’s (1976b) description of learning approaches and Pask’s (1976) theory
of learning styles was the extent to which they were seen as stable internal characteristics of the student, or responsive to contextual constraints and task demands. Marton and Saljo saw the approach adopted by students as dependent to a large extent on their perception of the task at hand, and particularly on students’ prediction of the method of assessment they would face (Marton & Saljo, 1997). Pask’s view held that a student’s learning style would be relatively stable across tasks, with the exception of those who showed versatility in their application of both serialist and holist methods (Pask, 1976).

From these complementary perspectives on student learning, Entwistle and Ramsden (1983, p. 28-30) developed a survey instrument largely by phenomenographic methodology, from a series of studies at the University of Lancaster. The purpose of the instrument was principally to test the external validity of the learning approaches identified by Marton and Saljo’s, and Pask’s learning styles. They further sought to examine the relative effects of context and stable personality characteristics on student approaches to learning by identifying differences in learning approaches in naturalistic settings across academic departments.

The development and use of the survey instrument, *Approaches to Study Inventory* (ASI) (Entwistle & Ramsden, 1983) fundamentally changed the nature of the research methodology used in examining student approaches to learning. Entwistle (1986) and Ramsden (1997) defended this development by arguing that the combined use of qualitative and quantitative methods provided complementary research dimensions. Ramsden further asserted that the
assumptions behind phenomenographic research were not transgressed by the use of the ASI, because:

[the ASI] ... remain[s] close to students’ experiences of learning, as the constructs and items were derived from interviews rather than from a pre-existing body of theory (Ramsden, 1997, p. 212-213).

The development of instruments to survey student approaches to learning, in particular the ASI and the *Study Process Questionnaire* (SPQ) developed by Biggs (1987a, 1987b), enabled the conduct of broad-based studies using large numbers of students to demonstrate the general application of learning approach theory across courses, departments, universities and cultures. The use of these questionnaires in a growing body of research has contributed substantially to the development of learning approach theory. Those issues salient to the theory development are discussed here.

As Ramsden (1997) reported, the ASI was developed from the basis of students’ reports of their study approaches. Students’ views were gained from: interview data; responses to another inventory of study methods and motivation; responses of selected students to a battery of personality, cognitive processing, and learning styles tests; and responses to passage readings conducted in a similar manner to Marton and Saljo’s studies (Entwistle & Ramsden, 1983). Items for the inventory were suggested from cluster analysis of these student data; interview responses; descriptions by Marton and Saljo of student learning approaches; descriptions by Pask of learning styles; and descriptions by Ramsden (1979) of strategic study behaviours (Entwistle & Ramsden, 1983, p. 33-37). Results of these analyses, particularly the cluster analysis and interview responses, confirmed the findings.
by Marton and Saljo (1976a, 1976b) of students who pursued deep and surface
approaches to learning. This distinction was evident in students across all faculties
and departments studied.

Students who used deep approaches tended to be intrinsically motivated and
studied with the intent of comprehending underlying meanings. They adopted the
strategy of organising new information according to integrated themes and
typically demonstrated an holistic learning style in the pursuit of their own
interest, rather than being constrained by syllabus demands. They also
demonstrated above average learning outcomes, as measured by normal faculty
assessment procedures and a meaningful understanding of subject content

Students who used surface approaches mainly adopted the strategy of memorising
surface features of study material in a serialist style with the intent of reproducing
it when required to do so, and were thus syllabus bound. These students were
often extrinsically motivated through a fear of failure and generally attained below
average learning outcomes and a surface understanding of the subject content
(Entwistle, 1986, p. 10-13; Entwistle & Ramsden, 1983, p. 36-47). In Marton and
Saljo’s terms, these students responded to the “sign” rather than to “what is
signified” by the content of learning material (Marton & Saljo, 1976a, p.7).

Another two groups were also identified who pursued, on the one hand, highly
organised and efficient study strategies with the purpose of attaining high level
grades, and on the other hand, by students who were disorganised and poorly
motivated leading to poor results (Entwistle & Ramsden, 1983, p. 36-37). The
approach used by the students in the former category was labelled a ‘strategic’ approach, while the approach of the latter group was labelled ‘disorganized’ (Entwistle, 1986; Entwistle & Ramsden, 1983).

Students who pursued a strategic approach were not however, an homogenous group. Some were motivated by a strong desire to excel by obtaining the highest grades possible, while others were motivated through a fear of failure and negative self-assessment (Entwistle & Ramsden, 1983, p. 34). These students tended to be cue-conscious (Entwistle, 1986; Entwistle & Ramsden, 1983; Ramsden, 1997), sometimes cynically so (Entwistle et al., 1991a, p. 338), with highly organised study methods operationally designed to produce high level performance in assessment tasks with the form and content that the students perceived was preferred by the lecturer (Entwistle & Ramsden, 1983). This group of students may be represented in Marton and Saljo’s (1976b) study by those whom they saw as adopting a “technified” approach. Thus the high achievement of this group in assessment tasks may belie their actual learning outcomes, since Marton and Saljo saw the strategies adopted by this group of students as a modified surface approach. They saw the technified approach as strategic attention paid to surface detail required by the students’ perception of the assessment task; rather than a genuine pursuit of understanding (Marton & Saljo, 1976b, p. 124).

The final category of student learning approaches identified by Entwistle and Ramsden’s (1983) study comprised those using disorganised or disintegrated approaches. This heterogenous category consisted of students who variously demonstrated extremes of holistic or serial learning styles and consequently
exhibited Pask’s (1976) learning pathologies of “globetrotting” or “improvidence”; and students who were extrinsically motivated towards social or sporting engagement and who exhibited poorly organised study patterns. The learning outcomes of this group were incomplete and may not have satisfied minimum learning objectives (Entwistle, Meyer, & Tait, 1991b; Entwistle & Ramsden, 1983).

Entwistle and Ramsden’s (1983) study used in excess of 2000 students across academic departments and universities in Scotland and England, with some additional data from Australia (Watkins, 1986). The study combined qualitative and quantitative methodologies with multiple data sources in several phases over a four-year period. The approaches to learning were consistently identified in each phase and location and important contextual influences in the adoption of learning approaches were identified. Their study confirmed the initial findings of Marton and Saljo and extended upon them with the identification of additional learning approaches. It also developed a survey instrument enabling further broad-based clarification of the dimensions of learning approach theory in following research. The instrument maintained close relevance to students’ authentic experiences having been developed largely from bottom-up (phenomenographic) processes (Entwistle, 1986; Ramsden, 1997).

2.3.3: Australian Developments:
Concurrently with Entwistle and Ramsden’s work in Lancaster, John Biggs (1987a, 1987b) developed a similar survey instrument in Australia. His work followed the more traditional top-down practice of identifying items from themes evident in established theory and from the results obtained with previous
instruments. Despite working independently and from a differing methodological orientation to Entwistle and Ramsden, Biggs’ instrument showed remarkable structural similarity to the ASI (Biggs, 1987a, p.13; Entwistle & Ramsden, 1983, p. 38).

Biggs’ research into the learning approaches used by students in secondary and tertiary educational settings grew from a reformulation of earlier research he had conducted into study behaviours using his *Study Behaviour Questionnaire* (SBQ) (Biggs, 1987a). This earlier research developed from personality and information processing theory and attempted to link learning styles with the predominant task requirements in different academic fields, mainly Arts and Science (Biggs, 1976). Second order factor analyses of responses on the SBQ from three samples of students who varied across courses, years of study, and nationality, consistently identified three main factors originally labelled by Biggs as utilizing, internalizing and achieving approaches to learning (Biggs, 1987a, p. 10). These labels were later replaced by the current terms surface, deep and achieving in order to maintain consistency with the terms used by Marton and Saljo (1976a, 1976b) and by Entwistle and Ramsden (1983). The second order factor structure led to the development of the revised instrument, the *Study Process Questionnaire* (SPQ) (Biggs, 1987b), now regularly used in learning approach research with university students.

The identification of the three higher order factors led Biggs to reconceptualise his model of student learning. Earlier research with the SBQ, was based on the notion that students enter the university environment with certain predisposed, internal learning styles. In this view, their success at university depended on the goodness
of fit between the students’ learning style and the contextual features of their course of study. Different courses require different types of engagement with the discourse and, notwithstanding other characteristics such as ability and prior knowledge, student success depended to a large extent on appropriately matching their learning style with course requirements.

Following his later round of factor analytic studies, Biggs brought student intent to the fore. In line with other learning approach theorists (Entwistle, 1986; Entwistle & Ramsden, 1983; Marton & Saljo, 1976b; Ramsden, 1979; Svensson, 1977), Biggs then saw student success and the quality of learning outcomes as related to students’ individual intent, or motive, in studying the particular course and to their perception of the learning environment and task requirements. In such a scenario, students who came to university motivated to gain a qualification with minimal effort would adopt a surface strategy. Those who were interested in the subject matter would seek to understand and integrate the material and in doing so, adopt a deep strategy. Those who sought ego or career enhancement would wish to achieve the highest grades possible and thus adopt an achieving strategy. This link between motives and strategies was evident in further analyses completed during Biggs’ factor analytic studies. As a result, each of the three learning approach scales in the SPQ contains two subscales measuring motives and strategies.

Consistent with the views of Marton and Saljo and with Entwistle and Ramsden, Biggs linked the approach chosen by students to qualitative differences in learning outcomes through the Structure of Observed Learning Outcomes (SOLO) Taxonomy (Biggs & Collis, 1982). In this frame, students who used surface
approaches to learning would achieve at the lower levels of the SOLO Taxonomy, at either the prestructural or unistructural levels. Those who followed deep approaches would be capable of achieving at the higher levels by producing relational or extended abstract outcomes, always depending that the students’ ability, prior knowledge and other personal characteristics were adequate to enable these higher quality outcomes (Biggs, 1987a, pp. 96-97, 1995).

The achieving approach is seen by Biggs as likely to produce medial levels of performance, mainly at the multistructural level of the SOLO Taxonomy. The achieving approach however, is perceived somewhat differently from deep and surface approaches, in that a student’s purpose in following an achieving approach is essentially functional. It does not describe the level of engagement with course content but rather the organisation, efficiency and intensity of that engagement. As such the achieving approach can be linked to either the deep or the surface approach to enhance the productivity of their use. A third order factor structure reported by Biggs (1987a, p. 17) identified only surface and deep approaches, with the achieving approach subsumed by both factors. Later analyses by Kember (1998) and Burnett and Dart (2000) appear to support Biggs’ findings in this regard.

Indeed, Biggs (1987a, 1993c) conceptualised the three learning approaches as separate and independent dimensions in contrast to Marton and Saljo’s (1976a, 1976b, 1997) unidimensional construct locating deep and surface approaches at the extreme ends of a single continuum. It is possible in Biggs’ model for students to pursue different approaches in different subjects, depending on their motivation, or even different approaches simultaneously in the same subject,
depending on their perceptions of the task requirements. Behaviours such as rote learning, with the clear purpose of reproducing content material or procedures, would typically be consistent with a surface approach. These learning strategies may even be consistent however, with a deep approach to learning if such behaviours enabled meaningful interpretation of the material, or developed automaticity as a precursor to understanding. Biggs (1987a) provides the example of a drama student using rote learning to memorise lines prior to, and possibly enabling, later interpretation of the character. Similar situations in most professions could be identified in which adequate performance, and adequate understanding, are facilitated by rapid responding developed through repetitive practice.

Similar arguments have been used to explain the apparent paradox of learning approaches used by Asian students (Kember, 1996; Volet, Renshaw, & Tietzel, 1994). According to this argument, some Chinese students use rote learning as a strategy when their reported intention is to understand and integrate the new material. Biggs (1993c), in his response to Christensen, Massey and Isaacs’ (1991) criticisms of the factor structure of the SPQ, highlighted the inability of specific study behaviours to be classified as belonging to deep or surface approaches in all circumstances.

According to Biggs (1987a, 1988b, 1993a, 1993b, 1993c, 1995) the defining characteristics of the learning approaches students follow, centrally depend on the students’ intention in pursuing their study and on the logical correspondence between that intention and the strategy selected. The logical connection, however, bridges the students’ intentions with the students’ perception of the subject goals
and task requirements and these may be at variance with the perceptions of others, including lecturers (Prosser & Trigwell, 1997).

The connection of study strategy and learning intention in the student’s own mind implies a metacognitive process in operation, in which students assess their own motives, perceive and interpret task requirements and choose appropriate behaviours to achieve desired outcomes (Biggs, 1988b, 1993a). Biggs however sees this kind of metacognitive operation (metalearning) as another defining feature of learning approaches. A key component in his formulation of student learning is the increasing involvement of metalearning in deeper learning approaches. He postulates that students who predominantly use surface approaches are less likely to include ruminations about their learning intentions and appropriate strategies into the equation. Rather, he believes these students would be operating at some preconscious level when selecting study strategies. Only those who consistently use deep approaches would maintain a sufficient level of cognitive monitoring and executive control to engage in metalearning processes (Biggs, 1987a, 1988b, 1993b).

2.3.4: Consolidated Findings of Early Developments
The aforementioned studies have established student approaches to learning as a central focus in investigating improvements in the quality of tertiary education. Deep approaches incorporating meaning orientation, and surface approaches dependent on students’ intention to reproduce information have been consistently identified from this research. An achieving or strategic dimension of learning motivation has also been consistently identified and has been defined as a motivational factor which qualifies the operation of deep and surface approaches
(Entwistle, 1991, 1994; Entwistle & Ramsden, 1983; Kember & Leung, 1998), or a primary learning approach which can be applied independently or in conjunction with other approaches (Biggs, 1987a, 1989, 1993a).

Importantly, the learning approach adopted by students affects the quality of learning outcomes (Biggs, 1987a, 1995; Entwistle, 1997a; Entwistle & Ramsden, 1983; Marton & Saljo, 1976b, 1997; Ramsden, 1992, 1993a; Svensson, 1977, 1997; Van Rossum & Schenk, 1984). Only students who adopt a deep approach are seen as being capable of developing the level of understanding required for the critical analytic outcomes of higher education study sought by the Aulich report, or developing the basis to operate as a reflective practitioner in Schön’s (1982) terms. The use of surface approaches to learning in higher education is seen as inadequate preparation for effective professional practice. Ramsden (1992, p. 59) noted that:

... surface approaches can never lead to understanding: they are both a necessary and sufficient condition for poor quality learning. Deep approaches are a necessary, but not a sufficient condition for high quality learning (emphasis in original).

The use of deep approaches to learning may, in this frame, be viewed as an enabling condition and the use of a surface approach as a disabling condition. Other factors such as sufficient ability, prior knowledge, access to educational resources and appropriate teaching are also necessary, in conjunction with deep learning, to ensure high quality outcomes. Biggs (1987a, p. 12) took a more cautious view when he stated:
The three strategies are likely to lead to different levels of quality learning. The surface strategy is likely to lead to accurate but unintegrated recall of detail; the deep strategy to greatest structural complexity; and the achieving strategy is likely to lead to whatever goals the student sees as pertinent to high grades.

Evidence that many students enter the tertiary educational environment with predominantly surface approaches to learning is therefore a cause for concern (Ramsden et al., 1988; Regan & Regan, 1995a; Van Rossum & Schenk, 1984), especially since many of them appear to expect that surface approaches are encouraged by what is expected in assessment tasks (Marton et al., 1993; Marton & Saljo, 1976b). Ramsden (1987) emphasised the relational perspective of the adoption of learning approaches. In this view, the approach used by students is not representative of an internal trait, but rather an outcome of students’ interaction with the learning tasks and the learning environment. The approach is chosen by the student, to suit immediate requirements as the student perceives them and should thus be responsive to contextual manipulation aimed at influencing students to adopt deeper approaches.

Some indications about how students adapt their learning approaches in response to different learning contexts were also established by the early learning approach theorists. In particular the central role of assessment practices is regularly cited as a motivating factor in students’ learning approach choice (Biggs, 1995, 1996; Entwistle & Entwistle, 1992; Entwistle, 1991; Entwistle et al., 1991a; Marton & Saljo, 1976b, 1997). Broad differences in learning contexts created by different faculties and content areas were also identified (Biggs, 1987a; Biggs & Kirby, 1983; Entwistle & Ramsden, 1983; Ramsden, 1992, 1997), as well as the
influence of other subject and course based factors such as the workload, lecturing style, perceived relevance, pace, pitch, amount of choice, opportunity for discussion and perceived lecturer approachability (Entwistle, 1986; Entwistle et al., 1991a; Ramsden, 1992).

In addition, intra-individual processes which impact on the student’s subjective perception of the learning environment and on task requirements have consistently been identified. Student perception is generally regarded as the key factor influencing their choice of learning approach (Biggs, 1987a, 1993c, 1995; Entwistle, 1986; Entwistle et al., 1991a; Marton et al., 1993; Marton & Saljo, 1976b; Ramsden, 1993a). Until the last decade, few studies were implemented to test the possibilities that students could be influenced to adopt deeper strategies. Those that did attempt some form of contextual manipulation demonstrated the ease with which surface approaches could be induced and the difficulties inherent in attempting to induce deeper approaches (Marton & Saljo, 1976b; Ramsden et al., 1986).

The principal findings reported above were repeated across large and small student samples in universities in a number of countries using research methodologies involving qualitative (phenomenographic) and quantitative (questionnaire) measures. The two questionnaires predominantly used (ASI and SPQ) were developed from different procedures but demonstrated similar factor structures and yielded similar results when applied. The similarity between the dimensions of study identified by the construction and application of the ASI and the SPQ provides support to their respective construct validity. The consistency of
findings using survey methodology and phenomenography, attest to the external validity of the learning approaches identified.

**2.3.5: Theoretical Perspectives**

Many characteristics of the learning approaches identified by early research have essentially similar features. Table 2.1 summarises the conceptions of learning approaches by the major theorists. Surface approaches are typically characterised by a reproduction orientation; a perception of the teaching and learning process as the transmission of declarative or procedural knowledge for which competence is measured in terms of the quantity of the information that can be recognised or reproduced (Biggs, 1995; Van Rossum & Schenk, 1984). Attention is seen as being directed to surface features of the text or the concepts studied, without necessarily requiring comprehension or critical evaluation of their underlying argument (Marton & Saljo, 1997; Ramsden, 1992). Economy of effort while satisfying minimum requirements is also a recurring theme. Academic work is seen as an externally imposed task needing to be completed in order to gain employment; not a task completed for pleasure or for any sense of personal satisfaction (Biggs, 1987a, 1993b; Entwistle, 1997a; Marton et al., 1993; Vermunt, 1998). Biggs (1987a, 1993a) also distinguishes learning approaches along a continuum of metacognitive involvement and characterises the use of a surface approach as involving few self-regulatory practices.

Deep approaches are typically characterised by a meaning orientation; a perception of the teaching and learning process as the facilitation of knowledge construction by the learner. Competence is measured in terms of the quality of the learner’s argument and the level of satisfaction gained by the learner (Biggs,
Attention is seen as being directed primarily to the underlying concepts and cohesiveness of the argument presented in learning materials, with comparative viewpoints, allied arguments and experiential contexts being actively sought by the learner, leading to the learner’s potential modification or transformation of the presented ideas (Dahlgren, 1997). This approach is seen as being largely intrinsically motivated by the learner’s personal search for meaning (Entwistle et al., 1991a) and heavily regulated by the learner’s metacognitive executive system (Biggs, 1993a; Vermunt, 1998).

The achieving or strategic approach is seen as one in which the student is motivated by a desire to gain high grades using whatever strategies are appropriate to attain them. The purpose may be improving the student’s competitiveness in the employment market, obtaining vocational advancement, or gaining the ego enhancement which comes from public endorsement of high performance (Biggs, 1987a; Entwistle & Ramsden, 1983). Competence in this approach is measured by the grading attained in assessment items, especially relative to the attainments of other students. Comprehension, integration and critical analysis of learning materials may be involved if such strategies are called upon to maximise the likelihood of high achievement, but they are incidental to the process. Other strategies including rote memorisation of information, may also be employed depending on the student’s perception of the requirements of assessment tasks (Biggs, 1993a; Ramsden, 1987). Students who pursue an achieving approach tend to be cue conscious and efficient in effortful study processes. Particular emphasis is placed on tasks in proportion to their grade earning potential (Entwistle, 1986; Entwistle & Ramsden, 1983; Marton et al., 1993; Marton & Saljo, 1997). Metacognitive regulation of learning is required in
order to be functionally adaptive in the pursuit of high grades, but only with regard to the monitoring and regulation of grade-related performance (Biggs, 1987a, 1988b, 1993a).

Although the study behaviours typical of different learning approaches have demonstrated stability, students’ perceptions of the learning environment and their intentions for engagement with it, have been identified as the principal dimensions which discriminate the approach adopted (Biggs, 1987a, 1993c; Clarke, 1996; Dart, 1994; Entwistle & Ramsden, 1983; Marton & Saljo, 1997; Ramsden, 1987, 1992). Some study behaviours may be applicable to multiple approaches and some may appear contradictory, like the use of memorisation while pursuing a deep approach, but the application of these specific behaviours may be quite consistent with any approach in certain circumstances (Biggs, 1993c; Clarke & Dart, 1994). From Biggs’ (1987a, 1988b) viewpoint the use of metalearning is the variable that governs the choice of learning strategies. He sees metalearning as the operation of executive function to enable metacognitive involvement in the adaptation of learning behaviours to achieve preset goals in the current context.
<table>
<thead>
<tr>
<th>Learning Approach</th>
<th>Marton &amp; Saljo</th>
<th>Entwistle</th>
<th>Ramsden</th>
<th>Biggs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intention</td>
<td>Processes</td>
<td>Intention</td>
<td>Processes</td>
</tr>
<tr>
<td>Surface</td>
<td>Attention is given to the sign, or the surface features of the text.</td>
<td>Reproducing course content to manage task requirements.</td>
<td>Memorising information without reflection. Treating components as atomistic and unrelated. Feeling stressed.</td>
<td>Complete task requirements; distortion of task structure.</td>
</tr>
<tr>
<td>Deep</td>
<td>Attention is given to what is signified or the author’s intended meaning in writing the text.</td>
<td>Arrive at a personal understanding of ideas with a transforming goal.</td>
<td>Identifying principles; relating ideas to prior knowledge. Critically examining logic and relating evidence to conclusions.</td>
<td>Reach an understanding with task structure maintained.</td>
</tr>
<tr>
<td>Achieving/Strategic</td>
<td>Technified approach adjusted to fit perception of task requirements.</td>
<td>Organising study processes to maximise achievement.</td>
<td>Structuring study conditions, time and effort for maximum efficiency. Sensitivity to assessment criteria and lecturer’s views.</td>
<td>Strategically identify the course of action necessary to succeed in assessment tasks.</td>
</tr>
</tbody>
</table>
Biggs (1987a, 1988b) originally applied his three stage ‘presage, process, product’ (3P) model of student learning (Figure 2.1) to explain the interaction of various personal and contextual features, the combination of which leads students to adopt particular learning approaches as they interact with the learning materials. The learning approach chosen, then leads to a suite of outcomes in accordance with the level of engagement in the learning process dictated by the choice of approach. Outcomes are differentiated in terms of quality as measured by the SOLO taxonomy (Biggs, 1987a; Biggs & Collis, 1982; Van Rossum & Schenk, 1984).

![Figure 2.1. Biggs’ elaborated model of student learning](Biggs, 1987a, p. 96)

Later refinement of this model (Figure 2.2) (Biggs, 1993a; Biggs & Moore, 1993) led to the incorporation of feedback mechanisms emphasising the interactive and
dynamic nature of the learning process. Particular emphasis in the refined version was placed on cognitive and metacognitive processes involved in self-regulation affecting both teachers’ and students’ self-perceptions and their perceptions of the learning environment. A complex set of interactions embedded within a wider ecosystem (Biggs, 1993a) was then envisaged.

Figure 2.2. Biggs’ refined model of student learning
(Biggs & Moore, 1993, p. 451)

In this model Biggs and Moore (1993) see students entering the learning environment with certain preconceptions about the nature of learning, about their expectations of success, relevance and enjoyment within it, and preferences about how to engage in the learning process. They would also have prior knowledge and skills, certain cognitive abilities and personality variables that would affect their likelihood of success, as well as attainment goals and a preparedness to apply a certain amount of effort. They would adapt a number of these entry characteristics
continuously, in accordance with their perceptions of the teaching context and their relative success in achieving personal learning goals, once they had experienced it. These adjustments may be enacted through the processes of self-regulation as described by Bandura (1997). The application of self-regulatory practices in student learning is discussed Chapter 3.

The teaching context according to Biggs’ model, and supported by others (Kember, 1998; Prosser & Trigwell, 1997, 1998; Trigwell et al., 1994), is established through preconceptions held by the teacher about the process of learning and how that might be facilitated. Perceptions of the learning process as variously transmissive or constructive inform different teaching practices which, in turn, lead to modifications of the students’ perception of the learning environment (Clarke & Dart, 1994; Ramsden, 1987, 1992; Trigwell et al., 1994). Teachers’ experience and perceptions of their teaching efficacy will moderate their implementation of teaching processes, as will their perception of their students’ capacity to manage learning tasks and their perceptions of overall workload (Prosser & Trigwell, 1997, 1998; Ross, Cousins, & Gadalla, 1996). Importantly, teachers’ perceptions about their efficacy in implementing the teaching program are crucial in this model in maintaining or adapting teaching methods (Ross, 1998). While the processes and influence of teacher efficacy are elaborated in Chapter 3, the salience of teaching self-efficacy as a mechanism for informing the self-regulatory processes involved in Biggs’ metateaching concept is highlighted as relevant in the present context.

Other macro-system influences also impact on the presage factors for both students and teachers. These may include such factors as: institutional curriculum
and assessment policies; teaching resources available; class size and course costs; regulatory policies of government, professional associations and employing authorities; and the availability and competitiveness of future employment (Biggs, 1993a; Nightingale & O’Neil, 1994; Ramsden, 1994).

Biggs’ model theorises that on the basis of the interaction of components in this complex, students will choose to approach their learning using either surface, deep or achieving strategies, or some combination of these, which best fits their perception of the circumstances. They will be informed by the outcomes of their engagement in the process about the appropriateness of their choice of strategy and may adjust their approach on the basis of the feedback they receive, including feedback about the accuracy of their initial perceptions. These views about the teaching and learning process were strongly supported by Ramsden (1987, 1992), who emphasised the need for an holistic perspective on the dynamic relationships between variables that determine student perceptions of the learning environment.

While Biggs (1987a; Biggs, 1993c) asserts that the learning approach students adopt is relatively stable over time, he recognises that it may vary from subject to subject depending on, for example, student interest. Biggs (1987a) cites the example of a student who adopts a deep approach in an elective subject chosen for its interest or vocational utility, but adopts a surface approach in another compulsory subject for which the student fails to see relevance. Other recent work by Trigwell, Prosser and their colleagues (Prosser & Trigwell, 1997; Trigwell & Prosser, 1991b; Trigwell et al., 1994; Trigwell et al., 1999), describes the adaptation of learning approaches by students in line with approaches to teaching adopted by the lecturer. On other occasions attempts to influence students to adopt
deeper approaches by manipulating contextual variables has had the reverse effect (Marton & Saljo, 1976b; Ramsden et al., 1986). It seems that while a student’s choice of learning approach is sensitive to the modification of other variables, the task of influencing learning approaches in a desired direction is quite complex because of the multiple interactions within the system and because the student’s perception of the lecturer’s intent is the determining agent (Biggs, 1993a; Dart, 1994; Marton & Saljo, 1997; Ramsden, 1987, 1992).

Another attempt to represent the complexity of interacting influences impacting on students’ adoption of learning approaches was undertaken by Entwistle and his colleagues (Entwistle, 1986; Entwistle et al., 1991a). This spatial diagram (Figure 2.3), represents intrapersonal and contextual features, which are contended to influence the adoption of deep approaches to learning. The arrangement of features, including the distance from the centre and the distances from other components, is intended to represent the relative influence of the feature described. Thus assessment procedures are seen as more influential in affecting choice of learning approach than work-based placements or careers guidance, but about as influential as the workload a student faces or the instructional methods used by the lecturer. Workload however, will also impact on assessment procedures and instructional methods used, and thus have additional indirect effects. The diagram is divided into three areas where factors predominantly under the influence of the student, teacher or institution are arranged. The transverse section implies direct impact on the learning approach adopted (Entwistle et al., 1991a, pp. 351-353).
Figure 2.3. Entwistle’s model of teaching and learning in higher education (Entwistle et al., 1991a, p. 352)

Given the complexity and extent of interaction between the personal and contextual variables described in these models of learning, the design and implementation of any intervention strategy aimed at encouraging students to adopt deep learning approaches and reduce surface approaches, is a difficult endeavour. The action of altering any one of the features in the lower half of Entwistle’s model (Figure 2.3) would have direct and indirect effects on any number of other features within the system, only some of which may be predictable and some may be counterproductive to the ultimate purpose.
Only some of the features identified may be subject to modification, such as instructional methods and assessment procedures. Others may be modified to a more limited extent, such as selection of content and opportunities for choice. The modification of other features may be heavily restricted, such as institutional policies (Ramsden, 1994), and others such as student ability and prior experiences cannot be modified.

Some student features may be influenced indirectly through the modification of some contextual variables. For example, confidence and anxiety may be improved through modified assessment procedures, the use of group-based learning methods, or the provision of detailed and encouraging feedback (Ramsden, 1992; Ramsden, 1993a). The extent to which such interventions are successful however, may not be known and they may have differential effects for individual students (Ramsden, 1987). Almost certainly, innovations attempted would have variable effects across institutions, courses and student bodies, making the replication of interventions difficult.

From the research and theory reviewed thus far, it appears however, that attempts to influence students to adopt deep learning approaches and abandon surface approaches would be worthwhile, if the goal of improving the quality of learning outcomes in higher education is to be realised. Certainly a number of researchers have attempted to identify the relative impact of various contextual features and many have attempted to modify them to bring about improved learning outcomes. The research dealing with the identification and modification of contextual features is reviewed in the following section.
2.4: Contextual Influences
Ramsden (1992) describes the student’s role in university as primarily adaptive. He states that:

*The most important thing to keep in mind is that students adapt to the requirements they perceive teachers expect of them. They usually try to please their lecturers. They do what they think will bring rewards in the system they work in. All learners, in all educational systems and at all levels, tend to act in the same way.* (Ramsden, 1992, p. 62)

This view embeds the student role in a strategic approach in the first instance. The view holds that students enter the learning environment with preconceived learning goals, which may be based on many factors such as their past experience, the amount of work they are prepared to do, the time they have available, their needs for achievement and ego enhancement, and other personal considerations. Then, based on their perceptions of many aspects of the learning environment such as the lecturers’ perceived standards, assessment tasks required, degree of content difficulty, relative workload, and other contextual features, they adapt their study behaviours to enable the achievement of their learning goals in that specific context.

There is certainly evidence to support the view that many students are essentially strategically adaptive. Marton and Saljo’s (1976b) study reported earlier and Ramsden et al. (1986) both attempted to promote deeper learning approaches by students, but resulted in promoting the use of surface strategies by virtue of the students’ perception of the task requirements. In both cases students perceived that successful achievement of the tasks would be attained through the
reproduction of information and so adapted their behaviour to bring about this end.

Further support for an essentially adaptive view of student behaviour is provided by Entwistle (1994) whose phenomenographic analysis of student descriptions of their preparations for exams and essays identified a similar theme. He reported that:

*In discussing their examination techniques, students described how they adapted their understandings in a consciously strategic way to what they perceived to be the demands of the examiners. Their explanations seemed to be controlled not only by the organisational structures or knowledge objects developed during revision, but also by the form and wording of the particular question set, by the examination context and perceived requirements, and partly by the audience - the examiners who would be reading the script* (Entwistle, 1994, p. 6).

Indeed Janssen’s (1996) theory of studaxology is based on the principle that university students are required to attain expertise in their desired profession, but also more immediately, in the strategic skills required to interact as a student in the context of their course. Janssen holds that only deep learning approaches will enable students to develop the level of expertise in their profession to operate effectively, and the task of the ‘studax’ is to learn how to adapt his or her behaviours to attain high grades, but at the same time seek to fully understand and perform the tasks of the profession.

A number of studies have reported differences in learning approaches used by students across institutions, faculties, departments and subjects (Alexander &
Generally students enrolled in Arts faculties demonstrate deeper learning approaches than students in Science or Applied Science fields, though it is unclear whether this outcome is due to differences in contextual features such as content, assessment and teaching methods; or whether these differences describe different entry characteristics of students who choose to follow a Science or Arts pathway. Education students generally occupy a median position between Science and Arts students in terms of their use of deep approaches, but differences have been found with respect to the institution in which Education has been studied and whether it was studied as a postgraduate or undergraduate course (Biggs, 1987a; Biggs & Kirby, 1983).

Cross-faculty differences in student learning approaches have generally been attributed to differences in the learning context brought about by course content, prevailing teaching methodologies, the demands of the profession, and assessment techniques, with some consideration given to differences in student intentions (Biggs, 1987a; Entwistle, 1991; Entwistle & Ramsden, 1983; Ramsden, 1992). Science programs tend to have a higher use of examinations that rely on short-answer, multiple-choice questions, or the application of mathematical formulae. Freedom of subject choice is more limited as is the use of discussion processes in tutorials (Biggs, 1987a; Kember & McKay, 1996; Prosser & Trigwell, 1993). These characteristics are amongst those identified by Ramsden (1992, 1993a, 1994) as likely to increase the use of surface approaches to learning. Arts courses on the other hand are characterised by greater freedom of subject choice, wide use
of discussion and debate, and assessment items that require the exposition of argument (Biggs, 1987a). According to Ramsden, these features would be more likely to encourage the use of deep approaches to learning.

Clarke and Dart (1994) attempted to identify characteristics of learning environments preferred by students using predominantly deep or surface approaches to learning. They selected four class groups, which comprised students who reported above average use of surface (2 groups) or deep (2 groups) learning approaches, and examined their open descriptions of processes that helped or hindered their learning. Class groupings were the unit of study because that enabled the researchers to assume a relatively constant environment on which the student perceptions were based1.

Their findings supported Ramsden’s (1992, p. 81) description of characteristics that variously encourage surface or deep approaches to learning. In particular Clarke and Dart (1994, pp. 19-20) noted that while the surface approach groups and the deep approach groups both reported a desire for well-structured and well-paced lectures delivered clearly and with connections to practice, their reasons for doing so differed. Students who used predominantly surface approaches required the lecturer’s presentation to be well structured in order to provide a scaffold for exam preparation. Students who used predominantly deep approaches liked the structure because it facilitated their efforts in seeking further information.

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1 A methodology involving class groupings as the unit of study was also argued by Prosser and Trigwell (1990).
Clarke and Dart (1994, p. 20) presented two examples of student responses to illustrate the differences between the students’ reasons for preferring apparently similar environments. A student using a surface approach responded:

*My learning is helped when the lecturer explains things properly and gives the format for the exam because you know how to answer questions - very important for (content area) subjects.*

A student using a deep approach responded:

*My learning is helped when the lecturer uses concise, well presented and documented information because it increases one’s capacity to retain the information and study further afield.*

While these selections illustrate the different intentions of the students in their use of the lecture material, they also raise potential differences in what is meant by qualified phrases such as “... explains things properly ...” and “... well presented and documented information ...”. It is possible that these explanations may appear to describe similar features but the students may have very different views about any individual lecturer’s presentation. What is perceived as well presented by a student using a deep approach, may not be considered a proper explanation by a student using a surface approach. So even though similar characteristics of lecture presentations were identified as important in helping or hindering learning by students in both surface and deep approach groups, the perceived attributes of a helpful lecture presentation may still differ. While the environments appeared similar on the surface, the student’s engagement with the learning environment may be quite different.
Students in the deep approach groups in Clarke and Dart’s study differed from those in the surface groups in their appreciation of discussion fora. Discussions were not identified by the surface groups as a helpful mechanism, but were emphasised by students in the deep approach groups. Differences were also noted between the two deep approach groups, with students in one group preferring a more structured learning environment, and those in the other preferring self-direction and greater freedom (Clarke & Dart, 1994, pp. 18-19). This finding led Clarke and Dart to postulate that the difference could have been due to differences in teaching strategies used by the lecturers who, despite using diverse methods, may have held similar intentions about their approach to teaching. Because the lecturer’s intention was similar, the learning environment they established may have enabled students, also with deep approach intentions, to adapt their behaviour to suit the circumstances.

Thus, Clarke and Dart’s study reaffirmed that although learning approaches are considered contextually dependent, the student’s perception of that context is the critical agent. Their conclusion that approaches to learning are multidimensional constructs appears justified given that students using deep approaches reported preferences for apparently different environments, and some similar environmental features were described as helpful by students using contrasting approaches to learning.

The key factor that discriminates between approaches to learning according to Clarke and Dart, appears to be the learner’s intention, with learning strategies being adapted to suit the perceived environmental constraints. Their conclusions are consistent with those of others (Entwistle & Tait, 1990; Kember, 1996;
Marton et al., 1993; Marton & Saljo, 1976b; Ramsden, 1992) and support Biggs’ (1987a, 1988b, 1993c) view that the learning approach adopted by students is the result of a dynamic interplay between intention, perception of context and feedback received.

2.4.1: Approaches to Teaching in Higher Education
A series of studies conducted by Trigwell, Prosser and their colleagues (Prosser & Trigwell, 1990, 1993, 1997; Trigwell & Prosser, 1991a, 1991b, 1996a, 1996b; Trigwell et al., 1994; Trigwell et al., 1999) provided convincing evidence of the interplay between intention, learning approach, perceptions of the learning environment and contextual features, by examining approaches to teaching.

Their studies, which were conducted with undergraduate nursing and science students and their lecturers, identified that: students evaluated courses that encouraged them to adopt deep learning approaches more highly than those that encouraged surface approaches (Prosser & Trigwell, 1990); the learning approaches adopted by students were related to the quality of their learning outcomes (Trigwell & Prosser, 1991b); contextual influences were related to learning approaches and the quality of learning outcomes at the subject level (Trigwell & Prosser, 1991a); lecturers varied in their approach to teaching in a way that showed consistent relationships with learning approaches adopted by students (Prosser & Trigwell, 1993; Trigwell et al., 1994); lecturers’ teaching intentions were consistent with the approach to teaching they adopted, and with the teaching strategies they employed (Trigwell & Prosser, 1996b); approaches to teaching were dependent on, and affected by, lecturers’ perceptions of the teaching environment (Prosser & Trigwell, 1997); approaches to teaching that
were oriented towards conceptual change elicited a greater use of deep approaches from students, and approaches to teaching that were focused on the transmission of information were more likely to elicit surface approaches (Trigwell et al., 1999).

These findings were largely based on initial phenomenographic and later correlational studies of lecturers’ and students’ reports of their approaches to teaching and learning respectively. Because of the later emphasis on correlational data, Trigwell and Prosser warn against over-interpretation of the results, particularly in relation to cause and effect. Their results are, however, consistent with earlier research (Entwistle & Ramsden, 1983; Marton & Saljo, 1976b; Ramsden, 1987; Van Rossum & Schenk, 1984), with concurrent research (Gow & Kember, 1993; Kember & Gow, 1994; Marton et al., 1993) and with the theoretical structure of Biggs’ (1987a, 1988b, 1993a, 1993b) ‘3P model’ of learning (Figure 2.2).

The cause and effect relationships are difficult to determine, not only because correlational data have been the principal source of quantitative analysis, but also because of the dynamic interaction of prior intention, perceived context, approach taken, operational feedback and modification, which would be presumed to operate from the perspectives of both lecturer and student, in Biggs’ model. In such a model, cause and effect relationships could be identified or argued between almost any two components, as the interactive agents within the model act to establish a measure of perceived equilibrium. In this frame, the establishment of inter-relationships becomes potentially more important in guiding interventions aimed at encouraging deeper learning approaches. If almost any variable can have
a causal and reciprocal impact on almost any other variable in a system, then mapping the connections may have more to offer the design of interventions than the establishment of causal connections between individual variables in isolation.

Prior to Trigwell and Prosser's investigations, the mapping of contextual interactions affecting learning approaches had been conducted primarily from the students' perspectives. This is understandable since students' perceptions, intentions and learning approaches were considered to be the variables most closely connected with learning outcomes. Certain teaching and assessment strategies were identified in that process as having a direct connection with students' choice of learning approach. On the basis of these findings, (see for example: Biggs, 1988b, 1989, 1995, 1996; Boulton-Lewis, 1995; Clarke, 1996; Dart, 1994; Eklund-Myrskog, 1997; Entwistle & Entwistle, 1992; Entwistle, 1994; Entwistle et al., 1991b; Jackson & Prosser, 1989; Lublin & Prosser, 1993; Newble & Hejka, 1991; Ramsden, 1992, 1993a, 1997; Scouller & Prosser, 1994) recommendations were forthcoming, which suggested lecturers should modify their strategies to variously reduce students' workload; increase subject and topic choice; encourage discussion and debate; use co-operative and problem-based learning methods; provide detailed and timely feedback; pace, pitch and structure class presentations appropriately but avoid spoon-feeding; build a friendly rapport; link new material to old; link material to other subjects and to professional practice; teach metacognitive processes; and assess using processes that encourage problem analyses and exposition rather than reproduction.

Ramsden (1992, 1993c), Biggs (1993a) and Entwistle (1997b) each suggest that simply describing deep learning approaches and advising students to adopt them
will not effect change in their study behaviour. In fact doing so may have negative
effects by providing cues to students and allowing them to refine surface or
achieving approaches in a more expedient form (Marton & Saljo, 1997). These
outcomes are expected on the basis that students’ adoption of learning approaches
is seen as a genuine reaction to contextual variables and students’ intentions.

Similar arguments are proposed by Trigwell et al. (1994) to explain the reluctance
of lecturers to embrace teaching strategies identified as being related to students’
adoption of deep learning approaches. Because of the logical relationship between
lecturers’ intentions in a teaching setting, their approach to teaching and strategy
choice (Trigwell & Prosser, 1996b), pressure to adopt alternate teaching strategies
without affecting intention would be resisted and, if implemented, may well be
done so disingenuously. Insincere implementation of alternate teaching strategies
may well undermine their effectiveness in promoting deeper learning strategies
because students may detect a discrepancy between the espoused and the
implemented approach (Trigwell et al., 1994).

Trigwell et al. (1994) used phenomenographic methodology with a group of 24
chemistry and physics lecturers across two universities. From these interviews
they identified five approaches to teaching, which varied according to the
lecturer’s level of teacher or student focus, and on the intention to transmit
information or facilitate knowledge construction. Each identified approach to
teaching, comprised an intention and a related strategy dimension in a structure
similar to the motive and strategy composition of student learning approaches as
formulated by Biggs (1987a, 1987b). These approaches to teaching were initially
linked theoretically and later empirically to students’ adoption of learning approaches (Trigwell et al., 1994; Trigwell et al., 1999).

At one extreme, lecturers who perceived teaching as the transmission of information and maintained teacher-focused strategies, were more likely to have students who used surface approaches. At the other extreme, lecturers who saw the purpose of teaching as the encouragement of conceptual change and used student-focused strategies, were more likely to have students who used a deep approach to learning. In theory, Trigwell et al. (1994, p.82) described the latter teaching approach as consistent with a deep learning approach because it placed emphasis on underlying meanings and alternative constructs. They described the former approach to teaching as consistent with a surface learning approach because it appeared to place emphasis on surface features such as information transmission.

Based on the responses in the qualitative study Prosser and Trigwell (1993) developed and trialed a survey instrument to measure approaches to teaching in order to establish the degree of generalisation of these findings. Two approaches to teaching were identified in the development of the Approaches to Teaching Inventory (ATI) (Prosser & Trigwell, 1993, 1999). These approaches equated to the extreme positions from the original phenomenographic study. The intermediate approaches from the original study were not differentiated in the questionnaire design. Since the two teaching approaches identified in both studies were linked most closely with surface and deep learning approaches, the ATI subscales were seen as a close match to the subscales within the SPQ and the ASI. The teaching approaches identified in the ATI also comprised two related
constructs construed as ‘intention’ and ‘strategy’, which directly relate to the ‘motive’ and ‘strategy’ structure of learning approaches in the SPQ. The two principal factors of the ATI were identified as an ‘Information Transmission/Teacher-focused’ approach to teaching and a ‘Conceptual Change/Student-focused’ approach.

Trigwell et al. (1999) applied the ATI and the SPQ to approximately 4000 students and 46 staff teaching first year science courses and compared the results of these alternate perceptions of the learning environments at the class level and at the individual student level. They found strong correlations at both levels of analysis that related students’ adoption of deep approaches to learning in classes in which lecturers reported the use of a conceptual change approach to teaching and a concomitant rejection of the transmission approach. Surface approaches to learning were associated with high scores on the transmission approach to teaching, though this association was not as clear because many of these lecturers rated highly on both teaching approach scales.

Similar findings with similar linkages of approaches to teaching and approaches to learning were also reported by Gow and Kember (1993) and Kember and Gow (1994). They independently developed a scale to measure lecturers’ approaches to teaching, which comprised two main approaches labelled ‘learning facilitation’ and ‘knowledge transmission’. Though these factors appear similar to Prosser and Trigwell’s (1999) ATI factors, they consist of items that equate to the intermediate approaches initially identified by Trigwell et al. (1994). Gow and Kember’s (1993) ‘knowledge transmission’ approach includes elements of Trigwell’s et al. ‘teacher-focused’ approaches, while Gow and Kember’s ‘learning
facilitation’ approach has items which appear similar to Trigwell’s et al. ‘student/teacher interaction’ approach, an intermediate position. None of the items in Gow and Kember’s instrument relate to Trigwell’s et al. conceptual change/student focused approach. Nevertheless sufficient similarity exists between the instruments to enable some data comparisons to be made.

In a retrospective analysis, Gow and Kember (1993) conducted a survey of lecturers across 15 academic departments in two polytechnics in Hong Kong and compared their approaches to teaching, at the department level, to the learning approaches adopted by the students and their change in learning approach reported over the length of the students’ courses. The results of Gow and Kember’s (1993) study provide some support for those of Trigwell et al. (1999) in that the knowledge transmission approach was associated with low and reducing deep approach scores; and the learning facilitation approach was associated with low surface approach scores across academic departments.

The picture emerging from these studies, relating lecturers’ approaches to teaching with students’ approaches to learning, suggests that lecturers who conceive of teaching from a constructivist frame are more likely to provide a learning context associated with students who use deep approaches to learning and achieve higher quality learning outcomes. Conversely, lecturers who see teaching as a process of information transmission are more likely to provide a learning environment associated with students who adopt a surface approach and attain lower quality outcomes.
Trigwell et al. (1999) caution against cause and effect interpretation of their results, and those of Gow and Kember (1993), since the analyses were conducted on a correlational basis. Prosser and Trigwell (1997) have demonstrated that lecturers’ approaches to teaching are also dependent on contextual features, such as class size and workload. Thus, lecturers must perceive the teaching context to be conducive to constructivist teaching before they feel able to implement such strategies, which may act to improve the quality of learning outcomes. Such features may also directly impact on students’ choices of learning approach. Large classes may reduce students’ ability to engage in formative discussion and a heavy workload reduces the time available for students to engage in deep learning approaches (Trigwell & Prosser, 1991a).

Lecturers’ perceptions about the requirements of different stages in the educational sequence may also affect their conceptions of teaching. The work of Trigwell, Prosser and their colleagues has been largely conducted with lecturers and students of first year courses in applied science. Lecturers may perceive students at this stage of their education require declarative knowledge, from which they may later draw in order to become more active in their own learning. Thus, the aims and assumptions of first year university teaching may well be different from those in other years and in other courses (Prosser & Trigwell, 1997; Trigwell & Prosser, 1991a; Trigwell et al., 1994).

The connection between lecturers’ conceptions of teaching and students’ approaches to learning has nevertheless been substantially established by the work of Trigwell, Prosser and their colleagues. Students’ intentions in engaging with the learning environment as well as lecturers’ intentions appear to have a
substantial relationship with the quality of learning outcomes. As well as these
direct effects, perceptions of the learning context impact on lecturers as well as
students in helping to determine other aspects of the learning context, which in
turn enhance or frustrate lecturers’ and students’ original intent. Surface
approaches to learning appear to be particularly susceptible to these variations,
either by being encouraged or inhibited (Gow & Kember, 1993; Trigwell et al.,
1999). Yet, despite being more difficult to encourage, increased deep approaches
appear to be associated with improvements in the quality of learning. Reduction in
surface approaches alone are not related to improved learning quality (Trigwell &
Prosser, 1991a).

2.4.2: The Central Role of Assessment
From the extensive mapping of contextual variables reported in the extant
literature, the effect of assessment practices on student learning approaches is
regularly reported as central to the process (Biggs, 1988a, 1995, 1996; Boud,
1990; Elton, 1996; Entwistle et al., 1991a; Nightingale, 1997; Ramsden, 1993c;
Trigwell & Sleet, 1990). Variation of assessment technique was one of the first
contextual features manipulated in the experimental studies of Marton and Saljo
(1976b) and developing the skills required of various assessment practices is a

The modification of study behaviour to take account of assessment demands
would in theory, predominantly affect students with high achieving or strategic
motivation (Biggs, 1987a; Entwistle & Ramsden, 1983). However all students
need to pass their assessment tasks in order to progress to the next stage in their
courses and this may require the modification of some study behaviour even for
students using surface approaches. Since achieving motivation and strategy have shown high correlations with both deep and surface approaches to learning (Burnett & Dart, 2000; Kember & Leung, 1998), the effects of pursuing an achieving motive may at times override the intention of using deep or even surface learning approaches (Entwistle & Entwistle, 1992; Entwistle, 1994; Trigwell & Sleet, 1990).

Assessment directly affects the workload of both students and lecturers. Tasks are established by lecturers partly in accordance with their conceptions of learning (Trigwell & Prosser, 1996b) and partly in accordance with their perceptions of the constraints of the learning environment (Prosser & Trigwell, 1997). Other constraints include departmental grading requirements, assessment policies, and professional accreditation requirements. Where classes are large, for example, and departmental policies require that student performance is graded, lecturers may perceive an excessive workload if assessment tasks require extended exposition. In such an instance the use of short-answer or multiple-choice examination formats may be preferred simply because of the expedience they offer. Students may perceive such an assessment process as an indication that accurate information reproduction is valued in that subject and adjust their study strategies to enable efficient reproduction (Biggs, 1995; Boud, 1990; Bouffard, Boisvert, Vezeau, & Larouche, 1995; Dart, 1994; Entwistle & Entwistle, 1992; Ertmer & Newby, 1996; Nightingale, 1997; Pintrich & Garcia, 1994; Scouller & Prosser, 1994).

Lecturers’ choice of assessment tasks is informed by their conceptions of learning (Ramsden, 1987; Trigwell & Prosser, 1996b; Vermunt, 1998), which also inform
their conception of the purpose of assessment, particularly whether it represents a quantitative measure of growth in student knowledge or a qualitative change in their understanding (Biggs, 1995; Biggs & Collis, 1982). Essentially assessment methods, which call for quantitative measures, assume a growth in student knowledge by some incremental process. Thus students who can demonstrate the attainment or retention of greater quantities of additional knowledge are assessed more highly (Biggs, 1995; Ramsden, 1992). This perception of the assessment process is consistent with the conception of learning as a process of transmitting information (Trigwell & Prosser, 1996b; Trigwell et al., 1994; Trigwell & Sleet, 1990). Both the assessment methods thus framed and the conception of teaching with which they are consistent, have been shown to be related to surface learning approaches by students (Biggs, 1988b; Clarke & Dart, 1994; Trigwell & Prosser, 1991a; Trigwell & Sleet, 1990).

Assessment practices that attempt to measure qualitative changes in student understanding are consistent with transformative conceptions of the teaching process, both of which have been linked with deep approaches to learning (Biggs, 1995; Biggs, 1996; Boulton-Lewis, 1995; Vermunt, 1998). Such practices call for, for example: assignments in essay form (Nightingale, 1997; Ramsden, 1992); problem-based learning models for which problem solutions are reported (McKinnon et al., 1996; Newble & Hejka, 1991); creative tasks (Trigwell & Sleet, 1990); journal writing (Batts & Wilkes, 1993; Dart, Boulton-Lewis, Brownlee, & McCrindle, 1996); portfolio assessments (Biggs, 1996; Gordon & Dunshea, 1996); personal theory development (Hoban, 1998); student presentation (McKinnon et al., 1996), or other assignments in which the exposition of argument is an essential ingredient (Dart, 1994; Nightingale, 1997; Ritter, 1997).
Grading procedures may then be based on measures of qualitative difference such as the SOLO taxonomy (Biggs & Collis, 1982; Boulton-Lewis, 1995; Nightingale, 1997; Ramsden, 1992; Trigwell & Prosser, 1991b).

Other approaches to assessment have been reported, which aim to transfer responsibility to students through various forms of peer and self-assessment (Gordon & Dunshea, 1996; McKinnon et al., 1996; Ryan, 1993; Stefani, 1994; Topping, 1998) or through performance in authentic or simulated settings which mirror professional practice (Boud, 1990; Eklund-Myrskog, 1997; Gordon, Gibson, Hall, Dillon, & Perisce, 1997a; McCormack, 1996; Newble & Hejka, 1991; Nightingale, 1997; White & Gordon, 2000). Such approaches recognise the role of student self-regulation in determining learning approaches (Biggs, 1993a; Vermunt, 1996, 1998) and attempt to guide self-regulatory practices by reducing the external regulation of assessment tasks set and graded by lecturers, often within an artificial context.

Biggs (1996, 1999) argues strongly for changes to assessment practices to bring them into alignment with subject objectives and teaching strategies. His argument relies on the centrality of assessment in influencing students in the choice of learning approach (Boud, 1990; Elton, 1996; Entwistle & Entwistle, 1992; Ramsden, 1993c). While the power of assessment tasks to influence student learning approaches is well documented, difficulties are reported in encouraging lecturers to modify assessment tasks to promote deeper learning activities (Biggs, 1995; Nightingale, 1997; Prosser & Trigwell, 1997; Ramsden, 1994). When lecturers’ perceptions of the teaching environment are influenced by high student numbers, the expediency provided by quantitative objective examination
procedures is seen as an essential evil to reduce workload to manageable levels (Prosser & Trigwell, 1997). While these procedures promote reliability, they may reduce the validity of the assessment process (Nightingale, 1997) by becoming misaligned with course or subject objectives. Such misalignment could occur by placing undue emphasis on minor objectives and little or no emphasis on core objectives and by reducing the measurement of learning outcomes to the addition of component parts given equal weighting (Biggs, 1995, 1996).

Creative methods may be necessary to resolve the dilemma presented by the oppositional requirements of quality learning and workload considerations. Promising use of action research methodology has been reported in attempting to find solutions (Kember & Gow, 1992; Kember & McKay, 1996; Zuber-Skerritt, 1993). For example, embedded within an action research paradigm, Gordon and Dunshea (1996) adapted Biggs’ (1996) use of portfolio assessment to reduce lecturer’s workload but improve students’ metacognitive involvement in their assessment process. The students were required to submit a portfolio consisting of items of their choosing, which they believed demonstrated growth in their knowledge and skill in a teacher education course on classroom management. Students were also required to include a rationale for the items chosen, explaining how the particular pieces of evidence they included in their portfolio demonstrated their achievement of the stipulated learning outcomes. They were also required to present an argument for the award of the grade they believed they had achieved, on the basis of their rationale and on the evidence provided in their portfolio. The grading scale was made explicit to them and was modelled on the SOLO taxonomy (Biggs & Collis, 1982).
The complete portfolio was then submitted to the lecturers for assessment purposes. The lecturers however needed to assess only the rationale and argument for grade, while sampling the supporting evidence in the portfolio. The lecturers’ workload was reduced, making the use of portfolio assessment possible. The students’ attention was focused on the attainment of the subject objectives by demonstrating learning outcomes in a qualitative rather than quantitative form and engaging in critical self-reflection. Other teaching strategies were also designed to conform to the Biggs’ model of constructive alignment including the use of case-based discussion, co-operative group problem-solving, personal reflection, journalling, student presentations, metacognitive instruction and modelling, and the use of a text (Gordon, Arthur, & Butterfield, 1996a) specifically written for the subject. According to Biggs (1996) however, it is unlikely that the alignment of teaching strategies and subject objectives alone would have formed an effective intervention without the concomitant effect of a similarly aligned assessment strategy (see also Dart, 1994; Entwistle et al., 1991a; Marton & Saljo, 1997; Nightingale, 1997; Ramsden, 1992; Trigwell & Prosser, 1991b; Vermunt, 1998).

Despite the need to maintain teaching methods that provide a context to support deep learning, in order to improve the quality of student outcomes (Clarke, 1995; Clarke & Dart, 1994), the methods used to measure these anticipated qualitative changes in student knowledge and skill are powerfully impactful on the learning approach students choose, and may override the other contextual features (Biggs, 1995; Biggs, 1996). Methods of assessment used are largely dependent on lecturers’ approaches to teaching (Trigwell & Prosser, 1996b) but these teaching intentions may be overpowered by perceptions of the teaching environment, which are assumed to hinder constructivist assessment models (Prosser &
Trigwell, 1997). Creative assessment techniques consistent with constructivist principles may be possible in many environments (Gordon & Dunshea, 1996; McKinnon et al., 1996; Nightingale, 1997; White & Gordon, 2000), but these need to be tailored to local conditions and may require action research methodology to develop and modify in order to make the possible practical (Kember & Gow, 1992; Kember & McKay, 1996; Zuber-Skerritt, 1992).

2.4 3: Student Characteristics
Despite being the focus of teaching and learning activities, students are of course an interactive component within any learning context (Biggs, 1993a; Entwistle et al., 1991a; Vermunt, 1998). Their perceptions of the learning environment govern their responses to it (Entwistle, 1991; Ramsden, 1987; Ramsden, 1992; Trigwell & Prosser, 1991a), but they enter the learning environment with previously held conceptions of learning (Lonka & Lindblom-Ylanne, 1996; Marton et al., 1993; Vermunt, 1996, 1998) which are in large part, responses to their experience in earlier learning environments (Alexander & Murphy, 1997; Biggs, 1993a; Ramsden et al., 1988; Zimmerman, 1994). Their perceptions of the current learning environment, informed by prior experiences, in part determine their study behaviour in the current context (Vermunt, 1996) which, in turn, may affect lecturers’ perceptions and the contexts they create (Prosser & Trigwell, 1997) establishing a self-perpetuating ecological interaction (Biggs, 1988b, 1989, 1993a; Weinstein, 1994).

Some student characteristics affecting learning are immutable such as gender, relative intelligence, prior learning experiences, and some aspects of personality (Biggs, 1993a). Some dispositional characteristics such as relatively stable
learning styles (Entwistle & Waterston, 1988; Pask, 1976; Svensson, 1997; Vermunt, 1998), and epistemological orientations (Wilkinson & Schwartz, 1991) may be resistant to change. Other study behaviours and conceptions of learning may be culturally embedded (Kember, 1996; Kember & Gow, 1991; Meyer, 1993; Volet et al., 1994), dependent on established patterns of causal attribution (Ashkanasy & Gallois, 1987; Drew & Watkins, 1998; Ferrari & Parker, 1992; Millar & Irving, 1995), or developmentally responsive to varying levels of maturity or domain knowledge (Ley & Young, 1998; Lonka & Lindblom-Ylanne, 1996; Marton et al., 1993; Richardson, 1994b; Scott, Burns, & Cooney, 1996; Vermunt, 1996).

Accordingly any body of students may comprise many members who perceive the learning environment, and thus react to it, in widely variant ways (Biggs, 1993a, 1993c; Clarke, 1996; Entwistle, 1986; Entwistle & Ramsden, 1983; Marton et al., 1993; Vermunt, 1996). Students differ in their perceptions of aspects of the same context that variously help or hinder their learning (Clarke & Dart, 1994) and teaching strategies that are highly valued (Entwistle & Tait, 1990). Although there is some evidence that many students express greater satisfaction with courses delivered in a manner which are presumed to encourage deeper learning approaches (Prosser & Trigwell, 1990), this is not a consistent finding (Clarke & Dart, 1994; Entwistle & Tait, 1990; McKinnon et al., 1996).

Vermunt (1996, 1998) explained variations in student responses to learning contexts in terms of their learning orientations, mental models of learning, regulation strategies, and processing strategies. His research was conducted in two phases. The first phase comprised a phenomenographic analysis of interviews
conducted with a small number (45) of regular (internal) and open (external) university students, from which the learning representations were established (Vermunt, 1996). The second phase consisted of a descriptive cross-sectional survey, developed from phase one, using a larger sample (1222) of students from two universities, across courses and years of study and differing in internal or external modes of study (Vermunt, 1998).

Across these groups of students Vermunt (1998) identified four predominant learning styles which broadly resembled the learning approaches identified by others (Biggs, 1987a; Entwistle & Ramsden, 1983; Marton et al., 1993). However, by linking learning strategies to the other cognitive representations of learning (orientation, mental models and regulation) a more complete picture of students’ intention and action in engaging with learning contexts emerged.

Vermunt (1998, pp. 161-162) found that those students whose learning style was meaning directed used deep learning strategies (relating and structuring, critical and concrete processing), typically held constructivist mental models of learning, were highly self-regulatory in their learning processes, and were oriented toward their learning out of personal interest. Those who followed a reproduction directed learning style used surface strategies such as memorising and rehearsing, held a model of learning typified by the intake of knowledge (a transmission model), were subject to external regulation of their learning processes, and were oriented in their learning by the desire to gain certification or to self-test. Those who followed an application directed learning style typically used concrete processing strategies, held a mental model of learning which emphasised its utility, were regulated in their learning in a way unrelated to the internal-external
dimension used in Vermunt’s study, and were oriented by vocational and certification goals. Those who were undirected in their learning style used few strategies, were non-regulated, and reported ambivalence in their learning orientation.

The locus of regulation is important in that its orientation was most strongly connected to the use of deep strategies (self-regulation) or surface strategies (external regulation) and also informed the students’ conception of learning as constructive or transmissive respectively (Vermunt, 1998, p.164-165). This finding supports Biggs’ (1987a) identification of correlations between internal and external locus of control with deep and surface learning approaches respectively, but extends the connection to include metacognitive strategies used by self-regulating students.

It is assumed that students following a meaning-directed learning style have greater awareness of their own learning are able to use this awareness to adapt their learning strategies in a given context to meet their learning goals (Janssen, 1996), and to reaffirm their self-regulatory strategies and constructive mental models of learning through internal causal attributions (Bouffard et al., 1995; Drew & Watkins, 1998; Hofer et al., 1998; Lefcourt, 1981; Millar & Irving, 1995). Thus they usually sustain a deep learning approach, or apply a surface approach, or technified approach (Marton & Saljo, 1997), depending on their perception of subject requirements, personal interest and other contextual features discussed earlier.
Students who follow a reproduction-directed learning style as described by Vermunt may be less adaptive because of their reduced metacognitive awareness, but due to their sensitivity to external regulation, may attempt to respond with a limited repertoire to the demands of the learning context to demonstrate their intake of knowledge (Bouffard et al., 1995; Vermunt, 1998, p. 166) through reproducing the content. Their external regulation may be reaffirmed by attributing success or failure externally, or to ability if internal. If the principal motive of a surface approach is to attain minimal passing grades (Biggs, 1993a; Entwistle & Ramsden, 1983) for certification purposes (Vermunt, 1998) the student’s main learning goals would be attained if the context supported it and a reproducing orientation with external regulation could be perpetuated.

Vermunt determined that the processing and regulating strategies students used were less stable over time and more adaptive to circumstances than higher order mental models or learning orientations. Following this reasoning, contextual manipulations by lecturers may be able to influence the study strategies and possibly also the regulatory strategies, of students who follow surface approaches since they are subject to external regulation. The development of deep approaches to learning embedded within students’ models of learning, may be more difficult to induce through changes to context (Marton & Saljo, 1997; Ramsden, 1997). If however, self-regulatory strategies can be taught to students who use surface approaches and these are supported by contexts which reward deep approaches, then sustainable changes in beliefs and attitudes represented by higher order mental models of learning may follow (Biggs, 1988b, 1996; Boulton-Lewis, 1995; Harackiewicz, Barron, & Elliot, 1998; Tait & Entwistle, 1996; Vermunt, 1998).
2.5: Developing Environments for Deeper Learning

Most of the studies reviewed in the learning approach literature reported over the last two decades are descriptive studies designed to further the collective understanding of the contextual correlates of learning approaches (Biggs, 1993b; Marton & Saljo, 1997; Ramsden, 1997). The purpose in pursuing such extensive mapping of this complex interactive system is presumably to inform interventions aimed at improving the quality of student learning (Trigwell & Prosser, 1991a). The effectiveness of interventions enacted through contextual manipulation in any interactive system need, however, to be tested in order to establish that the connections made through descriptive research translate into cause and effect relationships in the predicted direction. Early attempts to demonstrate changes in student learning approaches through contextual variation were less than successful (Marton & Saljo, 1976b; Ramsden et al., 1986).

There are a number of difficulties associated with the implementation of contextual changes with the purpose of impacting on students’ learning approaches. Firstly, because of the interactive nature of the elements within the system, it is unlikely that the manipulation of single, or even several elements will produce predictable or stable effects. Interventions need to consider the whole system rather than single elements (Biggs, 1993a, 1993b, 1996; Ramsden, 1987, 1992). If the system is conceived in terms of Biggs’ (1993a) ‘3P model’ (see Figure 2.2), then elements at each stage need to be considered in course design and delivery, including lecturer, student, instructional, assessment and outcome variables.
An obvious connected difficulty then relates to the fact that many important elements within such a system are not under the control of those, such as lecturers or course co-ordinators, who may wish to implement change. Student perceptions of the learning environment (Ramsden, 1992, 1997), their conceptions of learning (Vermunt, 1998), their self-regulatory ability (Butler & Winne, 1995; Pintrich & Garcia, 1994; Vermunt, 1998), and their metalearning (Biggs, 1987a; Biggs, 1993a) are all processes that appear as central to learning approach theory but are not easily altered in context. Perceptions are, of course, variable at the level of the individual student which leads to the same context being perceived differently by different students (Clarke & Dart, 1994; Entwistle, 1994; Hodgson, 1997).

Similarly lecturers’ views need to be taken into account, particularly at the course level, since multiple lecturers are usually involved in the teaching of different subjects within any course of study (Ramsden, 1993b). Lecturers’ conceptions of teaching (Kember & Gow, 1994; Trigwell & Prosser, 1996b; Trigwell et al., 1994; Trigwell et al., 1999), their perceptions of the teaching environment (Prosser & Trigwell, 1997), their metacognitive awareness of their own teaching (Biggs, 1993a; Boulton-Lewis, 1996), the emphasis on research output as a measure of academic performance (Ramsden, 1994; Senate Standing Committee on Employment Education and Training, 1990; Yerbury, 1993), all impact on the ability of any one lecturer or course co-ordinator to implement contextual change, even when it is agreed upon by others (Kember & Gow, 1992; Ramsden, 1992; Zuber-Skerritt, 1993).

Institutional restrictions imposed on lecturers’ ability to provide flexible content and delivery also affect their capacity to implement altered learning environments
(Ramsden, 1994). Student numbers in courses (Prosser & Trigwell, 1997), the physical layout of lecture theatres (Hodgson, 1997; Jackson & Prosser, 1985, 1989; Prosser & Trigwell, 1997), assessment requirements (Biggs, 1995; Boud, 1990; Nightingale, 1997), course evaluation procedures (Prosser & Trigwell, 1990; Ramsden, 1992, 1997), practicum placement in professional courses (Deer, Brady, Segal, & Bamford, 1997; McCormack, 1996; Wood & Eicher, 1989), and financial constraints (Ramsden, 1994), place physical limitations on the amount and sometimes direction of possible change. The extent of the institutional restrictions on innovative practice may also feed back through the system to affect lecturers' and students' perception of the teaching and learning context (Biggs, 1989, 1993b; Ramsden, 1994).

Coupled with the difficulties outlined above are the observations that increasing students' use of deep learning approaches may require long-term intervention (Biggs, 1988b; Ramsden, 1992, 1997). Short-term interventions in single subjects may result in a reduction in the use of surface approaches without a concomitant increase in the use of deep approaches (Gordon & Dunshea, 1996; Marton & Saljo, 1997; Regan & Regan, 1995a; Trigwell & Prosser, 1991a; Vermunt, 1998). Reduction in the use of surface approaches may not be sufficient to improve the quality of student learning. Rather, improvements in the quality of learning outcomes may depend on increased use of deep approaches (Biggs, 1993a; Ramsden, 1992; Svensson, 1997; Vermunt, 1998).

Furthermore, the efficacy of interventions identified in one context may be questionable when applied to other contexts. The context specificity of the learning system is such that the system-wide permutations generated by altering
some contextual variables may only be applicable to the setting in which they are applied (Biggs, 1993c; Clarke & Dart, 1994). While broad approaches may be generalisable, the actual procedures implemented to bring about the change may not. Such a scenario would require the agents within each new setting to develop many activities and procedures specific to that setting. The implementation of contextual changes in line with learning approach theory may bring with it the need to develop local creative problem-solving processes to identify novel solutions in each educational setting (Kember & McKay, 1996; McKinnon et al., 1996; Zuber-Skerritt, 1993).

Clearly the distance between theory and practice may be considerable in the implementation of altered contexts to improve student learning (Harackiewicz et al., 1998). A number of attempts have been reported in the extant literature to improve the quality of student learning using various methods aimed at addressing aspects of the learning context. Some interventions have been centred at the level of course design and have involved macro changes to course structure (Gordon, Lane, & Perisce, 1997b; Kember & McKay, 1996; Newble & Hejka, 1991; Taylor, 1994). Other intervention studies have examined the impact of altered teaching processes on student learning, usually within the context of single semester subject offerings (Alexander & Murphy, 1997; Biggs, 1988b; Hoban, 1998; Jackson & Prosser, 1985; McKinnon et al., 1996; Pollard, 1993; White & Gordon, 2000). Several studies measured the effect of changes to assessment methods on student study strategies (Batts & Wilkes, 1993; Biggs, 1995; Boulton-Lewis, 1994a; Gordon & Dunshea, 1996; McKinnon et al., 1996; Ritter, 1997; Stefani, 1994; Trigwell & Sleet, 1990; White & Gordon, 2000). The implementation of practicum mentoring and other work-based experiences, their
placement within courses, timing and requirements were the focus of other investigations dealing with student learning in professional courses (Deer et al., 1997; Dunshea, Foley, Hastings, McFadden, & Rae, 1995; Eklund-Myrskog, 1997; Gordon et al., 1997b).

Some intervention studies have attempted to foster changes in student learning approaches by addressing student study skills directly (Hattie et al., 1996; Ley & Young, 1998; Ramsden et al., 1986; Tait & Entwistle, 1996) and by teaching metacognitive skills (Biggs, 1988b; Hoban, 1998; Hofer et al., 1998; Weinstein, 1994). Others have used attempts to influence student study goals as motivators of study behaviours (Braten & Olaussen, 1998; Harackiewicz et al., 1998; Hofer et al., 1998; Meyer, 1993; Weinstein, 1994).

Interventions reported have had mixed success in promoting deep learning strategies. Many short-term studies have led to reductions in the use of surface approaches without raising deep approaches (Biggs, 1988b; Gordon & Dunshea, 1996; Ramsden, 1997; Trigwell & Prosser, 1991a). Some short-term intervention studies have demonstrated small increases in deep approaches (Biggs, 1988b; Biggs, 1996; McKinnon et al., 1996) and others have shown the reverse (Marton & Saljo, 1976b; Ramsden et al., 1986; Volet et al., 1994). Some global course-based studies have reported increases in deep approaches (Eklund-Myrskog, 1997; Kember & McKay, 1996; Newble & Hejka, 1991; Taylor, 1994), however with the exception of Kember and McKay (1996) these have been cross-sectional studies with a potential threat to validity caused by the attrition of less able students.
Kember and McKay’s study involved the redesign of a course for radiographers in Hong Kong, which involved increasing the amount of teaching time spent in small groups and laboratory sessions and reducing the proportion of lectures, implementing some problem-based learning methods, and using some formative, rather than summative assessment procedures. They used action research methodology to tailor the changes to meet local needs. Whether these results are generalisable is not known because of the local specificity of modifications made. The altered mix of lectures, tutorial and laboratory groups for example, were made from a base of very high proportions of lecture time which may have had the effect of encouraging high levels of surface approach use and discouraging deep approaches for the group against whom later outcomes were compared. Nevertheless the higher deep approaches reported by the students in the modified course are encouraging and indicate that learning approaches may be altered in a desired direction through the implementation of co-ordinated course-based interventions.

The earlier course-based intervention reported by Newble and Hejka (1991) implemented problem-based learning in small groups with formative assessment processes in the training of medical practitioners in Australia. Results indicated higher use of deep learning approaches and similar use of surface approaches in these students compared to students in other medical schools. Because of the high value placed on the need for medical practitioners to be reflective and maintain a desire to engage in life-long learning, this research has been influential in motivating other universities to implement similar programs (Newble & Hejka, 1991).
No studies in the literature reviewed have been identified that aimed to implement co-ordinated course-based interventions to increase the use of deep learning approaches amongst students of teacher education. It is argued that such a goal is warranted to improve teacher effectiveness in schools and to increase the likelihood of teachers establishing learning environments that encourage deep approaches to learning for their own students (Gordon et al., 1998b).

Many schools appear to produce students who have learned to use predominantly surface approaches to their learning (Ramsden et al., 1988). Teacher education students appear to demonstrate a high use of surface approaches in their studies (Biggs, 1987a; Biggs & Kirby, 1983; Boulton-Lewis, 1994b) and these students view the teaching and learning process largely in the frame of knowledge transmission (Christensen et al., 1995). Such students are likely to model their teaching practices from their own experiences rather than from knowledge gained in a teacher education course (Dunkin et al., 1994; Grossman, 1991; Wideen et al., 1998) and maintain a limited understanding of their own learning and of the teaching and learning process (Boulton-Lewis, 1996). Such conditions are unlikely to encourage deeper learning on behalf of students in schools and a cycle of cultural reproduction is possible (Biggs, 1988b, 1993a; Gordon et al., 1998b; Tobin & Fraser, 1991).

The current study represents an attempt to foster the development of deep learning approaches in students of teacher education by addressing aspects of the learning context at each level within Biggs’ (1993a) model of student learning. The interactions are considered within an ecological frame (Biggs, 1993a; Wideen et al., 1998) and as such are considered evolutionary, requiring the application of
action research methodology (Kember & Gow, 1992; Kember & McKay, 1996; Schratz, 1993; Zuber-Skerritt, 1993).

Since the outcomes of the use of deep learning approaches are assumed to promote more efficacious professional practice (Biggs, 1993a; Entwistle et al., 1991a; Ramsden, 1992), the effects of the interventions on the students’ development of teaching self-efficacy beliefs were measured in addition to their use of alternate learning approaches. The literature concerning effects of teacher self-efficacy is reviewed in Chapter 3.

2.6: Summary of Learning Approach Theory and Research
Students’ use of learning approaches has been the subject of extensive study over the last 20 years. These studies have consistently established differences in learning approaches labelled surface, deep and achieving and the characteristics of each. They have established links between the approach used and the quality of learning outcomes, favouring those who use deep approaches, such that this avenue of inquiry offers potential solutions to perceived problems of quality education identified within the university sector.

Later research has linked students’ choice of learning approach to many contextual features including student, lecturer, process and outcome variables in the manner predicted by Biggs’ (1993a) ‘3P model’ of student learning. Intervention studies designed to promote the use of deep learning approaches have met with mixed success. Major contributing factors to these qualified outcomes appear to be centred in the multiplicity of contextual features contributing to learning approach choice, their multiple and reciprocal interactions, and the
dependence of learning approaches on variable student perceptions of the learning environment.

Interventions which have shown the greatest success have addressed many aspects of the learning context at a course-based level using an integrated systematic approach, aligning the course requirements with teaching methods and assessment approaches in a manner supported by constructivist theory. To date such intervention studies have been limited and restricted mainly to fields of applied science in which high usage of surface approaches has been previously reported.

Concerns have also been discussed in the literature about the competencies of beginning teachers, particularly in relation to teacher self-efficacy. Many of the issues raised in reviewing approaches to learning also have a direct relevance to the development of teacher self-efficacy. In particular the relationship identified between students’ approach to learning and their conceptions of teaching is a concern, since many teacher education students report high usage of surface learning approaches. There may be a potential for the perpetuation of surface approaches when these students become teachers, if they adopt complementary transmission conceptions of teaching.

To date interventions addressing multiple components of Biggs’ model of learning, with the purpose of encouraging the use of deep learning approaches amongst teacher education students, have not been reported in the literature. The current study has attempted to determine the effectiveness of applying interventions across the learning complex within a teacher education course, with
outcomes measured in terms of relative use of learning approaches and growth in teacher self-efficacy.
CHAPTER 3

Teacher Efficacy and Teacher Development

3.1: Teacher Efficacy Research and Theory Development
Extensive research using the construct of teacher self-efficacy has been conducted over the period of the last two decades. This research has consistently identified that teachers’ beliefs about their own competence in performing the tasks that teaching requires are major contributing factors to almost all aspects of teaching behaviour, attitudes and outcomes (Bandura, 1997; Pajares, 1996; Ross, 1998; Smylie, 1990; Tschannen-Moran et al., 1998). Teacher behaviour, rather than the program taught, has long been associated with the behaviour and achievement of children in schools (Berliner, 1984; Brophy, 1987; Brophy & Good, 1986; Kounin, 1970; Rutter, Maugham, Mortimore, & Ouston, 1979; Weinstein & Mignano, 1993). Since the advent of research into teacher efficacy (Armor et al., 1976; Ashton et al., 1983; Barfield & Burlingame, 1974), this belief construct has consistently shown a close relationship with the teaching behaviours identified to promote positive classroom behaviour and advance student achievement (Bandura, 1997; Pajares, 1997; Ross, 1998; Tschannen-Moran et al., 1998; Zimmerman, 1995).

Generally these findings indicate that teachers who evaluate their own teaching competence highly and thus hold strong self-efficacy beliefs for the tasks of teaching, set higher teaching goals (Allinder, 1995), elicit higher achievement
from their students (Anderson, Greene, & Loewen, 1988; Ashton & Webb, 1986; Borton, 1991; Tracz & Gibson, 1986), and encourage positive self-referent beliefs in their students (Schunk, 1988; Schunk & Zimmerman, 1997). Teachers with high teaching self-efficacy are more likely to use innovative teaching practices (Bender & Ukeje, 1989; Berman & McLaughlin, 1977; Moeller & Ishii-Jordan, 1996), are more student-centred in their classroom practice (Dembo & Gibson, 1985; Gibson & Dembo, 1984; Tracz & Gibson, 1986), and use more effective behaviour management strategies (Agne, Greenwood, & Miller, 1994; Barfield & Burlingame, 1974; Woolfolk & Hoy, 1990).

Such teachers tend to apply appropriate problem-solving processes in novel circumstances (Borton, 1991; Moeller & Ishii-Jordan, 1996), including collaborative approaches (Coladarci & Brenton, 1991; Soto & Goetz, 1998; Stein & Wang, 1988), are more accepting of children who are difficult to teach or who have special needs (Borton, 1991; Podell & Soodak, 1993; Soodak & Podell, 1993; Soto & Goetz, 1998), and adopt collaborative approaches with parents (Hoover-Dempsey, Bassler, & Brissie, 1992; Stein & Wang, 1988). They exhibit lower levels of stress and burnout (Greenwood, Olejnik, & Parkay, 1990; Labone, 1995; Smilansky, 1984), and report a greater long-term commitment to the teaching profession (Evans & Tribble, 1986; Soodak & Podell, 1997). Teaching self-efficacy has been described as a powerful construct which distinguishes variability in teaching competence amongst teachers more consistently than any other measure (Ross, 1998; Smylie, 1990; Tschannen-Moran et al., 1998).

The research into this belief construct began with the ‘Rand studies’ (Armor et al., 1976; Berman & McLaughlin, 1977). The first of these (Armor et al., 1976),
aimed to identify exemplary school policies and classroom practices that
demonstrated improved reading outcomes for inner city children. In fact they
found no connection between the reading program used and gains in reading
achievement. Instead, certain aspects of the leadership behaviour of school
principal, such as setting high standards and allowing teacher autonomy, and the
teaching and classroom management practices of classroom teachers, such as
setting high standards, maintaining order, and implementing individualised
instruction, were related to reading achievement regardless of the program used
(Armor et al., 1976, pp. 36-40). Importantly here, Armor et al. also found that
teachers’ efficacious beliefs contributed strongly to reading achievement
regardless of the program used.

_The more efficacious the teachers felt, the more their students
advances in reading. This measure was strongly and significantly
related to increases in reading_ (Armor et al., 1976, pp. 24-25).

Subsequent research has identified a relationship between teachers’ efficacious
beliefs and the other classroom practices such as goal setting, classroom
management and individualised instruction, identified by Armor et al. as
impacting significantly on the reading achievement of the disadvantaged children
in their study (Ashton & Webb, 1986; Hoy & Woolfolk, 1993; Pajares, 1996). In
the second Rand study, Berman and McLaughlin (1977) found a strong
relationship between teachers’ efficacy beliefs and their continued implementation
of innovative teaching strategies.

The strong connection between teacher efficacy and teaching behaviour identified
by the two original Rand studies and Ashton et al. (1983) is presumed to be
causal, operating as described by the “link model” (Agne et al., 1994; Rose & Medway, 1981) such that teacher beliefs impact on teacher behaviours, which in turn motivate and direct student behaviours and result in varying levels of student achievement. A reciprocal pathway is also proposed by teacher efficacy theorists (Ashton & Webb, 1986; Bandura, 1986, 1997; Zimmerman, 1995), such that the perceived outcomes of student achievement and behaviour then impact through feedback mechanisms, on the revision or confirmation of the original teacher beliefs. An additional intermediate link is also proposed by efficacy theory and research, in which teacher behaviour impacts on student beliefs, which in turn determine student behaviour through similar mechanisms (Schunk, 1994; Schunk & Zimmerman, 1997; Zimmerman, Bandura, & Martinez-Pons, 1992).

Armor et al. (1976) and Berman and McLaughlin (1977) measured teacher efficacy through the inclusion of two questions in their questionnaire for teachers. These questions (usually referred to as RAND 1 and RAND 2) form the basis of the two dimensions of teacher efficacy commonly identified in later studies (Ashton et al., 1983; Gibson & Dembo, 1984; Guskey & Passaro, 1994; Hoy & Woolfolk, 1993; Tschannen-Moran et al., 1998).

RAND 1: When it comes right down to it, a teacher really can’t do much because most of a student’s motivation and performance depends on his or her home environment.

RAND 2: If I try really hard, I can get through to even the most difficult or unmotivated students (Armor et al., 1976, p. 23)

In the Rand studies, responses to these items were summed to indicate global teacher efficacy since they were viewed in terms of Rotter’s (1966) locus of
control of reinforcement concept. While Ashton, Webb and Doda (1983) used the two Rand questions in their subsequent study, to examine the antecedents and consequences of teacher efficacy, these researchers reconceptualised the construct in terms of Bandura’s (1977) notion of self-efficacy. Their basis for doing so rested on the finding that responses to the two Rand items were not significantly correlated (Ashton & Webb, 1986), a finding repeatedly supported in further research (Gibson & Dembo, 1984, 1997; Pajares, 1992, 1998; Ross et al., 1996). According to this formulation, Ashton et al. (1983) examined teachers’ responses to each Rand item separately, with RAND 2 corresponding to a personal dimension, labelled personal teaching efficacy (PTE) and RAND 1 corresponding to a general dimension, later labelled by Gibson & Dembo (1984), as general teaching efficacy (GTE).

The PTE dimension is conceived as representing Bandura’s (1977, 1986, 1997) self-efficacy construct applied to the tasks involved in teaching. As such, this construct is defined by how competent teachers believe themselves to be, in accomplishing the tasks required of them in the settings in which they conduct their daily activities. The belief thus informs teachers’ expectations that they will be relatively successful or otherwise in performing the necessary behaviours with the requisite skill to accomplish future similar tasks. The concept is obviously context dependent and task specific and may thus vary across contexts or across tasks (Bandura, 1997; Pajares, 1996).

For example, a teacher may feel confident in her ability to teach a new mathematics syllabus to children in fourth grade in an isolated rural school because of the provision of structured support material and her experience that
similar children have enjoyed the activities suggested. She may however lack confidence in her ability to teach a new language syllabus because the recommended processes of immersion within alternate genres are beyond her experience and few support materials or resources are available (Wills, 1998).

The level of specificity required for the measurement of the PTE construct is a controversial issue in the research literature and a potential research dilemma (Bandura, 1997; Pajares, 1997; Tschanen-Moran et al., 1998). On the one hand Bandura (1997) asserts that the more context and task specific the efficacy measure, the greater the accuracy of any prediction of future behaviour will be in similar circumstances. However Tschanen-Moran et al. (1998) point out that increased specificity reduces the generalisability of research findings and hence their usefulness beyond the specific contexts and tasks measured.

It may be useful in micro-analytic experimental studies for measures of PTE to be highly specific in order to closely identify behavioural effects due to efficacy, or to report modifications to efficacy expectations as a result of outcome observations. In such studies common behavioural elements of a single teacher may be identified at the specific level. In larger studies however, involving numerous respondents, individual variations in teaching style, content and context would reduce the level of specificity possible. In these cases elements common to most classrooms and most teachers may need to be the unit of study, rather than teachers’ personal expectations to very specific tasks in identifiable contexts. In the current study where student teachers are projecting their teaching behaviours to often unknown locations, the less specific level of common teaching practices would need to be the focus of efficacy expectations measured.
The GTE dimension was argued by Gibson & Dembo (1984), as representing Bandura’s (1977) formulation of outcome expectancy. The RAND 1 question is, however, a statement to which agreement signifies that teachers are powerless in the face of external influences in the education of some children, and disagreement signifies that teachers remain influential in the learning of all children. Though it has elements of Bandura’s concept of outcome expectancy, it is argued by Guskey (1986) and Woolfolk and Hoy (1990) that the internal/external dimension implied in the question bears a stronger relationship with Rotter’s locus of control of reinforcement. The equation of GTE and outcome expectancy remains controversial in the literature (Guskey & Passaro, 1994; Tschannen-Moran et al., 1998).

Outcome expectancy in Bandura’s (1986) social cognitive theory, is the extent to which an individual expects the desired outcomes to be achieved through the application of the requisite behaviour. Bandura (1997) refers to these outcome expectations in terms of their personal effect. Such effects may include feelings of personal satisfaction, pride, or social recognition from children, parents or school administrators for excellent teaching performance.

For example, the teacher who anticipates success in teaching the new mathematics syllabus to fourth grade students in a rural school may expect the children to engage in the learning context because the material is relevant and their success is reinforced at home. These expectations may have been informed by her perception that high skills in the principles of measurement are expected by the parents of the children in a rural farming community in order to succeed in the business of agriculture. Lower confidence in the outcomes of language teaching
may be informed by the teacher’s perception that those skills lack reinforcement at home and few sources of reading material are available to the children. Thus, despite possessing well-developed personal skills to teach literacy competently according to the new syllabus, the teacher may still anticipate a lower outcome for the children (Wills, 1998). Hence, the teacher may teach mathematics with greater enthusiasm and may invest more class time on this endeavour than the teaching of language skills bringing about the predicted outcomes, which reinforce the original belief.

Ashton and Webb (1986) proposed a multidimensional model of teacher efficacy, which attempted to integrate the findings of Armor et al. (1976) within Bandura’s (1977, 1978, 1982) conceptualisation of self-efficacy and outcome expectancy (see Figure 3.1). This model depicts an hierarchy in which more generalised beliefs form a foundation from which initial expectations about the outcomes of specific behaviours develop. The operation of the model assumes reciprocal activity such that each level informs behavioural choice and is then modified by the perceived outcomes of that behaviour. The more specific the representation in the hierarchy, the more active the construct will be in predicting behaviour in immediate circumstances. More general levels in the hierarchy imply orientations which influence, but don’t directly impact on specific behaviour (Ashton & Webb, 1986, pp. 5-6).
Figure 3.1. Teachers’ Sense of Efficacy: Ashton and Webb’s Multidimensional Construct
(Ashton & Webb, 1986, p. 5)

‘Generalised beliefs about response-outcome contingencies’ are assumed to
develop from broad life experience. They inform orientations towards confidence
and sets of behavioural choices in many circumstances, but their level of influence
in specific contexts is moderated by other task specific beliefs (Ashton & Webb,
1986). Constructs such as Rotter’s (1966) locus of control of reinforcement, on
which the early conceptions of teacher efficacy were formulated (Armor et al.,
1976), may represent one such generalised belief at this or a deeper level. Indeed,
Corcoran (1991) argued that Bandura’s notion of self-efficacy is distinguished
from locus of control only in terms of its level of generality. He viewed self-
efficacy as being simply a representation of locus of control at the specific task
level.
Bandura (1991a, 1993, 1997) argues however, that perceptions of control contribute to individuals’ outcome expectations rather than their efficacy expectations. Self-efficacy and outcome expectancy are related in social cognitive theory in determining the kind of behaviour likely to be produced. Control beliefs concern people’s views about the relative potential for any individual to influence the outcome of certain events. Efficacy beliefs concern individuals’ views about their relative skill in performing the tasks necessary to bring about the desired outcome.

Locus of control has been associated with many of the same behaviours with which self-efficacy has also been associated, such as behavioural choice and persistence in an activity (Carton & Norwicki, 1994; Graham & Weiner, 1993; Lefcourt, 1981; Lefcourt, Hogg, Struthers, & Holmes, 1975; Murphy & Galbraith, 1990). It has been associated as a motivational factor with student achievement and self-regulated learning (Ashkanasy & Gallois, 1987; Drew & Watkins, 1998; Ferrari & Parker, 1992; Marso & Pigge, 1991; Martin & Cowles, 1983; Millar & Irving, 1995; Pintrich & Garcia, 1994; Walden & Ramey, 1983). Teaching behaviours, persistence, innovative practice and levels of teacher stress have shown relationships with teachers’ control orientation (Agne et al., 1994; Greenwood et al., 1990; McIntyre, 1984; Rose & Medway, 1981; Smilansky, 1984; Thomson & Handley, 1990).

Locus of control is however, viewed as a more stable belief construct than self-efficacy and as such, is less likely to vary across settings and tasks (Agne et al., 1994; Ashkanasy & Gallois, 1987; Ferrari & Parker, 1992; Luzzo, 1995). Though some variability associated with domain dimensions has been found (Lefcourt,
1981, 1991; Millar & Irving, 1995) this variability is not represented at the task level. Where measures of both locus of control and self-efficacy have been employed and their comparative impact examined, self-efficacy has demonstrated a stronger relationship with behaviour choice, persistence and level of achievement (Ferrari & Parker, 1992; Greenwood et al., 1990; Luzzo, 1995; Pajares, 1996; Walden & Ramey, 1983; Zimmerman, 1995). Thus, consistent with Ashton and Web’s model, locus of control and outcome expectancy beliefs appear to be related to teaching behaviours but at a more general level of engagement. Self-efficacy appears distinct from these other self-referent beliefs and has demonstrated a greater predictive capacity at the task level. Other self-beliefs are relevant however, and may act in consort with efficacy beliefs to develop expectancies on which behaviour is based. They may also colour attributions made concerning past behaviour (Graham & Weiner, 1993; Lefcourt, 1981, 1991) which inform modifications of self-efficacy beliefs affecting expectancies for future behaviour (Schunk, 1983, 1988, 1994).

Teachers’ ‘sense of teaching efficacy’ represented in Figure 3.1, equates to the notion of GTE (Gibson & Dembo, 1984). This belief was seen by Ashton and Webb (1986) as contributing to teachers’ PTE in conjunction with ‘generalised beliefs about perceived self-efficacy’. Hence, context and task specific expectancies based on PTE are seen as products of general views of teachers’ relative impact, general views about personal competence, as well as perceptions of the outcome of prior behaviours in similar circumstances.

Perceived outcomes following new behaviours will inform modifications within this model in reverse order. Such perceptions impact first on PTE beliefs, then at
the more general level of personal competence and GTE, finally leading to refinement or reinforcement of generalised beliefs about response outcome contingencies (Ashton & Webb, 1986). Various cognitions, attributions, previously held levels of efficacy, amount and type of prior experience, would presumably filter the likelihood of the new information impacting on prior beliefs as the effect of new perception passes from the specific to more general levels in the hierarchy. This effect would reduce the impact of new outcome perceptions on more general beliefs. Thus maximum impact would be felt at higher levels of specificity such as PTE.

Outcome expectancy, locus of control and GTE are therefore seen as more stable constructs than PTE. The relative stability of PTE is seen as being dependent on the amount and similarity of prior experiences from which an individual can gauge expectations of competence in any new situation (Bandura, 1997, 1997; Pajares, 1992). The fewer or more dissimilar the prior experiences, the more an individual needs to rely on generalised beliefs to inform situation specific expectancies of competence (Ashton & Webb, 1986). Under these conditions PTE beliefs are seen as tentative, awaiting confirmation or reconsideration based on the evidence of outcomes perceived as experience grows.

Student or beginning teachers may be more likely on this basis, to initially inform their efficacy beliefs from general views of teachers’ ability to impact on student learning and their beliefs about their own more general views of competence (Ashton & Webb, 1986). Later adjustments to their PTE beliefs would arise from increasing personal experience in a number of teaching tasks. Such adjustments could be precipitated through practicum experiences during their period of
preservice education and continue into the early years of teaching. After sufficient exposure to the multiple tasks of teaching, PTE beliefs would approach relative stability (Bandura, 1997). This model would suggest that GTE beliefs would demonstrate less volatility over a similar period, showing slower rates of change.

While ideally, teachers would hold strong beliefs in GTE and PTE, it is not necessary in social cognitive theory for these two belief constructs to operate in consort (Ashton & Webb, 1986; Bandura, 1997; Labone, 1995). Bandura (1997) suggests that people who have strong beliefs in their self-efficacy for a task and hold the view that people are influential in effecting outcomes in that activity (for example, high PTE and high GTE), are likely to be motivated towards productive and persistent engagement with the task. People who have high self-efficacy for a task but feel powerless to have an effect on the outcome (for example, high PTE and low GTE) are likely to engage in protest to effect change in prevailing conditions. People who perceive they should be effective in their role but see themselves as possessing insufficient skill to successfully complete the required tasks (for example, high GTE and low PTE), are likely to engage in self-deprecation and experience high levels of stress (Ashton & Webb, 1986; Labone, 1995), and those who feel neither empowered nor efficacious (for example, low PTE and low GTE) are likely to exhibit an apathetic reaction to an activity (Bandura, 1997, p. 20).

Ideally, a focus of teacher education programs should be to develop high, but realistic, levels of GTE and PTE (Ashton & Webb, 1986; Pajares, 1992; Woolfolk & Hoy, 1990). As Pajares (1992) points out however, such an expectation may prove to be a difficult endeavour (see also: Borko & Putnam, 1996; Wideen et al.,
1998). Students of teacher education have developed perceptions of teaching and learning through their prior substantial careers as students in schools. This apprenticeship of observation (Borko & Putnam, 1996; Grossman, 1991) is impactful and leads to difficulties in changing earlier held beliefs (Wideen et al., 1998).

Bandura (1986, 1997) contends that efficacy information is derived from four main sources: mastery experiences, vicarious experiences, verbal persuasion and physiological reactions. Of these, mastery experiences are seen as the most powerful influences. Such experiences in teacher development are available during practicum placements and in great quantity once the teacher enters the teaching profession (Loughran, 1996). Hence, perceived success or failure in early teaching performance would have a powerful influence on the students’ developing sense of personal efficacy. The positive or negative results of the mastery experiences would be, according to Bandura, magnified by the physiological reactions to it, such as elation or anxiety.

Vicarious experiences, or modelling, may also be powerful in the development of efficacy expectations, depending largely on the degree of personal identification with the model (Bandura, 1997; Pajares, 1997; Schunk & Zimmerman, 1996; Tschannen-Moran et al., 1998). The apprenticeship of observation has provided preservice teacher education students with an abundance of vicarious experiences from which perceptions of teaching and learning (Dunkin et al., 1994) and in particular, beliefs about the efficacy of teachers in general (Hoy & Woolfolk, 1990) could be formed.
Ashton et al. (1983) described the development and maintenance of teacher efficacy in terms of the ecological structures (after Bronfenbrenner, 1976) impacting on teachers from their preparation, through their initial acculturation into the profession, to their experiences in their daily work. Threats to the development and continuance of high efficacy were identified at each system within the ecological structure (Ashton & Webb, 1986; Ashton et al., 1983). They concluded:

*Our research suggests that teachers’ sense of efficacy is reciprocally and multiply determined by a complex and interrelated system of variables. An adequate understanding of the dynamics affecting teachers’ sense of efficacy requires a perspective that reflects the complexity of the relationships existing among these variables* (Ashton et al., 1983, p. 17).

This identification of multiple reciprocal relationships between elements within an interactive system is consistent with Bandura’s (1978, 1991b) principle of reciprocal determinism which forms a foundation of his social cognitive theory (Bandura, 1986). An important tenet of this theory, within the triadic model, is the causal centrality of the self-efficacy construct (Bandura, 1993, 1997) as it affects behaviours chosen, the effort applied and the level of persistence in the face of difficulty (Bandura, 1997). Entry levels of efficacy are therefore important because they determine many characteristics of behaviour capable of effecting the outcomes expected, which when experienced, confirm the original efficacy belief (Bandura, 1993).

The model therefore has a tendency for stability over time and after multiple experiences confirm initial efficacy expectations (Ashton & Webb, 1986; Ross,
1994, 1998; Tschannen-Moran et al., 1998). PTE should then, be more pliable during teacher training (Butcher & Debus, 1996; Housego, 1992; Hoy & Woolfolk, 1990; Martin, 1989; Wood & Eicher, 1989; Woolfolk & Hoy, 1990), or the early years of teaching (Benz, Bradley, Alderman, & Flowers, 1992; Kemis & Warren, 1991; Soodak & Podell, 1997; Walker & Richardson, 1993), and become more resistant to change after many years of experience (Dembo & Gibson, 1985; Labone, 1995; Pajares, 1992; Soodak & Podell, 1997). Interventions aimed at improving teacher efficacy, and in particular PTE, should be most effective during the period of their initial development (Pajares, 1996, 1997; Ross, 1998; Tschannen-Moran et al., 1998). Preconceptions of teaching held by preservice teachers may, however, make this goal difficult to achieve (Dunkin et al., 1994; Grossman, 1991; Wideen et al., 1998).

3.1.1: The Measurement of Teacher Efficacy
The two original Rand teacher efficacy questions lacked the empirical rigour necessary for broad-based studies to confirm the initial relationships proposed between teacher efficacy and teaching behaviours. To enable comparisons of teacher efficacy beliefs on a larger scale Gibson and Dembo (1984) developed a scale to measure the construct according to the two dimensions identified in the Rand study. The Gibson and Dembo scale has since been the basis of the majority of studies that have attempted to establish connections between teachers’ efficacy beliefs, their teaching behaviours and student outcomes (Tschannen-Moran et al., 1998).

Gibson and Dembo (1984) conducted a three-phase study in the development and revision of their teacher efficacy scale, which demonstrated adequate construct,
concurrent, convergent, discriminant, predictive validity and internal consistency.

They collected data from a number of sources including open and closed self-report questionnaires, tests of verbal ability and flexibility, and classroom behavioural observations. Through this process these researchers were able to demonstrate that teacher efficacy, as measured by the Gibson and Dembo scale was a multi-dimensional construct, including at least the two dimensions identified in the earlier Rand studies, distinct from other teacher variables such as verbal ability and flexibility. These two main dimensions were interpreted to be consistent with Bandura’s dimensions of self-efficacy and outcome expectancy and were labelled PTE and GTE respectively (Gibson & Dembo, 1984). This interpretation of the constructs measured by the scale has however been disputed (Guskey & Passaro, 1994; Tschannen-Moran et al., 1998; Woolfolk & Hoy, 1990).

Woolfolk and Hoy (Hoy & Woolfolk, 1993; Tschannen-Moran et al., 1998; Woolfolk & Hoy, 1990) argue that the GTE dimension identified in Gibson and Dembo’s instrument is not a measure of outcome expectancy according to social cognitive theory. Like RAND 1, questions within the scale relate to the impact teachers generally have in overcoming potential negative effects of home background and other social impediments. These do not equate with a teacher’s expectations of self-satisfaction for succeeding in a teaching task. Such personal effects comprise the outcome expectations construed in social cognitive theory (Bandura, 1986, 1997). Thus, outcome expectations may encourage behaviour because an individual may believe that personally satisfying consequences will accrue from the production of the behaviour. The absence of personally satisfying consequences would act to discourage behaviour because, despite having the
requisite skill, the individual may perceive that the results of the behaviour are not worth the effort (Bandura, 1997).

Woolfolk and Hoy argue that the construct in Gibson and Dembo’s scale is appropriately labelled ‘general teaching efficacy’ as it relates to an individual’s expectations of teachers’ general empowerment and not the expectation of a personal outcome. Bandura (1997) proposes that outcome expectancies, in any event, offer little to the likelihood that behaviour will be enacted, beyond that predicted by self-efficacy. The general/personal dimensions, as interpreted by Woolfolk and Hoy, enable consistent interpretation of the Gibson and Dembo scale in relation to other measures used (Armor et al., 1976; Ashton & Webb, 1986) and with outcomes that would be predicted to variously lead to occupational satisfaction or stress (Agne et al., 1994; DeMoulin, 1994; Greenwood et al., 1990; Labone, 1995). The GTE dimension identified in Gibson and Dembo’s scale, as a measure of general empowerment, also appears to fit the interplay described by Bandura between empowerment beliefs and efficacy beliefs (Ashton & Webb, 1986; Bandura, 1997; Labone, 1995).

In attempting to resolve the issues raised by Guskey and Passaro (1994), Tschannen-Moran et al. (1998) refined the interpretation proposed by Woolfolk and Hoy (Hoy & Woolfolk, 1993; Woolfolk & Hoy, 1990). Their later interpretation of the GTE dimension identified in the Gibson and Dembo scale was that it partly informed an individual’s ‘analysis of the teaching task’ (Tschannen-Moran et al., 1998, pp. 231-232). In other words, prior to the formation of efficacy expectations teachers would be required to analyse the ‘resources and constraints’ of the setting. Such an analysis would be informed
partly by a belief about how successful teachers generally may be in overcoming common contextual or cultural constraints. Thus, for the purposes of the current research, it is accepted that the GTE dimension of the Gibson and Dembo scale does not conform to the properties of Bandura’s concept of outcome expectancy. Instead, the subscale measures general views concerning teachers’ ability to overcome negative aspects of other influences on children’s education and behaviour, such as home and family background. This formulation brings the GTE dimension in line with the views expressed by Woolfolk and Hoy (Hoy & Woolfolk, 1990; Woolfolk & Hoy, 1990) and Tschannen-Moran et al. (1998).

Two main difficulties have also been identified with Gibson and Dembo’s PTE subscale (Bandura, 1997; Pajares, 1996, 1997; Tschannen-Moran et al., 1998). These difficulties centre on problems with task specificity and the temporal framing of questions within the scale. The issue of task specificity has been mentioned earlier and relates to the problem arising from the definition of self-efficacy as a task-specific belief concept. Bandura (1997) has criticised current self-efficacy scales used in the research literature on the basis that items on these scales are too general. He suggests that connections between self-efficacy and other behaviours are most likely to be determined when response items are highly specific. Where items are less specific the instrument will be less likely to identify changes in efficacy, or connections between efficacy and behaviour (Bandura, 1997, pp. 44-45).

There is a clear trade-off however, between the level of specificity of an item in a scale and the generalisable utility of the scale. Highly specific items would be useful in single-subject or small case studies where teachers operate for example,
within the one school and the one teaching domain. Broad-based studies require
respondents from many similar settings, but which may differ in terms of many
specifics. Thus, scale items cannot be framed to a level of high specificity. What
is lost in such scales is some degree of the scale’s sensitivity, but potential
external validity is increased. Small studies using highly specific items, gain
sensitivity to change and improved predictive validity in the individual case, but
have a limited ability to be generalised.

Adequate coverage of a field of research requires both sets of data. In the current
study, in which preservice teacher education students were the focus of the
research and efficacy measures were required to be repeated over several years
and across cohorts, a high level of specificity was not appropriate. These students
had developing but limited views of the teaching role, especially early in their
course. Views about their own personal competence in teaching contexts were
expected to be closer to the level of generality depicted in the Gibson and Dembo
scale. Thus this scale was considered adequate for the current purpose.

Tschannen-Moran et al. (1998) and Ross, (1998) also emphasise that PTE beliefs
take the form of expectations of task performance in specified future settings.
Thus they are predictions of future effectiveness with task engagement.
Tschannen-Moran et al. (1998) point out that the items measuring PTE in the
Gibson and Dembo scale have variable temporal location. Some items cast the
situation as a future event and some as present or past influences. While
evaluations of present and past events inform future expectations they don’t
comprise the efficacy belief. Tschannen-Moran et al. (1998, pp. 232-233)
reinterpreted the meaning of this subscale to indicate ‘self-perceptions of teaching
competence’ rather than PTE. In other words, according to these authors, the PTE subscale measures a precursor to PTE, rather than the belief construct itself.

In the current study however, all items in the PTE scale were recast as descriptors of future events, largely because as student teachers, the participants in the study needed to view their teaching competencies in terms of expectancies, rather than current performance skills. In doing so, this difficulty with the Gibson and Dembo scale was largely overcome. Nevertheless it is accepted that because of the lower specificity of items and the limited task knowledge of the participants in the current study, PTE measures from the Gibson and Dembo scale are more likely to describe precursors to eventual task-specific teaching self-efficacy beliefs. Since the majority of research conducted into the construct of teacher self-efficacy has used the Gibson and Dembo scale, including studies conducted with preservice teachers (Bettenhausen & Rogers, 1991; Campbell, 1996; Emmer & Hickman, 1991; Evans & Tribble, 1986; Housego, 1992; Hoy & Woolfolk, 1990; Soodak & Podell, 1997; Tschannen-Moran et al., 1998), the use of this scale in the current research enabled comparison with the outcomes of previous research.

With reference to observed teaching behaviours, Gibson and Dembo (1984) predicted, consistent with Bandura’s (1977, 1978) theory of self-efficacy, that teachers who scored highly on PTE and GTE, would expect positive student learning outcomes from appropriately skilled teachers and would perceive they personally held the necessary skills to produce such outcomes. Because of these beliefs, these teachers would engage in their teaching more readily, plan more effectively and demonstrate greater persistence in the face of student difficulties.
Classroom observations conducted by Gibson and Dembo (1984) confirmed that teachers who scored highly on both PTE and GTE scales engaged in effective teaching behaviours more often than did teachers with low efficacy scores. High efficacy teachers engaged in whole class instruction more often, and interacted with individuals and small groups less often. They did not use intellectual or motivational games and spent a greater proportion of their time on preparation. When interacting with students they demonstrated greater persistence with those who had difficulty with the tasks, and omitted any criticisms of students when errors occurred. Gibson and Dembo (1984) also reported anecdotal evidence that high efficacy teachers had greater classroom control and demonstrated greater “withitness” (after Kounin, 1970) than teachers who had low efficacy scores.

A number of other studies, reported above, have repeatedly confirmed these findings and identified a number of other differences in the behaviour of teachers who report high PTE in particular. Among these, the use of humanistic methods of classroom management and discipline, the application of innovative teaching practices, and the willingness to cater for children with special learning needs have been regularly identified as predicted by PTE beliefs (Agne et al., 1994; Allinder, 1995; Bender & Ukeje, 1989; Butcher & Debus, 1996; Ghaith & Yaghi, 1997; Podell & Soodak, 1993; Ross, 1994; Ross et al., 1996; Saklofske, Michayluk, & Randhawa, 1988; Woolfolk & Hoy, 1990).

Most of these studies have used the Gibson and Dembo scale as originally devised or with minor modifications, indicating that its level of sensitivity is sufficient for the identification of the constructs among practising teachers. The teaching behaviours identified in conjunction with the use of the Gibson and Dembo PTE
subscale are also consistent with Bandura’s (1997) description of behaviours linked to variations in self-efficacy expectations. Despite the criticisms proffered (Guskey & Passaro, 1994; Tschannen-Moran et al., 1998), the scale therefore appears to hold acceptable concurrent validity as a measure of personal teaching self-efficacy.

3.1.2: Teacher Efficacy and Teaching Outcomes
The early Rand studies identified teacher efficacy as an important determining variable affecting student achievement (Armor et al., 1976; Berman & McLaughlin, 1977). Ashton and Webb (1986) further highlighted the connection between teachers’ efficacy beliefs, their behaviours and student achievement. Further evidence to support this connection with learning outcomes has come from a number of studies that have shown student achievement to be related to teachers’ efficacy beliefs (Agne et al., 1994; Allinder, 1995; Anderson et al., 1988; Benz et al., 1992; Chapman & Tunmer, 1997; Tracz & Gibson, 1986).

Effects on students’ self-efficacy for academic achievement from their teachers’ teaching efficacy were also demonstrated in a study by Midgley, Feldlaufer and Eccles (1989). These researchers assessed changes in students’ efficacy for mathematics as they progressed from elementary to junior high school. They also assessed the teachers’ teaching efficacy in both settings and noted differences among students’ self-efficacy beliefs as they moved to high school classes in which the teachers’ efficacy varied from that of their previous teacher. Students who moved from high to low efficacy teachers showed a delayed but corresponding drop in their own academic self-efficacy, which was especially pronounced for lower achieving students. Lower achieving students who moved
from low to high efficacy teachers demonstrated a growth in their academic self-efficacy beliefs. Only high achieving students showed any resilience to this trend, but changes in their self-efficacy expectations followed a similar pattern. Students who moved from high to high efficacy teachers showed no change in their own efficacy expectations (Midgley et al., 1989).

Direct and indirect links between student academic self-efficacy and student achievement have been demonstrated in numerous studies which indicate that student self-efficacy is a strong predictor of student achievement (Anderson et al., 1988; Bandura, 1993; Bandura & Schunk, 1981; Ferrari & Parker, 1992; Moriarty, Douglas, Punch, & Hattie, 1995; Pajares & Miller, 1994; Ross, 1998; Schunk, 1988; Zimmerman et al., 1992). Thus the research has demonstrated effects flowing from teacher efficacy which impact on student achievement directly, and indirectly through improved on-task behaviour and academic engagement. Teacher efficacy also shows an impact on students’ own academic self-efficacy beliefs which are strongly associated with student achievement outcomes (Bandura, 1997; Pajares, 1996; Ross, 1998; Schunk & Zimmerman, 1994, 1997).

The research reviewed in this and the preceding section suggests strong correspondence between teacher efficacy, teacher behaviour and student outcomes. The direct and indirect effects of teacher efficacy are brought about by the influence of efficacy beliefs on teachers’ behaviour. This research has consistently indicated that teachers with a high sense of PTE set higher goals for themselves and their students; engage in teaching activities more readily; actively choose teaching methods that are productive; are sensitive to student individual
differences; plan and prepare more thoroughly; persist in seeking solutions to
teaching problems; apply innovative methods; are more democratic and
humanistic in their classroom management; and use encouragement more often,
avoiding criticism of student errors. Such behaviours are those identified by the
research into teaching practice, that differentiate teachers of high and low
effectiveness (Agne et al., 1994; Berliner, 1984; Brophy & Good, 1986; Ross,

3.2: Self-Regulation as an Overarching Mechanism

3.2.1: Self-Regulatory Mechanisms
Central to Bandura’s social cognitive theory is the principle of reciprocal
determinism (Bandura, 1986, 1991b). Through this principle Bandura posits that
internal personal factors such as beliefs and cognitive processes, behaviour, and
environmental factors, interact as origins and effects in a causal relationship.
According to this model individuals’ forethought directs their behaviour and
produces environmental outcomes which are perceived, and may cause the
original thoughts or behaviour to be modified. Alternatively, certain environments
cause people to think in different ways, which call upon them to behave in a
manner intended to maintain or modify the environment. As people behave, their
actions and the environmental outcomes produced are monitored in relation to
predetermined goals and beliefs. These observations may reaffirm the original
beliefs or lead them to be modified. A triadic relationship of interactive cause and
effect is thus established between the three components of cognition, behaviour
and environment (Bandura, 1986, 1991b; Pajares, 1997; Schunk, 1989).
The monitoring of behaviour and environmental outcomes leading to subsequent adjustment of behaviour or beliefs are the core functions of self-regulatory mechanisms (Zimmerman, 1998a). According to Bandura, people are guided in their behavioural choices by predetermined goals, an assessment of environmental conditions and of their own capabilities required in order to achieve them (Bandura, 1991a, 1997). Progress towards the goal is monitored and adjustments are made to the behaviour, the goal or other self-beliefs in the light of self-regulatory processes. The processes assumed to comprise self-regulation are summarised in Figure 3.2. These processes involve monitoring one’s own behaviour and the environmental outcomes generated from it through a series of subfunctions, which perform comparisons with original goals and other belief constructs (Zimmerman & Bandura, 1994).

Task goals can vary according to their level of specificity, difficulty, temporal proximity, and the standard by which attainment is to be measured. In Bandura’s model of self-regulation, observations of behaviour and environmental outcomes are compared with goal requirements and with past observations to inform about progress towards the goal. Such information is used as a motivational force and to provide guidance about necessary behavioural adjustments to enable goal attainment, to modify perceptions of the goal’s attainability, or to modify aspects of the goal itself (Zimmerman & Bandura, 1994). The quality of the behaviour, its productivity in producing desired outcomes, and other attributes such as its moral or ethical fidelity may also be observed depending on the beliefs most highly valued by the individual (Bandura, 1991b). Attributes of the behaviour that

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2 The construct measured by Gibson and Dembo’s GTE subscale is assumed to inform teachers’ assessments of environmental conditions, while the PTE subscale is assumed to inform their perceptions of personal capability.
intersect with issues seen as pertinent to the goal and behavioural standards are those likely to be most rigorously monitored. These processes have been observed in the development of new skills and in the performance of tasks by experts in disparate fields of endeavour (Zimmerman, 1998a).

**Figure 3.2. Social Cognitive Model of Self-Regulation**
(adapted from: Bandura, 1986, 1991a, 1997; Schunk, 1989; Schunk & Zimmerman, 1997)

A metacognitive process of monitoring the quality of the monitoring is also suggested by Bandura (1991b) as being involved in the observational process. Irregular monitoring may be perceived as presenting an unreliable picture of
progress toward a goal. Monitoring which is temporally distant from the
behaviour or inaccurate would reduce the quality of the information obtained and
thus reduce its influence on future behaviour.

Behavioural observations must be judged to inform adjustments to future
behaviour or beliefs, but also to provide immediate self-reactions of relative
satisfaction or dissatisfaction with behavioural quality and progress. Judgements
are based on personal standards that develop from past experiences, vicarious and
social sources, and from reference to comparative groups with whom the
individual identifies. Whether a performance is judged good or bad will depend
on comparisons with an individual’s past performance, the relative performance
of similar others, and whether the behaviour is adequate to meet the goal
requirements (Bandura, 1991b, 1997; Schunk, 1989; Schunk & Zimmerman,
1997; Zimmerman, 1998a). Performances judged highly will build the
individual’s sense of efficacy for the task and provide motivation for continued
effortful engagement with the task (Zimmerman & Bandura, 1994).

Motivation is further mediated by the value ascribed to the successful
performance of the activity and the responsibility assumed for the outcomes
observed. Successful performance in a highly valued task, in which an individual
attributes outcomes to personal effort, is likely to provide strong motivation for
the continuance of the behaviour (Graham & Weiner, 1993). Unsuccessful
performance under these conditions may induce considerable stress. Successful
performance in tasks considered of little value or where outcomes are attributed to
factors external to the individual will have little motivating force (Bandura,
Values and attributions may be affected by performance appraisal so that an individual may ascribe a higher value to activities in which successful performance is observed. Activities in which poor performance is observed may be devalued or outcomes attributed to external factors. Consistent with the principle of reciprocal determinism, the outcomes of behaviour may thus prompt a reappraisal of the beliefs held (Bandura, 1997).

The final self-regulatory process according to social cognitive theory involves the valency of self-reaction. On the basis of observations and judgements made an individual will variously feel self-satisfied, remain neutral, or apply self-censure (Bandura, 1986, 1991b). These self-reactions may be restricted to affective influences or may involve tangible self-reward for perceived successful performance (Schunk, 1989; Schunk & Zimmerman, 1997; Zimmerman, 1998a; Zimmerman & Bandura, 1994). Self-reactions are linked to Bandura’s (1986, 1997) formulation of outcome expectancy. Before engaging in effortful behaviour, people anticipate outcomes that involve positive self-evaluation. Self-reactions, which are confirming of the anticipated self-satisfaction, motivate continued effort. Self-reactions that lead to self-censure or fail to provide the anticipated positive outcomes may lead the individual to modify, or withdraw from, the behaviour. These reactions are complex however, and interactions with other beliefs, such as self-efficacy, may produce different behavioural responses.

If the social cognitive theory of self-regulation is applied to the teaching example introduced in section 3.1 (Wills, 1998), the following process may have resulted in greater attention being paid to the teaching of mathematics instead of literacy skills. The teacher in a small rural school may believe she has the competence to
teach the skills and subskills of an aspect of the mathematics syllabus. She may also believe that she can adjust her teaching approach to take account of children’s individual progress in the development of these skills and meet the diverse needs of her multi-age class. She would anticipate success and a feeling of self-satisfaction on seeing the children master a new concept. She may also expect other outcomes such as parental approval. Given these anticipatory perceptions, she may engage the teaching task with eagerness and enthusiasm, clarity of purpose, effortful preparation and vigilance in observing the children’s progress.

Because of the high level of engagement the teacher developed by virtue of her beliefs, the likelihood of positive learning outcomes is high. Observations could confirm that the majority of students progressively succeed in mastering the material. Judgements are likely to meet personal standards and meet, if not exceed, the expected attainments described in the syllabus documentation. If the teacher viewed the mastery of the task by these children as a valuable gain, which would also be valued by their parents, and attributed the children’s success to her effort and ability as a competent teacher, the resultant feeling of self-satisfaction would reinforce her self-efficacy for the teaching of mathematical concepts.

Some children may not have progressed as well as the others, but with the vigilant monitoring of progress and confidence in her ability, aided by adequate support materials, the teacher could remediate these difficulties early. With energy applied to assist those having difficulty, they may also demonstrate adequate progress, leading to further self-satisfaction.
The teaching of literacy skills, especially writing, presented a very different scenario for this teacher (Wills, 1998). Unable to translate the syllabus document for guidance as a practical teaching tool and without perceived professional development support, the teachers’ goals were unclear. The approach taken by the syllabus was new and models of appropriate practice were not provided. The teacher’s self-efficacy for the task was apparently low, with correspondingly low confidence in her ability to monitor progressive achievement. Writing was not a valued activity for the teacher, nor from her perception was it valued by the children or their parents. Little writing was performed in the children’s homes and thus despite her potential efforts, the teacher believed that a lack of practice at home would result in a tediously slow learning process. With unclear goals, low self-efficacy, low efficacy for self-regulation in the activity, external locus of causality, and a devalued perception of the worthiness of the activity, the teacher’s expectancy for self-satisfaction with the outcome would also be low. Beginning with these beliefs, it is not surprising that the teacher devoted relatively little class time, beyond minimum requirements, to the task of writing (Wills, 1998).

Observations of performance would likely be less regular and less well defined. Performance outcomes would be lower than the mathematics task and student engagement would likely be reduced. Performance may be judged adequate in terms of the lowered personal standards applied to the writing task, but may also be lower than referent standards. The teachers’ low self-efficacy for teaching writing skills may be confirmed, but her efficacy for teaching more generally may be protected from possible threat by virtue of the lowered value placed on the activity, and by attributing the cause of lower performance to external conditions such as home, or the lack of support for writing skills in a small rural community.
Such attributions could enable the teacher to escape self-censure, but the anticipated absence of self-satisfaction or any other reward would be attained.

The reciprocal relationships between beliefs, behaviours and environmental conditions from the teacher’s perspective, are evident in the above example. Less evident, but of considerable importance is the outcome of the teacher’s actions, largely brought about by the teacher’s beliefs, on the children’s developing self-efficacy beliefs for learning mathematics and writing skills. Beliefs established by the children about their relative competence in these tasks will be likely to impact heavily on their attainments in future learning (Schunk, 1988, 1994; Schunk & Zimmerman, 1996; Zimmerman et al., 1992).

3.2.2: The Causal Centrality of Belief Mechanisms
Despite adherence to the principle of triadic reciprocal determination, which states that causal relationships can be developed and reinforced through any of internal, behavioural, or environmental sources, the impact of each of these sources in causal relationships is not given equal weighting in social cognitive theory.

_Self-regulatory systems lie at the very heart of causal processes. They not only mediate the effects of most external influences, but provide the very basis for purposeful action. Most human behaviour, being purposive, is regulated by forethought_ (Bandura, 1991b, p. 248).

Bandura’s contention is that through self-regulatory cognitive processes individuals initiate behaviour, perceive and regulate its expression and observe its product. While environmental forces can influence behavioural choices and provide incentives to act, individuals make the decision to carry out actions
through self-regulatory processes. A crucial component in self-regulation is an individual’s self-efficacy belief. Bandura further states that:

Among the mechanisms of agency, none is more central or pervasive than beliefs in personal efficacy. Unless people believe they can produce desired effects by their actions, they have little incentive to act. Efficacy belief, therefore, is a major basis for action. People guide their lives by their beliefs of personal efficacy (Bandura, 1997, pp. 2-3).

Self-efficacy clearly is not the only determining construct and many aspects of an individual’s belief system, behavioural repertoire, and self-regulatory processes influence the choice of behaviour. Bandura, however, contends that belief constructs are causally central to behavioural expression and that self-efficacy beliefs are predominant amongst the constructs that influence behaviour. He argues (Bandura, 1977, 1982, 1986, 1991a, 1991b, 1997) that self-efficacy influences the activities chosen, the goals and difficulty level set, effort and enthusiasm applied, level of persistence in the face of difficulty, and affective self-reactions. Through these influences self-efficacy plays a determining role in most behavioural choices.

Research demonstrating the strong influence of self-efficacy beliefs has been reported in a wide variety of activities (Bandura, 1993, 1997; Chapman & Tunmer, 1997; Cury, Biddle, Sharrazin, & Famose, 1997; Luzzo, 1995; Moriarty et al., 1995; Pajares, 1997; Schunk & Zimmerman, 1997; Zimmerman, 1998a; Zimmerman & Risemberg, 1994). In educational settings Schunk (1983, 1988, 1989, 1994) has reported numerous studies, which have demonstrated the centrality of the self-efficacy construct in influencing the learning of children who
have experienced learning difficulties. Zimmerman and his colleagues (Zimmerman & Bandura, 1994; Zimmerman et al., 1992; Zimmerman & Risemberg, 1994) have shown the direct and indirect effects, via goal setting, of self-efficacy in educational achievement of both school and college students. Research reported earlier has demonstrated the connections between teacher self-efficacy, teaching behaviours and teaching outcomes.

There seems little doubt that self-regulatory processes, and the self-efficacy belief construct in particular, are influential in the determination and maintenance of individuals’ behaviour in diverse activities (Zimmerman, 1998a). Evidence from teaching and learning indicates a significant role for self-regulation in both activities and within their interaction. The self-efficacy of teachers can affect the self-efficacy of students (Ashton & Webb, 1986; Midgley et al., 1989) and although not reported in the literature, the self-efficacy of students may affect teachers’ perceptions of efficacy because of the persistence necessary to teach students with low efficacy.

3.3: The Development and Maintenance of Teacher Efficacy
At an operational level efficacy beliefs must be matched by appropriate skill levels. Beliefs alone cannot produce skilled behaviour (Bandura, 1997). The skills involved in teaching however, are multifaceted and often require the teacher to devise solutions to novel problems in novel circumstances. While much teaching behaviour may eventually develop to a level of automaticity requiring little conscious cognitive processing (Ashton & Webb, 1986; Bandura, 1997), considerable planning, skilled execution and persistent effort will be required in novel circumstances. A considerable amount of the teaching process will be novel
to beginning teachers requiring levels of self-regulation above that required in subsequent years (Loughran, 1996).

Recent calls in the literature have identified the need for research to examine the development of teacher efficacy in teacher preparation programs (Pajares, 1996, 1997; Tschannen-Moran et al., 1998) especially involving longitudinal studies employing quasi-experimental designs (Pajares, 1996, 1997). The early years of teaching impose many threats to the developing efficacy of beginning teachers. Modifications to teacher education programs, which develop high efficacy and provide some measure of protection against the threats to efficacy in the early years of teaching, may assist teachers to maintain high efficacy beliefs leading to improved teaching and learning in schools (Pajares, 1996; Tschannen-Moran et al., 1998; Wideen et al., 1998).

Tschannen-Moran et al. (1998) described the development and maintenance of teacher efficacy beliefs diagrammatically (see Figure 3.3). They identified initial sources of efficacy information in accordance with Bandura’s (1986, 1997) view that they develop mainly from mastery experience, but also from the observation of others, verbal persuasion and the personal physiological effects of behavioural performance. In this model, these sources of evidence of personal competence from past experience are weighed in terms of current goals and task requirements to produce a prediction of likely efficacy in the current setting. Behavioural components are chosen in the manner described earlier and the performance outcomes are perceived and incorporated as new sources of efficacy information, which after accommodation with prior beliefs, influence future predictions of efficacy.
As mentioned earlier, this cycle of action and reaction has a tendency towards stability after repeated experience with similar tasks under similar conditions. Thus it would be predicted by social cognitive theory that teachers’ efficacy beliefs, the teaching tasks in which they readily engage, the teaching methods they typically choose, their relative persistence with children who have difficulty learning, and the pattern of learning outcomes they attain, would be reasonably stable and resistant to change after an initial developmental period (Ross, 1998; Tschannen-Moran et al., 1998).

Evidence relevant to the contention that teacher efficacy would stabilise and be resistant to change after an initial developmental period comes from a number of cross-sectional studies of the self-efficacy of teachers at various stages of professional experience (Benz et al., 1992; Campbell, 1996; Evans & Tribble, 1986; Herbert, Lee, & Williamson, 1998; Soodak & Podell, 1997). The findings
of these studies are however inconclusive. While they do generally reflect the pattern of a developmental period in which efficacy beliefs are unstable, leading to greater stability with increased experience, the entry levels and directions of change vary.

Soodak and Podell (1997) and Evans and Tribble (1986) reported that entry PTE levels of beginning teachers in their studies were very high, perhaps unrealistically so. The first two years of teaching experience appeared to operate as a reality shock, in which beginning teachers reassessed their PTE expectations to somewhat lower levels. This period was followed by sustained long-term growth in PTE, which stabilised over a period of approximately five years to a level remaining below the initial expectations of beginning teachers. This pattern was most pronounced with elementary level teachers. Though a similar pattern was evident with secondary teachers, the differences were not statistically significant. For both groups of teachers, perceptions of GTE remained relatively stable over time regardless of experience, though higher GTE was noted by elementary teachers, compared with secondary teachers.

The studies conducted by Herbert et al. (1998) and Campbell (1996) compared the efficacy expectations of preservice and experienced teachers using modified versions of the Gibson and Dembo scale. In contrast to Soodak and Podell’s (1997) findings, Campbell’s (1996) study indicated that, on the PTE dimension, final year preservice teachers held lower efficacy expectations than experienced teachers. His results obtained from small samples in two countries suggested that PTE strengthened with years of experience, higher teaching qualifications and age. The GTE dimension was not examined in Campbell’s study.
Herbert’s et al. (1998) results indicated that the GTE of preservice teachers was also lower than that of experienced teachers and a sharp growth in GTE beliefs was reported within the early years of teaching experience, remaining at these higher levels beyond 16 years of experience. The PTE of preservice teachers did not differ from that of experienced teachers in Herbert’s et al. study. The group of preservice teachers in Herbert’s et al study comprised students from all years of training however, including students from their first and second years of study who may be expected to hold naïve views about their efficacy as teachers. The teachers in this study also represented those from elementary and secondary settings, between whom differences were noted in Soodak and Podell’s investigation. Differences between subgroups within Herbert’s et al. study therefore may have been concealed by the agglomeration of groups within their samples.

Herbert et al. (1998) along with Benz et al. (1992) reported qualitative differences in efficacy expectations of preservice and beginning teachers, compared with experienced teachers. Differences were noted in relation to the tasks in which preservice teachers expressed high confidence compared with experienced teachers (Benz et al., 1992). Differences were also found between preservice and experienced teachers in the sources of efficacy information (Herbert et al., 1998). Experienced teachers reported relying on evidence from practice and outcomes observed to form their efficacy beliefs, whereas preservice teachers relied more often on confidence in their personal qualities.

The cross-sectional nature of these investigations (Benz et al., 1992; Campbell, 1996; Herbert et al., 1998; Soodak & Podell, 1997) could, of course, have affected
the validity of the findings because of the expected attrition of teachers with low PTE from the profession. Additionally, teachers with high efficacy expectations may have been promoted to administrative positions after a number of years of experience. These two groups therefore may have been absent amongst the experienced teachers in cross-sectional studies, but those who would eventually fall into either of these categories would have been present in the beginning and preservice teacher samples. The influence of the presence or absence of these groups from preservice or experienced teacher samples cannot be estimated and may partially explain the variability in the results obtained.

Short-term longitudinal studies examining the transition period from preservice to beginning teaching (Kemis & Warren, 1991; Loughran, 1996; Martin, 1989; Walker & Richardson, 1993) have however, consistently demonstrated the reality shock experienced by many beginning teachers. Threats to efficacy evidenced in this transition period include: the full-time multi-task demands of teaching; full responsibility for student outcomes and class organisation; planning and preparation requirements; classroom management; meeting students’ individual needs and managing administrative demands. The workplace pressures for teachers in their first two years led many to report that they spent the first two years fully concentrating on survival and were only able in their third year to begin to reflect on their performance (Loughran, 1996).

Efficacy information available to preservice teachers is limited (Tschannen-Moran et al., 1998). For the most part during coursework, it would take the form of verbal persuasion and vicarious experience. Bandura (1997) contends that these are weaker sources from which individuals may build their personal efficacy
expectations. They may be tentative at best, and be open to confirmation or modification from the more powerful source of mastery experience. Verbal persuasion and modelling effects are more likely to affect the development of GTE than PTE. They can contribute to preservice teachers’ views about how impactful teachers are able to be, but only by inference would they inform preservice teachers’ views about their own competencies.

Student teacher practicum experiences provide possibly the only source of information from a mastery perspective, and according to Bandura’s (1997) formulation this should provide the most powerful information to preservice teachers about their PTE. A number of studies have examined the impact of teaching practice on teacher preparation and the development of efficacy beliefs (Butcher & Debus, 1996; Deer et al., 1997; DeMoulin, 1994; Dunkin et al., 1994; Ghaith & Yaghi, 1997; Gorrell & Hwang, 1995; Housego, 1992; Hoy & Woolfolk, 1990; Martin, 1989; McCormack, 1996; Wood & Eicher, 1989). From a variety of perspectives these studies have repeatedly demonstrated the superior power of practicum experiences to influence preservice teachers’ beliefs about their preparedness and competence as teachers.

Practicum experiences of preservice teachers are however limited in the amount and length of time continuously spent in the role of teacher, and in the degree of responsibility the student teacher would feel, or could assume, for learning outcomes. They are also usually intended as supported environments with mentoring provided by an experienced teacher who may assume final responsibility for classroom management and provide formative and summative
feedback on a regular basis (Dunshea et al., 1995), though this ideal is not always provided by supervising teachers (Coladacci & Brenton, 1991).

Although the experience of reality shock for beginning teachers is well documented, the research is conflicting about the level of confidence exhibited by preservice teachers. Some studies indicate that preservice teachers report high levels of PTE and GTE amounting to overconfidence (Soodak & Podell, 1997; Walker, 1992; Walker & Richardson, 1993). They suggest that this overconfidence is based on an ill-informed view of the demands of the teaching profession and this makes beginning teachers susceptible to efficacy threats in their early years in the profession. Other research suggests that the efficacy expectations of preservice teachers are similar or somewhat lower than those of practising teachers (Campbell, 1996; Herbert et al., 1998).

Some studies have identified that preservice and practising teachers differ in their efficacy expectations about different aspects of teaching and suggest that global measures may not identify these differences (Benz et al., 1992; Evans & Tribble, 1986; Ginns, Tulip, Watters, & Lucas, 1995; Herbert et al., 1998). For example, preservice teachers may view highly their ability to motivate students using innovative methods, but have concerns about their classroom management and assessment skills (Benz et al., 1992; Hoy & Woolfolk, 1993; Woolfolk & Hoy, 1990).

Studies that have compared perceptions of preservice teacher efficacy with teaching behaviours indicate that students’ perceptions may be accurate predictors of their teaching competence (Marso & Pigge, 1991; Saklofske et al., 1988; Wood
& Eicher, 1989). For example Wood and Eicher (1989) found a close match between students’ efficacy ratings following practicum experience compared with their supervisors’ ratings of their performance.

Though the evidence is unclear about the accuracy of students’ assessments of their competence in teaching tasks, their teaching behaviours do differ in tandem with their efficacy expectations, in similar ways to practising teachers (Gorrell & Trentham, 1992; Hoy & Woolfolk, 1990; Woolfolk & Hoy, 1990). Those who hold high efficacy beliefs therefore, should engage in the teaching process more readily, apply more effort to their teaching and persist longer in the face of difficulty (Bandura, 1997). Such behaviour is more likely, according to self-efficacy theory, to bring about positive outcomes that should strengthen the original efficacious belief by providing beginning teachers with early mastery experiences.

It is important however, that these early experiences are ones of mastery and not ones that threaten the beginning teacher’s sense of efficacy. Since it is during teacher training and the early years of teaching that efficacy beliefs are malleable (DeMoulin, 1994; Ross, 1998; Tschannen-Moran et al., 1998), sustained high efficacy is likely to be achieved where teacher education programs build a high level of skill, and induction into the teaching profession is conducted in a supportive way (Dunshea et al., 1995; Loughran, 1996; Sumison, 1996). These circumstances may make mastery in early experience more likely.

As previously indicated, it is not sufficient for students to have confidence in their ability to teach. They must also have the ability to teach, otherwise their
confidence may be quickly exposed to the threats to efficacy identified by Ashton et al. (1983). These researchers suggested that teaching exposes teachers to efficacy threats for a number of reasons. The absence of benchmarks makes it difficult for teachers to know if their performance is competent and if their efforts result in lasting change in their students. Because teachers work in relative isolation from one another and there exists a culture of non-interference, teachers receive few collegial supports. Ashton et al. (1983) also suggested that teachers feel largely disempowered by decisions emanating from administrators and perceive little support from their school-based superiors. They are often the subject of public criticism and receive little public reward or recognition for their efforts (Ashton et al., 1983, pp. 9-10).

In addition to these efficacy threats endemic in the teaching profession, beginning teachers face problems associated with planning and organising a class on a full-year basis; classroom management and discipline issues; catering for students with diverse learning needs; assessing student progress and evaluating teaching outcomes; dealing with parent concerns; and meeting recording and administrative requirements (Labone, 1995; Loughran, 1996; Marso & Pigge, 1991; Martin, 1989; Moeller & Ishii-Jordan, 1996; Wideen et al., 1998; Woolfolk & Hoy, 1990).

These demands may place a considerable pressure on newly appointed teachers and given the absence of a collegial base, these pressures may not be shared. It may be insufficient in these circumstances for beginning teachers to rely on the limited content material provided during a teacher education program (Ashton, 1984; Dunkin et al., 1994; Wideen et al., 1998). Not all problems encountered
could have been anticipated during teacher training despite the building of recommended competencies (Preston & Kennedy, 1995). Many of the issues beginning teachers must confront could present as problems in novel form, requiring the application of appropriate problem-solving mechanisms embedded within a metacognitive frame (Biggs, 1993a), and following self-regulatory processes (Bandura, 1991b; Zimmerman, 1989).

In the light of teacher efficacy research, recommendations for the modification of teacher education programs have been made to enhance beginning teachers’ resilience in the face of threats to their efficacy (Ashton, 1984; Ashton & Webb, 1986; Tschannen-Moran et al., 1998; Woolfolk & Hoy, 1990). Such recommendations have included similar suggestions to those advocating the development of contexts to develop deeper learning approaches (Biggs, 1993a; Entwistle et al., 1991a; Ramsden, 1992). These suggestions included the provision of an explicit focus on metacognitive development that includes reflective self-assessment of efficacy and teaching behaviours and the provision of clear teacher role-definitions that view all students as educable (Ashton, 1984; Moeller & Ishii-Jordan, 1996). Personal goal setting and monitoring of the teacher’s own cognitive and emotional reactions to difficult students are considered necessary outcomes of teacher education programs (Ashton, 1984). It is suggested that these outcomes could best be achieved in programs that foster the development of reflective analytical thinking skills, by providing considerable exposure to self and peer assessment and the development of collegial learning methods (Ashton, 1984) in supported context-based programs (DeMoulin, 1994; Tschannen-Moran et al., 1998).
Operating from an analytical perspective, teachers would be less likely to succumb to the sense of helplessness due to inability to isolate factors contributing to feelings of inefficacy (Ashton, 1984, p. 31).

The metacognitive awareness implied by Ashton’s statement requires the development of critical self-reflection and integrated understanding emanating from meaningful study. According to learning approach theorists, only the use of a deep approach to learning would enable such development (Svensson, 1997). It is unlikely that student teachers would be able to develop sufficient awareness of self-processes linked to integrated understanding of educational theory, sufficient for the comprehensive construction of appropriate philosophical orientations to teaching, using a surface approach (Biggs, 1988b, 1993a; Entwistle et al., 1991a; Marton & Saljo, 1997; Ramsden, 1992).

To date a connection between the encouragement of deep learning approaches and the growth of students’ teaching efficacy beliefs has not been the subject of published research (Gordon et al., 1998b). The current study is an attempt to implement teaching approaches, in a teacher education program, which aim to promote students’ use of deep learning approaches in order to improve teaching efficacy as an outcome. It is proposed that the bases of learning approach theory and the theory of teaching efficacy can be supported by a consideration of the theory of self-regulation as an overarching explanation.

3.4: Learning Approach, Self-Regulation and Teacher Efficacy
The use of a deep learning approach is defined by the active search for meaning and understanding (Entwistle, 1997a, 1998; Marton & Saljo, 1997; Ramsden, 1993b), and the use of metacognition and metalearning as processes of self-
regulated learning in order to construct personal meaning from the material presented in courses of study (Biggs, 1993a, 1993b). Students using deep learning approaches are more likely to have the ability to engage in critical analysis and use the reflective processes required to address circumstances of practice, which have not been covered directly in the detail provided in their course (Svensson, 1997). Students who use surface approaches to learning may be able to reproduce material directly presented in their course of study, but may be hampered in situations of practice that call upon the integration of concepts and the creation of novel solutions (Biggs, 1993a; Ramsden, 1992).

The processes of self-regulation leading to the identification of effective solutions to novel problems in the practice of teaching may be summarised in Figure 3.4. This model proposes that the identification and application of effective solutions to problems of teaching practice may involve a number of self-regulatory phases and that each successive phase in the model will be aided, at least in the early years of teaching, by the use of deep learning approaches during teacher training. The model also proposes that student teachers who have used surface approaches to their learning will be hampered in the use of successive phases, especially phase 3 and beyond.
Figure 3.4. Model of self-regulation in teacher decision making
Figure 3.4 represents an attempt to depict the cognitive self-regulatory processes teachers may use when reflecting on the effectiveness of their teaching, and in identifying alternative strategies when faced with problem situations. The process begins with beliefs established principally through efficacy expectations, which in combination with outcome expectations, control beliefs and prior attributions of performance variability, determine the goals established in the current setting (Bandura, 1997; Schunk, 1989; Zimmerman & Risemberg, 1994).

In the case of goals established for student achievement, observations of student performance would be judged in comparison with goals set during ‘Self-Regulation Phase 1’. Where achievement observations meet or exceed prior goals, the teacher’s efficacy beliefs may be confirmed or reassessed positively and a decision to continue the current teaching method may be made. Where achievement falls short of goals the teacher is presented with a problem and a number of alternatives are evident. If the teacher attributes the lack of success in attaining goals to student ability, home background or other external factors, the teacher may reassess the goals to a lower level (Guskey, 1981), and PTE may be maintained. If attributions are made to the teacher’s effort or ability, efficacy may be threatened unless an alternative teaching strategy can be devised. If initial teaching efficacy is low, the teacher may accept the low outcome, confirm the initial belief in low efficacy and avoid persisting to find a solution to the problem. The higher the initial PTE, the more likely the teacher will be to attempt to implement another teaching approach to overcome the problem (Bandura, 1997; Pajares, 1996), by continuing the process to the next phase.
‘Self-Regulation Phase 2’ begins with the aim of selecting an alternative teaching method to improve the learning outcomes in line with the original learning goals. The teacher will need to observe his or her current teaching methods and make comparisons with teaching goals and prior outcomes. Here a level of critical self-analysis is required in order to identify the strengths and weaknesses in the teacher’s current teaching approach. The teacher may choose to apply an approach previously used in similar circumstances, or perhaps one that the teacher has observed a colleague, or practicum supervisor use. The new method may be applied and observations made once again, similar to Phase 1. Should the problem persist and the students’ attainments still be below the original learning goals, the teacher may adjust goals or reassess his/her efficacy as in Phase 1. Alternatively if the teacher has a high PTE and a consequent willingness to persist, he or she may move onto the third phase in this model.

‘Self-Regulation Phase 3’ requires the development of a new approach the teacher has neither used before nor observed others using. It may involve elements of other known methods, but essentially it requires the construction of a novel solution. This phase involves the application of a problem-solving process that calls for a considerable amount of critical self-analysis and reflection on student reactions to prior teaching methods and personal capabilities. It is suggested that the successful application of Phase 3 requires a high level of PTE, in conjunction with a high self-efficacy for problem-solving, a well integrated understanding of factors impinging on student learning and sound analytical skills.

It is contended here that only students who use deep approaches to their learning will be equipped, in their early years of teaching, with sufficient understanding of
learning principles to enable the construction of such novel solutions. It is also contended that through the application of critical methods in learning, these teachers will be more likely to have sufficient personal insight to engage in the level of self-reflection required of Phase 3 and subsequent phases. Furthermore, because these teachers may also be aware of their capacity for successful problem-solving, their efficacy for dealing with difficult teaching situations may be initially higher, providing the motivation for the persistence necessary to engage in Phase 3 processes. Phase 3 processes clearly require a depth of declarative, procedural and conditional knowledge, especially insofar as the latter applies to problem-solving practices. Because of their persistence and meaningful knowledge base, these beginning teachers may be more likely to have a resilient reaction to the threats to efficacy they face in their early years of teaching.

Conversely, it is argued that student teachers who adopted surface approaches to their learning may have developed acceptable competence in reproducing and applying methods for teaching requirements, which were specifically treated in their preparatory program and may have modelled several others to be applied in some problem circumstances. These teachers may also revert to methods by which they were taught as pupils, via their apprenticeship of observation (Borko & Putnam, 1996). With only a surface understanding of learning principles based on declarative and some procedural knowledge, such beginning teachers would have great difficulty successfully navigating Phase 3 requirements. They are therefore unlikely to move beyond Phase 2 in most teaching situations and would be exposed to efficacy threats earlier and more frequently than beginning teachers who had adopted deep approaches in their teacher preparation course.
Student teachers who complete their course using surface approaches may have high efficacy expectations, but these may be based on perceptions of their personal characteristics (Benz et al., 1992; Herbert et al., 1998), rather than a realistic appraisal of skills in overcoming teaching problems. Those who adopt deep learning approaches during teacher preparation, may assess their teaching competence on a more realistic basis with the anticipation that problems may occur, but that they have the capacity to identify and resolve many of these as they materialise. Thus it is argued that beginning teachers who employed deep learning approaches as student teachers are more likely to accurately assess their efficacy for teaching and demonstrate resilience to the efficacy threats face by beginning teachers (Gordon et al., 1998b).

The first stage in determining the strength of the argument proposed here relies on the development of a teacher education program that facilitates students’ progressive adoption of deep learning approaches over the length of their course. The proposed developmental effects on student performance and teacher efficacy beliefs from the use of a deep learning approach could then be examined. This is the central purpose of the current research. A future investigation could then examine the differential effects of early and later years of experience once these teachers enter the teaching service.

3.5: Research Aims
The current research aimed to investigate the progressive impact of altered teaching contexts on students’ learning approaches, teaching efficacy beliefs and attributions for academic success and failure within a university teacher education
program. It used quasi-experimental design in a longitudinal study with repeated measures across three cohorts to assess changes in these dependent measures.

It was expected that students would report a high reliance on surface learning approaches on entry to the course (Ramsden et al., 1988; Regan & Regan, 1995a). In response to the progressive application of teaching contexts associated with the use of deep learning approaches (Biggs, 1993a, 1995, 1996; Entwistle et al., 1991a; Prosser & Trigwell, 1998; Ramsden, 1992), it was expected these students would increasingly abandon surface learning approaches and adopt deep learning approaches as they progressed through their course.

The initial research questions were therefore:

1.1 Could the learning approaches adopted by students in a teacher education degree program be altered by contextual variations applied over the full term of their course?

1.2 Did the application of altered learning contexts reduce the students’ use of surface approaches to learning?

1.3 Did the application of altered learning contexts increase the students’ use of deep approaches to learning?

1.4 Were gains in deep learning approaches and reductions in surface learning approaches sustained across the students’ course experience?

PTE was expected to grow throughout the course from initial low levels to high levels at the conclusion of the course for all students (Benz et al., 1992; Herbert et al., 1998; Housego, 1992; Hoy & Woolfolk, 1990; Huey-Ling & Gorrell, 1998; Woolfolk & Hoy, 1990). It was expected however, that higher levels of PTE would be increasingly associated with the adoption of deep learning approaches because of these students’ greater knowledge of educational practices. The growth in PTE was expected to be especially pronounced following significant practicum experiences from which mastery experiences were anticipated, especially for
students who used deep approaches. A non-linear trend in the development of PTE was thus expected.

It was expected that GTE would begin and remain high throughout the course showing some increase, but not a substantial gain (Gorrell & Hwang, 1995; Herbert et al., 1998; Walker & Richardson, 1993). This view was based on the notion that student teachers’ perceptions of the impact of teachers generally, may have been developed over many years in their role as students and that their choice of teaching as a career may well have been informed from a positive view of the general efficacy of teachers. Some variation in this construct may result from practicum experiences and a consequent reassessment of their earlier assumptions or from persuasion during coursework components. It was considered however, that such reassessment would have minor overall impact on this belief. It was considered likely that students who used deep learning approaches should show the strongest gains in GTE because of their greater understanding of alternate teaching practices and problem-solving processes.

The following research questions were based on these expectations:

2.1 Were changes in learning approaches related to changes in teaching self-efficacy?
2.2 Was an increased use of deep approaches and a reduced use of surface approaches related to gains in personal teaching efficacy?
2.3 Was an increased use of deep approaches and a reduced use of surface approaches related to gains in general teaching efficacy?

Since the purpose of the current research needed to be explicit to the participants, its validity was threatened by the potential presence of Hawthorne effects (see section 4.6.2.2). Measures of locus of control and attributions for academic success and failure were included in the study to assess the level of this threat.
These constructs were expected to remain stable over the students’ course of study, relative to changes observed in learning approaches and teaching self-efficacy. This expectation was based on the view that concepts about control are developed over the length of an individual’s life experience (Ashkanasy & Gallois, 1987; Graham & Weiner, 1993; Lefcourt, 1981, 1991; Parent, Forward, Canter, & Mohling, 1975). Since the measures related specifically to attributions in academic activities, these students’ considerable prior experiences in academic environments from their schooling history would have informed relatively stable beliefs prior to entry to university. It was considered unlikely that the three years spent in their university study would have a marked impact on these beliefs despite the modifications implemented. It was anticipated therefore, that students would report differential changes particularly in learning approach usage and learning attribution measures. The resultant research question was thus formulated:

3.1 Were attributions for success or failure in academic settings affected by the altered learning contexts applied in the study?

Differential effects on different student groups were expected with younger students’ immediate school experiences encouraging a greater focus on surface approaches (Christensen et al., 1995; Ramsden et al., 1988; Tobin & Fraser, 1991) and those of mature age reported to more easily adapt to deep approaches (Regan & Regan, 1995a; Richardson, 1994b; Vermunt, 1996). Differences due to gender and cultural background may have also been expected, however, since the course of study contained very few males, gender differences could not be discerned. Likewise, the predominantly homogenous cultural background of the students
attending this rural university precluded any assessment of cultural impact on the research questions. Questions relating to maturity were:

4.1 Did mature-age students differ from young students in the learning approaches adopted on entry to the course?
4.2 Did mature-age students differ from young students in their response to the altered learning contexts?

3.6: Chapter Summary
Self-efficacy beliefs determine the activities in which an individual will choose to engage, the behaviours used, the level of effort applied, and an individual’s relative persistence in the face of difficulty. According to social cognitive theory, self-efficacy is developed and maintained through processes of reciprocal determinism. Through this principle Bandura argues that belief systems have a predominant affect in the production of behaviour and that self-efficacy beliefs are paramount in this effect.

Teacher self-efficacy has been the subject of continuing research over the last two decades. From this research teacher self-efficacy has emerged as a major characteristic distinguishing competent teaching behaviours and student outcomes. The research direction has evolved from initially describing the characteristics of teachers with varying efficacy beliefs, to more recently investigating methods of developing and maintaining high levels of teaching efficacy.

Cross-sectional research has provided an unclear picture about the efficacy levels of student teachers with some research indicating unrealistically high efficacy, others indicating little difference between student teachers and practising teachers, and some research indicating qualitative differences in the tasks about which
student and practising teachers feel efficacious. Few longitudinal studies have been reported that track the development of teaching efficacy constructs in preservice teachers or course-based interventions aimed at improving teaching efficacy outcomes.

If teacher education programs were able to produce students with higher ability to engage in the cognitive and metacognitive processes required by models of self-regulation, then a method for building and preserving teacher self-efficacy may be demonstrated. Such a program would rely on the building of reflective, analytical problem-solving processes and through this capacity, provide the skills necessary to deal effectively with the novel circumstances confronted by beginning teachers. The self-regulatory processes in this model provide a conceptual basis for the cognitive processing, task analysis and assessment of personal teaching competence required to develop conceptions of efficacy and the production of efficacious behaviours.

Preservice teacher education programs developed in accordance with contexts that promote the use of deeper learning approaches are considered likely to enhance the acquisition of the reflective and analytic qualities identified as necessary by teaching efficacy theorists. The current study represents an attempt to apply such modifications to the learning context across a teacher education program and to gauge the effect on student learning approaches and consequent teaching efficacy outcomes. The interventions used in the current study were applied pervasively across the entire length of the students’ course of study, with student responses progressively monitored so that developmental trends in learning approaches and teaching self-efficacy could be determined.
CHAPTER 4

Methodology

The current study employed a longitudinal, quasi-experimental, multiple cohort, design with repeated measures on non-equivalent dependent variables. Learning approaches, teaching efficacy beliefs, and causal attributions for learning outcomes were repeatedly surveyed at pre-determined intervals for each of three cohorts of students undertaking initial training in early childhood teacher education within the context of an Australian rural university.

The first cohort (Cohort 1) acted as the contrast group, with Cohorts 2 and 3 representing the treatment and comparison groups respectively (Wilkinson, 1999). Treatment was applied throughout the course experience of Cohort 2, and for the first two years of their course, for Cohort 3. Cohort 3, thus provided data on a partial replication of the treatment applied fully to Cohort 2 (Thompson, 1996, 1999). Cohorts 1 and 2 were surveyed from their entry to the university to the completion of their three-year degree, while Cohort 3 was surveyed on entry and during the second year of their new four-year degree course. An embedded action research paradigm was used to develop, implement, evaluate and revise teaching approaches and specific applications for the treatment and comparison groups. As such, the treatment applied to Cohorts 2 and 3 continuously evolved throughout the course of the study.
4.1: Project Development:
The project began in 1994 following the conjunction of two independent developments. The first involved the researcher’s consolidation of the research focus for his doctoral studies, relating teacher efficacy development and learning approaches in undergraduate teacher education programs. The second resulted from the Head of School’s attendance at a conference presentation (Clarke & Dart, 1994) dealing with student approaches to learning and consequent learning outcomes. As a result of the insight acquired from the conference presentation, the Head of School sought and gained funding from the university to pilot the implementation of altered approaches to teaching, in a teacher education program, and asked the researcher to co-ordinate the project (Gordon et al., 1995). This thesis details the resulting study.

4.1.1: Planning the Study
The initial meeting with the Head of School and the researcher, held in early February 1995, enabled both parties to outline their research agendas and agree on the basic aims of the study. This meeting also identified the Bachelor of Teaching (Early Childhood) course as the focus of the study. This course was chosen on the Head of School’s recommendation. She held the perception that this teaching team, of three lecturers and one senior lecturer, operated as a small cohesive unit whose members were highly committed to quality teaching and open to alternate views and teaching practices.

A second meeting was held in the following week, which included the Early Childhood course co-ordinator and another of the researcher’s colleagues whose assistance was sought in planning and conducting the first phase of the study.
During this meeting the elements of learning approach and teacher efficacy were identified by the researcher as the salient dependent variables in the study with locus of control measured for the purpose of establishing internal validity. The longitudinal multiple cohort design, with multiple data sources was identified as the most appropriate methodology, during this meeting.

Three phases in the inquiry were agreed to. Phase 1 represented the collection of baseline data from Cohort 1 (year 1, 1995) who would become the contrast group in an eventual quasi-experimental approach. Their development as a cohort of learners and teachers would be followed with administrations of questionnaires repeated annually. Descriptive data would be gathered, presented and published, identifying key relationships among the dependent variables (Gordon et al., 1998b; Gordon et al., 1995; Gordon, Lim, McKinnon, & White, 1996b). It was also agreed that the Head of School would employ a research assistant from her grant to assist with data collection during this first phase of the study.

Phase 2 represented the development and implementation of altered teaching and learning contexts by the principal teaching team, and others from time to time, who taught in the Bachelor of Teaching (Early Childhood) course. Phase 2 was to examine the effect of these modifications on the dependent variables and on the relationships between them. Altered teaching and learning contexts were planned to be applied to Cohort 2, who began year 1 in 1996, and to continue in varying forms throughout the length of their course. It would then be possible to compare the traditional approach used with Cohort 1 and the modified approach used with Cohort 2 across the identified dependent variables through longitudinal analysis.
Modifications were required to maintain the subject structure and sequence of the
course and principally be restricted to teaching methods, assessment methods, and
student engagement with the learning tasks. Assessment was still required to
adhere to university policy for the standardisation of grades consistent with a near
normal distribution, with set tolerances for the award of particular grades. The
teaching modifications were to be developed collaboratively, to meet the specific
learning objectives of the course and the subjects it contained. Action research
methodology was identified as the appropriate approach to follow in the
development, implementation, evaluation and modification of altered teaching
methods. The action research team was to be co-ordinated and led conjointly by
the researcher and the course co-ordinator, with heavy reliance on the researcher’s
input initially, but with gradual transference of responsibility for the initiation of
change, to the other team members (Zuber-Skerritt, 1993).

Certain core subjects would be specifically targeted for modification by the action
research group each semester, but each member of the team would reinforce the
theme of developing deeper learning approaches across the subjects they co-
ordinated. Other subjects could include altered teaching methodology in
conjunction with the identified core subject, if the subject co-ordinator desired to
do so. The researcher would consult with individual subject co-ordinators as
required, especially during subject planning stages, to assist with the development
of altered teaching and assessment methods. He would also provide information
about the project goals to the students and feedback about their progress toward
these goals after conducting each survey round. In this way, it was hoped that the
theme of developing deeper approaches to learning would be pervasive, from the
students’ perspective, across the course and some information to assist their self-regulation of learning would be available.

Phase three involved the redesign of the three-year Bachelor of Teaching course into the new four-year Bachelor of Education program. This redevelopment took place through the 1996 academic year, for implementation in 1997 for the new year 1 intake. Early and ongoing results from the study were to inform this course re-development, through the researcher acting as consultant, and through the insights of the action research team members, who held the core responsibility for re-developing the program. The first intake into the new program would become Cohort 3. By this time it was anticipated that the researcher would have become a peripheral member of the action research team, with greatest responsibility for initiating change resting with the teaching team members. The purpose of including similar repeated measures from this third cohort was to verify that the patterns that developed in Cohort 2 could be repeated. This was necessary to assist, at least in part, in establishing the external validity of the study (Thompson, 1996; Thompson, 1999). Replication of the findings with Cohort 3 could also partly verify that the teaching team had continued to implement the innovations applied to Cohort 2 and that the newly developed course could encourage students to use deeper learning approaches.

4.1.2: Research Design
Due to the nature of the research and the restrictions placed on the potential design by the requirements of the institution and the context in which the research was to be conducted, a multiple cohort approach using quasi-experimental design was chosen. Participants could not be assigned randomly to control and treatment
groups because modified teaching approaches and assessment methods would need to apply to the entire cohort. Even if equity and ethical considerations could have been met, these would have needed to be accomplished through a self-selection, rather than random selection basis. Self-selection would introduce serious threats to validity by virtue of the probability that those self-selecting into the treatment group, may well be those with a predisposition to deeper learning approaches. This eventuality may have made the groups non-equivalent on a key dependent variable.

It is also unlikely that sufficiently impactful teaching innovations could have been delivered without contamination across the groups. A multiple-group, within-cohorts, design would have restricted altered teaching contexts to tutorial application only with lectures remaining in the traditional format. This restriction would have limited the outcomes of the study by unduly containing the level of innovation possible. Thus a quasi-experimental design was considered the only option in the setting, with whole cohorts acting as treatment and contrast groups. It was anticipated that Cohorts 1 and 2 would be unlikely to differ markedly on key variables, as they were students attending the same university in the same course in successive years.

The selection of one program in one university as the focus of the intervention was also considered the most appropriate methodology given the research goals. The outcomes of the study depended on the development of innovative teaching and assessment methods that had relevance in the current context. Neither were methods developed elsewhere simply transported to the current setting, nor was it expected that the methods developed in this setting would be transportable to
others, without requiring modification. In such a situation a multiple-case approach, using data gathered from other institutions would not allow direct comparison, since the modifications appropriate to one context may not be appropriate in another.

It was decided that the most valuable approach would be to model an effective process in the creation of innovation, then in later projects apply the process elsewhere, rather than the innovations per se. This research approach thus fits within Yin’s (1994) single case (embedded) design. The single case is produced by the treatment applied to students within a single program in one university. Multiple sources of qualitative and quantitative data were, however, embedded to measure the outcomes of this treatment across a number of different dimensions.

4.1.2.1: Action Research as an Embedded Paradigm
Action research was chosen as an enabling method in the creation, application and review of innovative approaches to teaching. The nature of the research was essentially creative and collaborative. It required the development and tailoring of altered teaching methods, informed from a basis in theory and some examples of practice. Such practices reported in the literature however, needed modification to suit the particular teaching goals of the course, the nature of the student population, perceived skills of the lecturing staff and requirements of the institution. A similar approach had been reported by Kember and Gow (1992) in the development of an innovative course restructure in Hong Kong with considerable benefits in encouraging staff development, such that the continuation of the innovations at the conclusion of the program was likely. Zuber-Skerritt (1992, 1993) advocated the use of action research in the renewal and enrichment
of educational programs, and of staff commitment to teaching, in higher education settings.

Kember and Gow (1992), nevertheless saw a level of contradiction in the dual processes of action research and staff development. They contended that staff development involved directives established externally to the action research group, which by their nature conflicted with the emancipatory conception of action research.

*Action research is based upon collaboration, participation, democratic decision making and emancipation through critical self-reflection. Staff development, however, implies some element, at least, of external involvement and/or direction setting* (Kember & Gow, 1992, p. 301).

The developmental model of action research advanced by Zuber-Skerritt (1992, 1993) however, accommodates this apparent contradiction. Three successive phases of development through which action research in higher education may move, were proposed by Zuber-Skerritt (1993, p. 47), respectively termed technical, practical and emancipatory. In this frame, the beginning of an action research process may necessarily take a “technical” form where members are co-opted and rely on the assistance of an outside expert or facilitator to provide formative information and encouragement. After at least one cycle to provide a basis for reflection and a model of operation, the action research group may take a “practical” form. In this phase the developing awareness of the group members has empowered them to initiate innovation and they rely on the facilitator as “… a process consultant with a Socratic role …” (Zuber-Skerritt, 1993, p. 47). Finally as the experience and awareness of the group members grows, they become
empowered as equals and the role of the facilitator is reduced to collaborative “process moderator” in a team of equals. The final phase defines the emancipatory outcome of action an research paradigm and enables the accommodation of the apparent incongruence suggested by Kember and Gow.

All three phases described by Zuber-Skerritt were experienced during the course of the current study. Initially, the members of the action research team were co-opted by their course co-ordinator’s commitment to the research project and entered the project in a technical phase. While they each proved to be eager and committed participants in the program, their original involvement was nevertheless not of their own initiative. The researcher acted as the facilitator, or outside expert, by providing information concerning the theory on which the project was based, together with some examples of practice emanating from the literature surveyed, and from the outcomes of concurrent exploratory studies conducted with other student groups and teaching teams (see for example: Gordon, 1993; Gordon & Dunshea, 1996; Gordon et al., 1997a; Gordon, Lane, & Hall, 1998a; McKinnon, Gordon, Coates, & Grieg, 1997; McKinnon et al., 1996).

Following the first cycle, original members of the action research team independently developed initiatives but often sought the researcher’s opinion and suggestions to improve the innovation. The phase of practical orientation had developed for these team members. Meanwhile, some other members of the school staff were invited to join the team for that cycle, because they were teaching a targeted core subject in the course. These new participants began at a technical level. Thus throughout the course of the research, several of the stages
proposed by Zuber-Skerritt (1992) may have been represented simultaneously by subgroups or individuals within the larger action research group.

In the final year of the program, team members independently introduced and evaluated innovations and, on one occasion, co-opted the researcher to implement a procedure the team member had planned. They had reached a level of familiarity and confidence with the methodology to develop and implement an approach, still in collaboration with other team members, but without prior consultation with the researcher. These actions represented the emergence of the emancipatory stage, in accordance with Zuber-Skerritt’s model.

Continual invention and revision of altered approaches to teaching were necessary because the repeated use of singular methods (particularly assessment methods) may have led to their over-use and resulted in the students becoming bored or using automated processes in their execution. For example, peer assessment, reflective journal writing, and group presentations were some of the methods identified as potentially over-used. Implementing a program containing innovative practices over a three-year course, across subjects, required a sufficient bank of alternate practices to prevent tedium from interfering with students’ application of deep learning approaches. Collaborative processes were necessary in the development and implementation of these innovative practices and action research methodology ideally suited the task. As an embedded process it was considered possible to use action research in this way, to complement the simultaneous use of the potentially contradictory, essentially positivist, quasi-experimental methodology. By virtue of the action research process, the intervention applied to the treatment group in the study continually evolved as the study progressed.
4.1.3: The Researcher’s Role
The researcher’s role was multifaceted, but primarily engaged in the co-ordination of the study. Specifically the researcher undertook to develop the research design of the study; identify and administer suitable questionnaires; analyse the data derived; compile progressive summaries of the data obtained and present these summaries to the teaching staff and the students; identify, invite and interview selected students; inform the members of the action research team of the main tenets of learning approach and teacher efficacy theory; develop and trial alternate teaching methods and inform the team of their potential usefulness; assist team members in the development of alternate teaching methodologies; consult with team members about the effectiveness of proposed innovations; encourage and motivate team members; observe and record recurrent themes; make periodic reports to the Head of School, the university’s Ethics in Human Research Committee and other bodies; prepare, present and publish the early descriptive findings of the research.

The researcher’s role itself, evolved through the course of the study and eventually included teaching and co-ordinating two elective subjects chosen by a large proportion of the students in Cohort 2; attending numerous student presentations by invitation of the students and the lecturers; and presenting modules to the students in subjects co-ordinated by other team members. The researcher had intended to adopt the role of observer-as-participant, but this position held a level of detachment unable to be maintained beyond the second year of the four-year study. With Cohort 2 in particular, the researcher’s role had developed to the position of participant-as-observer by their second year in the program.
4.1.4: Gaining Approval to Conduct the Study
Because the study was wholly contained within one university, approval to conduct the study was required from the Ethics in Human Research Committee of the university. Successive phases gained approval in 1995 and 1996. These approvals document the manner in which students were to be invited to take part in the study through the completion of questionnaires and participation in voluntary interviews. They also document the assurances given, especially pertaining to confidentiality of responses and their freedom to take part or to withdraw from the study without coercion or penalty. The documentation for these approvals is contained in Appendix A.

4.2: Sources of Data
Principal sources of data used in the study consisted of student responses to annual administrations of the Study Process Questionnaire (SPQ) (Biggs, 1987b), the Teacher Efficacy Scale (TES) (Gibson & Dembo, 1984) and the Achievement subscale of the Multidimensional-Multiattributional Causality Scale (MMCS) (Lefcourt, 1981). Other student data were derived from structured interviews conducted with selected students, participant observation, and an examination of students’ reflective journals. Data from teaching staff were derived from responses to the Approaches to Teaching Inventory (ATI) (Prosser & Trigwell, 1993, 1999), and an in-depth interview conducted with the course co-ordinator on completion of the project.

4.2.1: Study Process Questionnaire
The SPQ (1987a; Biggs, 1987b) was selected to assess the learning approaches used by the students in each of the cohorts studied. The instrument was developed
in Australia for use in Australian universities and provides normative data for students in these institutions undertaking education degrees. The scale consists of 42 statements about students’ motives and strategies for learning. Students were required to rate their relative level of agreement with each statement on the five-point Likert scale from 1 = strongly disagree to 5 = strongly agree. The reported factor structure of the SPQ enables the calculation of scores representing Deep, Surface and Achieving approaches to learning by summing the Likert responses to the fourteen questions identified for each subscale. These subscales may be further subdivided into Motive and Strategy scores by the sum of seven items in each. Thus the structure of the SPQ can be represented by figure 4.1.

The SPQ was developed from a sample of 2365 students attending 15 universities and colleges of advanced education (CAE) in five Australian States in 1979. The sample included students from Arts, Education and Science courses, the majority of whom (1183) were studying Education (Biggs, 1987a, pp 25-28). Reliabilities, as represented by Cronbach’s alpha, were reported for each of the 7-item motive and strategy subscales to range between 0.51 – 0.75 for CAE students, and between 0.61 – 0.77 for students attending a university (Biggs, 1987a, p. 28). The lower alpha co-efficients in both settings were reported for the surface motives and surface strategy subscales, while the higher alphas were reported for corresponding achieving subscales. Alpha co-efficients for the three fourteen-item approach scales were reported as: 0.68 and 0.73 for the surface approach; 0.79 and 0.81 for the deep approach; and 0.77 and 0.78 for the achieving approach with CAE and university students respectively. Biggs (1987a) argued that the lower alpha co-efficients for the surface motives and strategy subscales were a product
of separate internal components measuring the desire for professional credentials with minimum effort, coupled with a fear of failure (Biggs, 1987a, 1993c).

![Figure 4.1. Structure of the SPQ](adapted from Biggs, 1987a, p. 20)

A number of attempts to replicate Biggs’ SPQ structure using mainly exploratory factor analytical procedures have been reported in the literature and these have met with mixed results. Some studies have provided qualified support for Biggs’ 6-factor structure (Biggs, 1993c; Hattie & Watkins, 1981; O’Neil & Child, 1984; Regan & Regan, 1995b; Volet et al., 1994). Others have identified various combinations of 2 factor (deep and surface), 3 factor (deep, surface and achieving) and 4 factor (deep motives and strategy; achieving motive and strategy) solutions (Burnett & Dart, 2000; Christensen et al., 1991; Kember & Gow, 1991; Richardson, 1993, 1994a; Watkins, 1998).
Problems identified in the structure of the SPQ relate to the surface motive and surface strategy subscales, in the main. Items within these subscales have been reported to load on separate lower order factors making it difficult to identify them as contributing to a cohesive scale (Biggs, 1993c; Burnett & Dart, 1997; Christensen et al., 1991; Kember & Gow, 1991; Richardson, 1994a). Items in the achieving scales, and in the achieving motive subscale in particular, have also been problematic in replication studies by loading mainly with deep approach items (Richardson, 1994a; Watkins, 1998).

Confirmatory factor analytical procedures have been used in more recent studies (Burnett & Dart, 1997, 1998; 2000; Kember & Leung, 1998) and these have identified similar problems. Kember and Leung’s (1998) study used the SPQ data from 4838 students enrolled at various stages in various courses at a Hong Kong university. Cronbach alphas were reported within the range 0.57 for the surface strategy subscale to 0.74 for the achieving strategy subscale. Alpha coefficients for the Approach scales were not reported. Seven structural models were tested (see Kember & Leung, 1998, p. 401), including Biggs’ original model (Figure 4.1) and other combinations which attempted to account for the correlations between the achieving scales and the deep approach, or the achieving scales with deep and surface approaches.

These researchers (Kember & Leung, 1998) found that Biggs’ original three-factor model (their model 1) provided the poorest fit with the data. It produced a $\chi^2$ of 2975 with $df = 12$, a comparative fit index (CFI) of 0.582, and a non-normed fit index (NNFI) of 0.477. A model, which reduced the SPQ structure to two factors (their model 7), provided the most satisfactory fit. It produced a $\chi^2$ of 96.3
with $df = 7$, a CFI of 0.987 and a NNFI of 0.973. These two first-order factors were labelled a Meaning Orientation, comprised of deep motive and strategy as well as achieving motive and strategy, and a Reproduction Orientation, comprised of surface motive and strategy as well as achieving motive and a small contribution from the achieving strategy subscale. Both achieving subscales were allowed to contribute towards meaning and reproduction orientations.

Burnett and Dart’s (1998; 2000) study used confirmatory factor analysis to test five possible structures of the SPQ. This study used data from 1994 Australian university students with similar backgrounds, according to Burnett and Dart (1998, p. 5), to Biggs’ (1987a) original sample. The sample used by Burnett and Dart was drawn from one metropolitan and one rural university in Australia. It consisted of students across faculties including Health, Arts, Education, Science and Business, with approximately 63% being female. The models investigated by Burnett and Dart included Biggs’ original three-factor (deep approach, surface approach, achieving approach) and his six-factor model (motives and strategies by the three approaches) as well as other models suggested in the literature. Burnett and Dart (1998) found Biggs’ three-factor model to produce the best fit ($\chi^2 = 9378, df = 816, GFI = 0.77, AGFI = 0.74$), but according to these authors, this fit remained less than acceptable.

These researchers noted that the achieving motive and achieving strategy scales loaded across deep and surface approaches. However the model corresponding to Kember and Leung’s (1998) preferred structure (model 7), which allowed the achieving scales to load across deep and surface approaches, did not produce a satisfactory fit in Burnett and Dart’s study ($\chi^2 = 9095, df = 804, GFI = 0.78, AGFI$).
= 0.75 (Burnett & Dart, 1998, p.6). Instead, Burnett and Dart deleted the achieving strategy and achieving motive scales from their analysis and tested the structure of a two-factor model containing the best eight items from the surface scales and the best eight items from the deep scales. This analysis produced a relatively good fit ($\chi^2 = 965$, $df = 103$, GFI = 0.94, AGFI = 0.92). The resulting scale also produced alpha co-efficients of 0.69 for the surface approach and 0.78 for the deep approach.

Biggs (1993c) argued that variability in the structure of an instrument such as the SPQ is to be expected in different student samples, especially where the learning context differs. Measures of student approaches to learning are not measures of any stable trait, but of student responses to perceived learning environments, perceived learning skills and perceived learning outcomes (Biggs, 1993c, pp. 6-8). Certain study behaviours may be consistent with surface approaches to learning in one context but with achieving or deep approaches in another. The behaviour is thus considered adaptive rather than static.

The context of the current study; initial early childhood teacher education, was represented only partially by the sample used to develop the SPQ. Confirmatory factor analysis (CFA) was therefore considered necessary to test and modify the scale structure to ensure it adequately differentiated the learning approaches it was designed to measure within the current sample. Biggs’ (1987a) three-factor and six-factor models were initially tested using data derived from all students enrolled in the second year of the three cohorts used in the main study. Second year responses were chosen for the analysis because the first year data were collected close to entry to university and responses may have been informed more
from school experience than university experience. It was expected that by early second year the students would have been at university long enough to have developed perceptions of the learning environment and formed adaptive study behaviour, but not been as affected by the contextual changes applied in this study as they might have been by the time they had reached their third year. Another cohort of year 2 early childhood students who were not involved in the study, was added to build the numbers sufficiently to conduct the CFA with confidence.

Confirmatory factor analysis procedure was undertaken using LISREL 8.2 (Joreskog & Sorbom, 1993) with these 219 year 2 student responses on the 42 item SPQ. Results reported in Table 4.1, indicated an unsatisfactory fit for both the original three-factor or six-factor structures. The three factor model (deep, surface and achieving approach) yielded a highly significant $\chi^2$ of 2354.86 with $df = 816 \ (p < .001)$, a GFI of 0.66 and an AGFI of 0.62. Goodness of fit indices are conventionally considered adequate as they approach 0.9, and with smaller samples a non-significant $\chi^2$ statistic is also expected (Burnett & Dart, 1997; Kember & Leung, 1998; Schumacker & Lomax, 1996). The six-factor model, including separate motives and strategies for the three approaches, also yielded a highly significant $\chi^2$ of 2163.25 with $df = 804 \ (p < .001)$, a GFI of 0.68 and an AGFI of 0.64. The analysis for the original SPQ scales is presented in Appendix B.1.

A number of attempts to improve the original scales’ fit with the data sample were made using LISREL 8.2 Modification Indices, however none was successful. Largely the problem appeared to be with the majority of questions on the achieving motive subscale loading separately onto the deep and surface scales.
similar to the findings reported by (Burnett & Dart, 1998; Kember & Leung, 1998). Some questions in the achieving motive subscale dealt with a desire to attain high grades in order to be more competitive in gaining employment (eg: I want top grades in most or all my courses so that I will be able to select from among the best positions available when I graduate). These questions tended to load with the deep approach. Other achieving motive questions implied a desire to achieve simply for the purpose of winning (eg: I see getting high grades as a kind of competitive game and I play to win). These items tended to load with the surface approach. It may be that highly competitive motivation is not a sufficiently common attitude, in the context of early childhood teacher education, to warrant its distinction as a separate subscale in an assessment of these students’ learning approaches.
Table 4.1. Goodness of Fit Statistics for Original Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Structure</th>
<th>Goodness of Fit Statistics</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>( \chi^2 )</td>
</tr>
<tr>
<td>SPQ</td>
<td>original 3 factor</td>
<td>2354.86 (df=816)</td>
</tr>
<tr>
<td></td>
<td>original 6 factor</td>
<td>2163.25 (df=804)</td>
</tr>
<tr>
<td>TEF</td>
<td>original 2 factor</td>
<td>360.11 (df=103)</td>
</tr>
<tr>
<td>MMCS</td>
<td>original 2 factor</td>
<td>1129.33 (df=251)</td>
</tr>
<tr>
<td></td>
<td>original 4 factor</td>
<td>909.91 (df=246)</td>
</tr>
</tbody>
</table>

Four cohorts of year 2 data used in these analyses (\( n=219 \))
4.2.1.1: Modified SPQ
In order to establish a modified measure of learning approaches with acceptable fit to the data the following procedures were adopted. Each approach with its constituent motive and strategy subscales was first subjected to CFA procedures separately. Certain error terms were then allowed to correlate where this seemed warranted after examination of the modification indices in conjunction with question wording. Individual questions with poor subscale loading or with substantial loadings on both subscales were then deleted. The analysis was then re-run and the procedure repeated until no further modifications were indicated. When satisfactory subscales had been developed on the basis of separate analysis, a CFA of the whole scale was conducted with all subscales included in the analysis. This procedure resulted in a modified scale with a highly significant $\chi^2$ of 1206.23 ($df = 600, p < .001$), a GFI of 0.77 and an AGFI of 0.73. Though these modifications improved the scale’s fit with the data, it was still considered unsatisfactory.

Because of the high correlation between the motive and strategy subscales within the deep and surface approaches, their combination into single deep approach and surface approach scales appeared justified. Since the achieving motive subscale correlated more highly with both deep motive and deep strategy, than it did with the achieving strategy subscale, the achieving motive scale was dropped from the analysis (after Burnett & Dart, 1998). The above procedure was then repeated using the deep and surface approach scales as the first order factors and the achieving strategy subscale as a separate dimension.
This final version of the SPQ consisted of a measure of deep approach comprising 8 items from the original scale, and a measure of surface approach also comprising 8 items from the original scale (see Table 4.2). Confirmatory factor analysis of this scale resulted in a non-significant $\chi^2$ of 118.87 ($df = 93, p = .063$), a GFI of 0.94 and an AGFI of 0.91. These results represented an adequate fit with the year 2 data (see Table 4.3). Further analyses with the data sets for year 1 ($n = 176$) and year 3 ($n = 138$) were also conducted to determine the adequacy of the modified scale across all years studied. The results of these analyses are also summarised in Table 4.3.

Table 4.2. Items Comprising the Modified SPQ

<table>
<thead>
<tr>
<th>Deep Approach Items</th>
<th>Surface Approach Items</th>
<th>Achieving Strategy Items</th>
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<tbody>
<tr>
<td>SPQ 2</td>
<td>SPQ 7</td>
<td>SPQ 6</td>
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<td>SPQ 11</td>
<td>SPQ 10</td>
<td>SPQ 12</td>
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<td>SPQ 14</td>
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<td>SPQ 23</td>
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<td>SPQ 26</td>
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The achieving strategy subscale was subjected to a similar separate analysis to determine its adequacy as a scale that could operate in conjunction with deep or surface approaches independently. This scale in its original form (7 items) provided an adequate fit with the data. The analysis with the year 2 data yielded a marginally significant $\chi^2$ of 20.49 ($df = 11, p = .039$), a GFI of 0.97 and an AGFI of 0.96. Confirmation with data from years 1 and 3 also indicated an adequate fit.
(see Table 4.3). The analyses for the final version of the modified SPQ are reported in Appendix B.
Table 4.3. Goodness of Fit Statistics for Modified Scales

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*Year 1: $n=176$; Year 2: $n=180$; Year 3: $n=138$
Reliabilities of the modified SPQ scales were tested using Cronbach’s alpha statistic for internal consistency and both Spearman and Guttman split half correlation coefficients. The results of these analyses are reported in Table 4.4. These tests yielded internal consistency measures for the modified surface scale within the range $\alpha = .59$ for year 1, to $\alpha = .72$ for year 2. Particularly in year 1, this scale remained affected by the existence of the two distinct aspects of surface learning approaches described by Biggs (1993c), a desire to barely satisfy requirements and a fear of failure. The reliabilities for the surface scale with the current data, for each year, were within the range of reliabilities reported in the literature for the surface scales in the original SPQ. Despite the low year 1 alpha, these reliabilities were accepted as adequate for the purposes of the present study, especially given the bi-dimensional construct of the surface scale.

Internal consistency measures for the modified deep approach yielded alpha statistics within the range $\alpha = .73$ in Year 1 to $\alpha = .79$ in year 3. These were also within the range identified in previous studies and were accepted as adequate for the purposes of the current study. Internal consistency measures for the modified achieving approach were identical to those for the original achieving strategy subscale, since the items were the same. These maintained $\alpha = .80$ from year 1 to year 3 and were considered adequate for the present study.
Table 4.4. Reliability of Original Scales

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*Year 1: n=176; Year 2: n=180; Year 3: n=138
Table 4.5. Reliability of Modified Scales

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*Year 1: n=176; Year 2: n=180; Year 3: n=138

4.2.2: Teacher Efficacy Scale
The TES (Gibson & Dembo, 1984) was selected to measure the efficacy expectations of the students in each of the cohorts studied. While the instrument was developed to measure efficacy beliefs among practising teachers, it has been successfully adapted with minor modifications, in other studies of preservice teacher education students (Emmer & Hickman, 1991; Evans & Tribble, 1986; Hoy & Woolfolk, 1990; Saklofske et al., 1988; Soodak & Podell, 1997; Woolfolk & Hoy, 1990). The original scale comprised 30 statements along two dimensions: one that described a teacher’s confidence in meeting the requirements of typical teaching situations, labelled
personal teacher efficacy (PTE), and another dimension that described teachers’ relative impact on student learning, compared to other external influences, labelled general teacher efficacy (GTE). Students were required to rate their level of agreement with each statement on the six-point Likert scale from 1 = strongly disagree, to 6 = strongly agree. A shortened 16-item version was recommended by Gibson and Dembo (1984) because it provided a clear factor structure and yielded an adequate internal consistency of $\alpha = .78$ for the PTE dimension using 9 items, and $\alpha = .75$ for the GTE dimension using 7 items. The current study however, used the original 30-item scale in order to enable the substitution of some questions if that became necessary, because the sample being studied was not represented in the sample used for the scale’s development.

The two-factor structure of the TES has been replicated in a number of studies using exploratory factor analytical procedures (Coladarci & Brenton, 1991; Emmer & Hickman, 1991; Hoy & Woolfolk, 1990; Rich, Lev, & Fischer, 1996; Saklofske et al., 1988; Soodak & Podell, 1993, 1997). The use of confirmatory factor analytic procedures has not been reported amongst these, however. Using the TES with different groups of practising teachers, measures of internal consistency (Cronbach’s alpha) have been reported to range between .74 – .77 for the PTE factor and between .65 – .72 for the GTE factor (Coladarci & Brenton, 1991; Hoy & Woolfolk, 1993; Rich et al., 1996; Soodak & Podell, 1993). With groups of preservice teacher education students, reported reliabilities range between .68 – .90 for the PTE factor and between .61 – .74 for the GTE factor (Emmer & Hickman, 1991; Evans & Tribble, 1986; Hoy & Woolfolk, 1990; Saklofske et al., 1988; Soodak & Podell, 1997; Woolfolk & Hoy, 1990). The GTE subscale is consistently reported in this literature as having lower reliability than the PTE subscale, however since the PTE
factor was the dependent variable of major interest in the present study, the lower reliability of the GTE scale was not considered problematic.

4.2.2.1: Modified TES

Minor modifications to the wording of some items in the TES were undertaken to make the scale suitable for use with prospective teachers, rather than practising teachers (after Saklofske et al., 1988). The initial administration of the surveys in the present study occurred after the students had been attending the university for approximately one month. This was prior to their first practicum experience.

Expectations of teaching efficacy therefore were future oriented rather than having a base in past experience. The future orientation of efficacy expectations is consistent with efficacy theory (Tschannen-Moran et al., 1998) and one of the features which distinguishes these beliefs from causal attributions (Bandura, 1997). The wording of items 1, 12, 14, 15, 19, 21, and 25 from the PTE subscale and items 2 and 23 from the GTE scale was thus altered usually by the substitution for the present tense form of the verb ‘be’ with its future tense equivalent ‘would be’. Other changes in wording included substituting the term ‘task’ for the term ‘assignment’, considered more suitable in an early childhood setting (as did Huey-Ling & Gorrell, 1998), and the avoidance, where possible, of gender specific personal pronouns (after Coladarci & Brenton, 1991).

For example, the original item 19 stated:

*When the grades of my students improve it is usually because I found more effective teaching approaches.*

The modified item stated:

*When the grades of my students improve it would usually be because I found more effective teaching approaches.*
Item 12 originally stated:

> When a student is having difficulty with an assignment, I am usually able to adjust to his/her level.

The modified item stated:

> If a student was having difficulty with a task, I would usually be able to adjust to his/her level.

Item 14 originally stated:

> When a student gets a better grade than he usually gets, it is usually because I found better ways of teaching that student.

The modified item stated:

> If a student gets a better grade than usual, it would be because I found better ways of teaching that student.

The full TES scale used in the present study is reproduced in Appendix E.2.

Gibson and Dembo’s (1984) original two-factor model was tested using data derived from all students enrolled in the second year of the three cohorts used in the main study. Second year responses were chosen for the analysis because the first year data were collected prior to any teaching practice and responses may have been informed more from their experience as students, rather than as teachers. In early second year the students would have experienced two developmental teaching practice sessions for approximately 6 weeks having the opportunity to form tentative beliefs about their teaching performance. As with the SPQ, another cohort of year 2 early childhood students was added to build the numbers sufficiently to conduct the CFA with confidence.
Confirmatory factor analysis procedure was undertaken using LISREL 8.2 (Joreskog & Sorbom, 1993) with these 219 year 2 student responses on the 16 item TES recommended by Gibson and Dembo (1984) and used in most other studies of teacher efficacy (Tschannen-Moran et al., 1998). Results reported in Table 4.1, indicated a marginal to moderate fit with the data. The two-factor model (PTE and GTE) yielded a highly significant $\chi^2$ of 360.11 ($df = 103 \ p < .001$), a GFI of 0.83 and an AGFI of 0.77. Further details concerning this analysis are presented in Appendix C.2.

A similar procedure to that used with the SPQ was applied to the TES analysis. Each subscale was subjected to separate CFA procedures and then a combined analysis was undertaken when an acceptable structure for each subscale had been obtained. Examination of the output for the original structure indicated that item 27 should be removed because of poor loading on the GTE factor (.03). This item presented similar problems in another study (Soodak & Podell, 1993). When this item was removed and the errors of two logically related questions were allowed to correlate, the GTE subscale returned a satisfactory fit with a $\chi^2$ of 12.45 ($df = 8, \ p = ns$) a GFI of 0.98 and an AGFI of 0.95 with the year 2 data. Modifications to the PTE scale were informed by the modification indices produced by LISREL 8.2. Item 1 was removed because it showed a moderate loading on the GTE scale as well as the PTE. Certain error terms were allowed to correlate where this seemed warranted after examination of the modification indices in conjunction with question wording. The final version of the PTE subscale then returned a satisfactory fit with a $\chi^2$ of 18.77 ($df = 11, \ p = ns$) a GFI of 0.98 and an AGFI of 0.93 with the year 2 data.
When these subscales were subjected to simultaneous analysis, PTE item 24 and GTE item 4 were allowed to also load the opposite factors. These opposite loadings were small however (−.15 and −.14 respectively) and well below accepted thresholds used in the instrument’s development (Gibson & Dembo, 1984). Since they both predominantly loaded on the scales for which they were intended (.31 and .67 respectively) the items were retained. The final version of the TES returned a marginally significant $\chi^2$ of 81.13 ($df = 61, p = .043$), a GFI of 0.95 and an AGFI of 0.91 with the year 2 data. These goodness of fit statistics were considered satisfactory for the purposes of the present study.

The structure of the final version of the TES containing 8 items for the PTE subscale and 6 items for the GTE subscale is reported in Table 4.6. This modified scale was then tested for goodness of fit with the Year 1 and Year 3 data. These analyses produced non-significant $\chi^2$ statistics with adequate goodness of fit. Results of these analyses are summarised in Table 4.3 and further reported in Appendix C.

Table 4.6. Items Comprising the Modified TES

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</table>
Reliabilities of the modified TES scale were tested using Cronbach’s alpha statistic for internal consistency and both Spearman and Guttman split half correlation coefficients. The results of these analyses are reported in Table 4.5. These tests yielded internal consistency measures for the modified PTE scale within the range $\alpha = .66$ for year 3 to $\alpha = .81$ for year 1. These reliabilities for the PTE scale using the current data for each year, were within the range of reliabilities reported in the literature for the original scales and were accepted as adequate for the purposes of the present study. Internal consistency measures for the modified GTE scale yielded alpha statistics within the range $\alpha = .57$ in year 1 to $\alpha = .79$ in year 3. These were somewhat lower in years 1 and 2, than reliabilities identified in previous studies. Nevertheless, these results are consistent with previous findings that regularly report the internal consistency of the GTE subscale to be lower than that of the PTE subscale. The current study, as mentioned earlier, was mainly concerned with outcome measures of PTE rather than GTE. Furthermore, the reliability analysis indicated that the internal consistency of the GTE in the current study could not be improved with the inclusion of other questions in the scale. Thus, despite the less than ideal reliability of the GTE subscale, the final version of the TES was accepted as adequate for the purposes of the current study.

4.2.3: Multidimensional-Multiattributinal Causality Scale (Achievement)
The MMCS (Lefcourt, 1981; Lefcourt, 1991) was chosen as a measure of locus of control principally because it was specifically developed to measure attributions concerning issues of high reinforcement value for undergraduate university students. As such the scale comprised items that deal separately with attributions for academic
achievement and affiliation. Only the measures dealing with academic achievement were relevant to the present study and thus this subscale only was administered.

This scale purports to have an hierarchical structure. The measure of internality is divided into two subscales of attributions for ability and effort, which are further subdivided into attributions for success and failure. The measure of externality is likewise divided into attributions for context and luck that are similarly subdivided into attributions for success and failure. There are 12 items measuring internality, 6 items for ability and a further 6 for effort. A similar structure is used to measure externality. Thus the instrument, as used in the current study, consisted of 24 statements concerning attributions for academic success or failure to which the students responded on a 5 point Likert scale from 1 = strongly disagree to 5 = strongly agree. Lefcourt (1981, 1991) reports Cronbach alpha values to range between .50 – .70 for the internal locus of control dimension and between .66 – .88 for external locus of control.

As with the SPQ and the TES, confirmatory factor analysis was used to test the structure of the MMCS, using LISREL 8.2 (Joreskog & Sorbom, 1993) with the 219 year 2 student responses. Results reported in Table 4.1, indicated a poor fit with the data. The two-factor model (internal and external) yielded a highly significant \( \chi^2 \) of 1129.33 \((df = 251 \ p < .001)\), a GFI of 0.70 and an AGFI of 0.64. The four factor structure, using ability, effort, context and luck as first order factors fared little better with a highly significant \( \chi^2 \) of 909.91 \((df = 246 \ p < .001)\), a GFI of 0.74 and an AGFI of 0.69. The analysis for the original MMCS scale is presented in Appendix D.1.
An examination of the output from these analyses indicated that for this early childhood setting the two-factor structure proposed by Lefcourt (1981) was wholly unsuitable. The statements that comprised the proposed subscales for ability and effort did not load together on a single factor, ‘internal’. There was in fact little relationship between them ($r = .10$). Lefcourt (1981, p. 252) reports a similar outcome in one of his analyses, where the ‘ability’ subscale correlated more strongly with the external subscale ‘luck’ ($r = .30$) than with its internal counterpart ‘effort’ ($r = .06$). He contended however, that this result had been contradicted in other studies. Certainly though, with the current data, the scale could not be considered as having a two-factor structure. Therefore, despite a strong relationship between the two ‘external’ subscales, context and luck ($r = .90$), indicating these two could form a unified scale, the MMCS was considered as four separate scales in further analyses. Reliability measures for the original MMCS subscales were thus not computed.

The precise structure of the MMCS was unimportant in the present study because its purpose was to act principally as a measure of internal validity, as an indicator of any likely Hawthorne effect. Because locus of control is theorised as forming gradually in response to long-term generalised life experiences (Carton & Norwicki, 1994; Lefcourt, 1981), scores on this scale were expected remain relatively stable over the period of the current study. Marked change in MMCS scores could therefore indicate that a Hawthorne effect was present and that interpretation of changes in other dependent variables may need to be reconsidered in the light of such an effect.

Each of the four subscales of the MMCS was then subjected separately to confirmatory factor analysis using the Year 2 data and then, as with the previous scales, the structure was confirmed with year 1 and year 3 data. The error terms of
some items were allowed to correlate with other items within the same subscales. Principally these correlations were due to the statements dealing with responses to success and failure correlating with other like statements. All analyses then produced non-significant $\chi^2$ statistics with GFI ranges between 0.98 - 1.00, and AGFI ranges between 0.91 - 0.99. These results are summarised in Table 4.3 and further reported in Appendix D. Reliability measures were then computed for each year (see Table 4.5). Cronbach alphas ranged between $\alpha = .57$ for ability in year 1, to $\alpha = .78$ for luck in year 3. These measures of internal consistency were within the range reported by Lefcourt (1981, 1991) and despite the less than ideal alpha statistic for ability in year 1, these scales were accepted as adequate for the purposes of the present study.

### 4.2.4: Approaches to Teaching Inventory

The ATI (Prosser & Trigwell, 1993, 1999) was chosen as a measure of lecturers’ intentions and strategies in a teaching role. This instrument contains 16 questions, each of which provides a statement about an approach to teaching. Responses, on a five-point Likert scale, range from 1 = only rarely, to 5 = almost always. The scale was designed for use with university lecturers and produces scores on two main factors labelled *conceptual change/student focus* (CCSF) and *information transmission/teacher focus* (ITTF). Each first-order factor is composed of two second-order factors relating to teaching intentions and teaching strategies.

Exploratory factor analysis undertaken by the authors indicates a clear two-factor structure with satisfactory reliability. Cronbach alpha values of $\alpha = .81$ for the ITTF scale and $\alpha = .75$ CCSF scale were reported (Prosser & Trigwell, 1993, pp 471-472). These results were derived from questionnaires completed by lecturers of
undergraduate Science however, and the authors caution that the scale’s reliability may vary if used with other groups.

Because of the small number of lecturers involved in the current study ($n = 6$, not including the researcher), it was not possible to confirm either the factor structure or the internal consistency of the scale. An examination of the scale items suggested that they were not discipline specific and would be likely to have equal relevance and applicability for lecturers of early childhood education. Since the original factor structure was clear and the reliability very satisfactory, it was decided to accept that this scale would, in all probability, serve as a suitable measure of these two dimensions of lecturers’ approaches to teaching.

As part of a complementary investigation of potential changes in approaches to teaching, the ATI was originally intended for use in this study as a pretest and posttest measure with the lecturers involved in implementing the modified program to Cohort 2. In order for the project to maintain manageable proportions, however, the decision was made in July 1996 to limit the study to its primary purpose of investigating changes in student learning approaches and teacher efficacy beliefs. By this time the ATI had been administered as a pretest to the two lecturers who had begun implementing the modified program to year 1 for Cohort 2. No other pretest measures were taken with lecturing staff and one of these two lecturers resigned in 1996, due to illness. Thus pretest and posttest measures using the ATI are available for only one member of the teaching staff, the course co-ordinator, whose case details are reported in section 4.5.4 of the current chapter. The ATI was further used with the remaining core teaching staff as a post hoc measure only, to assist in a determination of implementation fidelity (see section 4.5.4).
The original scale\(^3\) (Prosser & Trigwell, 1993) was used as the pretest measure in the case description for the course co-ordinator. The revised scale (Prosser & Trigwell, 1999) was used as the posttest measure in this case description, and the post hoc measure for the remaining 5 lecturers. Scores for the pre- and posttest measure from this instrument were derived by matching the questions in the original version to those in the revised version. All items in the revised version were represented in the original version, however the wording of some questions varied.

For example item 31 in the original questionnaire stated:

\[ I \text{ feel that examinations should be an opportunity for students to reveal how their understanding of the subject has changed. } \]

The matching item in the revised version stated:

\[ I \text{ feel that the assessment in this subject should be an opportunity for students to reveal their changed conceptual understanding of the subject. } \]

Lesser weight must therefore be placed on the results of course co-ordinator case description, and results should be interpreted from the view that responses in both questionnaires may have been affected by the altered wording of some items. The questionnaire was improved by the revisions conducted by Prosser and Trigwell (1999), thus it was considered more suitable to administer to all lecturers at the conclusion of the study. This unfortunately meant that direct correspondence with the pre- and posttest in the case study was no longer possible. The original and revised versions of this scale are reproduced in Appendices E.4 and E.5 respectively.

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\(^3\) Prosser and Trigwell (1993) discuss the development of the ATI only. The original scale was reproduced in Martin and Ramsden (1994).
4.2.5: Student Interviews

The researcher interviewed selected students from the treatment group (Cohort 2), in their first and final years of the course. These interviews were conducted in a semi-structured format. Questions were prepared, but were asked flexibly to enable the interview to take the form of a conversation about learning and teaching. Each interview took approximately 30 to 45 minutes and was arranged at the students’ and researcher’s mutual convenience within a two week period. Most interviews took place in the researcher’s office, but other locations were used from time to time, depending on where the student felt most comfortable.

The researcher is trained in interview technique and is a qualified psychologist with 15 years experience as a counsellor. He was considered the most appropriate person to put the students at ease, establish an effective rapport, ask open questions, and probe where necessary without confronting the students. The researcher did not form part of the students’ teaching team, and although he was known to the students, his role was detached from their course of study and in particular, from any role in their assessment. The researcher’s role in the initial interviews could be described as “observer-as-participant”, where the researcher “… is known to the hosts, but he or she remains a relative stranger …” (Burns, 1994, p. 258). This position altered over the course of the study, as the researcher became more involved with the students. Initially however, there would have been few impediments to the students’ provision of genuine responses in the interviews.

All participants in the study had been guaranteed that their responses would remain confidential prior to completion of the surveys, 6 months earlier. Before the interviews, all students were provided with a written reminder of this confidentiality
guarantee (see Appendix A.3.2). The interviews were tape recorded with the
students’ consent, and later transcribed by an independent transcriber employed
specifically for the purpose. No notes were taken during the interviews in order to
enable the development of a conversational atmosphere. The interview schedules and
example transcripts are included in Appendix F.

4.2.5.1: Initial Interviews
In the first year for Cohort 2, interviews took place between the 14th and 25th of
October, 1996. They were timed to be some 6 months after the students had
completed their initial questionnaires. This latency period was designed to ensure
that their questionnaire responses were not in recent memory and thus reduce the
potential for interference from a desire to appear consistent. The timing of the first
interviews also gave the students sufficient experience (almost two semesters) with
university learning, to enable them to speak confidently about the learning methods
they used, and to experience some of the altered contexts provided in the study. In
addition, this period enabled them to experience one practicum session in schools
and anticipate the second, due to start in November. They would therefore be better
informed about their teaching expectations than they had been when the initial
questionnaires were completed.

The initial interviews covered issues relating to the students’ motivation for entering
their course of study, prior expectations and future goals, experiences at university,
the study methods they used, contextual features that helped or hindered their
learning, attributions for success and failure, expectations of success for that
semester, factors considered when choosing elective subjects, practicum experiences,
and teaching expectations. Appendix F.1.1 presents the complete interview schedule.
4.2.5.2: Selection of Students for Interview
Students were selected for interview on the basis of the distribution of their surface approach, deep approach and achieving approach scores, from the first administration of the SPQ. Students representing different patterns of responses on these three domains were required, so that they could elaborate on the findings of the questionnaire and reveal any possible changes in their approach to learning adopted over the first 6 months of the course.

An hierarchical cluster analysis was undertaken using squared Euclidean distance with average linkage between groups on the basis of the students’ distribution of scores across the three learning approaches. This method of forming clusters uses the sum of the squared differences between scores on the component scales, to define the distance between cases. It then applies an agglomeration approach to the formation of clusters beginning with single cases representing separate clusters, and concluding with all cases included within one single cluster. Distances between clusters are identified by averaging the distances between each paired combination. Clusters with the lowest average distance between them are combined at each stage in the agglomeration process (Alexander & Murphy, 1998; Norusis, 1993). In this way the scores from each case within the cluster contribute to the estimation of differences between the clusters.

The original SPQ scales were used in this process, rather than the modified version developed from the confirmatory factor analysis procedures described earlier, because at this time in the study, insufficient questionnaires had been completed to enable the confirmatory process to take place. The student group used in this analysis consisted of all those who completed the questionnaires in year 1 of Cohort 2 ($n =$}
The purpose of the cluster analysis was to identify groups that demonstrated a variable pattern of scores across the three learning approaches, so that students with variable patterns of responses could be identified as potential candidates for interview. While this purpose required the grouping of students with similar response patterns from which representatives could be drawn, it also required the identification of clusters whose typical response patterns demonstrated different learning approach emphases. A solution identifying 11 clusters appeared to meet these needs. This solution, while containing a large number of clusters, appeared to represent a division where distances between clusters began to increase noticeably, as indicated by the dendrogram. Further agglomeration would have thus combined clusters of students with increasingly dissimilar patterns and defeated the purpose of the analysis. In general, the clusters comprising small student numbers tended to remain distinct with further agglomeration. Rather, this process largely resulted in the combination of larger clusters within cluster 1B, producing a less well-balanced representation of the cohort. Further analyses to identify differences between these clusters were not undertaken because of the small number of cases in most clusters. These results are summarised in Table 4.7.

The largest cluster (cluster 1B) contained 24 students and appeared to represent a relatively even pattern of scores across the mid-range of all three learning approaches. Cluster 1G, which contained 5 students, also showed an even distribution, but with higher mean scores on all approaches. Similarly cluster 1J,
which contained only one student, showed an even pattern, but with lower scores on each approach.

Cluster 1A contained 10 students and represented those who mainly used a surface approach to learning. Cluster 1C contained 7 students who had a similar pattern of responses across the three learning approaches as represented by cluster 1A, but scoring somewhat higher in each. Cluster 1K was also represented by only one student who had a similar pattern of responses to clusters 1A and 1C, but with lower scores overall.

Table 4.7. Hierarchical Cluster Groupings According to Learning Approach (Cohort 2, Year 1)

<table>
<thead>
<tr>
<th>Distribution</th>
<th>Cluster 1B</th>
<th>Cluster 1G</th>
<th>Cluster 1J</th>
<th>Cluster 1A</th>
<th>Cluster 1C</th>
<th>Cluster 1K</th>
<th>Cluster 1E</th>
<th>Cluster 1I</th>
<th>Cluster 1H</th>
<th>Cluster 1D</th>
<th>Cluster 1F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Even distribution across SA, DA &amp; AA. Scores have higher or lower threshold.</td>
<td>24</td>
<td>5</td>
<td>1</td>
<td>10</td>
<td>7</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Surface Approach</td>
<td>X</td>
<td>SD</td>
<td>range</td>
<td>X</td>
<td>SD</td>
<td>range</td>
<td>X</td>
<td>SD</td>
<td>range</td>
<td>X</td>
<td>SD</td>
</tr>
<tr>
<td>1B</td>
<td>44.58</td>
<td>2.84</td>
<td>40-51</td>
<td>46.38</td>
<td>3.05</td>
<td>39-52</td>
<td>42.92</td>
<td>3.54</td>
<td>38-50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1G</td>
<td>53.60</td>
<td>1.52</td>
<td>51-55</td>
<td>56.80</td>
<td>4.76</td>
<td>51-63</td>
<td>58.00</td>
<td>1.22</td>
<td>57-60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1J</td>
<td>38.00</td>
<td>.</td>
<td>.</td>
<td>32.00</td>
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<td>.</td>
<td>33.00</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Deep Approach</td>
<td>X</td>
<td>SD</td>
<td>range</td>
<td>X</td>
<td>SD</td>
<td>range</td>
<td>X</td>
<td>SD</td>
<td>range</td>
<td></td>
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</tr>
<tr>
<td>1B</td>
<td>44.58</td>
<td>2.84</td>
<td>40-51</td>
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<td>51-63</td>
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<tr>
<td>1J</td>
<td>38.00</td>
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<td>.</td>
<td>32.00</td>
<td>.</td>
<td>.</td>
<td>33.00</td>
<td>.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Achieving Approach</td>
<td>X</td>
<td>SD</td>
<td>range</td>
<td>X</td>
<td>SD</td>
<td>range</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1B</td>
<td>44.58</td>
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<td>40-51</td>
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<tr>
<td>1G</td>
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</tr>
<tr>
<td>1J</td>
<td>38.00</td>
<td>.</td>
<td>.</td>
<td>32.00</td>
<td>.</td>
<td>.</td>
<td>33.00</td>
<td>.</td>
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</tr>
</tbody>
</table>

Note: SA = surface approach, DA = deep approach, AA = achieving approach.
* Bracketed numbers indicate the number of students interviewed from the total cluster.
Clusters 1E and 1I represented the six students of the group who used a deep-achieving approach, again with similar response patterns across the clusters, varying only in the overall magnitude of the DA score. Overall the pattern of both groups appeared to represent higher DA and AA scores combined with lower SA scores. Cluster 1H contained 3 students who represented a surface-achieving approach. Only two students represented Cluster 1D who demonstrated moderate SA and DA, but low achieving scores. Finally, the single student in cluster 1F showed an exclusively deep approach pattern.

After an examination of the students’ scores across the three approaches, two students who appeared to represent the typical pattern from each cluster were selected for interview, where it was possible to do so. Some clusters (1F, 1I, 1J and 1K) consisted of only one student, and since cluster 1B comprised more than a third of the group, the sample drawn from this cluster was increased to four students. Thus interviews were planned to occur with 20 students.

Students nominated by this process were asked, during a class conducted by the course co-ordinator, if they would be interviewed for the purposes of the study. All were given a blank two-week timetable and asked, if they agreed, to select three time-slots that suited them and return the timetable to the researcher at the conclusion of the class. If they did not agree to be interviewed they were asked to return the blank timetable at the conclusion of the class. The researcher chose one of the three times nominated by the students to avoid clashes and the students were advised of their scheduled interview time during the same class in the following week. If the nominated student declined to be interviewed another, selected by the same process, was asked during class-time in the following week if she was prepared to do so.
Three students declined to be interviewed and one originally nominated was not in class when the requests were made. The two students from cluster 1A were replaced by others, but the student from cluster 1J could not be replaced because she was the only member of that cluster, and an administrative error led to the non-replacement of a student in cluster 1C. The initial interviews were then conducted with 18 students who had agreed to take part.

4.2.5.3: Final Interviews

Final interviews were conducted with the same group of students, during the period 2nd to 12th November, 1998. Of the original 18 students interviewed, 15 remained enrolled in their final year, and all agreed to participate in another interview. Because three of these students had left the university during the course of the study, only one interviewee remained in cluster 1A, one in cluster 1E, and cluster 1F was no longer represented.

The researcher’s role had altered somewhat by this stage of the study as he had become more involved with the students. While he still did not form part of the students’ core teaching team, he had taught one elective subject and co-ordinated another, in which many of the students in the main treatment group enrolled. At the request of the course co-ordinator, the researcher conducted intensive interview training with this cohort as part of the final semester professional preparation subject (White & Gordon, 2000). He had also visited the class on numerous occasions across subjects throughout the students’ course of study, to administer questionnaires, provide feedback on progress, and observe student presentations. Student responses in the final interviews may therefore have been coloured by their changed perception of the researcher and the role he played with other members of the teaching team.
The final interviews were arranged at the students’ and researcher’s mutual convenience in a similar manner to the initial interviews. Students nominated three timeslots over a two-week period and one of those times was chosen by the researcher to avoid clashes. On this occasion all interviews took place in the researcher’s office as all students were comfortable with this setting. Questions covered issues relating to the students’ prior expectations and future goals, experiences at university, the study methods they used, the teaching and learning contexts provided in their course, features that helped or hindered their learning, attributions for success and failure, expectations of success for that semester, factors considered when choosing elective subjects, practicum experiences, and teaching expectations. The interview schedule is presented in Appendix F.2.

4.2.6: Student Reflective Journals
As part of their year 1 professional introductory subject (EEB102) in semester 1, and continuing into their practicum subject (EPT105) in semester 2, students in Cohort 2 were required to keep reflective learning journals. Journal entries were made on a weekly basis with notations that included comments on planned activities, an exposition of personal insights, and links from theory to practice and to students’ personal teaching experience. These journals were submitted to the students’ tutor for grading purposes twice during each semester. They contributed to 25% of the academic grade component of the subject in first semester, and 40% of the students’ grade in second semester.

Despite the fact that the journals formed part of the students’ assessment, it was considered that they may provide some insight into students’ development of reflective processes from the perspectives of both teaching and learning, during their
first year at university. In addition, the initial journal task required the students to
describe the three most important conditions for their effective learning. This
question was asked again during the final interviews when the students were in year
3. It was anticipated that the responses to the same question on these two occasions
might provide a snapshot of the degree to which students’ perception of learning had
changed over the lifetime of the course. Students selected for interview were asked
for their permission to allow the researcher to read their journals and photocopy them
for use in the study. All students gave their consent for this to occur. The journals of
all students interviewed were thus collected and photocopied at the conclusion of the
semester.

4.2.7: Course Co-ordinator Interview
At the conclusion of the study a formal interview was undertaken with the course co-
ordinator, who had been an integral member, and leader, of the teaching team
throughout the project. This interview took place in November, 1998 in the
researcher’s office. The researcher had established a sound rapport with the course
co-ordinator over the previous 4 years, due to the close working relationship
demanded by the study. The interview took approximately 45 minutes and covered
issues concerning the course co-ordinator’s notable experiences over the period of
the study, her assessment of the project’s effects on the students, herself, other staff
in her teaching team, and the school as a whole, in terms of learning outcomes,
teaching philosophy and teaching practices. This semi-structured interview was
conducted in a conversational style. It was tape recorded and later transcribed. Data
from this interview were used to support the findings from the ATI questionnaire and
to enable the course co-ordinator to elaborate on issues pertinent to the
implementation of the project.
4.2.8: Participant Observation
The current study was undertaken in the researcher’s workplace. Although the direct participants in the study comprised students and lecturers in a course in which the researcher did not normally contribute, the opportunity to make direct observations of lecturer and student behaviour was available. Throughout their course of study the students in the project took subjects delivered by other teaching teams. The researcher’s role as a peer of these other lecturers also enabled him to conduct numerous discussions with them about the nature of the project and to note their feedback.

Since the project was actively supported by the Head of School, a number of requests were forthcoming for the researcher to present the rationale and early findings of the study to the school’s staff, university teaching development colloquiums, and at national and international conferences attended by a number of the school’s staff. In this way the project’s parameters were broadened well beyond its planned scope of influence. In some ways the broadening of the study’s influence presented threats to its validity and needed to be monitored.

The researcher’s membership of the school’s teaching staff presented the opportunity to enable some monitoring to occur through the processes of participant observation. Burns (1994, p. 259) describes participant observation as “… a process of waiting to be impressed by recurrent themes that reappear in various contexts”. When observations of note were made by the researcher, a notation of the occurrence was recorded in the researcher’s diary. These fieldnotes represent a record of observations that was used to inform weightings attached to other forms of data
collected, such as interview and questionnaire responses, and also to maintain vigilance over potentially confounding influences in the study.

4.3: The Location
The study took place in a small rural campus of a multi-campus, largely rural university that offers courses internally and by distance education. The university was established in 1988 with the amalgamation of three previous colleges of advanced education. The campus has a long history of providing teacher education courses and is located approximately 260 kilometres west from Sydney.

Total full-time internal students located at the campus numbered approximately 2500 over the course of the study. Approximately 900 of these students live on campus in college style accommodation and the remainder live in the local community or surrounding districts. The student population is drawn largely from rural NSW, however a sizeable proportion (approximately 25% – 30%) come from major metropolitan centres, mainly Sydney. Because of its location this university is often the first or second preference by students who live in rural communities, but usually has a lower preference by students who have come from metropolitan areas. The Bachelor of Teaching (Early Childhood) course generally attracts rural students of moderate matriculation scores and metropolitan students who achieved lower scores. The overwhelming majority of these students are female.

Attrition from the course predominantly involves the students from metropolitan centres moving to another university closer to home following successful performance in years 1 or 2. Their positions are often filled by students enrolling after successfully completing the Associate Diploma of Social Sciences (Child
Studies) course conducted by a college of Technical and Further Education (TAFE). These students are credited for the first year of the Bachelor of Teaching (Early Childhood) and therefore enter the course in year 2.

### 4.4: The Participants
The participants in the study consisted of: the students enrolled in the Bachelor of Teaching (Early Childhood) degree who entered the course in 1995, 1996 and 1997; the teaching staff, all of whom were drawn from one teaching school but were mainly those in the Early Childhood team; the researcher, who is a member of the Special Education teaching team; two other colleagues, one from the Special Education teaching team and one from the Science and Information Technology teaching team, who assisted the researcher during phase 1 of the project; The Head of School; and a research assistant, employed by the Head of School for phase 1 of the project.

#### 4.4.1: The Students
A total of 197 students enrolled in the first year of their respective programs. Cohort 1 consisted of 73 students who enrolled in the Bachelor of Teaching (Early Childhood) in 1995, Cohort 2 consisted of 70 students who enrolled in the same course in 1996, and Cohort 3 consisted of 55 students who enrolled in the new Bachelor of Education (Early Childhood) course in 1997. Almost all of these students were female, with 1 (0.01%) male in Cohort 1, 3 (4.29%) males in Cohort 2, and 1 (0.02%) male in Cohort 3. Some were mature-age students on entry to the university with 14 (19.17%) in Cohort 1, 19 (27.71%) in Cohort 2, and 18 (32.72%) in Cohort 3. Students considered mature aged were those whose age on entry to first year was 21 years or greater.
The principal mode of entry to the program for these three cohorts was via the NSW University Admissions Centre (UAC). Students from NSW who completed their final year of schooling applied through this centre for entry into courses they selected in priority order. Offers of admission were governed by the quota available for the course and the students’ tertiary entrance rank (TER). The TER was calculated for all final-year secondary students across the state on the basis of their performance in assessment tasks and examinations conducted primarily in their last year of schooling.

Table 4.8 presents a summary of the TER’s for the 3 cohorts who participated in the current study. These data were available for 34 students in Cohort 1, 31 students in Cohort 2 and 38 students in Cohort 3. On making these ranks available the university removed student identifiers for confidentiality reasons, therefore scores could not be matched to students in these cohorts and no comparisons could be made to learning approaches adopted. Furthermore, no determinations could be made about cohort differences because the numbers of students who entered on the basis of their TER represented, in the cases of Cohorts 1 and 2, less than half of the students in their year. Nevertheless, on this parameter, it would appear that the cohorts were broadly similar, with Cohort 1 possibly representing fewer lower ranks.

<table>
<thead>
<tr>
<th>Tertiary Entrance Rank</th>
<th>X</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort 1 (n = 34)</td>
<td>62.1</td>
<td>11.2</td>
<td>51.6</td>
<td>91.4</td>
</tr>
<tr>
<td>Cohort 2 (n = 31)</td>
<td>55.6</td>
<td>12.3</td>
<td>31.0</td>
<td>87.4</td>
</tr>
<tr>
<td>Cohort 3 (n = 38)</td>
<td>57.8</td>
<td>16.1</td>
<td>31.9</td>
<td>97.6</td>
</tr>
</tbody>
</table>
Some students entered the program from other states, overseas, or other education systems where a TER was not available. Some others also entered following work experience in childcare or other allied fields, the completion of other preparatory courses or through direct entry via the Principal’s recommendation scheme. The TER’s therefore represent only a portion of the students enrolled in each cohort.

Of these students, 65 from Cohort 1 agreed to take part in the study, but 2 returned incomplete questionnaires and were subsequently unable to be located, leaving 63 useable data sets. From Cohort 2, 60 agreed to take part in the study and 59 useable data sets were returned. All 55 agreed to take part in Cohort 3 and 54 complete data sets were returned. This made a total number of 176 students from whom first year data were collected (89.3%). These data are summarised in Table 4.9.

### Table 4.9. Questionnaire Response Rates for all Cohorts

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Response Rates for Year of Study</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 1</td>
<td></td>
<td>Year 2</td>
</tr>
<tr>
<td></td>
<td>N° surveys returned</td>
<td>N° useable surveys</td>
<td>% of yr. 1 group</td>
</tr>
<tr>
<td>1</td>
<td>65</td>
<td>63</td>
<td>86.3</td>
</tr>
<tr>
<td></td>
<td>n=73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>60</td>
<td>59</td>
<td>84.3</td>
</tr>
<tr>
<td></td>
<td>n=70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>55</td>
<td>54</td>
<td>98.2</td>
</tr>
<tr>
<td></td>
<td>n=55</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In year 2 of Cohort 1, complete data sets were returned from 69 students, but only 51 of these were from continuing students who had completed the initial questionnaires. Of the original cohort, 7 had left the university or had taken leave, another 6 could not be located at the time the surveys were administered, and 1 student’s
questionnaire was removed because it was considered a non-serious response, designed to form patterns, rather than respond to the questions. The additional data sets had come from students who had entered or returned to the course in second year, or from students who had originally chosen not to take part in the study but who had reconsidered in second year.

In year 2 of Cohort 2, 66 students returned complete questionnaires, but only 52 of these were matched with year 1 responses. 8 students were no longer attending the university, and an additional 14 had enrolled or newly decided to take part in the study. In year 2 of Cohort 3 an unusually large attrition rate was experienced with 18 students leaving the course after year 1. 9 new students joined the course, bringing the total set of year 2 responses from this group to 46, and 37 matched with year 1 responses. In total 180 year 2 data sets were available, because of the removal of the non-serious response, and 140 could be matched to year 1 responses.

Of the completed questionnaires returned from the final-year students in Cohort 1, 46 of these were matched with this cohort’s first year responses, and 40 were matched with their year 2 responses. The 6 students who could not be located when the year 2 questionnaires were completed, did complete the questionnaires in year 3. Because first and final year data were available from these 6 students it was decided to include them in the analyses and to replace their missing year 2 responses with the mean year 2 scores. This method of dealing with the missing data was considered the most appropriate in this instance, because the differences between these students’ year 1 and year 3 scores were of most interest in the analyses, and because preliminary analysis had indicated that change in learning approach and efficacy scores impacted predominantly in these students’ final year. Replacement with the
mean year 2 scores would not interfere with the overall analysis, and would enable these students’ data for years 1 and 3 to be included. Because year 3 data were not available from Cohort 3, the total number of completed questionnaires from final year students was 138, with 97 matched responses. This represents an overall return rate for Cohorts 1 and 2, of 67.8% across the three years of the study.

4.4.1.1: Mature-Age Students
The proportions of mature-age students in the final groupings were 10 (21.73%) in Cohort 1, 15 (29.41%) in Cohort 2, and 11 (29.73%) in Cohort 3. The small number of mature-age students in the final samples for each cohort presented a problem in the implementation of the planned analyses. Small cell sizes and large inequality between groups pose a substantial threat to the validity of MANOVA (Stevens, 1996) and both of these conditions would have been present in any of the analyses conducted. Consideration was given to redefining ‘mature age’ to the attainment of 20 years during the first year of the course, and such an adjustment would have produced groups of 18 (39.13%) in Cohort 1, 21 (41.18%) in Cohort 2, and 17 (45.95%) in Cohort 3.

These more equal group sizes would have enabled the analyses to proceed as planned, but since 14.95% of the total sample were 20 years of age, these students would have strongly influenced the means of the ‘mature-age’ groups. In addition the classification of ‘mature’ to this age group is dubious (Richardson, 1994b), given that some may still have progressed directly from high school to university and others may have experienced only one year away from schooling. It was therefore concluded that the number of genuinely mature-aged students in the current sample was insufficient to enable a representative analysis of their responses to the altered
program and the planned analyses of their responses as a separate group were abandoned. The investigation of learning approach responses by mature-age students to the altered context was secondary to the main research goals, thus this decision did not influence the principle aims of the study.

4.4.2: The Teaching Staff
The teaching staff consisted of those members of the early childhood teaching team and other members of the school’s staff who taught specialist core and elective subjects in the course. The early childhood team comprised 3 lecturers and one senior lecturer who was the course co-ordinator. One of these lecturers resigned due to ill health during 1995 and was replaced at the beginning of 1996 with an experienced lecturer who had transferred from another rural university. This was the only change to the teaching staff in the early childhood team throughout the course of the study.

Staff teaching specialist and elective subjects from other staffing teams remained reasonably constant throughout the study also. The lecturer of Science Education was absent on study leave in 1996, when Cohort 1 took this subject and returned in 1997, to teach the subject to Cohort 2. He then became part of the project, modifying the offering of this subject for Cohort 2. The retirement of the subject co-ordinator of the core subject, Child Development, led to another change from Cohort 1 to Cohort 2, however two other lecturers who also taught this subject remained constant across the groups. This subject was not a focus of modification in the project. One newly appointed lecturer replaced two experienced lecturers in the subject Movement and Health in Early Childhood, and modified the subject for Cohort 2 in a manner
counter to the philosophy of this project, thus creating an unavoidable, but minor, threat to the validity of the study.

Two elective subjects taught or co-ordinated by the researcher were chosen by substantial numbers of students from Cohort 2, partly because of their knowledge of his involvement in the project. Fewer students from Cohort 1 chose these two subjects. Other changes may have occurred in elective subjects but these were considered to be few and to have minimal influence.

4.5: Procedures
This thesis reports the main study undertaken in this project with the three cohorts of preservice, early childhood teacher education students. A number of concurrent exploratory studies were also undertaken with different student groups to identify suitable procedures that might be undertaken in the main study, and to signal any difficulties that may need to be overcome prior to implementation of the procedure in the main study. Since some of these exploratory studies are briefly described below and others have been reported elsewhere, they are not detailed in the context of this thesis.

4.5.1: Data Collection Procedure
Similar procedures were used for all questionnaire data collection across all cohorts. All questionnaires were keyed in Times 10-point font using the same format. The statements were printed on the left-hand side of the page and the corresponding Likert scale was printed on the adjacent right hand side. Students responded by circling the appropriate number on the question sheet (see Appendix E). The questionnaires were laser printed and photocopied onto the facing page and
counterbalanced such that the six possible orders of the three questionnaires were equally represented. A cover page requesting the student’s name, date of birth, course of enrolment, and the current date was added, and the bundle was stapled in the upper left-hand corner. Questionnaire bundles were then arranged such that the six counterbalanced orders occurred in sequence during distribution. These measures were taken to ensure any fatigue or order effects were evenly distributed across the scales and that students in adjacent seating were not presented with the questionnaires in the same order, to eliminate the possibility of responses being copied.

The SPQ is under copyright and commercially published but the question and answer format was considered unsuitable for the requirements of the study. SPQ questions are normally distributed in a preprinted question booklet and a separate answer sheet is provided. The answer sheet was considered confusing, since it was ordered counter-intuitively across the page and also provided codes such as DS (for deep strategy) and SM (for surface motive), which could have been deciphered by the students in this study. It was also considered inappropriate for different formats to be used for the different questionnaires. To overcome this problem sufficient SPQ question booklets were purchased for each student’s use, but were not used. Instead, the scale was reformatted to be consistent with the other scales and distributed in the manner described above.

On the first occasion for each cohort, a letter describing the purpose of the study, providing a guarantee of confidentiality and information concerning complaints, was distributed and read to the students in accordance with ethical requirements (see Appendix A.2). Students were requested to complete the questionnaires only if they
agreed to take part in the study. No information was provided to the students prior to this time about the study or its basis in theory. Considerable discussion of these issues occurred however, in the weeks following the completion of the initial surveys. On subsequent occasions students were reminded of the purpose of the study and their rights to confidentiality and withdrawal if they chose, prior to distributing the questionnaires.

Questionnaires were distributed to students at the beginning of lectures in different core subjects. Choosing subjects delivered by different lecturers for the distribution of questionnaires was a deliberate measure to reinforce the pervasive nature of the project. Lecture time was provided for the questionnaires to be completed, which took approximately 30 to 40 minutes, and they were handed to the researcher on completion. Students who were absent from the class were forwarded a copy of the questionnaire in tutorials during the following week. They were returned to the researcher either in person or via the class tutor in a sealed envelope provided. The researcher examined the surveys for completeness and any that were incomplete or illegible were identified. The researcher approached these students after class during the following week and sought clarification or completion of the responses provided. This measure greatly reduced potential wastage.

The timing of the questionnaire and interview data collection is summarised in Table 4.10. Initial surveys were administered during early April of the students’ first year at university. This timing provided them with at least 6 weeks to orient themselves to the university environment and consider issues such as the learning approaches they might take. It was hoped that allowing this orientation period would improve the reliability of responses, at least for the SPQ. The administration of the initial
questionnaires occurred prior to any practicum experience. The first two-week practicum occurred in late April to early May. Since the TES attempted to measure expectancy for teaching success, the immediacy of the practicum for occasion 1 and occasion 2 was planned to provide a suitable focal point for these expectations.

4.5.2: Treatment Procedures
Treatment procedures began with Cohorts 2 and 3 following the collection of the initial surveys in April 1996. Cohort 1 was to follow the program with subjects taught in their original format. However, especially in semesters 5 and 6 (the final year of the course) these students were also subject to some modifications. The maintenance of Cohort 1 as a contrast group became increasingly difficult to sustain because of the teaching insights gained by the principal teaching staff and those in the wider school community, resulting from the project. Ethical standards dictated to them that when improved teaching methods became known they could not withhold their implementation for the purpose of a research study. Further discussion of this potential contamination is contained within section 4.6 Threats to Validity. The program undertaken by students in Cohorts 1 and 2 is summarised in Table 4.11 and further detailed, along with the program followed by Cohort 3, in Appendix H.
Table 4.10. Schedule of Data Collection

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<tr>
<td><strong>Notes</strong></td>
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<tr>
<td>SPQ: Study Process Questionnaire; TES: Teacher Efficacy Scale; MMCS: Multidimensional-Multiattributional Causality Scale</td>
<td></td>
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</table>
4.5.2.1: Examples of Modifications Applied

Subject outlines showing the changes applied to sample subjects listed in Table 4.11 have been reproduced in Appendix H.2. Approximately half of the subjects taken by Cohort 2 were modified from their offering to Cohort 1. Each semester, one core subject was chosen as the main carrier of the modifications, in which the theme of developing deeper learning approaches was emphasised. In most semesters other subjects, which were either compulsory or electives, were modified in conjunction with the core subject.

Some program changes involved the combination of subjects with material covering similar conceptual areas assisting the students to make linkages across subjects and in particular between theory and practice. Each combined subject offering was linked to a practicum experience. Since the theme of encouraging deep learning approaches was emphasised in each of the modified subjects, to justify the modifications, the integration of subjects assisted in this theme becoming pervasive throughout the course.

Many of the modifications involved the use of co-operative group problem-based learning methods. These involved the students in pairs or larger groups of up to five students addressing a set task, often in case study format, and producing either a class or public seminar, research poster session, and/or a written report of their research (eg. EED106, EED105/EPT105, ESS201, ESA301). Jigsaw format was also used with co-operative learning methods, as in the case of the EEA201/EPT305 combination. In other cases the teaching content and method of delivery was refocussed to a personalised dimension, as with EEB102/EPT130. Personalisation and personal reflection were also encouraged through the use of
reflective learning journals and the exposition of personal theories of learning, as used in EED105/EPT105, EED106, EMS102 and EEA302.
<table>
<thead>
<tr>
<th>Offering</th>
<th>Code</th>
<th>Subject Name</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 1, 1995</td>
<td>EEP103</td>
<td>Aboriginal &amp; Multicultural Australia</td>
<td>Nil change</td>
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<tr>
<td></td>
<td>EED106*</td>
<td>Child Development</td>
<td>Assessment changed to reduce anxiety.</td>
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<tr>
<td></td>
<td>EMA105*</td>
<td>Creative Arts 1</td>
<td>Nil change</td>
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<tr>
<td></td>
<td>EEB102*</td>
<td>Introduction to the EC Profession</td>
<td>Subjects redesigned for Cohort 2 and taught together.</td>
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<tr>
<td></td>
<td>EPT130*</td>
<td>Orientation to Teaching</td>
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<td>Semester 2, 1995</td>
<td>EML104*</td>
<td>Child Literacy Development 1</td>
<td>Nil change</td>
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<td></td>
<td>EMM103*</td>
<td>Developmental Mathematics 1</td>
<td>Nil change</td>
</tr>
<tr>
<td></td>
<td>EED105*</td>
<td>Play &amp; the Learning Environment</td>
<td>Subjects redesigned for Cohort 2 and linked via journals.</td>
</tr>
<tr>
<td></td>
<td>EPT105*</td>
<td>Practice Teaching 1: Learning</td>
<td></td>
</tr>
<tr>
<td>Semester 3, 1996</td>
<td>EML206*</td>
<td>Child Literacy Development 2</td>
<td>Nil change</td>
</tr>
<tr>
<td></td>
<td>EMR104*</td>
<td>Movement &amp; Health in Early Childhood</td>
<td>Exam introduced</td>
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<tr>
<td></td>
<td>ESS201*</td>
<td>Young Children with Special Needs</td>
<td>Assessments redesigned for Cohort 2 (after: McKinnon et al., 1996)</td>
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<td>Elective Subject</td>
<td>ESS202 redesigned – taken by 14 Cohort 2 students (after: Ritter, 1997)</td>
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<td>ESC331*</td>
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<td>Subjects redesigned for Cohort 2 and taught together.</td>
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<td>Subjects redesigned for Cohort 2 (White &amp; Gordon, 2000)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elective Subject</td>
<td>ESB302 redesigned and taken by 30 Cohort 2 students (after: Gordon &amp; Dunshea, 1996)</td>
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Assessment tasks were generally shifted away from examinations either by reducing their contribution to the overall grade (eg. EED106, ESA301) or removing them altogether (eg. ESS201, EEA302). A greater emphasis was placed on assessment techniques that involved a substantial amount of student exposition, such as essays and written reports (eg. EMS102, ESS201). Where reports were lengthy and contributed to a sizeable proportion of the grade, these were submitted progressively in stages, with each stage contributing to the grade (eg. EED105/EPT105, EEA201/EPT305). Often where presentations were given to the class, self and peer assessment methods contributed wholly or partially to the grade awarded, such as the process used in EED105/EPT105, ESS201, ESA301.

### 4.5.3: The Students’ Experience

In the first semester, students in Cohort 2 were introduced to their course and the early childhood teaching profession by the course co-ordinator and another member of the early childhood teaching team in the combined subject EEB102/EPT130. This was an early attempt to combine subjects as a trial for later application elsewhere in the course. The subject EPT130 is an additional fifth subject to the semester offerings requiring students to spend 2 weeks in an early childhood setting, largely observing and assisting in minor teaching roles. It is graded as satisfactory or unsatisfactory and normally has only a small academic component. In past years EEB102 had links to the practicum, but not as explicitly stated as in the case for Cohort 2. Traditionally the subject introduced students to early childhood theoretical foundations and professional issues with weekly topics such as ‘History of Early Childhood Education’, ‘Research in Early Childhood’, ‘Early Language Development 1 & 2’, with links to professional practice in topics
such as ‘Teaching in Long Day Care’ and ‘Teaching in the Early Years of School’. It included a journal of personal reactions to the academic material presented, preparation of a teaching aid and an examination as assessment criteria.

In the modified subject, material was personalised instead of examining theory at this stage. Weekly topics included ‘Myself as a Learner’, ‘Myself as a Listener’, ‘Myself as a Writer’, leading to later topics such as ‘Myself as an EC Professional’ and ‘Myself as a Colleague’, where explicit links to the practicum component began. The early weeks of the subject encouraged personal reflection through guided activities recorded in the journal, which was to continue, and became a link to the second semester subject EPT105. In the early weeks of self-reflection the subject enabled material about learning to be taught in the frame of developing the students’ own study skills. Explicit teaching of university requirements for reading, writing and information access was undertaken. The examination was removed as an assessment item and replaced with an essay to help make the tutorial work on writing an essay more relevant.

The aims of the current research project, learning approach and teacher efficacy theory, were introduced by the researcher to the students within the context of this subject. Since the subject’s focus was self-awareness and self-analysis in the processes of learning, considerable interest was established at a very early stage in these students’ university careers about alternate approaches to learning.

In these students’ second semester the theme of developing deeper learning approaches was continued in EED105/EPT105, the focus subjects for the project in that semester. The practicum subject had the same subject co-ordinator as the
focus subject in semester1. The subject was introduced in the first lecture with a motivational extract from Biggs (1996) and the connection with the researcher and the current study was made explicit to the students from the outset.

*With the help of Chris Gordon, we wish to emphasise the importance of developing deep learners who will be competent teachers able to face novel teaching situations with sensitivity, understanding and confidence.* (EPT105 Subject Outline, p. 1)

Two major assessment tasks accounting for 90% of the grade set the scene for continued personal reflection, progressive problem-based analysis (the ‘Trina’ exercise), co-operative learning (in pairs), and the introduction of peer assessment. The workbook from the students’ Semester 1 subject EEB102, in which they recorded weekly reactions to structured activities, was continued in the second semester as a reflective learning journal. Weekly reflections were now required to relate personal learning insights from theory presented in lectures to experiences whilst on their orientation practicum, their problem-solving processes during the second assignment, and practical issues from tutorials. This journal, submitted twice during the semester, accounted for 40% of the grade awarded and provided an infrastructure to form explicit links across semesters.

The second assessment task in EPT105 accounted for 50% of the grade and was submitted in three progressive stages over an 11-week period, each accounting for 15%-20% of the total. This problem-based activity used a simulated case study about a child ‘Trina’, and required students to work in pairs. They firstly presented a written report identifying the issues raised by the case material, which required an analysis of theory relevant to play, growth and development. This
feature provided the link with the sister subject EED105 (Play and the Learning Environment). The student dyad’s second report demonstrated their preparation for the final ‘culminating activity’. It included a reporting of their research answering questions raised from their initial submission. The culminating activity took the form of a creative presentation to the tutorial group of the dyad’s quest for a solution to the problems raised by the case study.

The culminating activity was peer assessed, using a technique developed by Gordon (1993), in which each person in the dyad rated self and other contribution, and then ranked the performance of each dyad within the whole tutorial group. Thus a rank order of student group presentations was established as well as a rating for individual performance within the group. The lecturer collected the scoring sheets and calculated the overall ranks. The range of scores was then moderated by the lecturer’s perception of relative performance across tutorial groups. This process proved effective in other classes, but this was its first application with groups as small as two, or with students below third year level.

Following their completion of these subjects the students from Cohort 2, then embarked on their four-week practicum in a facility for children under 5 years of age. This practicum was the first in which the students were expected to take on some independent teaching activities, including planning and conducting lessons under the mentoring of an associate teacher.

Midway through the second semester of their first year, the researcher conducted a lecture in the subject EED105, providing feedback on the evidence gained thus far in the study, which linked learning approaches and teacher efficacy beliefs
through a correlational analysis. Essentially this lecture was a summary of the conference paper presented at the conclusion of phase 1 of the study (Gordon et al., 1995). On this occasion he also provided feedback to the students, and the lecturers, about the Cohort 2 students’ aggregated responses to the initial questionnaires. These data highlighted that the group had entered university with high scores on the surface approach scale. The lecture summarised some of the contextual modifications that had been made to the course delivery to encourage the students’ adoption of deeper approaches and emphasised that the students’ active engagement with the learning materials was needed to complement these modifications if the goal of developing deeper learning was to be met. The lecture was intended, and apparently accepted⁴, as motivational with feedback given to provide a baseline from which students could assess their current learning behaviour and their progress toward the stated goal.

The provision of feedback to the students about their cohort’s relative scores on the SPQ and TES is unusual in research design. Here the decision to do so was designed to inform goal-setting and feedback functions of academic self-regulation (Zimmerman, 1998a) and presage factors within Biggs’ ‘3P model’ (Biggs, 1988b, 1993a). According to Biggs’ model, learning approaches are adopted in accordance with students’ perceptions of the requirements of the learning environment. These perceptions may be developed from previously held views of successful learning behaviours in similar environments and moderated by feedback obtained from the current setting.

⁴ See interview responses and journal entries reported from selected students, in Chapter 6.
These attempts to encourage students to adopt deeper learning approaches were not intended to be manipulatory. They were meant to provide students with a conceptual frame to inform their choice of study behaviour and to provide a context to support the use of deeper approaches. The researcher, and the lecturing staff, believed that if the contextual modifications, their purpose, and the students’ current approaches were not made explicit, then many students may not perceive that the opportunity for change was available, or indeed necessary.

Since the learning environment is seen as an interactive set of interdependent components within Biggs’ model, the achievement of all educational goals relies at some point on the co-operative interaction of all parties. It was considered that no purpose would be served in the long term by keeping the results of the questionnaire responses from the students other than the reduction of a potential Hawthorne effect in the study. Alternative measures were therefore taken to account for this potential threat to validity and these are described below in section 4.6. It was anticipated that making the overall results of students’ responses known to them, may encourage them to become more actively engaged in choosing deeper approaches when the context supported these. Approaches to learning ultimately rest on students’ choice of behaviour. Feedback about their reported behaviour and potential learning outcomes could assist in ensuring their choices were well informed.

During the third semester the core special education subject (ESS201) was chosen as the focus for modification. This represented the first occasion a subject taught by lecturers outside the early childhood teaching team was brought into the research project. Because the researcher was a member of the special education
team, the other team members were aware of the goals of this study. Two lecturers for this subject had identified that the two multiple-choice examinations traditionally used as assessment methods in ESS201 were impediments to deeper learning. The remaining assessment pieces, a book and video review, were also considered unsatisfactory for developing critical thought.

Following the researcher’s presentation of alternative assessment methods at a university Teaching and Learning Colloquium, he assisted these lecturers to develop an alternative assessment plan for this subject. This alternative was based on the use of small group research and poster presentations developed in one of the exploratory studies during the previous year, with fourth-year research methods students (McKinnon et al., 1996). Students were to work in small self-selected groups of 3 – 4 students, research an aspect of disability and present their findings at a conference style poster presentation open to all staff and students within the school. Oral presentations were to be made to assembled audiences on a rotational basis. The presentations were peer and lecturer assessed by the completion of a feedback sheet, which contained comments about the presentation and a recommended grade. Identical feedback was reproduced on two reports, one unsigned, and given to the students, the other signed and placed in an assessment box. With this approach, grades could be awarded despite posters having variable audiences. Feedback sheets from all audience members were accepted but only those from class members could be placed in the box.

The poster presentation was developed to replace the multiple-choice examinations. An essay question requiring critical analysis was also developed to replace the earlier use of book and film reviews. When these proposals were
suggested to the third member of the subject’s teaching team however, he objected strongly and insisted the examinations and reviews remain. This was also the only occasion in which a lecturer objected to proposed subject modifications as part of the study. His objection was problematic because he held the role of subject co-ordinator and stated a firm commitment to a transmission approach to teaching. This impasse was resolved only with the intervention of the special education course co-ordinator. The lecturer then relented, but under sufferance and on the condition that he did not gain an additional marking load as a result. For this reason, no further changes could be made to the method of delivery in the subject.

The researcher attended a lecture in this subject to administer the second round of questionnaires. After these had been collected he then described the changes to the assessment procedures in this subject to the students and illustrated how they might take the opportunity to engage in deep learning practices. These principles were also reinforced by the two lecturers who had originally desired the assessment change. The students were thereby exposed to the issues of learning approach and teacher efficacy, as they affect teachers’ competence with children with disabilities, being espoused by lecturers outside the early childhood teaching team.

In Semester 4, the researcher approached the science lecturer newly returned from study leave, to assist in the modification of the subject EMS102 Science for Early Childhood. The researcher was aware that the science lecturer had been interested for some time in developing metacognitive interaction between the students and his subject material, which was grounded in social constructivist views of science
education. He had previously used a method by which students analysed his teaching on a weekly basis, with reference to their own learning and used these anecdotal records to develop their own personal theory of learning. Students’ personal theories, together with their anecdotal records, were then submitted as a major assessment piece (Hoban, 1998). This approach had not been implemented with Cohort 1, since this lecturer was on study leave in the previous year. The lecturer was keen to use this approach again and the researcher’s suggestion that it be assessed in accordance with Biggs’ and Collis’ (1982) SOLO Taxonomy was also well received. The researcher again addressed the class during a lecture in this subject, to provide feedback from the second round of questionnaires and to reinforce the science lecturer’s innovation in metacognitive training as another opportunity to engage in deep learning.

In Semester 5, the subjects EEA201 Investigating and Planning in Early Childhood and EPT305 Practice Teaching 3: Program Planning were fully integrated with joint lectures, tutorials and team teaching by the two main lecturers in both subjects. These lecturers planned to take advantage of their personalities and combined repartee as a major force to motivate and engage the students in lectures. The combination of subjects also encouraged student learning by making explicit the logical links between the subjects. Students’ work outside class was directed by two principal learning and assessment tasks and also by the forthcoming major practicum, in which students were expected to teach full-time, and take full responsibility for the class, for at least the final two weeks.

The assessment tasks included a small-group co-operative tutorial presentation and a submitted paper, developed from a review of literature stimulated from their
attendance at the local Early Childhood Conference, which was co-ordinated by
the two lecturers of this subject. Additionally students were required to
progressively build a planning cycle portfolio, which had a theoretical base and a
practical intent and could be used on the forthcoming practicum. The portfolio
was submitted for grading purposes and partly presented to the class where it was
subject to concomitant peer evaluation. The researcher attended this class to
administer an additional round of questionnaires in order to compare the students’
responses before and after the final practicum. The opportunity was also taken,
after the questionnaires were completed, to reinforce the modifications in this
subject as ideal opportunities to practice deep learning approaches.

In the final semester of their course two subjects were modified. One of these was
the only core subject offered in this semester ESA301 Children’s services and
Administration, and the other was an elective subject co-ordinated by the
researcher, in which approximately half of the early childhood students enrolled
(EEA302 Discipline and Classroom Management). The core subject in this
semester aimed in part, to acculturate the students into the early childhood
teaching profession and to prepare them for possible leadership roles. Their access
to the profession relied initially on performance in job interviews, and interviews
for a major employing authority were conducted during the semester. The early
childhood course co-ordinator was aware that the researcher had previously
developed intensive interview training approaches which relied on interactive
remote coaching (Gordon et al., 1997a; Gordon et al., 1998a). She requested he
adapt this methodology to provide interview training for these students in order to
improve their skills in employment interviews.
The students were allocated to co-operative teams of 4 or 5 students such that they could rotate the roles of interviewee, coach and two (or three) interviewers. Heterogenous groups were constructed to contribute to authenticity by requiring students to impress potentially critical others in an interview setting. Groups developed interview questions in response to actual advertisements and shared these questions with the remainder of the class. A bank of questions was produced from which interviewers could choose, without the interviewee knowing which questions would be asked. Interviewees were supplied with a FM audio receiver and a coach, located in a nearby observation room and provided with the interviewee’s resume, prompted the interviewee through the FM transmitter. Students video-recorded the interviews and rotated roles. At the completion of the interviews the students in each group viewed their recordings and made constructive criticisms. After three rounds, students were peer-assessed in terms of their suitability for appointment to the advertised position. These students then presented for their real interviews one week later (White & Gordon, 2000).

Eight different lecturers were arranged to give guest lectures on particular aspects of discipline and classroom management in the elective subject EEA302. The guiding frame was created by the text, written by the researcher and two other colleagues (Gordon et al., 1996a). Cohort 2 students were combined with two other groups to bring the total numbers in the subject to approximately 160. Tutorials were arranged as case workshops with each student required to present a brief case description. The tutorial group then attempted to apply the focal theoretical approach for that week to the cases presented. The students also submitted the case study in written form for grading purposes.
The major assessment task took the form of a personal portfolio based on Biggs’ (1996) description of portfolio use. Students developed and submitted three components simultaneously. The first was a collection of materials which students believed demonstrated the growth in their knowledge and skill over the course of the subject, for example, before and after philosophies, reworked case studies, journal reflections and the like. The second component comprised a rationale arguing why their choice of items included for the first component were the appropriate items to demonstrate growth in their knowledge. The theme of creating contexts to enable students to develop deeper learning approaches was made explicit in the introduction to this assignment and thus was expected to be mentioned in the rationale. The final component was a self-assessment. The students were required to recommend their own grade for the portfolio and argue their justifications for the award. This approach was based on its successful trial in an exploratory study with another group (Gordon & Dunshea, 1996).

Grading was undertaken by placing the rationale and grade argument within an adaptation of the SOLO Taxonomy. The students were given the grading requirements at the beginning of the semester, within the subject outline. The documentation forming the first part of the portfolio was considered supporting documentation and was surveyed for completeness, but not read for grading purposes. Only the rationale and grade justification counted for assessment purposes. The purpose of this process was to overcome some lecturers’ perceptions of a heavy workload as an obstacle to setting assignments that encourage deeper approaches to learning. Grade awards were determined through consensus marking of sampled portfolios from each tutorial group to determine initial standards followed by individual marking of the remainder.
Final questionnaires were administered during this semester in the core subject. The students were thanked for their participation in the study and for their patience in repeatedly completing identical questionnaires. A future follow-up study of their experience in entering the teaching profession was foreshadowed and met with general approval.

The modifications outlined here are detailed in Appendix H. The intent was to make contextual alterations conducive to the development of deeper learning approaches which were manageable in the context of an existing course by a small team of lecturers who had overall responsibility for the course, but relied on others for much service teaching. In this way, it was thought the process that evolved could be transportable to other teaching settings without requiring a complete course restructure as was the case in other studies reported (Kember & Gow, 1992; Newble & Hejka, 1991).

The action research team decided that the key elements in the provision of such an environment were: the development of a pervasive and explicit theme of deeper learning as a favoured approach; creating a culture of co-operative effort towards the achievement of this goal; creating teaching and assessment tasks that made surface learning approaches more difficult for students to apply; providing variety in teaching and assessment methods to encourage students to consider their approach on each occasion and alleviate tedium and the development of automated responses. The experience of students in Cohort 3 is not detailed here, but was essentially similar to that of Cohort 2, in the main treatment foci over the first two years. The course description for the new Bachelor of Education (Early Childhood) is also reproduced in Appendix H.
4.5.4: Fidelity of Implementation
The fidelity with which these course modifications were implemented was investigated using three approaches. Firstly, it was planned to compare the ATI responses from the two lecturers who began implementing the modified program with Cohort 2 during their first semester, with their responses from a second ATI administration at the conclusion of the study. Secondly, the ATI was administered at the conclusion of the course experience of Cohort 2, to the six lecturers responsible for implementing the major modifications. Finally, an in-depth interview was conducted with the course co-ordinator to determine her perceptions about the fidelity of program implementation across the course, and her perceptions of student outcomes.

Unfortunately, one of the two lecturers involved in the implementation of the initial modifications became seriously ill and needed to resign her position part way through the program. The other lecturer, who was also the course co-ordinator, did complete the ATI at both the beginning and conclusion of the course experience of Cohort 2, however, on the second occasion the newer version of this instrument needed to be used (see previous report of the procedure used for matching these responses in section 4.2.4 of this chapter).

The course co-ordinator (case 1) was responsible for the initial implementation of the program modifications, since she also co-ordinated three of the targeted subjects in year 1 of the course for Cohort 2. The original ATI was completed by her in February 1996, immediately prior to the first meeting held with her teaching colleague and the researcher, for the purpose of designing the approach to teaching for these subjects. The co-ordinator had been part of the original team
who planned the implementation of the project, had taught these same subjects to Cohort 1, and had been present when feedback lectures had been given to Cohort 1. She had also participated in a staff meeting conducted by the researcher, where the aims of the project and early data from Cohort 1 were described. While she thus had a good knowledge of the project’s aims and early findings at this time, she had only a limited knowledge of the theory underpinning the project and of teaching and learning contexts, which might be used to enhance the use of deep learning approaches.

The second administration of the ATI with the course co-ordinator occurred in November 1998, at the conclusion of the course for Cohort 2. By this time she had participated in the project for three years, and had designed and implemented a number of the contextual modifications used. She had been involved in numerous meetings and informal discussions about the research with the researcher and others within her teaching team, other members of the faculty, and members of staff from other faculties. She had co-presented the study’s early findings with the researcher at the Australian Association of Research in Education joint conference in Singapore, held in November 1996 (Gordon et al., 1996b). Her knowledge of the project goals and its underlying theory were thus well developed, by the time of the second ATI administration. She had also built considerable experience in the development and implementation of contextual variations designed to promote the use of deep learning approaches.

The two major dimensions measured by the ATI are labelled *Conceptual Change/Student Focus* (CCSF) and *Information Transmission/Teacher Focus* (ITTF). These dimensions are each further divided into *Intention* (I) and *Strategy*
(S) subscales. Hence, for example, CCSFI refers to ‘conceptual change/student focus intention’ and CCSFS refers to ‘conceptual change/student focus strategy’.

![Figure 4.2. Comparison of approaches to teaching, intention and strategies for Case 1 (1996-1998)](image)

**Figure 4.2. Comparison of approaches to teaching, intention and strategies for Case 1 (1996-1998)**

The distribution of scores across the four subscales of the ATI for the course co-ordinator described in Figure 4.2, were obtained after matching items from the original and revised ATI (see Appendix E4 and E5). Only a partial match was obtained by this process and thus the changes identified may only represent a broad approximation of the development of her approach to teaching.

Nevertheless, the changes represented in Figure 4.2 are in the direction consistent
with the development of teaching and learning contexts that promote students’ adoption of deep learning approaches (Prosser & Trigwell, 1999; Trigwell et al., 1994) and provide some evidence that her implementation of program modifications were likely to be in accordance with the aims of the project.

When the intention and strategy subscales of the two main approaches measured by the ATI are combined, the course co-ordinator’s CCSF dimension grew throughout her experience in the project, from an original score of 22, to a final score of 36. Her ITTF dimension remained relatively static, with an original score of 20, to a final score of 18. At the beginning of the program for Cohort 2, she appeared to place approximately equal weight on information transmission and conceptual change. By the conclusion of the program, her relative focus appeared to shift in such a way that considerably greater focus was given to a conceptual change orientation.
Figure 4.3. Comparison of approaches to teaching intention and strategy for core lecturing staff

Comparison of the scores on the ATI administered in November 1998 to all lecturing staff who undertook modifications to their teaching as part of the project are described in Figure 4.3. All staff members reported CCSFI and CCSFS as their primary focus at the conclusion of the project. Some lecturers, Cases 2 and 4, reported extreme differentials between conceptual change and information transmission, while others, Case 3 in particular, reported only marginally stronger conceptual change strategy use. Results for the conceptual change and information transmission approaches reported by these staff members, once the scores across the intention and strategy dimensions were collapsed, are reported in Table 4.8 below.

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<thead>
<tr>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
<th>Case 5</th>
<th>Case 6</th>
<th>X</th>
<th>SD</th>
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<tbody>
<tr>
<td>CCSF</td>
<td>36</td>
<td>40</td>
<td>31</td>
<td>38</td>
<td>37</td>
<td>33</td>
<td>35.8</td>
</tr>
<tr>
<td>ITTF</td>
<td>18</td>
<td>9</td>
<td>21</td>
<td>8</td>
<td>23</td>
<td>22</td>
<td>16.8</td>
</tr>
</tbody>
</table>

All core lecturing staff reported a considerably greater CCSF than ITTF in their orientations to teaching at the end of the program. This outcome is consistent with the development of teaching contexts that foster students’ use of deep approaches to learning, and consistent with the aims of the current study (Prosser & Trigwell, 1998, 1999).
From these results, it cannot be determined if the teaching intentions reported through the ATI by the core teaching staff, developed as a result of the study. Indeed, because of these lecturers’ knowledge of the aims and theoretical bases of the current research, the possibility that these scores are coloured by lecturers’ perceptions of the researcher’s desired outcomes, cannot be excluded. Further evidence was therefore sought in relation to teaching intentions and learning contexts applied throughout the study, through an in-depth interview with the course co-ordinator at the conclusion of the course experience of Cohort 2. Throughout this interview (see transcription in Appendix F.3), the course co-ordinator identified a number of the program modifications listed earlier, including the use of reflective journals, problem-based learning, the use of small group methods, linkages of theory to practice, linkages across subject boundaries, feedback sessions by the researcher, alternative assessment methods, reduction in the use of examinations, and the overall number of assessment pieces. She also described the way in which she perceived her involvement in the project had impacted on her own professional development and that of her colleagues within the early childhood teaching team.

In the following extract, the course co-ordinator described one of the central features of the modifications to teaching that occurred within the study. She identified the explication of linkages across subject boundaries as a central feature. In the process of responding to the question, she also engaged in the preliminary generation of techniques that could be implemented to develop subject linkages further, through integrated assignments. Thus, at the conclusion of the project, the course co-ordinator still continued to reflect on the teaching
methodology applied through the study, in an attempt to develop further
refinements.

Interviewer: What were some of the things that you did try that were
different?

Co-ordinator: I think the first thing was probably working across the
subjects more - and I think there’s much more that we could do
with that - so that what you’re - the assessment that you do in
one subject - you know - is kept quite separate, where I think in
lots of ways we’re trying to get them to make connections across
subjects and I think the best way to do that, is to say - you know
- this assignment goes across the two. So we’re not just saying
it we’re actually doing it. So I think we’re perhaps more aware
of trying some of those things and being more aware of what
people were doing at different stages. So I guess, as Co-
ordinator, I’ve usually got a pretty good idea, but I think the
others were perhaps more aware of what was going on across
different subjects. I think letting go - you know - thinking that
we have to do everything all the time - when we’re getting
people to do assessments every couple of weeks we’re doing our
job - and I think that takes a while to do that. But I think it’s
proven that when we - we let go, the results are - you know - as
good as we would have hoped they would be, without them
having us peering over their shoulders prompting to do them. ... So I think - you know - that’s a lesson in itself that you’d be
surprised what the students can do, when we step back.

In the above extract, the course co-ordinator also related two aspects of the study
that impacted on herself and the other members of her teaching team. She
indicated that the other members of her team had gained a greater awareness of
the processes used in other subjects, and that both she and her colleagues had
learned about ‘letting go’. It appeared to be an important awareness for the course
co-ordinator, that it was possible to relinquish some responsibility to the students
for the provision of learning content, and the repeated assessment of its
acquisition. She developed this issue further, emphasising the difficulty she
experienced about trusting that the students would develop the level of
understanding required of her subject, without the highly directed teaching strategies used with previous groups.

Co-ordinator: ... that’s one of the things - one of the things that’s perhaps changed, in lots of ways, to a lot of the staff. You don’t have to do that. More is not - you know - necessarily better, and having less - fewer pieces of assessment um, and giving them a little, I think, more responsibility in the way that they tackle it perhaps. So they decide. Perhaps that really began, that semester that I worked with [name of lecturer]. Remember? That would be – what? - at least 3 years ago.

Interviewer: That was three years ago, yeah.

Co-ordinator: In the second semester when we tried the situation analysis learning which I knew a little about - well we hadn’t actually tried it. We worked our way through that um - but in actual fact the students, even at that stage, came up with some quite outstanding ways to do what we wanted them to do, rather than us - you know - giving them information all the way along. But it was quite difficult to do though, to trust them to do it, I guess. Or to trust ourselves to let them do it.

When asked to describe how the current research impacted on her personally, the course co-ordinator noted that she’d been removed from research for a considerable time. She found her involvement in the study timely and well connected with her teaching. She was able to sustain her efforts towards the research goals largely because she was not required to lead the research, she could see ongoing results from her efforts and those of her colleagues, and the action research group provided collegial support.

Interviewer: ... How has it [the research] affected you personally?

Co-ordinator: Well it probably is the right sort of thing for me to be involved in, because I guess I was in that category of people that’s primarily a teacher, and the research has been more a peripheral activity. I think - even if I did spend six months in 1980 being a research sort of person in England - but I think, because it’s related so much to the teaching, I think that’s had an impact - you know - I think that’s really important. ...
Whereas, if it was something that was generated on my behalf, I don’t think I would have sustained that work. Whereas, ’cause you were working it primarily, but other people were too - and was being picked up in Special Ed subjects - so it was being [inaudible] - you know. You sort of got swept up with the group too, and I think you could see the outcome, so I think that’s what made the impact on me. ...

The course co-ordinator was cautious throughout the interview in her attribution of cause and effect. She often qualified her responses with suggestions for alternative explanations and was tentative in her descriptions of changes observed. When asked whether involvement in the research project had similarly affected other members of her teaching team, those who had mainly comprised the action research group for the majority of the study, her response was tentatively affirmative.

Co-ordinator: I think it has. I think what’s happened is people have tended to um, follow in the pattern of whatever has been set up, but also to make changes, depending on the personnel. I think it has. um It may vary a little bit in the subject but I think – I mean, I think they’re certainly aware of what’s - of what’s happening. Whether it’s mainly – it’s impacted outside our group, apart from the Special Ed. people, I’m not sure. I think possibly not.

In the above extract, the course co-ordinator made the distinction between the impact of the research on members of her own team and those in other teaching teams within the school. Some attempts had been made to inform the wider staff of the school about the aims of the research and to report some early findings, by making presentations at several staff meetings and faculty colloquiums. These presentations were made at the behest of the Head of School, because of her observation that the study was effective in improving quality teaching and learning. The course co-ordinator observed that these presentations had made little
difference to lecturers in other teaching teams and only those involved in the project’s action research process had modified their approaches.

Her observation that changes within her own team were based mainly on an awareness of the modifications others had made, and a desire to follow patterns established by other lecturers, appeared to understate other statements made earlier in the interview. On previous occasions she had, for example, indicated that the project had altered the perception of the core lecturing staff during her response to a question that asked if the project had impacted on the students in the course.

Co-ordinator: I think on the whole they’re [the students] usually pretty good, but maybe this group was perhaps even more so, but perhaps that’s because our awareness was heightened too. Like I think what you’re doing had an impact on the staff. So whether indirectly we influenced that possibility - you know - we were focusing on other things as well, and trying different things, rather than just worrying about - you know - that’s 40% that’s 20%.

The context of this response was a discussion surrounding the use of peer assessment and the co-ordinator’s observation that the students in Cohort 2 were, on the whole, less competitive and more co-operative in their working relationships. Her statement about the impact of the current study on the perceptions of other lecturers in her teaching team was intended as a qualification of her observations of student behaviour. During her prior comments concerning teaching modifications made, the broad-based staff knowledge of teaching contents and teaching strategies, the issue of relinquishing responsibility, and the support provided by her team in relation to her own development, all involved a discussion of her teaching team in a collective sense.
On most occasions when the interview questions required a response in the form of a judgement, the course co-ordinator responded tentatively, and regularly qualified her observations with suggestions of alternative explanations. It was therefore accepted that she generally used a tentative communication style. Since the substance of her responses consistently reported close agreement between course modifications described in Table 4.11, teaching and assessment processes described in subject outlines (see Appendix H), and reports from students during interviews about their course experience (see Chapter 6), it was also accepted that the program implementation was generally consistent with the aims of the research and the interventions planned. Since these conclusions were also consistent with the results obtained by the completion of the ATI from each member of the core teaching staff, the program modifications designed for implementation during the current study were accepted as having been implemented with acceptable fidelity.

4.6: Threats to Validity
Any experimental research contains threats to the validity of the conclusions drawn in cause and effect relationships and their ability to be generalised to other groups. These threats are compounded in the case of field research using non-randomised quasi-experimental design. Cook and Campbell (1979) identify a considerable number of threats to validity in such settings. These threats are broadly categorised as threats to internal validity, statistical conclusion validity, construct validity or external validity. Each of the threats identified by these authors considered applicable to the current study is discussed in this section.
4.6.1: Internal Validity
Internal validity refers to the ability of the researcher to make cause and effect connections between the independent and dependent variables in the study. In the current context the ability to draw conclusions about variations in learning approach and teacher efficacy in response to the contextual variations applied are dependent on the study’s internal validity. Cook and Campbell (1979) identify thirteen potential threats to internal validity, seven of which are considered plausible threats to the current study.

4.6.1.1: History
History refers to the threat that some other event occurring during the time of the study impacted on the students, causing the outcomes assumed to be caused by the altered learning contexts. Despite the fact that this study took place over a four-year time span and many extraneous events may have impacted on the students, this threat was considered to have minor impact on the study. It was considered that extraneous events would be likely to produce short-term responses unlikely to be sustained over the entirety of the students’ courses and that such occurrences would affect Cohorts 1 and 2 in similar ways.

Though the cohorts were in different stages of their course, they were temporally distant by only one year, so events such as changes to teachers’ salary and working conditions, changes to university fees and charges, for example would have impacted equally on both cohorts. Course changes could have affected Cohort 3, but not Cohorts 1 and 2. If differences were identified between Cohorts 2 and 3 the source of the difference may be attributed to course changes, but the study predicted similarities between Cohorts 2 and 3 and differences between
these two, and Cohort 1. This threat was considered minor because of the absence of any major event affecting the cohorts differently.

4.6.1.2: Maturation
Maturation would be a threat to validity if the students’ growth in knowledge and experience over time led to different responses on the questionnaires, rather than the contextual treatment. This threat would have been major had a contrast group not been employed in the study, since differences have been noted in learning approaches between mature-aged and young students, and since it would be expected that greater knowledge about teaching and learning would lead to more considered responses on surveys of teaching and learning. As this threat would affect Cohorts 1 and 2 in the same way, any differences noted in the pattern of their developing attitudes would not be attributed to maturation.

4.6.1.3: Testing
Testing is a threat to repeated measures on the same instrument, when memory of items or test practice may improve responses. While the current study employed repeated measures on identical instruments, these were usually spaced one year apart. The students were advised that the questionnaires did not represent a test of how well they remembered their responses from the previous administration, and were instructed to respond according to their current beliefs. Because this threat would also have affected Cohorts 1 and 2 equally it was not considered a major threat to the study.
4.6.1.4: Statistical Regression
Statistical regression refers to the tendency for high and low scores on subsequent measures to change in the direction of the mean due to error variance. This tendency does not usually affect overall group means, which were the basis for the analyses conducted in the current study. This threat would also affect contrast and treatment groups equally and was not considered a major threat in the current study. Had the relative scores of the different cluster groupings from the SPQ, reported earlier, formed the basis of later statistical analyses, statistical regression may have played a part with clusters represented by extreme scores on the SPQ profile.

4.6.1.5: Mortality
Any longitudinal study, especially one conducted over several years, suffers from a mortality threat. The threat in this instance related to the reduction in sample size in each of the cohorts due to students leaving the university, taking leave of absence or failing to complete the whole series of questionnaires. This threat was most pronounced in Cohort 3. The resultant return rates for complete sets of questionnaires from the base of year 1 enrolments, was above 60% for all cohorts and above 70% for Cohort 2. These return rates were considered adequate for conclusions to be drawn and the sample sizes of 46 in Cohort 1 and 51 in Cohort 2 still enabled statistical comparisons to be made. The sample size of 31 in Cohort 3 however, reduced the confidence in conclusions drawn.

Mortality also affects the composition of the groups surveyed. The data collected in the current study represents only the sample of students who continued to the conclusion of the course. These people may have different characteristics across a
number of dimensions to students who failed to complete the course, who decided
to move elsewhere, or took time away from university. Further investigations
would need to be made with those who left the university to measure the extent to
which the study’s findings applied to them.

4.6.1.6: Compensatory Equalisation of Treatments

The threat of compensatory equalisation of treatments emerges when the
treatment applied to one group is seen as being clearly advantageous. Those who
deliver the treatment may see the contrast group as missing out, or being
disadvantaged, by the absence of the treatment. If those who deliver the treatment
change the way they interact with the contrast group to compensate them for their
disadvantage then the findings of the study may be compromised.

Compensatory equalisation of treatments emerged as a major threat in the study
because those who taught Cohort 2 also, in the main, taught Cohort 1. As the
study progressed these lecturers clearly saw Cohort 2 as receiving a higher quality
of education and being principled, ethical educators they could not refrain from
applying some similar approaches to Cohort 1. This effect would have impacted
on Cohort 1 almost exclusively in their final year, since the outcomes of the
altered learning contexts were only apparent to the lecturers after the conclusion
of the first year for Cohort 2 (ie. after Cohort 1 had completed their second year).
The effect of this threat to validity would be to reduce the differences between
Cohorts 1 and 2 in their final years and thereby increase the likelihood of a type II
error. This threat needs to be considered in the interpretation of the results from
this study.
4.6.1.7: Compensatory Rivalry between Respondents Receiving Less Desirable Treatments
A threat to validity may occur when members of the contrast group increase their output or product, or in some other way behave differently, because they see the treatment group as advantaged competitors. Members of Cohorts 1 and 2 would have known and interacted with each other. This possibility was magnified by the fact that many students lived on campus and interacted daily with students from other courses. Students from different cohorts may have discussed the nature and impact of the research project. The cohorts however, were not in competition with each other for the distribution of grades, nor were they enrolled together in the same subjects. Students in Cohort 1 would have already completed the subjects in which students in Cohort 2 were enrolled. In the main the cohorts were taught the same subjects by the same lecturers, so little disadvantage would have been assumed by the members of Cohort 1. It is considered unlikely that a scenario of competition would have evolved.

4.6.2: Construct Validity
Construct validity is concerned with the attribution of cause and effect and in the case of the current research, the attribution of changes in the dependent variables to the altered teaching and learning context. Of the ten threats to construct validity identified by Cook and Campbell (1979), four were considered plausible threats in the current study. These threats are considered in the following sections.

4.6.2.1: Mono-Method Bias
This threat refers to the method of data collection affecting the data gathered, rather than the treatment. In the current study the major source of quantitative data was gathered from surveys, all of which used pencil and paper responses to
statements on a Likert scale. The scale used always indicated levels of
disagreement toward the left and levels of agreement toward the right. Since
respondents to such surveys may have a tendency to use, or avoid, the extremes of
the scale, or to take a predominantly positive or negative view, the heavy reliance
on Likert scale measures may have produced a bias in the data.

The effect of such a bias would be to increase the likelihood of a type II error by
reducing the level of change reported by the students due to their preference for
using only part of the scale. Such a response bias would also increase the error in
the instruments used and reduce their internal consistency, also increasing the
likelihood of a type II error. This problem would not affect the groups
differentially since a similar range of response biases would be expected in Cohort
1 as well as Cohorts 2 and 3. The study anticipated greater change in Cohorts 2
and 3 and less change in Cohort 1. Since this threat to validity would act to reduce
the appearance of change it is unlikely that a type I error could result.

In an attempt to pre-empt the potential of mono-method bias to affect the
outcomes of the study, multiple data sources were included. In particular the
conduct of student interviews, apart from allowing students to elaborate on their
views, enabled a comparison of their perceptions expressed in interview and on
the surveys. Several questions were asked in the interviews to ascertain the
students’ views on each of the scales used to make up the questionnaires. Thus the
sample of students interviewed provided a validity check on the distribution of
scores derived from their survey responses.
4.6.2.2: Hypothesis Guessing within Experimental Conditions

This threat to validity describes a process where subjects in a field experiment become aware of the purposes of the study and adjust their behaviour in order to please the researcher, rather than the behaviour change resulting from the treatment conditions. The Hawthorne effect is one result of hypothesis guessing and because the students in the current study were clearly aware of the study’s purpose, it was anticipated that their reaction to this knowledge might pose a major threat to the validity of the conclusions reached.

Students’ perceptions of the learning environment, their perception of lecturers’ expectations and feedback about their performance in accordance with those expectations are considered important determining variables in affecting the learning approaches students adopt. Whether students responded to the contextual variations or to their perception of lecturers’ expectations could not be differentiated in the study, nor were they intended to be. Both were considered important, complementary and necessary conditions to encourage students to choose deeper approaches to learning. Indeed the detailed explication of the lecturers’ and the researcher’s expectations was considered an important component of the contextual milieu created for this research. In these conditions it was not possible to conceal the purpose of the research from the students.

It was not expected that the use of deep learning approaches could be sustained by an Hawthorne effect alone over the three-year period of a student’s experience in the study. An attempt was made, however, to partially control for this potential threat to validity and to estimate its effect on the outcomes of the study.
A partial control was established by making the aims of the study known to the contrast group (Cohort 1) as well as the other cohorts (Cohorts 2 and 3). Their role as a contrast group was not made explicit to them, nor was the remainder of the research design, but they were informed from the outset that the purpose of the study was to improve deep approaches to learning and teacher efficacy. The nature of these concepts and their hypothesised relationship was explained to them after they had completed their initial surveys. They were also later given similar feedback about their responses to the questionnaires. Their attention was specifically drawn to the significant correlations between deep approach use and high personal efficacy. This control was only partial because the explanations of the study were not as powerful as those used with the treatment groups without examples of contextual modification being possible. Nevertheless the contrast group were aware of the study’s purpose and the response patterns considered ideal by the lecturers and researcher.

In order to estimate the impact of any Hawthorne effect, the questionnaires were composed of non-equivalent dependent variables (Cook & Campbell, 1979). The MMCS consists of scales that measure causal attributions, which are theorised to develop in response to long-term experience generalised across environments. As such they are unlikely to change markedly over a three-year period in response to relatively minor contextual variation. It was expected however, that any Hawthorne effect would impact on student responses to the MMCS in the same way as the SPQ and the TES. The statements contained in the MMCS Achievement subscale, especially those pertaining to effort and context, are structurally similar to items on the SPQ. It was expected that students would reasonably construct a similar pattern of responses in the MMCS and the SPQ if
they responded in accordance with their perception of the researcher’s expectations, rather than their genuine beliefs.

The study predicted positive change in the deep approach and personal efficacy scales in particular, a negative change in the surface approach scale and relative stability in causal attributions for ability, effort, context or luck. If an Hawthorne effect was active then it is likely that a similar positive change would also apply to the effort subscale in the MMCS and negative change would be likely with the context and luck subscales. These expectations regarding the MMCS were not made known to the students in any of the three cohorts or to the lecturers who taught them. It is considered very unlikely that they would have been concluded through hypothesis guessing.

4.6.2.3: Experimenter Expectancies
Experimenter expectancies, for example halo effects, can threaten a study when such expectancies bias the data obtained. Cook and Campbell (1979) recommend that such threats may be overcome by separating the roles of those who deliver the treatment and those who collect the data. Such a scenario existed in the current study with respect to the students, but not with respect to staff development. The researcher collected all the data used in the study but was only peripherally involved in the actual delivery of the treatment to the students. The researcher still held expectations of the research outcomes, but since the majority of data was quantitative and not subject to the researcher’s discretion, it is unlikely that these expectations could have biased the data in any significant way. Qualitative data gathered from interviews and participant observations made could have been
affected by experimenter bias and the researcher needed to remain cognisant of this potential during the analysis, reporting and interpreting stage of the project.

4.6.3: Statistical Conclusion Validity
Statistical conclusion validity refers to the sensitivity of the data collection and data analysis procedures to type I and type II errors. The researcher needs to be assured that the instruments used to collect data and the methods used to analyse these data are sensitive enough to detect significant change within acceptable bounds for accuracy. Cook and Campbell (1979) identify seven potential threats to statistical conclusion validity of which five were considered plausible threats in the current study. These are considered in the following sections.

4.6.3.1: Multiple Comparisons and Error Rate
Multiple comparisons increase the likelihood of a type I error by concluding a difference exists when its occurrence has been brought about by chance, rather than the treatment applied. In the current study the effect of the treatment on nine dependent variables has been measured and subjected to analysis. Therefore the commonly accepted error tolerance of 5% (ie. where $p = .05$) may overstate observed differences in the study and lead to some spurious results. A correction factor is therefore appropriate to counter this potential threat to validity.

If a Bonferroni correction (Winer, Brown, & Michels, 1991) were applied, the standard .05 probability level would be divided by the number of dependent variables. This is however, considered a conservative estimate and could increase the likelihood of a type II error (Cohen, 1988; Tabachnick & Fidell, 1996; Thompson, 1996). Since most other threats to validity in this study could also act
to increase the likelihood of a type II error, a somewhat less stringent correction factor was needed. The probability level of .01 was considered adequate to reduce the potential of a type I error emanating from multiple comparisons while avoiding an increase in the concomitant type II error rate. All multiple comparisons in the present study have therefore been adjusted to take account of this correction factor.

Thompson (1996), Hammond (1996) and Wilkinson (1999) suggest that the use of probability statistics to test the null hypothesis represents an inadequate estimate of replication likelihood since they largely depend on the sample size used in the study. They suggest that judgements about the significance of findings should be made on the basis of statistical significance, effect size (see also Cohen, 1988, 1992) and replication. Consideration of all three approaches to the establishment of significance has been made in the current study in an attempt to reduce the likelihood of type I and type II errors.

4.6.3.2: The Reliability of Measures
This threat refers to the inflation of error that occurs when tests of low reliability are used to measure change resulting from the treatment applied in the study. Despite the rigorous confirmatory and modification procedures employed in the current study and reported earlier in this chapter, some scales applied to some years, still produced less than desirable Cronbach alpha co-efficients. The lowest of these accounted for some 33% - 36% of the variance obtained and the highest accounted for between 61% - 66% of the variance. The confirmatory procedures and reliability analyses indicated that these scales could not be improved further beyond the modifications already made. The range of reliabilities obtained,
however, was within the range reported in the literature for all scales used in the study. The likely effect of lower reliabilities was to increase the possibility of making a type II error and this possibility needed to be considered in the interpretation of the analyses based on the measures with lower reliability.

4.6.3.3: The Reliability of Treatment Implementation
This threat refers to differences in the implementation of treatments by different individuals and by the same individual on different occasions. Its outcome is an increase in the error in measures used to determine the effectiveness of the intervention and may lead to an increase in the likelihood of a type II error.

Because this study was implemented in a naturalistic setting this threat to validity could not be controlled. Through discussion and collaborative planning, attempts were made to maintain a consistent theme throughout the treatment phase of the study, however variations due to differences in the individuals applying the altered learning contexts would undoubtedly have led to differences in the implementation of the treatment. Nevertheless, the results reported earlier from the ATI questionnaires with core teaching staff suggest that major variations in treatments applied were unlikely. Had a control for this threat been possible, it is doubtful that any ability to generalise the results to other naturalistic settings would have ensued. Thus a reduction in this validity threat would have meant an increase in another. The results of this study therefore need to be interpreted in the light of the potential impact of some variable treatment implementation.
4.6.3.4: Random Irrelevancies in the Experimental Setting
Extraneous variables that impact on the students in the study increase the error factor in measures and are likely to lead to an increased possibility of a type II error. In this study factors such as student differences in their relationships with various lecturers, personal linkages with subject materials, different patterns of elective subject choice and the like, could all have impacted variably on their response to the treatment applied. Because of the naturalistic setting this threat could not be adequately controlled. Again, a reciprocal impact with external validity would have resulted from attempts to control typical factors applying to any similar setting. The operation of this threat to validity may be one of the reasons accounting for the lower reliability co-efficients of some measures used in this study and others.

4.6.3.5: Random Heterogeneity of Respondents
Participants in a study can vary in terms of personal experience and other personal characteristics that affect the way they respond to the treatment applied. Such individual variance has the effect of increasing the error of measures used and can increase the likelihood of a type II error. Control for this threat usually involves selection of respondents in such a way as to construct homogenous groups across a number of parameters considered to impact on the outcomes of the study. Such selection procedures were not possible in the naturalistic setting of the current study and would have reduced the study’s external validity if applied.

Variation in personal characteristics is another possible source of the variance in some of the scales used in the current study. The threat is reduced through repeated measures where within subject differences across occasions are the
principal source for data analyses. Within subject differences accounted for the major focus of data analyses within this study.

4.6.4: External Validity

Threats to external validity reduce the researcher’s ability to generalise the outcomes of the current study to other settings or to other population groups. The current research reports a case study with 3 cohorts of students in a rural university in Australia who were predominantly female and who undertook to acquire training in early childhood education. The generalisation of the outcomes of this research is limited to other groups with similar characteristics. Their applicability to other population groups or other courses in other universities would require replication before generalisation to these groups would be appropriate.

4.6.4.1: Interaction of Selection and Treatment

Non-random processes used in the selection of participants in a study may reduce the ability of the outcomes to be generalised to other population groups. In the current study whole cohorts were used to select participants, but these were self-selected groups for two reasons.

Firstly the participants comprised students who had chosen to enter a preservice teacher education degree in early childhood. Such courses are traditionally dominated by female students and there may be other motivational factors such as a desire to nurture young children. The entry into the course is not as competitive as some other courses, often leading to lower average matriculation scores than other education programs and other professional programs. These factors
represent a potential bias in the selection of participants and threaten the validity of the outcomes being generalised to other students in other courses, not represented in the current study.

Participation in the study, through the completion of questionnaires and participation in interviews, was voluntary in order to satisfy ethical requirements. It is possible that those who chose to take part in the study, remained enrolled in the course throughout the study and completed repeated administrations of the questionnaire, more commonly represented students who adopted deeper or higher achieving learning approaches. It is possible that there could have been a higher representation of students who used surface approaches amongst the groups who chose not to take part or who withdrew from the course part-way through. Because the return rate for questionnaires was relatively high for a longitudinal study of this kind (above 60% for all cohorts), voluntary participation posed a limited threat to the data. Nevertheless the possibility of some bias is present and thus the outcomes of the study need to be viewed within this context.

4.6.4.2: Interaction of Setting and Treatment
This threat to external validity is created by the extent to which the research setting can be regarded as atypical. Since the study occurred in a small rural university in Australia, it was affected by the typical characteristics of such a setting. These would have included a higher proportion of students with rural backgrounds and cultural backgrounds which were predominantly Anglo-Saxon or Anglo-Celtic with small representations, less than 10% of students, from other Western or European cultures and less than 2% of students who were Aboriginal. Generalisation of the outcomes of the study is therefore restricted to institutions
whose students have a similar background. Further generalisations could only be made confidently through the replication of the study in other locations in future research.

4.7: Data Analysis Procedures
Data were analysed using the statistical packages SPSS 8.0 for Windows and AMOS 3.6 for Windows. These packages contained the required procedures for the following analyses.

Multivariate analysis of variance with repeated measures procedure was employed to measure the extent to which students’ scores on each of the dependent variables changed across the three occasions on which they were measured. Relative differences between the cohorts in relation to their extent of change on these variables were also determined with this procedure. Two sets of analyses were necessary for this purpose since the dependent variables for Cohorts 1 and 2 were measured on three occasions, but only 2 occasions for Cohort 3. The first of these sets was conducted for Cohorts 1 and 2 across the three occasions and the second was conducted for Cohort 3 across two occasions. Because of the use of multiple dependent variables a correction factor was applied to control for the possibility of type I error. Probability values of less than or equal to .01 were used to determine significance of any differences identified in these analyses. The argument for this procedure is contained in the earlier section 4.6.3.1 Multiple Comparisons and Error Rate.

Path analysis was then used to determine the relative contribution made by alternate approaches to learning on the main outcome variables of PTE and GTE.
A series of regression analyses was also conducted to determine the extent to which the use of alternate learning approaches mediated the development of PTE, following procedures described by Baron and Kenny (1986).

The movement of students from initial to final cluster groupings were profiled (after Alexander & Murphy, 1998) to track learning approach development for each of the students in the treatment group. Qualitative data derived from student interviews and student reflective journals were then subjected to an analysis of major themes (Miles & Huberman, 1994). These were compared to the findings in the quantitative analysis and used to provide richer descriptions of the development of students’ beliefs and behaviours.

**4.8: Chapter Summary**

This chapter has detailed the use of a quasi-experimental design with repeated measures on non-equivalent dependent variables, to determine the impact of altered teaching contexts on students’ learning approaches and teaching efficacy. The use of an embedded action research paradigm was also argued as an appropriate vehicle to develop and apply the necessary modifications to the cohorts representing the treatment and comparison groups.

Measures used in the study to determine variation in the dependent variables were subjected to confirmatory analyses and modifications indicated by these analyses were made to improve their validity and reliability. Some problems remained with these instruments especially in relation to their reliabilities with some year groupings, but it was concluded that they were adequate for the purposes of the current study.
Potential threats to the validity of the project’s outcomes were identified and measures taken to counter these threats were described. The multiple data sources used in the study and the use of non-equivalent dependent variables among the survey data were identified as the principal mechanisms used to overcome major threats to validity. Some threats remain however and these need to be taken into account in the interpretation of the results analysed.
The results reported in this chapter describe the analyses conducted on data derived from repeated administrations of the survey instruments across the three cohorts involved in the study. These surveys examined changing student perceptions of their approaches to learning, teaching efficacy and causal attributions for achievement. They were administered on three occasions to Cohorts 1 and 2, and on two occasions for Cohort 3.

Two sets of multivariate analyses of variance with repeated measures were used as the main analyses. The first of these sets compares the responses obtained from Cohorts 1 and 2 across the three occasions. The second set of analyses concerns responses from Cohort 3 for the first two occasions. An examination of the influences and casual pathways leading to changes in teaching self-efficacy is then presented using path analysis and multiple linear regression. These results are reported for Cohorts 1 and 2 for whom data across the whole three-year program were available. Where major changes in the dependent variables occurred, these were noted principally in the third year of the students’ course. As data for Cohort 3 covered their first and early second years only, their results were excluded from the path analyses.
5.2: Differences in Learning Approaches (Cohorts 1 & 2)

A multivariate analysis of variance (MANOVA) with repeated measures across the three occasions for Cohorts 1 and 2, was undertaken in order to determine the extent of change in each of the three learning approach measures over the course of the program, and whether the cohorts responded differently to the treatment conditions. Means and standard deviations obtained from these repeated administrations of the Study Process Questionnaire (SPQ) are presented in Table 5.1.

<table>
<thead>
<tr>
<th>Learning Approach</th>
<th>Cohort 1 (n=46)</th>
<th>Cohort 2 (n=51)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Occasion 1</td>
<td>Occasion 2</td>
</tr>
<tr>
<td>Surface Approach</td>
<td>X</td>
<td>SD</td>
</tr>
<tr>
<td>Deep Approach</td>
<td>29.63</td>
<td>4.82</td>
</tr>
<tr>
<td>Achieving Strategy</td>
<td>26.59</td>
<td>4.48</td>
</tr>
<tr>
<td></td>
<td>21.59</td>
<td>5.19</td>
</tr>
</tbody>
</table>

Note. For surface and deep approaches, maximum score = 40, minimum score = 8. For achieving strategy, maximum score = 35, minimum score = 7.

Box’s M test of equality of covariance matrices was used to test whether the data conformed to the MANOVA assumption of homogeneity and equality of covariance between groups. A Box’s M statistic of 60.75, $F (45, 28992) = 1.214$, $p > .15$ was produced using the data to be analysed. This result indicated that between group variances did not differ from each other, consistent with the
MANOVA homogeneity assumption. Cochran’s C test was used to determine departures from the additional assumption of univariate homogeneity of variance. This test revealed that only one variable, surface approach (SA), for the year 2 groups marginally breached this assumption with $C(48, 2) = .643, p < .05$. All other dependent variables produced nonsignificant results at the 0.05 level.

Further investigation of the SA variable for year 2 was undertaken to determine the source of the problem. This investigation indicated that the distribution suffered from moderate kurtosis (2.604) and a negative skew (-1.032) with Cohort 1. The possibility of applying a transformation to these data was considered, but rejected. This decision was made on the bases that such a transformation could not be applied selectively to this one errant variable for one occasion only, that any transformation would be unlikely to correct the problem of kurtosis, and that such transformations applied singularly, might unduly affect the error term within the MANOVA increasing the likelihood of obtaining a spurious result. It was concluded that while the effect of an unequal distribution across cohorts on one variable for one occasion would be unlikely to threaten the integrity of the analysis (Stevens, 1996), interventions to correct this minor problem might do so (Tabachnick & Fidell, 1996). In order to maximise the robustness of the multivariate analysis, given the minor problem noted with the SA distribution, the Pillai-Bartlett trace was used as the primary method of arriving at a multivariate $F$ statistic (Stevens, 1996, p.226).

Bartlett’s Test of Sphericity was conducted to test the assumption that the variance-covariance matrices for the dependent variables were circular in form. This test is necessary to assess the validity of the $F$ statistics resulting from
univariate tests of within-subjects factors and is sensitive to intercorrelations among the dependent variables. The results of this test indicated that the variance-covariance matrices did not meet the assumptions of sphericity for univariate analyses. Between subjects effects for the dependent variables produced a \(\chi^2(3, n = 97) = 38.96, p < .001\). Within subjects effects for year of study were \(\chi^2(3, n = 97) = 60.55, p < .001\).

Coefficients for Pearson product-moment correlations among learning approach scores for each of the three cohorts at each occasion of testing, along with 2-tailed significance levels are presented in Table I.1 of Appendix I. Correlations presented in this table indicate little association between scores on the deep approach and those on the surface approach for the two cohorts represented in the current analysis. Correlations across cohorts within occasions, ranged from \(r = -.14 (p = ns)\) for Cohort 1 in year 3, to \(r = .13 (p = ns)\) for Cohort 2 in year 1. The reported use of achieving strategies appeared, however, to have a strong association with the use of deep approaches, ranging from \(r = .41 (p < .001)\) for Cohort 1 in year 1, to \(r = .74 (p < .001)\) for Cohort 2 in year 2. Achieving strategies varied in its association with surface approaches, with correlations ranging from \(r = -.03 (p = ns)\) for Cohort 2 in year 3, to \(r = .41 (p < .001)\) for Cohort 1 in year 3.

Because of the statistically significant canonical relationship between the dependent variables identified in Bartlett’s Test of Sphericity, the standard univariate analysis within MANOVA design may lead to spurious results. For this reason a doubly multivariate MANOVA incorporating Roy-Bargman stepdown procedure was employed in the current analysis (Tabachnick & Fidell, 1996, pp.
476-478). The stepdown procedure applies successive covariate analyses to partial out the effects of the intercorrelated variables in the order of variable entry. In the current analysis, variables were entered in the order: Achieving Strategy (AS), Surface Approach (SA) and Deep Approach (DA). AS was entered first because of its strong association with both SA and DA variables. While SA and DA variables were largely unrelated, SA was entered next because greatest variation in scores across years was evident in SA scores (see Table 5.1). The results of the 2 x 3 x 3 MANOVA for Cohorts 1 and 2 across the three learning approach dependent variables for the three years of study are summarised in Tables 5.2 and 5.3 and further reported in Appendix J.1.

Table 5.2. Multivariate Analyses of Variance for Learning Approach with Cohorts 1 and 2, by 3 Years of Study

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Pillai-Bartlett V</th>
<th>df₁</th>
<th>df₂</th>
<th>F</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort</td>
<td>.06937</td>
<td>3</td>
<td>93</td>
<td>2.31073</td>
<td>.081</td>
<td>.069</td>
</tr>
<tr>
<td>Year</td>
<td>.47906</td>
<td>6</td>
<td>90</td>
<td>13.79388</td>
<td>.001**</td>
<td>.479</td>
</tr>
<tr>
<td>Year x Cohort</td>
<td>.22819</td>
<td>6</td>
<td>90</td>
<td>4.43472</td>
<td>.001**</td>
<td>.228</td>
</tr>
</tbody>
</table>

** p < .01

This analysis indicates that no significant multivariate main effect for cohort was found, with only 6.9% of the variance in scores attributable to cohort differences in learning approach. The multivariate main effect for year was statistically significant indicating that both cohorts varied their learning approaches as they progressed through the three-year course of study. This effect had a large impact, accounting for some 47.9% of the variance in learning approach scores. The statistically significant multivariate interaction effect between cohort and year of
study indicates that the cohorts’ pattern of variation over the three years differed, and this difference accounted for some 22.8% of the variance.

Results of univariate analyses for each of the three learning approach measures are reported in Table 5.2 using the Roy-Bargman stepdown procedure. Since the stepdown procedure effectively controls for type 1 error rate, probability levels of $p < .05$ can be accepted as the basis for statistical significance in this analysis (Stevens, 1996, pp. 353-357).

Table 5.3. Univariate Analyses of Variance for Learning Approach with Cohorts 1 and 2, by 3 Years of Study

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Dependent Variable</th>
<th>Univariate F</th>
<th>df</th>
<th>Stepdown F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Subjects</td>
<td>Achieving</td>
<td>2.20290</td>
<td>1,95</td>
<td>2.20290</td>
<td>1,95</td>
<td>.141</td>
</tr>
<tr>
<td>cohort</td>
<td>Surface</td>
<td>1.33088</td>
<td>1,95</td>
<td>2.25031</td>
<td>1,94</td>
<td>.137</td>
</tr>
<tr>
<td></td>
<td>Deep</td>
<td>4.92692</td>
<td>1,95</td>
<td>2.38400</td>
<td>1,93</td>
<td>.126</td>
</tr>
<tr>
<td>Within Subjects</td>
<td>Achieving</td>
<td>.97142</td>
<td>2,190</td>
<td>.97142</td>
<td>2,190</td>
<td>.380</td>
</tr>
<tr>
<td>year</td>
<td>Surface</td>
<td>26.45263</td>
<td>2,190</td>
<td>26.43977</td>
<td>2,189</td>
<td>.001**</td>
</tr>
<tr>
<td></td>
<td>Deep</td>
<td>6.34364</td>
<td>2,190</td>
<td>8.36462</td>
<td>2,188</td>
<td>.001**</td>
</tr>
<tr>
<td>Year x Cohort</td>
<td>Achieving</td>
<td>2.29324</td>
<td>2,190</td>
<td>2.29324</td>
<td>2,190</td>
<td>.104</td>
</tr>
<tr>
<td></td>
<td>Surface</td>
<td>6.16091</td>
<td>2,190</td>
<td>5.85131</td>
<td>2,189</td>
<td>.003**</td>
</tr>
<tr>
<td></td>
<td>Deep</td>
<td>1.58731</td>
<td>2,190</td>
<td>3.77303</td>
<td>2,188</td>
<td>.025*</td>
</tr>
</tbody>
</table>

* $p < .05$; ** $p < .01$

The univariate analyses revealed that student responses on the surface and deep approach subscales were responsible for producing the significant main effect for year of study. Changes on these subscales were statistically significant across the three years, regardless of cohort membership, while little change was evident in the use of achieving strategies. These cohorts also differed from each other on the extent of change for surface and deep approaches over these years and this difference was responsible for the significant year by cohort interaction.
The statistically significant differences identified by this analysis were further investigated to determine differences in the reported use of deep and surface learning approaches for each occasion. For this purpose, a series of paired comparison t-tests were used and the results of these analyses together with effect sizes are reported in Table 5.4.

Table 5.4. Paired Comparison T-Tests and Effect sizes for Surface and Deep Approaches to Learning, Cohorts 1 & 2

<table>
<thead>
<tr>
<th>Approach</th>
<th>Paired Comparison</th>
<th>Paired Differences</th>
<th>X</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>p (2-tailed)</th>
<th>Cohen's d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort 1</td>
<td>Surface</td>
<td>SA1-SA2</td>
<td>0.155</td>
<td>5.313</td>
<td>0.198</td>
<td>45</td>
<td>.844</td>
<td>.03</td>
</tr>
<tr>
<td></td>
<td>SA1-SA3</td>
<td>1.609</td>
<td>4.399</td>
<td>2.480</td>
<td>45</td>
<td>.017*</td>
<td>.37</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA2-SA3</td>
<td>1.453</td>
<td>3.773</td>
<td>2.612</td>
<td>45</td>
<td>.012*</td>
<td>.39</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DA1-DA2</td>
<td>-0.438</td>
<td>4.602</td>
<td>-0.646</td>
<td>45</td>
<td>.522</td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td>Deep</td>
<td>DA1-DA3</td>
<td>-0.891</td>
<td>5.318</td>
<td>-1.137</td>
<td>45</td>
<td>.262</td>
<td>.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DA2-DA3</td>
<td>-0.453</td>
<td>3.450</td>
<td>-0.891</td>
<td>45</td>
<td>.378</td>
<td>.13</td>
<td></td>
</tr>
<tr>
<td>Cohort 2</td>
<td>Surface</td>
<td>SA1-SA2</td>
<td>1.686</td>
<td>4.675</td>
<td>2.576</td>
<td>50</td>
<td>.013*</td>
<td>.36</td>
</tr>
<tr>
<td></td>
<td>SA1-SA3</td>
<td>4.784</td>
<td>4.424</td>
<td>7.723</td>
<td>50</td>
<td>.001**</td>
<td>1.08</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA2-SA3</td>
<td>3.098</td>
<td>3.976</td>
<td>5.564</td>
<td>50</td>
<td>.001**</td>
<td>.78</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DA1-DA2</td>
<td>0.117</td>
<td>3.456</td>
<td>0.243</td>
<td>50</td>
<td>.809</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>Deep</td>
<td>DA1-DA3</td>
<td>-1.784</td>
<td>4.076</td>
<td>-3.126</td>
<td>50</td>
<td>.003**</td>
<td>.43</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DA2-DA3</td>
<td>-1.902</td>
<td>3.002</td>
<td>-4.525</td>
<td>50</td>
<td>.001**</td>
<td>.63</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05; **p < .01

Results from these paired comparisons clarify the statistically significant univariate effects for surface and deep approaches by year of study, and by cohort and year of study. Statistical significance is however, largely dependent on sample size. Small samples require large effects to achieve statistical significance but small and potentially irrelevant changes may be considered significant with larger samples. Consideration of effect size, along with statistical significance enables interpretation to be informed by the likelihood of chance occurrence together with the relative impact of the observed changes (Hammond, 1996; Thompson, 1996; Wilkinson, 1999).
With consideration to effect size, the cohort exposed to the altered teaching program (Cohort 2) demonstrated a large reduction in their use of surface approaches, and a moderate increase in their use of deep approaches over the three year program. Values of Cohen’s $d$ represent standard deviation multiples by which distribution shifts have occurred in the samples compared. Values of $d$ at approximately 0.2 or below are considered small. Values of $d$ at approximately 0.5 are considered moderate and readily noticeable, while values greater than 0.8 are considered large effects (Cohen, 1988, 1992).

For Cohort 2, the large reduction in surface approach from year 1 to year 3 ($d = 1.08$) means that the lower half of the third-year distribution attained surface approach scores below approximately 86% of the first-year distribution (Cohen, 1988, p. 24). Between the first and second administrations of the survey, surface approach scores for this group reduced by more than one-third of a standard deviation ($d = .36$), and between the second and third administration a further reduction of more than three-quarters of a standard deviation ($d = .78$) was reported. Cohort 1, on the other hand, demonstrated a small reduction in surface approach of a little more than one-third of a standard deviation over the three-year program ($d = .37$), almost all of which occurred in their final year.

A moderate increase in deep approach scores was also evident with Cohort 2 occurring between the second and final administrations of the survey. The upper half of the third-year distribution yielded deep approach scores greater than 66% of the first-year distribution. Cohort 1 on the other hand, demonstrated very little change in the use of deep approaches over the three-year program realising a growth of only 0.13 of a standard deviation from year 1 to year 3. For Cohort 1,
the upper half of the third-year distribution exceeded only 55% of the first-year distribution.

This pattern of variation for deep and surface approaches is more clearly described by their graphical representation. From a multivariate perspective, Figure 5.1 shows that both cohorts began their courses reporting high levels of surface approach usage and this was the experience of the students in Cohort 1 for the entirety of their course. While some reduction in surface approach usage occurred during year 3, these students reported a relatively stable level of deep approach usage across the three-year program (see Table 5.1). The combined effect of this pattern of change may have reduced an initial reliance on a surface approach, but this approach remained influential throughout the course experience of Cohort 1.

![Figure 5.1. Changes in deep and surface learning approaches, Cohorts 1 & 2](image-url)
Students in Cohort 2 reported a more rapid reduction in their use of surface approaches evident across all years, combined with a growth in the use of deep approaches, all of which occurred during their final year in the program. By year 2, students in Cohort 2 had reached the point of relative influence of deep and surface approaches achieved by Cohort 1 at the conclusion of their program. By year 3, Cohort 2 students reported a relative reliance on deep rather than surface approaches. The pattern of learning approach development observed with Cohort 2 was in the direction desired by the current study, for both surface and deep approaches, and was significantly different to the pattern displayed by students in Cohort 1.

5.2.1: Summary of Learning Approach Analysis (Cohorts 1 & 2)
The picture that emerges from the analysis of learning approach scores for Cohorts 1 and 2 describes one of relatively small to moderate change for Cohort 1, and moderate to large change for Cohort 2. Both cohorts began their programs with a similar pattern of surface, deep and achieving approaches to learning. Cohort 1 remained relatively stable on the dimensions of deep and achieving approaches and reported a small to moderate reduction in their use of surface approaches in their final year. Cohort 2 students reported a large reduction in the use of surface approaches and this was distributed across the three years of study. Their use of deep approaches also showed a moderate increase in their final year. The use of achieving strategies remained relatively stable throughout for Cohort 2, as it did with Cohort 1. Because of the complementary reduction in the use of surface approaches and the growth of deep approaches, Cohort 2 completed their
course appearing to be guided predominantly by the use of a deep approach to learning. Cohort 1 retained their high level of surface approach usage for the greater part of their course, concluding with neither approach appearing to predominate.

5.3: Differences in Teaching Efficacy (Cohorts 1 & 2)
A MANOVA with repeated measures was conducted using scores on the Teaching Efficacy Scale (TES) as dependent variables. This analysis was conducted in order to determine whether variations in teaching efficacy were observed over the three-year program for Cohorts 1 and 2 and whether the cohorts differed in the way their teaching efficacy beliefs developed. Means and standard deviations obtained from these repeated administrations of the TES are presented in Table 5.5.

<table>
<thead>
<tr>
<th>Teaching Efficacy</th>
<th>Occasion 1</th>
<th>Occasion 2</th>
<th>Occasion 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>SD</td>
<td>X</td>
</tr>
<tr>
<td><strong>Cohort 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal</td>
<td>31.91</td>
<td>6.15</td>
<td>32.93</td>
</tr>
<tr>
<td>General</td>
<td>23.35</td>
<td>3.67</td>
<td>23.03</td>
</tr>
<tr>
<td><strong>Cohort 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal</td>
<td>34.12</td>
<td>4.17</td>
<td>34.45</td>
</tr>
<tr>
<td>General</td>
<td>22.65</td>
<td>4.43</td>
<td>22.84</td>
</tr>
</tbody>
</table>

Note. For personal efficacy, maximum score = 48, minimum score = 8. For general efficacy, maximum score = 36, minimum score = 6. Intercorrelations between personal and general teaching efficacy scores across the three cohorts for all occasions are presented in Table I.2 of Appendix I. These correlations appear to show very little association between the two dimensions of teaching efficacy for the two cohorts represented in the current analysis. Correlations within occasions ranged from $r = -.12$ ($p = ns$) for Cohort 1 in year 1,
to \( r = .17 (p = ns) \) for Cohort 2 in year 2. Students’ perceptions of their own teaching competence thus appeared to be independent of their view of the impact teachers generally have. Their perceptions of efficacy within these dimensions also appeared to exhibit reasonable stability across each administration of the survey. Correlations across occasions for personal teaching efficacy (PTE) ranged from \( r = .40 (p < .01) \) to \( r = .43 (p < .01) \) for Cohort 1 and from \( r = .25 (p = ns) \) to \( r = .59 (p < .001) \) for Cohort 2. For general teaching efficacy (GTE), correlations across occasions ranged from \( r = .49 (p < .001) \) to \( r = .54 (p < .001) \) for Cohort 1 and from \( r = .47 (p < .001) \) to \( r = .57 (p < .001) \) for Cohort 2.

The homogeneity of the covariance matrix met the assumptions of MANOVA with a Box’s M test producing the nonsignificant result of \( F(21, 32439) = 1.054, p = ns \). Sphericity could also be assumed since Bartlett’s Test produced a nonsignificant \( \chi^2(1, n = 97) = .650, p = ns \) for between subject effects. Within subjects effects for year of study were \( \chi^2(1, n = 97) = .105, p = ns \). Since these MANOVA assumptions about homogeneity of variance within the data being analysed were met, the analysis could proceed with confidence. The results of the 2 x 3 x 2 MANOVA for Cohorts 1 and 2, for the three years of study, across the two teaching efficacy dependent variables, personal and general, are summarised in Tables 5.6 and 5.7.
Table 5.6. Multivariate Analyses of Variance for Teaching Efficacy with Cohorts 1 and 2, by 3 Years of Study

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Pillai-Bartlett V</th>
<th>df1</th>
<th>df2</th>
<th>F</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort</td>
<td>.10188</td>
<td>2</td>
<td>94</td>
<td>5.33163</td>
<td>.006**</td>
<td>.102</td>
</tr>
<tr>
<td>Year</td>
<td>.50471</td>
<td>4</td>
<td>92</td>
<td>23.43730</td>
<td>.001**</td>
<td>.505</td>
</tr>
<tr>
<td>Year x Cohort</td>
<td>.09573</td>
<td>4</td>
<td>92</td>
<td>2.43486</td>
<td>.053</td>
<td>.096</td>
</tr>
</tbody>
</table>

* ** p < .01

This analysis identified a statistically significant multivariate cohort main effect, indicating that these two cohorts differed in their efficacy beliefs. Approximately 10.2% of the variance in scores was attributed to cohort differences in teaching efficacy beliefs. The multivariate main effect for year was also statistically significant, indicating that the efficacy beliefs of both cohorts changed as they progressed through the three-year course of study. This effect had a large impact, accounting for some 50.5% of the variance in efficacy scores. The multivariate interaction effect between cohort and year of study was nonsignificant indicating that the pattern of variation over the three years was similar for each cohort. This interaction effect accounted for some 9.6% of the variance in scores. Results of univariate analyses for each of the three learning approach measures, are reported in Table 5.7. Roy-Bargman stepdown procedure was not required in this analysis because sphericity could be assumed and thus the .01 level for statistical significance was retained.

The nature of the cohort difference is explained in the univariate analysis as a difference between the cohorts in personal efficacy beliefs. General efficacy beliefs did not differ across the cohorts. Both cohorts changed their teaching efficacy beliefs in similar ways as they proceeded through the course. Personal
and general efficacy beliefs changed as a result of exposure to the programs of study each cohort experienced.

Table 5.7. Univariate Analyses of Variance for Personal and General Teaching Efficacy with Cohorts 1 and 2, by 3 Years of Study

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Dependent Variable</th>
<th>Univariate</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cohort</td>
<td>Personal</td>
<td>10.76107</td>
<td>1,95</td>
<td>.001**</td>
</tr>
<tr>
<td></td>
<td>General</td>
<td>0.02202</td>
<td>1,95</td>
<td>.882</td>
</tr>
<tr>
<td>Within Subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>Personal</td>
<td>25.91504</td>
<td>2,190</td>
<td>.001**</td>
</tr>
<tr>
<td></td>
<td>General</td>
<td>22.32546</td>
<td>2,190</td>
<td>.001**</td>
</tr>
<tr>
<td>Year x Cohort</td>
<td>Personal</td>
<td>1.54193</td>
<td>2,190</td>
<td>.217</td>
</tr>
<tr>
<td></td>
<td>General</td>
<td>2.88913</td>
<td>2,190</td>
<td>.058</td>
</tr>
</tbody>
</table>

** p < .01

The statistically significant differences identified by this analysis were further investigated to determine differences in the reported efficacy beliefs for each occasion. For this purpose, a series of paired comparison t-tests was again used. The results of these analyses are reported in Table 5.8.

Table 5.8. Paired Comparison T-Tests and Effect Sizes for Personal & General Teaching Efficacy, Cohorts 1 & 2

<table>
<thead>
<tr>
<th>Efficacy</th>
<th>Paired Comparison</th>
<th>Paired Differences</th>
<th>t</th>
<th>df</th>
<th>p (2-tailed)</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal</td>
<td>PEF₁-PEF₂</td>
<td>1.012 5.871</td>
<td>1.169</td>
<td>45</td>
<td>.249</td>
<td>.17</td>
</tr>
<tr>
<td></td>
<td>PEF₁-PEF₃</td>
<td>2.804 5.737</td>
<td>3.315</td>
<td>45</td>
<td>.002**</td>
<td>.48</td>
</tr>
<tr>
<td></td>
<td>PEF₂-PEF₃</td>
<td>1.792 4.401</td>
<td>2.762</td>
<td>45</td>
<td>.008**</td>
<td>.41</td>
</tr>
<tr>
<td>General</td>
<td>GEF₁-GEF₂</td>
<td>-0.323 3.749</td>
<td>-0.584</td>
<td>45</td>
<td>.562</td>
<td>.09</td>
</tr>
<tr>
<td></td>
<td>GEF₁-GEF₃</td>
<td>1.370 3.660</td>
<td>2.538</td>
<td>45</td>
<td>.015*</td>
<td>.37</td>
</tr>
<tr>
<td></td>
<td>GEF₂-GEF₃</td>
<td>1.692 3.736</td>
<td>3.072</td>
<td>45</td>
<td>.004**</td>
<td>.45</td>
</tr>
<tr>
<td>Cohort 1</td>
<td>PEF₁-PEF₂</td>
<td>0.333 3.968</td>
<td>0.600</td>
<td>50</td>
<td>.551</td>
<td>.08</td>
</tr>
<tr>
<td></td>
<td>PEF₁-PEF₃</td>
<td>3.824 4.918</td>
<td>5.552</td>
<td>50</td>
<td>.001**</td>
<td>.78</td>
</tr>
<tr>
<td></td>
<td>PEF₂-PEF₃</td>
<td>3.490 3.546</td>
<td>7.029</td>
<td>50</td>
<td>.001**</td>
<td>.98</td>
</tr>
<tr>
<td>General</td>
<td>GEF₁-GEF₂</td>
<td>0.196 4.070</td>
<td>0.344</td>
<td>50</td>
<td>.732</td>
<td>.05</td>
</tr>
<tr>
<td></td>
<td>GEF₁-GEF₃</td>
<td>3.255 4.390</td>
<td>5.295</td>
<td>50</td>
<td>.001**</td>
<td>.74</td>
</tr>
<tr>
<td></td>
<td>GEF₂-GEF₃</td>
<td>3.059 4.173</td>
<td>5.234</td>
<td>50</td>
<td>.001**</td>
<td>.73</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01
Results from these paired comparisons clarify the statistically significant within
subject effects for year of study. Both cohorts reported little change in either
personal or general efficacy beliefs during their first year of study. Marked change
occurred however between the second and final administrations of the survey for
both cohorts, which covered the final three semesters of their course. The cohort
exposed to the traditional curriculum (Cohort 1) demonstrated moderate gains in
personal and general efficacy, equivalent to slightly less than half a standard
deviation shift. The cohort exposed to the altered teaching program (Cohort 2)
demonstrated large gains of three-quarters of a standard deviation, for general
efficacy, and almost one standard deviation shift for personal efficacy. These
differences can be seen clearly in Figures 5.2 and 5.3, which plot the Teaching
Efficacy means for both cohorts.

Figure 5.2. Changes in personal teaching efficacy for Cohorts 1& 2
Very little difference can be seen between the cohorts apart from the higher scores in personal teaching efficacy for Cohort 2 across all years. The trends however are approximately the same for both cohorts. It appears from these results that the differences in learning approaches evident in the previous analysis have not translated into improvements in teaching efficacy beliefs for Cohort 2, since Cohort 1 also followed a similar pattern. The differences however, may be qualitative, rather than quantitative and this issue is further discussed later in the context of the path analyses conducted.
5.3.1: Summary of Teacher Efficacy Analysis (Cohorts 1 & 2)
The picture that emerges from the analysis of teacher efficacy scores for Cohorts 1 and 2 describes one of moderate growth for Cohort 1 and large growth for Cohort 2. Since both cohorts made strong gains in efficacy and followed a similar pattern of making these gains in the latter half of their course, the differences between the cohorts were not statistically significant.

The statistically significant cohort main effect was explained by the higher personal efficacy scores reported by Cohort 2 throughout the study. General efficacy scores did not vary significantly between the cohorts. The highly significant main effect for year indicated that both cohorts responded well to their teacher education programs developing strong efficacy beliefs over the course of their studies.

5.4: Differences in Learning Attribution (Cohorts 1 & 2)
A MANOVA with repeated measures was conducted using scores on the Multidimensional-Multiattributional Causality Scale (MMCS) with the subscales of effort, ability, context and luck as dependent variables. This analysis was conducted in order to determine whether variations in learning attributions were observed over the three-year program and if so, whether the two cohorts responded differently to them. Means and standard deviations for the results of these repeated measures are reported in Table 5.9.

<table>
<thead>
<tr>
<th>Attribution</th>
<th>Occasion 1</th>
<th>Occasion 2</th>
<th>Occasion 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cohort 1</td>
<td>Ability</td>
<td>18.98</td>
<td>3.35</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>Effort</td>
<td>23.41</td>
<td>3.51</td>
<td>21.73</td>
</tr>
<tr>
<td>Context</td>
<td>16.30</td>
<td>3.60</td>
<td>18.03</td>
</tr>
<tr>
<td>Luck</td>
<td>14.87</td>
<td>4.20</td>
<td>16.05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cohort 2</th>
<th>Ability</th>
<th>18.82</th>
<th>2.78</th>
<th>19.18</th>
<th>3.32</th>
<th>18.45</th>
<th>3.36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effort</td>
<td>23.65</td>
<td>2.95</td>
<td>23.29</td>
<td>3.28</td>
<td>23.33</td>
<td>3.27</td>
<td></td>
</tr>
<tr>
<td>Context</td>
<td>17.16</td>
<td>3.22</td>
<td>17.27</td>
<td>3.74</td>
<td>16.63</td>
<td>3.77</td>
<td></td>
</tr>
<tr>
<td>Luck</td>
<td>15.55</td>
<td>3.41</td>
<td>14.84</td>
<td>3.68</td>
<td>14.24</td>
<td>3.67</td>
<td></td>
</tr>
</tbody>
</table>

Note. For each scale the maximum score = 30, minimum score = 6.

The homogeneity of covariance matrix did not meet the assumptions of MANOVA with a Box’s M test producing $F(78, 27873) = 1.660, p < .001$. To identify the source of the problematic distributions, Cochran’s C test for univariate homogeneity was conducted on all variables. These tests produced nonsignificant results however, indicating that a number of relatively minor departures from homogeneity were affecting the overall covariance matrix, rather than marked departure in the distributions of individual scales. An examination of the distributions produced by these variables identified that moderate kurtosis and negative skew affected some variables on separate occasions with each cohort.

The ability subscale, for example, demonstrated a kurtosis of 1.536 and a skew of −0.935 for Cohort 1 in year 2. The same scale produced a kurtosis of 2.299 and a skew of 0.253 for Cohort 2 in year 3.

Transformation of these scores was considered, but rejected. Only two of the twenty-four distributions were affected by moderate skew and five were moderately leptokurtic. Transformations may act to increase the error term in subsequent analyses and thus create a greater interference than the presence of unequal distributions (Tabachnick & Fidell, 1996). The application of a
transformation to correct the two instances of moderate negative skew may have had an uneven effect, since many of the distributions demonstrated positive skew. Any transformation is also unlikely to improve the problem with kurtosis.

Since the largest generalised variance contributing to the significant Box test was located in the cell containing the largest group (Cohort 2), it can be assumed that its effect within the MANOVA would be to produce a conservative bias into the calculation of the $F$ statistic. Stevens (1996, pp.254-257) suggests that, in such cases, the problem may be resolved by the application of a more liberal significance level, of say $p < .05$. Because the measures of learning attribution were included in the research design largely to signal the possible presence of Hawthorne effects, a conservative bias would reduce the sensitivity of these measures. A more liberal significance level ($p < .05$) was thus applied for this analysis in order to improve the potential to identify this threat to validity.

Bartlett’s test for sphericity was also significant, yielding a $\chi^2(6, n = 97) = 89.091, p < .001$ for between subject effects. Within subjects effects for year of study were $\chi^2(6, n = 97) = 65.642, p < .001$. Intercorrelations between learning attributions are reported in Table I.3 of Appendix I. These data describe an expected and relatively strong association between the two external attributions of ‘context’ and ‘luck’ evident in each of the cohorts. A modest negative relationship between these external attributions and the attribution of ‘effort’ to learning outcomes is also evident, though most strongly so in Cohort 2. As these subscales were originally intended to be components of two scales measuring internality and externality (Lefcourt, 1981, 1991), these relationships were not unexpected. Because of the canonical relationships identified among these variables, the Roy-
Bargman stepdown procedure was required in this analysis for the assessment of univariate significance. Results of the multivariate analysis for this 2 x 3 x 4 MANOVA are summarised in Table 5.10.

### Table 5.10. Multivariate Analyses of Variance for 4 Learning Attributions with Cohorts 1 and 2, by 3 Years of Study

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Pillai-Bartlett $V$</th>
<th>$df_1$</th>
<th>$df_2$</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort</td>
<td>.04542</td>
<td>4</td>
<td>92</td>
<td>1.09439</td>
<td>.364</td>
<td>.045</td>
</tr>
<tr>
<td>Year</td>
<td>.14737</td>
<td>8</td>
<td>88</td>
<td>1.90119</td>
<td>.070</td>
<td>.147</td>
</tr>
<tr>
<td>Year x Cohort</td>
<td>.14020</td>
<td>8</td>
<td>88</td>
<td>1.79370</td>
<td>.089</td>
<td>.140</td>
</tr>
</tbody>
</table>

* $p < .05$; ** $p < .01$

Since no significant main effects or interactions were identified in this analysis, univariate and paired comparisons were not justified. Effect sizes ($\eta^2$) were however larger than expected for the nonsignificant main effect for year and the interaction effect year x cohort, each representing approximately 14% of the variance. Because of the relatively small sample size in the MANOVA cells (51, 46) and the expected conservative assessment of significance predicted by the Box test, the marginally nonsignificant results in this analysis may have acted to conceal real differences (Stevens, 1996). In view of Thompson’s (1999) comments in relation to the inadequacy of statistical significance in determining the acceptance or rejection of the null hypothesis, some further investigation of attribution variables was warranted.

The scores on the attribution scales are plotted in Figure 5.4. The picture that emerged from this analysis was one of relative stability across cohorts and over
years of study. The order of importance of these causal attributions was identical for both cohorts and remained the same throughout their university experience.

![Graph showing learning attributions for Cohorts 1 & 2](image)

**Figure 5.4. Learning attributions for Cohorts 1 & 2**

Students in both cohorts placed greatest emphasis on effort as a function of their success in a learning environment and least emphasis on luck. Ability and context were seen as medial attributions with slightly greater weighting on the former. Some slight variations occurred over their course of study, mainly affecting Cohort 1 in the second year, and returning to earlier patterns in third year. In addition, a univariate trend towards decline was observed in the attribution for luck with Cohort 2 and a rising trend for the attribution of context was observed for Cohort 1. As these changes did not alter the multivariate structure of the
attributions, it was considered that the minor variations noted were likely chance effects.

### 5.5: Partial Replication (Cohort 3)

Thompson (1996, 1999) and Hammond (1996) recommend three components to the establishment of significance in research within the social sciences. These three components include statistical significance, effect size measures and replication. Thompson (1996, 1999) recommends that attempts to replicate findings should form a routine component in experimental studies in the fields of psychology and education. In the current study Cohort 2 acted as the treatment group, Cohort 1 acted as the contrast group, and Cohort 3 represented a partial replication of the modified program for comparison purposes.

Data were gathered from Cohort 3 for the first two administrations of the survey instruments, a period of some 15 months, because of the temporal limit to the study. The three cohorts began their studies in sequential years, but only a four-year period was available for data collection. Consequently, Cohort 3 could be included for the first two years of their course. While only replication in an independent study would provide confirmation of the current findings, it was considered that the partial replication provided by Cohort 3, would add weight to the current conclusions were they to show similar patterns of change to those observed with Cohort 2 (Yin, 1994).

Because major changes for Cohorts 1 and 2 did not occur until the latter half of the second, and during the third year of the program, the identification of changes

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5 The terms ‘treatment’ and ‘contrast’ groups are used here consistent with Wilkinson’s (1999) recommendations, since the current study used a quasi experimental design.
reaching statistical significance for Cohort 3 was unlikely. This likelihood was further reduced because the sample size for Cohort 3 \((n = 37)\) was considerably smaller than Cohorts 1 or 2. Statistical significance however, is less important in this analysis than direction and size of the effect. Because this is a replication of the early effect demonstrated with Cohort 2, changes in a similar direction are less likely to be the result of chance interaction within the data (Hammond, 1996; Thompson, 1999). In effect, the analysis with Cohort 3, represents pattern matching across cohorts on multiple non-equivalent data sources, considered by Yin (1994, pp. 106-110) as a robust mode of analysis. For this reason the emphasis placed on the probability of chance effects is reduced. Means and standard deviations of all measures across the two occasions for Cohort 3 are reported in table 5.11.

Table 5.11. Means and Standard Deviations of all Measures for Cohort 3 for Two Occasions

<table>
<thead>
<tr>
<th>Measure</th>
<th>Occasion 1</th>
<th>Occasion 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(X)</td>
<td>(SD)</td>
</tr>
<tr>
<td>Learning Approach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface Approach</td>
<td>30.46</td>
<td>3.37</td>
</tr>
<tr>
<td>Deep Approach</td>
<td>28.22</td>
<td>3.98</td>
</tr>
<tr>
<td>Achieving Strategy</td>
<td>21.32</td>
<td>6.20</td>
</tr>
<tr>
<td>Teaching Efficacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal</td>
<td>32.89</td>
<td>4.68</td>
</tr>
<tr>
<td>General</td>
<td>22.24</td>
<td>3.57</td>
</tr>
<tr>
<td>Learning Attribution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability</td>
<td>19.86</td>
<td>2.87</td>
</tr>
<tr>
<td>Effort</td>
<td>23.03</td>
<td>3.36</td>
</tr>
<tr>
<td>Context</td>
<td>17.76</td>
<td>2.93</td>
</tr>
<tr>
<td>Luck</td>
<td>16.03</td>
<td>3.45</td>
</tr>
</tbody>
</table>

Note. Possible scores for SA and DA range from 8 to 40 and for AS, 7 to 35. For PTE, the possible range is 8 to 48 and for GTE, 6 to 36. For each learning attribution scales possible scores range from 6 to 30.
Repeated measures MANOVA were conducted with the data from Cohort 3 using the same procedures as those conducted with Cohorts 1 and 2. The first analysis examined changes in the three learning approaches over the two years for which data were available for Cohort 3. The second analysis examined changes in the two dimensions of teacher efficacy and the third analysis examined the four measures of learning attribution. Because no between-group analyses were produced for this single cohort, the multivariate results have been aggregated and reported in a single table (Table 5.12).

Despite the unlikelihood of obtaining statistically significant results from these analyses, the multivariate change in learning approach from year 1 to year 2 for Cohort 3 was highly significant and this effect accounted for 36.8% of the variance observed. Univariate analysis of changes in the three learning approach measures indicated that this multivariate effect was almost totally the result of a sharp reduction in the students’ use of surface approaches.

Table 5.12. Multivariate Analyses of Variance for Learning Approach, Teacher Efficacy & Learning Attributions with Cohort 3 by 2 Years of Study

<table>
<thead>
<tr>
<th>Main effects for Year</th>
<th>Pillai-Bartlett V</th>
<th>df₁</th>
<th>df₂</th>
<th>F</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Approach</td>
<td>.36842</td>
<td>3</td>
<td>34</td>
<td>6.61119</td>
<td>.001**</td>
<td>.368</td>
</tr>
<tr>
<td>Teacher Efficacy</td>
<td>.13398</td>
<td>2</td>
<td>35</td>
<td>2.70740</td>
<td>.081</td>
<td>.134</td>
</tr>
<tr>
<td>Learning Attribution</td>
<td>.12551</td>
<td>4</td>
<td>33</td>
<td>1.18409</td>
<td>.336</td>
<td>.126</td>
</tr>
</tbody>
</table>

*p < .05; ** p < .01

The univariate analysis for surface approach resulted in $F(1, 36) = 19.80944$, $p < .001$. Analyses of paired comparisons also revealed Cohen’s $d = .73$, indicating that the distribution of surface approach scores shifted almost three-quarters of a
standard deviation over this 15 month period, and that the lower half of the
surface approach scores in year 2 were below approximately 76% of the year 1
scores. This would be considered a large effect according to Cohen’s (1988)
criteria. In contrast, the use of deep and achieving approaches changed little from
year 1 to year 2 for Cohort 3. The achieving approach yielded $F(1, 36) = .45445, p = ns$, and a Cohen’s $d = .11$. The deep approach yielded $F(1, 36) = .01972, p = ns$, and a Cohen’s $d = .02$. These effects are very small and would be imperceptible
according to Cohen’s (1988) criteria.

The multivariate effect of the deep and surface approach scores for Cohort 3, for
years 1 and 2, are plotted on Figure 5.5 along with the results for Cohort 2 to
enable visual comparison. From Figure 5.5, it can be observed that the early
pattern of the surface and deep approach variables evident in Cohort 2 has been
replicated in Cohort 3. Both cohorts entered the course with surface approaches
predominant. By the middle of the second year of the program, the use of surface
approaches had diminished sharply, while little change had occurred with the use
of deep approaches. While no data are available for Cohort 3 in their final year,
the outcomes of this partial replication provide strong evidence that the changes
evident in Cohorts 2 and 3 occurred as a result of the altered teaching program,
and not from chance or other spurious sources.
Figure 5.5. Changes in deep and surface learning approaches for Cohort 3, compared with Cohort 2

Univariate analyses were also undertaken for the efficacy measures for Cohort 3, since approximately 13.4% of the variation in these scores was due to the main effect for year, and the marginally nonsignificant multivariate $F(2, 35) = 2.7074, p = 0.081$, may have reflected the smaller sample size, rather than a reduced effect (Cohen, 1992; Hammond, 1996). Results of this analysis for personal efficacy indicated no change over this period with $F(1, 36) = .33784, p = ns$, Cohen’s $d = .02$. Comparison across the two administrations of the survey for general efficacy however, produced $F(1, 36) = 5.51649, p = .024$, Cohen’s $d = .38$.

While PTE scores for Cohort 3 demonstrated early stability, similar to Cohorts 1 and 2, GTE results demonstrated a small to medium growth (Cohen, 1988), not
evident in the other cohorts until the final year of the program. This result is in the
direction predicted by the study, and in the same direction demonstrated by the
earlier cohorts in the final year. It may represent a spurious result however, given
the number of analyses conducted, the marginal statistical significance of the
finding, and the fact that it does not represent a replication of findings with Cohort
2. Further replication in future studies would be necessary to determine if the
altered teaching program led to early growth in GTE beliefs. Changes in the
efficacy scores in the partial replication study with Cohort 3 thus warrant only a
conservative interpretation. Univariate analyses of learning attribution responses
for Cohort 3 were not conducted because the results of the multivariate analysis,
\(F(4, 33) = 1.18409, p = .336\), were clearly nonsignificant. This outcome was also
consistent with the findings for learning attributions with Cohorts 1 and 2.

5.6: Summary of Findings from Multivariate Analyses of
Variance for Cohorts 1, 2 & 3
The aggregated findings of the analyses reported thus far indicate that the cohorts
exposed to the altered teaching program, Cohorts 2 and 3, experienced marked
shifts in their approaches to learning. Surface approach usage declined sharply
across all years, and the use of deep approaches increased in the latter half of the
program for Cohort 2. These responses occurred earlier and to a greater extent
than was evident with the cohort exposed to the traditional program, Cohort 1.
The use of achieving strategies remained relatively stable across all cohorts.
While all three cohorts entered their course with similar approaches to learning
characterised by a predominance of surface approaches, only the cohort exposed
to the altered teaching program throughout, exited with a predominance of deep
learning approaches. The early pattern of learning approach development
exhibited by Cohort 2 was replicated with the data available from Cohort 3 during the first half of their course.

PTE and GTE scores showed a similar pattern of development across all three cohorts with no differences evident between the cohorts exposed to the traditional or altered programs. All cohorts demonstrated relative stability in teaching efficacy in the early stages of the course and Cohorts 1 and 2 demonstrated strong growth in both efficacy constructs in their final year. Responses to the four subscales measuring learning attributions produced relatively stable scores for all cohorts across all years of their respective course. Minor fluctuations in univariate analyses were identified, mainly affecting Cohort 1, during the second year of their program and returning to earlier levels in their third year. Both cohorts exposed to the modified learning context reported stable responses to these measures across occasions.

5.7: Path Analyses
In order to examine the relationships between learning approaches and efficacy beliefs, a series of path analyses were conducted using AMOS 3.6 (Arbuckle, 1997). The first of these plots the effects on final PTE and GTE scores of aggregate learning approaches reported over the three-year program for Cohorts 1 and 2. A semi-saturated model was developed in order to compare influences across the two cohorts, to identify any differences in the way final efficacy beliefs were informed. Figure 5.6 reports the standardised estimates generated from this model for Cohort 1. The results for Cohort 2 are reported separately in Figure 5.7.
The model used the maximum likelihood method with 25 variables, 11 of which were observed from survey responses. The unobserved latent variables for surface, deep and achieving approaches were developed from survey responses for each of the years of study. The analysis produced a recursive model for both cohorts with $\chi^2(86, n = 97) = 176.2, p < .001$, an IFI of .812 and CFI of .802. These goodness of fit indices describe a marginal fit to the data, but may be considered suitable for small sample sizes (Ullman, 1996). As the purpose of the current analysis was to explore the relationships between the variables in both cohorts, a parsimonious model was not required. To achieve improved fit to the data, different models would have been necessary for each cohort leading to a reduced comparative capability. Since the scales reported here use different metrics, the standardised estimates enable the greatest level of comparison and are thus reported in the body of the thesis. Unstandardised estimates are reproduced in Appendix K.1.
Figure 5.6 indicates that for Cohort 1, the learning approach chosen throughout the course had very little influence on the development of either general or personal teaching efficacy at the conclusion of the course. Together the effect of learning approach explained only 5% of the variance for GTE, and 7% of the variance for PTE. Individually, the reported use of an achieving strategy had the strongest direct influence on GTE ($\beta = .27, z = 1.14, p = \text{ns}$), with the use of a surface approach having the greatest negative influence ($\beta = -0.22, z = 1.03, p = \text{ns}$). Surface approach had the strongest direct influence on final PTE ($\beta = .17, z = 0.79, p = \text{ns}$), with deep approach having the least influence ($\beta = .07, z = 0.34, p = \text{ns}$).
Cohen (1988) and Kline (1998) suggested that effect sizes of standardised path co-efficients of the order of 0.1 should be considered small, 0.3 moderate and 0.5 should be seen as large effects. Given this structure the path co-efficients reported above would be viewed as small to moderate effects, explaining only small proportions of the variance in general and personal efficacy. It would appear that for Cohort 1, efficacy beliefs developed from factors other than students’ approaches to learning. Such other factors could, for example, have included relative success in practice teaching or observations made of practising teachers in schools.

Of interest in the analysis presented in Figure 5.6, is the moderate to large covariance between achieving strategy and surface approach (.44, \( z = 2.31, p = .021 \)), and between achieving strategy and deep approach (.48, \( z = 2.43, p = .015 \)). Achieving strategies in Cohort 1 were adopted by students pursuing surface as well as deep approaches, in approximately equal proportions.
The pattern of influences evident for Cohort 2, depicted in Figure 5.7, shows important differences compared to the distribution of effects produced by the analysis with Cohort 1. While the combined effect of all learning approaches still accounted for a very small amount (5%) of the variance for GTE, a large effect accounting for 36% of the variance was noted with respect to PTE. For Cohort 2, the use of a deep approach made a large contribution to final PTE (.71, \( z = 2.73, p = .006 \)). The use of a surface approach had a negligible influence, and achieving strategies showed a small negative influence (-.14, \( z = 0.57, p = ns \)) on final PTE scores.
The covariance identified with Cohort 1, between achieving strategy use and surface and deep learning approaches, also differed with Cohort 2. A strong relationship between deep learning approach and achieving strategy was generated in this analysis (.80, \( z = 4.12, p < .001 \)) and the relationship identified between achieving strategy and surface learning approach with Cohort 1, became negligible with Cohort 2. One explanation for the close association between deep and achieving approaches in Cohort 2 is that those who sought to achieve did so through the use of deep approaches to learning. Deep approaches were overtly favoured as part of the modified program and may have convinced students with an achieving orientation to conform to the desired learning approach.

5.7.1: The Influence of Deep Learning Approach on the Development of Personal Teaching Efficacy

The developing influences of learning approach and teaching efficacy were also examined longitudinally for Cohorts 1 and 2, using path analysis. Because of the strong influence of the use of deep approach on final PTE identified in the global analysis for Cohort 2, the progressive effect of deep approaches on developing perceptions of personal efficacy was examined first for both cohorts. These analyses are represented by Figure 5.8 for Cohort 1 and Figure 5.9 for Cohort 2 with unstandardised estimates reported in Appendix K.2.

The maximum likelihood method with 12 variables, 6 of which were observed from survey responses was used in the generation of the path diagrams. The analysis produced a recursive model for both cohorts with \( \chi^2(12, n = 97) = 13.597, p = .327 \), an IFI of .993 and CFI of .992. These goodness of fit indices indicate an acceptable fit to the data.
For Cohort 1 the development of PTE over three consecutive years in conjunction with the use of deep learning approaches explained 19% of the variance in the final personal efficacy measure and 45% of the final deep approach measure. Statistically significant contributions with moderate effect sizes were made to each successive personal efficacy measure from its like predecessor. Similarly, each deep approach measure contributed significantly to the subsequent deep approach measure with moderate to large effects. These paths account for the majority of the variance in deep learning approach and personal efficacy explained by the model.

Figure 5.8. Development of personal teaching efficacy in conjunction with deep learning approach over three years (Cohort 1)
Apart from the initial survey responses, deep approach contributed to the development of personal efficacy with only small effects. In the first year, deep approach provided a moderate to large effect (.45, \( z = 3.36, p < .001 \)), however this relationship was not maintained in subsequent years, dropping to .17 in year 2 and .12 in year 3. The contribution of a deep learning approach to the development of PTE over the three-year period appears minor.

Personal efficacy development in year 2 led to the adoption of deep learning approaches in year 3 (.34, \( z = 3.03, p < .01 \)). Using the procedures described by Baron and Kenny (1986) and Kline (1998), this direct effect was examined, but did not produce a mediated indirect effect to personal efficacy in year 3 (\( z = 1.31, p = ns \)). Overall, with the exception of the two paths noted above, it appears that PTE and the use of deep learning approaches developed relatively independently for Cohort 1.
For Cohort 2 the development of personal teacher efficacy over the three years, in conjunction with the use of deep learning approaches, explained 43% of the variance in the final personal efficacy measure and 63% of the final deep approach measure. Statistically significant contributions with large effect sizes were made to each successive deep approach measure from its like predecessor. Each personal efficacy measure also contributed significantly and with moderate effects, to the subsequent personal efficacy measure. These paths account for the majority of the variance in deep learning approach but may not have comprised the major influence on personal efficacy development.
The development of PTE for Cohort 2 was influenced by the use of deep approaches to learning. The paths from each deep approach measure to each personal efficacy measure produced moderate to large direct effects on each occasion. Indirect effects were also noted through the path pte2 \( \rightarrow \) da3 \( \rightarrow \) pte3 \( (z = 2.52, p = .012) \) and the path pte1 \( \rightarrow \) da2 \( \rightarrow \) pte2 \( (z = 2.71, p = .007) \). These indirect effects were further examined using Baron and Kenny’s (1986) procedures to determine the extent to which the use of deep learning approaches operated as a variable that mediated the growth of personal teaching efficacy.

5.7.1.1: Deep Learning Approach as a Mediating Variable
Baron and Kenny’s (1986) procedures rely on three regression equations: one demonstrating the effect of the independent variable on the mediator variable (path a); another demonstrating the impact of the independent variable on the dependent variable (path c); with the final equation demonstrating a reduction in the direct effect of the independent variable (path c), when the path between the mediator and the dependent variable (path b) is included in the equation. Figure 5.10 illustrates the three components of this model with their standardised path co-efficients. Details of the mediation analyses are reported in Appendix L.

In Figure 5.10, the growth of PTE from year 2 to year 3 appears to include a mediation component through deep learning approach used in year 3. Baron and Kenny’s first equation yielded a significant regression for path ‘a’ with an unstandardised co-efficient of .700 and a standard error of .108 \( (\beta = .679, t = 6.481, p < .001) \). A significant regression was also obtained for path ‘c’ with an unstandardised co-efficient of .563 and a standard error of .111 \( (\beta = .588, t = 5.086, p < .001) \).
Figure 5.10. Mediation of deep approach on personal efficacy for year 3: Cohort 2 (standardised estimates)

Figure 5.10 equates to the outcome of Baron and Kenny’s third equation in which the two predictor variables (da3, pte2) were entered in a stepwise process. The variable da3 was entered first and this resulted in a $R^2$ change for pte3 of .378 ($\beta = .400, t = 2.701, p = .010$). The variable pte2 was entered on step 2 and resulted in an $R^2$ change for pte3 of only .054 ($\beta = .316, t = 2.130, p = .038$). Thus there was a significant direct effect from the independent variable (pte2) to the mediator variable (da3) (path a), and a significant direct effect from the independent variable to the dependent variable (pte3) when they were considered in isolation (path c). Finally, this latter effect was markedly reduced when the influence of the mediator variable (path b) was included in the equation.

These outcomes are consistent with the action of a mediator variable. Since the residual direct effect for path ‘c’ is above zero, the mediation provided by the use
of a deep learning approach on final PTE was partial, albeit significantly so. Final PTE was informed by other influences, including previously held beliefs, and very likely factors such as practicum experiences and vicarious experiences.

Importantly however, with Cohort 2, it appears that the use of deep learning approaches also informed the development of PTE beliefs from year 2 to year 3.

A similar process was applied to examine the mediation effect of deep learning approach on the development of PTE from year 1 to year 2, for Cohort 2. In this analysis, the personal efficacy score for year 2 was the dependent variable, personal efficacy in year 1 was the independent variable, the deep learning approach score for year 2 was tested as the mediating variable.

Figure 5.11. Mediation of deep approach on personal efficacy for Year 2: Cohort 2 (standardised estimates)

Note: numerical indices 1, 2 & 3 refer to the corresponding year of study.
The first equation yielded a significant regression for path ‘a’ with an unstandardised co-efficient of .450 and a standard error of .145 (β = .406, t = 3.108, p = .003). A significant regression was also obtained for path ‘c’ with an unstandardised co-efficient of .504 and a standard error of .116 (β = .528, t = 4.352, p < .001). The third equation, in which the two predictor variables (da2, pte1) were entered in a stepwise process, resulted in the variable da2 being entered first and a $R^2$ change for pte2 of .486 (β = .578, t = 5.499, p < .001). The variable pte1 was entered on step 2 and resulted in an $R^2$ change for pte2 of .072 (β = .294, t = 2.794, p = .007). The result of the final equation is illustrated in Figure 5.11.

These equations produced a similar overall result to that obtained on the first mediation analysis. Significant direct effects were noted from the independent variable (pte1) to the mediator variable (da2) (path a), and from the independent variable to the dependent variable (pte2), when they were considered in isolation (path c). The latter effect was again reduced when the influence of the mediator variable (path b) was included in the equation, however the residual direct effect (path c) remained significant in the analysis for PTE in year 2. This result indicates that the comparative strength of the mediation relationship for deep learning approach in the development of PTE in year 2, was lower than the corresponding relationship in year 3. Thus, deep learning approaches appeared to adopt a growing mediation role across the two years examined in these analyses.

In the first two years of the program, only slight changes were noted in the personal efficacy and the use of deep learning approaches. The final year of the program however saw considerable growth in both factors for Cohort 2 (see
Figures 5.1 & 5.2). Thus, the impact of the use of a deep learning approach was greatest during the period of greatest growth in personal efficacy. During this time the development of PTE for Cohort 2, was to a large extent informed from their growing use of deep learning approaches in addition to other influences.

Similar analyses were conducted for Cohort 1 but no mediation relationships were identified in the development of PTE in either year 2 or year 3. For this cohort, the regression of the path $pte_1 \rightarrow da_2$ (path a) was nonsignificant with an $R^2$ of only .024 for $da_2$ ($\beta = .155, t = 1.044, p = ns$). The regression of $da_2 \rightarrow pte_2$ (path b) was also nonsignificant ($\beta = .175, t = 1.255, p = ns$). The regression of $pte_1 \rightarrow pte_2$ (path c) was significant with an $R^2$ of .156 ($\beta = .395, t = 2.853, p = .007$). Clearly, the use of a deep learning approach did not mediate the development of PTE from year 1 to year 2, for Cohort 1. Its direct contribution to this development was also minor.

Using PTE in year 3 ($pte_3$) as the dependent variable in a similar analysis, the regression of $pte_2 \rightarrow da_3$ (path a) was significant with an $R^2$ of .211 ($\beta = .460, t = 3.434, p = .001$). The regression of $pte_2 \rightarrow pte_3$ (path c) was also significant with an $R^2$ of .182 ($\beta = .427, t = 3.133, p = .003$). In the final equation however, the regression of $da_3 \rightarrow pte_3$ (path b) was excluded from the equation on step 2 ($\beta = .123, t = .800, p = ns$) and no reduction occurred in the co-efficient for path ‘c’. At no stage then, was the development of PTE for Cohort 1 mediated by the use of a deep approach to learning.

PTE appeared to follow a similar quantitative development for both cohorts (see Figure 5.2), however the mediation analysis provided evidence suggesting that
this development was informed, at least in part, by the use of a deep approach to learning, in the case of Cohort 2. The development of personal efficacy for Cohort 1 was not similarly influenced by learning approach and seems to have developed from other factors not identified by this study. The potential implications for qualitative differences in efficacy beliefs so attained are discussed further in Chapter 7.

5.7.2: The Influence of Surface and Achieving Learning Approaches on the Development of Personal Teaching Efficacy

Surface and achieving approaches to learning demonstrated variable influences on the development of PTE with Cohorts 1 and 2, and across years of study. With the exception of year 1, surface approaches to learning had a comparable influence on the development of personal efficacy for Cohort 1, as did the influence of deep approaches. This was not the case for Cohort 2, which showed a negligible relationship between surface approach and personal efficacy. The use of achieving strategies assisted in the development of PTE for Cohort 2, especially in the early years of study. These factors however, appeared largely unconnected for Cohort 1.

Figures 5.12 – 5.15 present the standardised estimates for these two learning approaches, derived from Cohorts 1 and 2, in relation to their influence on the development of PTE. Unstandardised estimates are reported in Appendices K.3 and K.4.
Figure 5.12. Development of personal teaching efficacy in conjunction with surface learning approach over three years (Cohort 1)

The use of surface approaches demonstrated a small to moderate effect on the development of PTE for Cohort 1, with its strongest influence in year 2 of their course ($z = 2.49$, $p = .013$). Despite the negative effect of personal efficacy in year 2 on the use of surface approaches in the subsequent year, surface approaches retained a small positive influence on final personal efficacy, though this path coefficient was nonsignificant ($z = 1.73$, $p = \text{ns}$). Surface approaches displayed direct effects only during each concurrent year. None of their influences mediated the development of personal efficacy from one year to the next. With reference to Figures 5.12 and 5.13, however, the use of surface approaches appeared
considerably more important for the development of PTE with Cohort 1 than with Cohort 2.

For Cohort 2 (Figure 5.13), the paths connecting the series of like factors were the only significant paths in the model. As with Cohort 1, surface approach had its strongest influence in year 2 ($z = 1.09, p = ns$). Similarly also, a negative relationship, though nonsignificant, was identified between personal efficacy in year 2 and surface approach use in year 3 ($z = -1.84, p = ns$). Unlike Cohort 1 however, the influence of surface approach on final personal efficacy was negligible. The picture for Cohort 2 is one of minimal effect of surface approach on personal efficacy, throughout the program.

Figure 5.13. Development of personal teaching efficacy in conjunction with surface learning approach over three years (Cohort 2)
Achieving strategy use affected the development of personal efficacy for Cohort 2, with moderate overall effect sizes. Cohort 1 demonstrated small to negligible effects for the interaction of these factors. Figures 5.14 and 5.15 illustrate the effects of achieving strategy use on the personal efficacy for Cohorts 1 and 2 respectively.

![Diagram](image)

Note: numerical indices 1, 2 & 3 refer to the corresponding year of study.
* $p < .05$, ** $p < .01$

**Figure 5.14. Development of personal teaching efficacy in conjunction with achieving strategy over three years (Cohort 1)**

Paths connecting the series of like factors in Figure 5.14 were the only significant paths in the model for Cohort 1. The strongest influence of achieving strategy use on personal efficacy occurred in the final year of the course, though this effect was statistically nonsignificant ($z = 1.84, p = ns$). Effect sizes in other years were
negligible. The use of achieving strategies in Cohort 1 appears to be largely unconnected with the development of PTE.

The development of PTE for Cohort 2, on the other hand, was strongly influenced by the use of achieving strategies (Figure 5.15), especially in years 1 and 2. Moderate to large direct effects were evident in these students’ first year ($z = 2.72$, $p < .01$), and in their second year ($z = 4.51$, $p < .001$). Personal efficacy in year 1 also influenced the pursuit of achieving strategies in year 2 ($z = 2.17$, $p < .05$), though with a relatively small effect size.

![Diagram showing the relationship between achieving strategies and personal teaching efficacy over three years (Cohort 2)](image)

Note: numerical indices 1, 2 & 3 refer to the corresponding year of study.
* $p < .05$, ** $p < .01$

**Figure 5.15. Development of personal teaching efficacy in conjunction with achieving strategy over three years (Cohort 2)**

The results of this analysis for Cohort 2 are not surprising given the strong covariance between deep approach and achieving strategy identified in Figure 5.2.
(.80, \( z = 4.12, p < .001 \)). Those students who sought to achieve in Cohort 2, tended to do so through the use of a deep approach and each of these approaches assisted in the development of their PTE.

5.7.3: The Influence of Learning Approaches on the Development of General Teaching Efficacy

Few relationships were identified between learning approaches and the development of GTE with either Cohorts 1 or 2 over the three years of the course. No relationship between the use of deep or achieving approaches and the development of general efficacy were identified. These factors appear unconnected for either cohort, at any stage.

The use of surface approaches demonstrated a moderate negative association with the development of general efficacy in Cohort 2 in the first two years of the program, and with Cohort 1 in their first year. For Cohort 1, the path from surface approach in year 1 (sa1) to general teaching efficacy in year 1 (gte1) produced a standardised path co-efficient of -.40 (\( z = -2.94, p < .01 \)). All other paths connecting surface approach and general efficacy for Cohort 1 had negligible co-efficients with a negative weighting.

Cohort 2 also produced negative path co-efficients for the connections between surface approach and general efficacy, but small to moderate effects were evident for years 1 and 2. The path sa1 \( \rightarrow \) gte1 yielded a moderate standardised path co-efficient of -.29 (\( z = -2.11, p < .05 \)). The path sa2 \( \rightarrow \) gte2 also yielded a moderate path co-efficient of -.39 (\( z = -3.29, p < .01 \)). A negative effect was also evident from gte1 \( \rightarrow \) sa2 with a moderate path co-efficient of -.32 (\( z = -2.77, p < .01 \)).
remaining inteconnecting paths were negligible, but maintained their negative
direction.

It would appear from these analyses that learning approach had little to do with
the development of GTE. Apart from the use of surface approaches on some
occasions detracting from students’ perception of the impact of teachers generally,
no relationships which build the construct were identified.

5.8: Summary of Main Results Analysis
Students in Cohorts 1 and 2 were surveyed on three occasions throughout their
course of study, to determine changing patterns in their use of learning
approaches, development of teaching efficacy, and attributions for success and
failure in learning. In order to provide data for a partial replication of the main
study, students in Cohort 3 were surveyed using the same instruments on two
occasions covering the first two years of their course.

The learning approaches used by Cohorts 1 and 2 generally moved in similar
directions over the period of their course, with a trend towards reducing surface
approach usage and increasing deep approach usage. These changes produced
considerably greater effects in Cohort 2 than in Cohort 1, and the use of surface
approaches began to reduce earlier in the program for Cohort 2. A similar early
trend was identified in Cohort 3 with a marked reduction in surface approach
usage.

Although they moved generally in the same direction, growth in the use of deep
approaches was statistically significant for Cohort 2, but not for Cohort 1. Effect
sizes indicated moderate growth in deep approach for Cohort 2, but these changes
produced small effects for Cohort 1. Where they were identified, changes in the use of deep approaches occurred in the final year of the program and were thus not evident in the data available for Cohort 3.

Students in Cohort 2 began their course with a stronger belief in their personal teaching efficacy than those in Cohort 1, and maintained this differential throughout the program. Notwithstanding this difference, both cohorts developed their perceptions of personal and general efficacy in a similar pattern, with greatest growth in the final year of their course. Growth in personal and general efficacy in the final year produced moderate effects for Cohort 1 and large effects for Cohort 2. Since results for the final year were not available for Cohort 3, replication of this finding was not possible. Results for Cohort 3 did replicate the early stability in personal efficacy evident in Cohorts 1 and 2. Learning attributions demonstrated relative stability across all years, for all cohorts.

Path analyses were conducted with data from Cohorts 1 and 2 to determine how differences in learning approaches contributed to the growth of teaching efficacy. The pattern of learning approach used in Cohort 1 appeared to contribute little to either personal or general teaching efficacy developed by the conclusion of the course. A considerable contribution to the development of final personal teaching efficacy in Cohort 2 however, was made by the use of deep learning approaches. This influence produced the only large effect on efficacy development identified in the study. A close association between the use of deep learning approaches and achieving strategies was also evident in Cohort 2, whereas achieving strategies equally covaried with surface and deep approaches in Cohort 1.
Longitudinal path analysis demonstrated that the influence of deep learning approaches on personal teaching efficacy for Cohort 2 was distributed throughout their course of study. Deep learning approaches mediated, at least in part, the development of personal teaching efficacy, from each year to the next, for Cohort 2, but these effects were not evident in Cohort 1.

The use of achieving strategies also contributed to the development of personal efficacy in Cohort 2, though this influence may have been due to the close association of achieving strategies and deep learning approaches for this cohort. A greater influence from surface approaches to the development of personal teaching efficacy was evident in Cohort 1, though this influence was of marginal statistical significance and produced relatively small effects. Some small negative effects were identified from surface approach usage to the development of general teaching efficacy in both cohorts. No other influences were noted between the use of learning approaches and general teaching efficacy.

Overall, these results indicate that Cohorts 1 and 2 differed in the way they approached their learning. They also indicate that, although both cohorts developed personal and general teaching efficacy beliefs in a similar pattern, the growth in personal teaching efficacy was informed by the emphasis given to deep learning approaches in Cohort 2.
Chapter 6

Patterns of Student Responses to Program Modifications

The results reported in this chapter principally detail responses to the semi-structured interviews conducted with selected students from Cohort 2, during their first and final years in the program. Also included are qualitative data from other sources such as student journal writings, evidence of teaching outcomes and field observations as they relate to students’ responses to the modified program.

These data were collected for two main purposes. Interviews with selected students were conducted to provide evidence from another source to clarify the construct validity of the survey instruments used in the study (Yin, 1994). In effect, this purpose was intended to inform a triangulation function to complement evidence provided by the confirmatory factor analyses reported in Chapter 4. More importantly, the interviews were conducted to provide a richer elaboration of the learning processes these students used and clarify how students with varying entry characteristics responded to the altered learning contexts. These purposes were intended to fulfil an embellishment function and also further develop the process of theory driven pattern-matching, argued by Yin (1994, p. 106) as a most desirable strategy to strengthen the internal validity of the study. It was also anticipated that the information provided from the interviews would assist in the interpretation of the outcomes identified from the quantitative analyses reported in Chapter 5.
6.1: Data Analysis Procedures for Student Perceptions (Cohort 2)

As described in Chapter 4, an hierarchical cluster analysis was undertaken using year 1 data for Cohort 2, derived from the original SPQ. Scores from the original SPQ, rather than the modified version, were used to determine cluster membership because the cluster analysis necessarily preceded the confirmatory factor analytic procedure. This analysis identified 11 clusters with varying distributions of scores across Surface (SA), Deep (DA) and Achieving (AA) approaches to learning. A total of 18 students were interviewed during October of year 1, some six months after having completed the original surveys. These students represented all but one of the clusters identified. Chapter 4, section 4.2.5.2 provides a description of the cluster analysis and procedures employed in the selection of students for interview.

Of the original 18 students selected for interview, 15 remained in the course at its conclusion. These students were again interviewed during November of their final year. The data generated from these interviews yielded over 500 pages of transcripts. In order to analyse these data systematically to meet the research functions required, the following procedures were implemented.

Transcripts from the year 1 interviews were subjected to a thematic analysis following procedures recommended by Miles and Huberman (1994). The interview tapes were transcribed by a third party, unfamiliar with the university or the research. These transcripts were then read and re-read by the researcher, with continuous reference to the original tapes to determine meaning conveyed through intonation and inflection and to identify some jargon content. Throughout this process a series of checklist matrices was developed (Miles & Huberman, 1994,
These matrices indicated beliefs or behaviours concerning the student’s approach to learning, and teaching expectation. Other emergent themes were also noted that indicated, for example, the student’s reaction to the altered teaching context. Appendix F provides examples of transcripts and matrices developed through this method.

Example passages from the transcripts were selected as typical for particular themes to inform the illustrative purpose. Exceptions to themes developed were also identified and selected to describe divergent views. Themes identified through this process were compared to cluster group membership and original survey scores. A further analysis of key words and concepts was then undertaken using the same transcripts and similarly compared with cluster membership.

Journal entries from these students were subjected to a similar process (Dart et al., 1996). These journals chronicled the students’ development from the time of the initial surveys to the time of the interviews. Thematic analysis was again used and cross-referenced to interview data as a separate source to clarify the validity of the themes recorded through analysis of transcript data.

Field notes containing behavioural observations and impressions gained by the researcher at the time of the interviews were recorded at the conclusion of each interview tape. These notes were examined and cross-referenced to classifications made on the basis of transcript data. Although these field notes did not emerge from an independent source, since the researcher also conducted the interviews, it was considered that they would assist in the triangulation of the qualitative data obtained through interview (Burns, 2000; Miles & Huberman, 1994).
These procedures were considered adequate to fulfil the first function of the qualitative analysis, which was to inform concurrent validity of the learning approach survey data. It would also assist in the interpretation of those data by providing a richer description of the motives, beliefs and behaviours of the students as they engaged in the learning process and responded to the early stages of the altered teaching context.

Since the purposes of the qualitative data in this study were to fulfil essentially clarification and confirmatory functions, the detailed analyses afforded by computer assisted processes commonly associated with ethnographic exploratory studies (Miles & Huberman, 1994) were considered neither necessary nor desirable in this instance. The procedures applied in the present research have their basis in the explanatory case-study approach of Yin (1993, 1994) using theoretical propositions previously established through exploratory phenomenographic methodology (Entwistle & Ramsden, 1983; Marton, 1981; Van Rossum & Schenk, 1984), and empirical analysis (Biggs, 1987a, 1987b).

6.2: Changes in Cluster Formation
The second stage of the student qualitative data analysis required the establishment of cluster groupings based on year 3 survey results. To enable comparison with year 1 cluster groupings, the final analysis was also conducted on the basis of DA, SA and AA scores from the original SPQ. Final cluster groupings were then established using identical procedures for first and third year (see Appendix G.2). Final cluster groupings produced the pattern described in Table 6.1 while cluster groupings produced from first year data are reported in Table 4.7.
Table 6.1. Hierarchical Cluster Groupings According to Learning Approach (Cohort 2, Year 3)

| Distribution | Cluster | n* | Surface Approach | | | Deep Approach | | | Achieving Approach | | |
|--------------|---------|----|------------------|----|----------------|----|------------------|----|------------------|----|
| Even distribution across SA, DA & AA | 2A | 24 (5) | 44.08 | 3.82 | 36-54 | 49.38 | 3.74 | 40-56 | 42.33 | 3.71 | 35-48 |
| Low AA | 2B | 6 (3) | 39.17 | 5.12 | 30-44 | 43.50 | 2.74 | 40-48 | 29.33 | 1.97 | 27-32 |
| High DA & AA with low SA | 2C | 5 (3) | 33.00 | 4.53 | 27-38 | 62.00 | 4.50 | 45-59 | 47.40 | 3.05 | 43-51 |
| High DA, mod AA, low SA | 2D | 8 (2) | 35.75 | 2.71 | 33-40 | 52.75 | 4.50 | 45-59 | 43.88 | 2.90 | 39-47 |
| High DA & AA, mod SA | 2E | 6 (2) | 42.67 | 3.20 | 39-47 | 54.33 | 3.01 | 51-58 | 52.83 | 2.23 | 51-57 |
| High AA, mod DA & SA | 2F | 1 (0) | 45.00 | . | . | 42.00 | . | . | 58.00 | . | . |
| Low all | 2G | 1 (0) | 37.00 | . | . | 24.00 | . | . | 24.00 | . | . |

* Bracketed numbers indicate the number of students interviewed from the total cluster.

The largest cluster in both first year and third year was represented by students who reported a relatively even distribution of the use of surface, deep and achieving approaches. These clusters were represented by cluster 1B, in first year, and cluster 2A, in third year. While there were some changes in individual student’s membership of these clusters (see Figure 6.1), this grouping comprised 24 students in both years.

In year 1, four cluster groupings (clusters 1A, 1C, 1H and 1K; n = 21) comprised students characterised predominantly by high surface approach scores and variable deep and achieving approach scores. In the final analysis with year 3 data, these clusters were no longer represented.

By contrast, the cluster analysis with year 3 data produced three clusters (clusters 2C, 2D, and 2E; n = 19), which were predominantly characterised by high deep
approach scores with variable surface and achieving approach scores. These groupings were represented in year 1 by two clusters (clusters 1E and 1I; $n = 6$).

The movement of every student in Cohort 2 from cluster groupings in year 1 to final cluster groupings in year 3 was then traced following the procedures described by Alexander and Murphy (1998). Students who had been interviewed on both occasions were then selected to illustrate developing conceptions of teaching and learning which followed different trajectories (see Figure 6.1). Students who represented 5 of the final 7 clusters had been interviewed on both occasions and these students incorporated 12 of the 22 trajectories identified. This procedure follows a descriptive case-study approach (Burns, 2000; Yin, 1994) with the purpose of contributing to the illustrative function of these data (Alexander & Murphy, 1998).

Figure 6.1 indicates that the largest movement occurred between cluster 1B in year 1, to cluster 2A in year 3 (12 students). This represents the group that began the course with a moderate and relatively even distribution of scores across all three learning approaches. Since cluster 2A, in year 3, corresponds to the same distribution of scores, these students can be considered to have experienced little change, in response to the program offered. These 12 students represent 50% of cluster 1B (year 1), and of cluster 2A (year 3). The remaining half of the students from cluster 1B were distributed across five final cluster groupings, four of which were characterised by higher deep and/or achieving approach scores.
Figure 6.1. Learning approach cluster groupings for Cohort 2, Year 1 and Year 3
Students originally located in three of the clusters characterised by high surface approach scores in year 1 (clusters 1A, 1C and 1H), predominantly filled the remaining places in cluster 2A. In other words, these students appeared to change their learning approach by increasing their use of deep approaches, or reducing surface approach use, such that no one approach appeared dominant by the time they reached their final year.

The students in year 1 who began with high deep approaches (clusters 1E and 1I) maintained a similar pattern in their final year. These students progressed to clusters 2C and 2D. The remaining students who comprised the year 3 clusters predominantly characterised by high deep approach scores, were derived from original clusters that showed high or moderate scores in all three learning approaches, or those characterised by high achieving approaches.

These findings indicate that the overall reduction in surface approach scores for Cohort 2, across the three years of the program (see Chapter 5) predominantly affected those students who originally reported high surface approach scores. The decline in the use of surface approaches for these groups reduced the relative importance of this approach, such that surface approach usage did not predominate in any of the year 3 clusters, with the exception of the single student in cluster 2G.

6.3: Student Qualitative Responses
For the purposes of this analysis, the qualitative responses for students whose cluster membership from year 1 to year 3 represented a change in learning approach, are examined and compared to those whose learning approaches
remained similar throughout their course experience. Students in clusters defined by marked variation, or extreme values, are also described to exemplify the characteristic qualities of the predominant approach or combination of approaches.

Responses from students who represented initial clusters characterised by high surface approach are described first. Responses from these students who progressed to alternate destination clusters are then compared. Major features of these data are then evaluated against the responses from those students who reported a high use of deep approaches. These students’ responses are then compared to students from clusters in which high scores on achieving approaches were either present or absent in combination with variations in deep and surface approach scores.

**6.3.1: High Surface Approach**

Students who were considered predominantly guided by the use of surface approaches to learning in year 1 comprised clusters 1A, 1C and 1K. Students in cluster 1H also used surface approaches but were additionally guided by high achieving approaches and are treated separately in this analysis. The 10 students in cluster 1A yielded learning approach means of SA = 50.2 (SD = 1.75), DA = 39.2 (SD = 3.61) and AA = 35.2 (SD = 4.89). The 7 students in cluster 1C yielded mean scores of SA = 56.86 (SD = 2.54), DA = 46.43 (SD = 5.41) and AA = 44.14 (SD = 3.18). The single student in cluster 1K produced a SA score of 49, a low DA score of 24 and a low AA score of 32.
Some difficulty was experienced in conducting the interviews with students in cluster 1A. Initially three students were identified from this cluster, only one of whom was in class on the day the interviews were arranged. That student agreed to be interviewed. One of the absent students also agreed to take part when requested during the following week, but withdrew two days prior to the appointed time because of assignment pressure. The other student who was initially absent had already withdrawn from the course, but without advising the course co-ordinator. Two more students were substituted from cluster 1A, one of whom also withdrew on the day prior to the scheduled interview because she had an exam on the following day and stated that she needed to begin studying. Neither of the students who withdrew had begun their assignment or exam preparation and neither was willing to reschedule their interview. Further substitution was not possible after that time.

The interviews were scheduled in the final fortnight of the semester, immediately prior to the students undertaking their first formal teaching practicum. Assessment items for two subjects were due and an exam for another was scheduled during this period. One-hour appointments were arranged for the interviews, though most took between 30 and 45 minutes, and the students were asked to nominate a time, convenient to them, during the two-week period.

These behavioural observations concerning students in cluster 1A are consistent with expectations of students with a high surface and low achieving profile. Biggs (1987b, pp. 15-16) identifies students with such profiles as likely to feel pressured by deadlines and exams, as having poor academic self-concepts and little insight into their learning behaviours. He further suggests that students characterised by
low achieving approaches may also fear public scrutiny of their learning behaviour.

While a guarantee of confidentiality was given to all students at each stage of the data collection process and was reaffirmed personally at each interview, these students’ study behaviours would still have been displayed to the researcher and some embarrassment may have been feared. When combined with pressure of due assignments and an imminent exam for which little preparation had occurred, it would not be surprising, given Biggs’ comments, that the only students who declined the interview or who failed to attend, were students from cluster 1A. All other students from all other clusters were in attendance at the initial lecture, agreed to take part and attended the initial interview at the nominated time. Additionally, one of the students from cluster 1A (case 1) who did attend the initial interview, then failed to attend the final interview in year 3. This student was the only one who failed to attend the final interviews and consequently one student only, from the initial cluster 1A was represented by interviews on both occasions. Because final interviews were conducted at the conclusion of the students’ final year of study, it was not possible to trace them after the scheduled interviews were completed.

The SPQ scores obtained by the three students interviewed from the clusters predominantly characterised by the use of surface approaches (clusters 1A, 1C and 1K), are detailed in Table 6.2. This table reports the SPQ scores and deciles at the time of the first and final interviews together with the students’ initial and final cluster membership for cases 15, 43 and 56, who have been given the pseudonyms Susan, Sonya and Sharon respectively for the purposes of the
discussion that follows. The initial ‘S’ used for these pseudonyms identifies these students as beginning the course with predominantly surface orientations, to assist in later comparison with students from other clusters.

Table 6.2. Initial and Final SPQ Scores of Interview Respondents (Surface Approach Clusters)

<table>
<thead>
<tr>
<th>Case</th>
<th>Pseudonym</th>
<th>Score</th>
<th>Initial SPQ</th>
<th>Final SPQ</th>
<th>Initial cluster</th>
<th>Final cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Raw score</td>
<td>Surface</td>
<td>Deep</td>
<td>Achieve</td>
<td>Surface</td>
</tr>
<tr>
<td>15</td>
<td>Susan</td>
<td>50</td>
<td>9</td>
<td>41</td>
<td>3</td>
<td>36</td>
</tr>
<tr>
<td></td>
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<td>3</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>43</td>
<td>Sonya</td>
<td>55</td>
<td>10</td>
<td>41</td>
<td>8</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>SPQ decile*</td>
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<td>3</td>
<td>8</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>56</td>
<td>Sharon</td>
<td>49</td>
<td>9</td>
<td>24</td>
<td>3</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>SPQ decile*</td>
<td>9</td>
<td>1</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

* Deciles from SPQ norms for University (Education - females) (Biggs, 1987b, p. 33).

Susan and Sharon began the course with high surface orientation and low scores on both deep and achieving dimensions. According to Biggs (1987b, p. 15-16) this profile should describe students who have little insight into their own learning, lowered motivation for success, little organisational skill and elevated levels of academic stress. Biggs also suggests that they may prefer highly structured learning environments that are task specific. These two students developed differently as the course progressed. While both markedly reduced their reliance on surface methods and improved their use of deep approaches, Sharon’s response was less than ideal while Susan responded in the manner intended by the study.

By the end of the study, Susan had developed deeper and more achievement oriented learning approaches. Biggs (1987b, pp. 14-15) suggests that, at that stage, she would have sought more to understand the structural complexity of the material learned than simply aiming to satisfy minimum subject requirements. She
may have been more self-directed in her learning by seeking to satisfy personal learning goals and more organised and highly motivated to achieve them. Sharon, on the other hand, adopted the characteristics of a low achieving student by the end of the program. While her surface orientation demonstrated considerable decline coupled with a moderate growth in the use of deep approaches, both approaches were considered low at the conclusion of the course. The very low final achieving orientation would indicate a lowered motivation to achieve and disorganised study patterns.

Sonya’s learning approach differed from Sharon and Susan at the beginning of the program. While her surface orientation was the highest of these three students, she also reported moderately high achieving orientation. Her initial study characteristics may be expected to be between those of the other surface oriented students and the surface-achieving students considered later (see 6.3.3). While she may have maintained a reproducing orientation to her studies, according to Biggs (1987b, p. 15) she should have demonstrated a greater amount of organisation and systematic application to her work. At the conclusion of the course, Sonya reported a deep-achieving learning approach. This is an ideal pattern according to Biggs, which would lead the student towards a self-directed meaning orientation, guided by personal relevance and subject assessment requirements.

6.3.1.1: Qualitative Responses – Year 1.
During the initial interviews, the students were asked about their motivation for joining the Early Childhood course at CSU. The three students from the surface approach clusters described largely functional motivations for enrolling. They wanted to work as early childhood teachers and required a degree to do so. For
example, Sharon explained that her reason for attending university was essentially that she discovered it to be a vocational requirement.

Sharon: *Um - I finished my HSC in ‘95 and I was at [name of school] in Orange and then I wanted to do early childhood. I didn’t really make up my mind till probably um - sometime in ‘95 and I didn’t know whether I wanted to go to Uni or to TAFE or just go straight into work - and then I rang a few places and they said that um - they go - some of them went by a um University Degree. So I thought “Oh well, I’d better go and do that” - and um so then I thought which Uni I’d go to and thought if I can do it closest to home I’ll do that – so.*

Sharon’s initial commitment to the course of study appears weak, since it seemed to be undertaken only as a means to an end. Had other courses been acceptable, or positions been available with no post-secondary qualifications, she may have chosen those options. While Sonya’s reasons for choosing Charles Sturt University were the same as Sharon’s, her approach to entering the course shows greater commitment.

Sonya: *Um well I completed year 12 - I always wanted to work in the early childhood field - I finished year 12 and I applied for a Principal’s recommendation. Which um - I got an early acceptance. I got that in about December. So that’s pretty much how I got here. [discussion of principal’s recommendation scheme omitted]*

Interviewer: *So why CSU?*

Sonya: *Um just closer to home I didn’t want to leave home.*

Sonya’s intention to enter early childhood teaching was long held and her pursuit of a principal’s recommendation to gain early entry demonstrated a level of organisation and forward planning absent from Sharon’s description.

Given that these students enrolled in the course mainly in order to fulfil requirements to enter teaching, it is probably not surprising that their perception
of the learning environment they found themselves in, was characterised by the view that it was hard work. Work pressure was a theme emphasised by Susan and Sharon with the key words ‘hard’ and ‘work’ being used with highest frequency. Coupled with the emphasis on work pressure, was a view that such work was a burden that needed to be endured on a daily or weekly basis, in order to attain the desired end of a teaching qualification in the long-run. Susan, for example, expressed the following view about the workload.

Susan: \[\ldots\text{ Oh it’s just that it’s a lot of work and sometimes you think you’d be better off just to go to work for 5 days a week and at the end of the day and come home and that’s it.}\]

Interviewer: Yes - finish at 5:00 o’clock or something and put your feet up and have the night off.

Susan: \[\text{Yeah, and that’s it for the day, and you get your weekends off and then you get four weeks a year holiday and you know - but um no, but then you keep thinking of the big picture. I keep thinking I should be able to do that, eventually that will - and then at least you will enjoy what you do.}\]

In this example, Susan explained her feeling of work pressure and the way she manages this by maintaining her mental image of the job satisfaction she will eventually attain. Later in the interview, she explained that the difficulty level of the work and her inexperience in managing the tasks added to her perception of pressure.

Interviewer: \[\text{Is it the quantity of work that’s been the problem or the difficulty of it?}\]

Susan: \[\text{Um probably a bit of both. Like I’ve had a bit of difficulty with all of it - um leaving - letting things get on top of you. I think that’s the problem - like I’ve sort of only just learnt that you can go see your lecturers and they’re really not so bad - they’re really - like, really they’re good – like, they’ll help you out - you know, if you’re genuine.}\]
Susan’s view, especially concerning the desire to be unencumbered with work after hours, is probably coloured by the fact that she had spent some years previously in the workforce. The younger student, Sharon, who came to university directly from school, did however express similar themes.

*Sharon:*  
Yep, you’ve just got to do it [the work] - however you can, to get it done. It doesn’t matter about this: - um like - learn it so you know it in two months time; - and learn it for when you have to - ‘cause there’s one after the other.

The number of assessment pieces led Sharon to feel overwhelmed. She felt the need to produce assignments by whatever means possible in a reactive fashion because there were so many of them. She perceived this work pressure prevented her from engaging in regular study. It was also apparent that her perception of the purpose of regular study was to ‘know’ the material for other assessment tasks in ‘two month’s time’ or ‘when you have to’. This perception suggests a reproduction orientation and was reinforced by later comments made by this student. On the other hand, Sonya experienced little difficulty with the workload.

*Interviewer:* What did you expect it [university] to be like?

*Sonya:* Oh God! Um probably what it is. ...I wasn’t that disappointed - no maybe a little bit – more - I thought we would have done a lot more work in [childcare] centres. We haven’t really done much of that. I suppose our pracs account for a lot of that. Other than that it’s pretty much what I expected. ... Even - if anything - less workload. I thought we would have had a lot more workload than what we did.

Workload was an issue for the other two students as they tried to cope with the number of assessment pieces, multiple classes and find the time necessary to engage in rewriting and re-reading of notes. Only Sonya had successfully adapted some strategies resulting in an easing of workload concern. Susan appeared to be
beginning to develop strategies for workload management, but Sharon remained overwhelmed and expressed no plan to identify the sources of the problem.

Sonya: ... I found I was going home every night and spending two hours just copying up notes and rewriting, 'cause I was writing really messy, 'cause I was trying to scribble everything down - and then I just thought I can't do this any more. It was really making me tired - and my mum suggested it to me. She said, “Why don’t you just write down only what you have to?” - and I thought “No that’s silly” and then I tried it and it was lot easier.

A strong theme of anxiety about examinations and other assessment items that contributed heavily towards the total marks awarded in the subject was evident within these clusters. These students expressed considerable concern about exams and problems with assignments that required essay responses. They preferred a larger number of smaller assignments submitted on a regular basis, with delineated tasks and short answers.

Interviewer: What kind of assessment pieces do you prefer?

Sharon: Um, I’m not really keen on the essays that are worth the whole - essays worth the whole grade. Like not the hundred percent, but you know - say an assignment’s worth 20% or 30% and the essay’s worth - because oh I’m not, personally not really hot at doing essays - so I - if there was like questions to it - like you know, questions - say you write 500 words on this one - or like if there was about five questions. I think it would make it easier like - because if you get the wrong idea with the whole essay there’s all your marks gone. But with those other ones you might, for two of them out of the six, you might get on the wrong track, but you’ve got another four chances to get some sort of mark.

While these students recognised they had difficulty planning and scheduling their work, allowing work to accumulate and then attempting to address the tasks close to the due date, they saw the solution in a modification of the requirements, rather than a modification of their behaviour. In relation to exams, again the issue of
weighting was of major concern, and the anxiety was centred on the likelihood of misunderstanding the question, or of having studied the wrong topics. When asked her views on exams, Sharon summed up many of these issues in the early stages of the interview.

Sharon: *I don’t - like again like today - the literacy one [exam] was 20% Thursday’s maths one’s 50. 50’s a bit scary like coming straight out of year 12, assessment tasks are no more than probably 15% - but then people say “Oh 50, I’ve got ones worth 80” and some are 100% and - I think that’s a bit of a risk of your marks - but um no - I’ve never been able to just sit down and study two weeks before. I’ll do a bit of work and then I’ll just sort of go: “Oh, oh I’ve got time to do that later” and put it off as long as I can but.*

Sharon also revisited this issue near the conclusion of the interview and reaffirmed the importance to her of regular small assessment pieces, or weekly class tests. The regularity of the assessment piece, she concluded would provide an incentive for her to engage in regular study and thus improve her learning. Her expressed need for imposed structure to enforce a study routine and her fear of failure principally brought about by misunderstanding the task requirements are consistent with Biggs’ (1987b) description of the problems experienced by students who pursue surface approaches.

Susan also expressed considerable anxiety about the prospect of exams. This anxiety was strongly stated in the following extract. Her language structure became quite disconnected and her pace and volume increased.

Susan: *I don’t like exams. I think exams do put a lot of pressure on people. And some people really really get worried. [inaudible] yeah - I just think that they’re um - I mean, if you’ve like, well, you know - if you can like pass and do okay through the year - because you’re under pressure and you know - like you’re all nervous about doing some exam and then you fail it - like that might cause you to fail like your whole subject, so - and you know - if you’ve done well for the rest of*
the time, then what’s the point? I just think it’s unnecessary. I think there’s other ways of measuring someone’s knowledge other than sitting down like to a two-hour exam - and you know - even have more practical - like have a discussion with someone - how you know - see what they know - don’t - yeah.

Despite Sonya’s higher achieving orientation, apparent greater organisation and adaptability to contextual demands, she also expressed high anxiety about assessments that included examinations. She connected her current feelings to her most recent experience with exams during the Higher School Certificate and described extreme feelings of discomfort stating that she had a ‘phobia about exams’.

The study strategies that these students engaged in almost entirely comprised methods aimed at memorising information so that it could be reproduced at a later date. Such methods relied heavily on the creation of a detailed set of notes, which were repetitively rewritten and re-read as an exam approached.

Sharon: For my study, I just write out my notes summarise my notes - and then usually read that a bit and then, as it gets closer, I usually just rewrite it and rewrite it - just - like last night, that’s what I was doing. I just had my notes and was rewriting it ’cause a lot of it was terms - and I was just rewriting it.

Sonya: I sort of make a point of reading over my notes every night to try and keep it fresh in my mind – um, I don’t know what else.

Personal interest in the information was also considered important, but mainly as an aid to memory. When interest was high, or the material was presented in an engaging manner, and when the topic under discussion was seen as relevant and practical, the students in these clusters reported that they were more likely to understand and retain the information.
Susan: You [the researcher] come into class and sort of talk about the deep learning and [inaudible]. I don’t know - I think sometimes it’s like something’s - just if something’s of - really of interest to you - or something’s presented to you of interest - its made interesting so you just tend to know it, you tend to remember it, and refer back to it.

Students in these clusters also expressed a desire for lectures to be conducted in highly structured formats in which topics were clear and required information was provided in an easily accessible form. For example, Sharon reported that the opportunity to copy notes from overheads was an important characteristic of a good lecturer.

Interviewer: What would your idea be of a good lecturer? ...

Sharon: That they just don’t talk for an hour straight. Like you’ve got - I mean - some use overheads that you can copy notes down then you know exactly what you need and you don’t like start writing down all the other stuff that you think - you get half way through it and think “Oh I didn’t really need that”.

Thus, the process of learning, from these students’ perception appears principally a matter of receiving transmitted information, which needs to be stored in memory, then accessed and reproduced when required for assessment purposes. A general perception of hard work, fear of large assessment items, a preference for environments which are practically oriented and well structured with little theory, or in which links from theory to practice are made explicit, appear to characterise these students’ views. They expressed a difficulty being able to motivate themselves to complete work before due dates, an anxiety about progress and all predicted Pass grades only, with the exception that Sonya tentatively predicted a Credit grade in one subject.
These findings are consistent with previous research defining the characteristic perceptions, preferences and concerns of students who use surface approaches to learning (Biggs, 1987a, 1993a; Entwistle & Tait, 1990; Entwistle & Waterston, 1988; Ramsden, 1992). As such, these current findings provide further evidence to support the validity of the learning approach measures used in the present study, specifically in relation to the identification of surface learning approaches from the SPQ.

6.3.1.2: Response to Program Modifications
Modifications to the program as part of the current study in year 1 included the use of reflective journals to assist in the development of metacognition in learning practices, to enable students to reflect on content of weekly classes, on the teaching processes used in the course, and to identify links across subjects studied and between their formal classes and practicum experiences.

Modifications also included the application of small group problem-based learning tasks, with multiple subtasks, which were partially subject to peer assessment. Feedback was also given to students as a whole group about the overall responses to the initial surveys conducted in the first semester. Two lectures were conducted by the researcher explaining the purpose of the research and providing descriptions of alternate learning approaches. These concepts were then reinforced periodically throughout the year by the lecturers responsible for teaching the subjects studied.

All of these aspects of the program, as well as traditional teaching methods including lectures, tutorials, field visits and traditional course content, were to be
considered and discussed in the reflective journals. The journals comprised 40% of the assessable grade in the Practice of Teaching subjects and were continued across both semesters. Grading occurred on two occasions each, during both semesters of year 1 on the bases of content, evidence of reflection and formation of links between subjects and between theory and practice. The central purpose of the reflective journal task was to encourage students to develop deeper learning approaches early in their university experience by building core skills, possibly under-utilised in prior learning experiences. The task however, was a complex one and considerable variation was evident in students’ ability to manage its requirements. Not surprisingly, students who began the course with predominantly surface orientations generally experienced some difficulty with the reflective journal task.

6.3.1.2.1: Sonya

Of the three students interviewed from the initial high surface approach clusters, Sonya demonstrated greatest competence with the reflective journal task and appeared to display a growing level of skill. Initially her journal entries consisted mainly of restatements of the content of lectures during the week, with some evidence of linking the material to practicum observations. The content of the lecture material was reported separately, without integration despite her assertion that links between subjects were formed.

Journal extract: Sonya – July 25, 1996\(^6\)

\textit{This week’s Educational Psychology lecture was on the topic of motivation. We looked at three main perspectives:} 
\begin{itemize}
  \item Behaviourist (extrinsic factors);
  \item Humanist (intrinsic factors);
  \item Cognitivist (both).
\end{itemize}

\(^6\) Journal entries have been reproduced as they were written. Syntax, grammar, abbreviations and emphases were those used by the student unless otherwise noted.
Learning about motivation is tremendously significant for myself as a future teacher. By understanding how a child can become motivated in learning I can learn to become a better educator.

The topic of motivation can also be linked to the other Prac [Practice of Teaching] lecture which focused on development and learning. This link, however, was not very obvious to me until after I completed the set text and then the pieces began to slot together.

While Sonya claimed to have developed links between lectures in this extract, only the content of one lecture was summarised and no integration of the material was evident. In week 4 of the second semester of her first year, however, Sonya’s linking of material across subject areas and to practice appeared to crystallise.

Journal extract: Sonya – August 15, 1996

I can really see the lectures coming together. I think this wasn’t as obvious because each lecture took a different angle, but with last session’s knowledge and the lectures from other topics, the links have become more apparent.

In the Educational Psychology lecture we looked at Bruner ... [extended discussion of Bruner, Piaget and Ausubel]... [Ausubel’s theory] also has its disadvantage because it doesn’t encourage the children to think for themselves, in my opinion this theory can be related to surface learning. ... [discussion of Vygotsky].

... [in the subject The Practice of Teaching] we looked at principles 4 and 5. Principle four stresses that a variety of theories can be combined for the best learning experiences. I found it easy to relate Bruner and Ausubel’s theories to this principle.

Principle 5 concentrated on building a knowledge base from our experiences. When I read this I immediately thought of Bruner’s theory of scaffolding where we keep building on information stored in our brain.

These lectures have several implications for the classroom because as future teachers we need to consider all theories of learning because no one is totally correct... [further discussion of the problem-based assignment and observations from practice].

In this extract Sonya demonstrated the formation of links across two concurrent subjects and indicated a recognition of prior learning. She linked one of the
theories to the current research project, and related the material across both
subjects to practice. The journalling task was identified by Sonya in the final
interview as one of the program modifications that contributed toward the
development of her deeper learning approaches. She felt that the formation of
links between sources of information and information provided across subjects
assisted her learning. The following extracts are taken from Sonya’s interview
conducted at the conclusion of year 3, the final year of the program.

Sonya: ... A lot of our subjects involved journals - keeping journals and
making the links between the lectures, tutorials and the textbook
which has been really helpful.

Interviewer: Right, so that’s good ‘cause it sort of forces you to make those links?

Sonya: Yeah, it’s been really helpful, and then eventually also look at the
links between the other subjects as well that you’re also studying, so
that helps as well – yeah, helps to make those links a lot easier.

Later in this final interview, when asked to identify what helps her learning,
Sonya also noted linkages with practice, informal discussions with peers and the
exposition of argument in tutorial groups as helpful because they assist her
understanding of the material.

Sonya: Um what helps me learn? I guess when I can make the link between
my practical knowledge because that’s grown hugely after our last
prac, you just feel like you know so much more - so I mean you can
make the link between what you’re learning and the practical side of
it. That helps heaps. That’s really - and when the tutorial teacher
actually asks for your feedback, and asks you to comment on certain
situations and that sort of thing, that helps me learn as well and you
get to hear other peoples’ um opinions as well - yeah um yeah - I like
to contribute a lot I talk a fair bit so - but that helps me I guess.

Her focus on expressing herself, discussion with others and her own active linking
of material are indicative of a shift for this student from the principally
transmission notions she described in the initial interview. Sonya saw of the modified program as contributing towards her change of approach. These influences included the journal work as well as the absence of threatening assessment practices. At the conclusion of the final interview the students were asked to offer advice about how the lecturers involved in the current research could continue to improve teaching at the university. Sonya responded with the following advice.

Sonya: Um I think it’s great that they’ve sort of ruled out the exams. I think that’s really good. That’s helped me a lot. People can’t believe that we really don’t have that many exams. They think we’re really lucky and I’ve explained that that’s sort of through your research and that, so that’s really good.

Interviewer: And why has that been good?

Sonya: I just can’t learn through exams. I rote learn if I have to. If I know I have an exam on, I just rote learn it and then I forget it straight after the exam. I don’t even want to remember it ‘cause I’m sick of it.

Sonya’s response to the modified assessment processes was positive. She found the problem-based learning tasks motivating, largely because of the multiple smaller tasks and the absence of an exam. She also reported the knowledge provided about the research project itself as influencing her change of learning approach from first to third year. This indicates, at one level, a metacognitive goal orientation, which may have encouraged her to take advantage of the program modifications applied.

Interviewer: ...And has the knowledge that you’ve actually been part of this research project had any impact on you? Has that influenced you at all?

Sonya: I guess it has. When you first spoke to us and talked to us about the difference between a deep learner and a surface learner, that sort of made me think “I don’t want to be a surface learner. I sort of want
Sonya changed her approach to learning from one predominantly guided by surface orientations and a moderately high achievement goal, to one mainly characterised by deep and achieving approaches. It appears from her responses in interviews and journal writings, that the program modifications may have assisted her in the process of change, but that this was guided by her desire to do so.

6.3.1.2.2: Sharon
In contrast to Sonya, Sharon’s journal entries comprised largely personal reactions about the difficulty level of the subject materials. Her responses contain little evidence of reflection, linkages drawn across subjects, or material being related to practice. Early entries indicate confusion with the subject content and an expressed difficulty meeting the requirement of forming links between subjects.

**Journal extract: Sharon – July 26, 1996**

*I’m beginning to think that the mass lectures with the G.P [General Primary students] are going to be a lot like Child Development I. Maybe having done C.D. this part of prac may seem easier to understand. The three types of motivation seem to confuse me a bit, but as the work progresses things will clear up.*

*When Chris Gordon gave the lecture on the 3 approaches to learning I began to think about which area I seemed to fit in. I wish I could say it was the ‘deep approach’ – but it’s not.*

There is a small reference in this extract to previously learned material, but expressed essentially as a hope that the earlier material will provide a foundation to comprehend the new material. There is also some evidence of an awareness of her own learning approach, but both appear to be responded to passively. The theme of passive responding to growing confusion continues in later entries. Following her entry on August 1, in which Sharon expressed her confusion about
forming subject linkages, her tutor attempted to provide scaffolding advice on exploring the content of lectures in her journal writings. Sharon’s struggle with the lecture content continued however, as she responded passively to the tutor’s comments.

**Journal extract: Sharon – August 16, 1996**

*The prac lectures which involve the G.P. [General Primary] & E.C. [Early Childhood] are making no sense to me at all. I’m just going there, writing notes & making no sense at all. I guess we’ll just have to take what info we can from this subject. I’m just glad that we don’t have an exam for this – or else I’d be in trouble.*

*The lectures we have on the Principles is a lot clearer and some information from these can be taken in. I don’t mind the work we do in tutorials because it has relevance to what we are doing in our assignments and also what we will experience when we teach.*

Sharon’s conception of the learning process as the transmission of information and her passive response when she found the information presented difficult to understand, appeared to have defeated her by this stage (week 4) of her second semester. Through notations in the journal, her tutor repeatedly suggested that she explore her rudimentary understandings of the subject content by explaining the pieces she claimed to have “taken in” and comparing these with her own observations during the practicum. Instead, Sharon continued her practice of limiting her journal writing to personal reactions, which displayed an increasing level of frustration for her and her tutor.

In later entries however, Sharon partially followed her tutor’s suggestion by reporting the content of the lectures conducted each week. In these entries, Sharon identified the main ideas of at least one lecture and provided some evidence of relating the content to practice. The brief content descriptions were not linked to
material from other subjects, nor integrated with past learning, nevertheless reduced confusion and frustration were evident.

Journal extract: Sharon – September 12, 1996
This week’s lecture was on teacher expectations and their effect on children. I have learned about the influences on expectations, such as race, gender, personality. The ‘self-fulfilling prophecy’ is interesting to know how much of an influence a teacher’s attitude can have on a child’s attitude of themself.

The ways which we as teachers can communicate expectations is interesting as I don’t think we often realise how easy it is to convey the wrong messages to children ie. by giving them the answer thinking that you are helping them but, in reality are giving them the wrong impression.

As the end of the semester is nearing the info given in lectures is meaning more – as I am thinking how to apply it to our prac in week 12.

The record of entries in Sharon’s journal describe a considerable struggle on her part to come to terms with the reflective context of the modified program. A similar struggle was noted in her journal entries in response to the problem-based learning activity (Trina). On submission of the first component of this activity, she and her partner, were asked to resubmit the work because of its failure to meet minimum requirements.

Journal extract: Sharon – August 22, 1996
Well the main concern of this week is the result of Section A of ‘Trina’. Maybe the information was spoken about in tut’s and lectures – but why wasn’t it in print if that was the requirement? We do have a hell of a lot of other assignments to do and do not have time to be re-doing assignments because of the clarity of the requirements. I personally have 6 assignments due in week 8 – what time do I have to be re-doing an assignment?

The themes of workload pressure and frustration were again expressed in this entry. A further theme developed here is Sharon’s propensity to attribute the cause of the difficulties she faced to external sources. Earlier, these attributions were expressed as problems with the manner in which lecture material was presented
and prejudice on behalf of the tutor. Similar views were also expressed in the final interview undertaken at the completion of the course. In this interview, Sharon suggested that her motivation to learn and to expend the required effort was largely determined by her interest in the subject. Her interest, however, was partly determined by the manner in which lecturers teach the subject and she attributed part of the responsibility for her resultant grades on the lectures’ abilities to stimulate her interest.

It appears that her learning approach was heavily dependent on the lecturer with little evidence of critical analysis on her behalf. Learning as a transmission process partly through modelling without critical evaluation was a perception expressed when she was asked, in her final interview, to offer advice about improving teaching at university.

Sharon: ... I guess our peer assessments sort of changed after the start of this sort of research - I think that sort of came in. I think that’s a good idea and it involves us in the evaluating process which is what we’re taught to do with kids - like we’ve just - we’ll try to include them in their own evaluation assessments - which I guess - everything that our lecturers do with us should be what we do with them, so if they’re telling us to teach practical activities and um be enthusiastic about what we do, then we should expect them to be the same with us. We’re their class - they’re the teacher in our classroom, just as we will be with children in the future.

Interviewer: Yeah? So in a sense they should model what they’re expecting you to do?

Sharon: Yep ‘cause that’s how we pick it up. I mean everything they say - I guess when you’re learning you take for gospel, just like children do with us. You know - like they could tell us anything about something we don’t know and we go “OK!”

Despite the apparent growth in Sharon’s deep approach and the reduction in surface approach identified in the final administration of the SPQ, both of which
remained in the low range, the low achievement orientation may have driven her learning engagement. Her learning methods and content were determined to a large extent only by the completion of assignments and it appears these assignments were often left to the due date and completed hastily. Sharon opened her final interview with the comment that she had six assignments and a hand-in exam all due within the following week, which was the final week of her course. She needed to work in her part-time job at the weekend and had effectively two days in which to complete the assignments. She commented that these ones would be ‘a bit rushed’. Her low level of commitment to achieving learning outcomes appeared to militate against the development of quality learning in her case.

It is thus not surprising that, during the interview, Sharon described difficulties she’d experienced in practicum placements, drawing criticism from her supervising teacher about her lack of content knowledge and failure to prepare teaching resources. In the final interview, she expressed a low level of confidence in meeting the pressures of teaching and felt unprepared to leave the university to begin her teaching career. She also experienced difficulties with the course, largely due to her problems in managing the workload pressures.

**Interviewer:** Overall. How difficult have you found the course?

**Sharon:** Um I guess it’s easy to look back and say it wasn’t that bad. But at the time.

**Interviewer:** Now that you’ve gone through, yeah?

**Sharon:** Like by the end of this term I’ll say “Oh it wasn’t that bad.” But yeah - sometimes its pretty full-on. Um again the same problems occur - the end of term and here’s all this due. Um I don’t think there’s much way of getting around it. I don’t know, there might be ways to get around it, but it seems to happen all the time - so they’re the hardest parts. I mean I know we should be into our work and doing it consistently so we don’t have this build up so. These
assignments due next week, I should have already had done. But that's easy enough to say.

Clearly, Sharon did not respond to the modified program in the intended way, however it is unlikely that the traditional program would have led to any improvement in her quality of her learning. The themes she expressed in her final interview were consistent with her views in the initial interview and through her reflective journal. Her learning was driven by meeting assignment requirements which were regularly left to due dates and allowed to accumulate resulting in hasty effort in response to perceived pressure. Learning was perceived as the transmission of information and the responsibility for her acquisition of this knowledge was evenly shared between herself and the lecturers. Sharon’s response to the learning environment was predominantly passive and she demonstrated little insight into her own learning processes.

6.3.1.2.3: Susan

This student indicated in her final interview that personal interest and vocational relevance were factors that affected her learning positively. These were identified as features that influenced her choice of elective subjects and improved the likelihood of higher results in subjects studied. She was aware that her own learning had developed over the period of the course. Initially she had been overwhelmed by the university environment and the course demands. In her final interview, she indicated that it took some time for her to become aware that the subjects formed links with each other and these links facilitated her understanding of the material and its relevance in practice.

Interviewer: Have you found that the University has actually provided what you expected of it?
Susan: Yeah I think it took me - um probably the first two or three semesters to work out - to work that out so I - you kind of think “Oh I probably wasted - you know - if I knew what I know now back then.” You know - and just how everything links in and what have you - I don’t think that was explained - or whether everything was so overwhelming you didn’t - you missed it or something. At the beginning of when you first start, explain how the course is set up, like explain how you - how the subjects will be interlinked ... like even like just something written. I guess then only the people who are interested will read it...

Like Sonya, Susan’s identification of links between subjects during the course was an important revelation to her in aiding her understanding of the material covered. She identified a time during her second year of the course when subject linkages first became apparent. Subject linkages and links between theory and practice were explicit foci of the year 1 modified program. These links were drawn in the subject outlines distributed to all students in written form during the first week of classes. They were also specific requirements of assessment items, such as the reflective journal. Links between theory and practice were also recommended to the students in completion of the major problem-based learning activity completed in year 1, and these links were regularly identified during tutorial classes. At these early stages in the program, Susan had however, adopted a learning approach strongly dominated by surface orientations and she appeared to have overlooked the identification of subject linkages.

Susan used her reflective journal almost exclusively to link theory expressed in one subject’s weekly lectures, to her observations on practicum. The pattern represented by her entry in week 3 of the second semester was repeated on all but two other weeks.
Journal extract: Susan – August 8, 1996

The ‘Schema’ when being defined as being ‘the basic unit necessary for mental organisation and mental functioning’, makes it easier to comprehend than the text definition. I can see why when learning about a particular subject children need to have that subject built on until it has some depth, instead of just skimming over things and moving on to new subjects without any depth being achieved.

At the school, in the kindergarten/one class, material was always being revisited and related, where possible, to the present work. Although some of the children didn’t understand the material when first taught, they now had a chance to go over it again, in a different way and relate it to different things which may have more meaning or understanding to them.

By the end of each day most of the children seemed to be back in a state of equilibrium after being in a state of disequilibrium caused by the challenges they were faced with during the day. …[continues]

While Susan used the journal to link theory to practice, she did not integrate material across subject boundaries. Only on one occasion did she reflect on her own learning as part of the journalling process. Usually she recorded a brief summary of the main idea from one lecture followed by an opinion on the idea and the report of an observation from practice illustrating the idea.

Susan also identified a structured approach to meeting task requirements in her final interview as a feature of her process of learning. She had difficulty addressing task requirements in her early university experience. By year 3 the structured application of a problem-solving strategy had become figure to her.

Interviewer: So over the period of time that you’ve been here how - broadly, how have you found is the best way to go about learning?

Susan: Ah. Get organised to start with. Just think about like, if you’ve got an assignment, think about the assignment you’ve got to do, like and sort of put it in - put it down in points what the process [is] that you need to go through to do it, instead of just rushing out going “I need to get books on this subject.” Because usually you go and get books and they haven’t got what you need.
The use of achieving strategies such as these were not evident in her initial interview. In her final interview, Susan also identified the development of an understanding of the material being learned, as an important factor. Requesting clarification and explanation from the lecturer and widely researching the topic from library resources were methods identified in year 3 to achieve a deeper understanding of the topic under discussion. The following extract was taken from part of her response to the question asking her to attribute academic success.

Susan: ... just like from researching and you know you look into it and you think oh yeah - you know - you get a bit more interested and look a bit further and - you know - sometimes you get like that far off the task that you have to do, but you probably learn more getting off the task - you know - you’ve learnt like heaps of new things anyway but um yeah.

Interviewer: If the reverse happens and you find that you’re - you know - you’ve done poorly in a subject, um what would you put the cause down to for that?

Susan: When you’re really struggling with the subject um. Lack of interest, lack of understanding. I think you’ve got to have clear in your head before you can. You can’t research something if you don’t really understand what you’re researching. You can’t - you know - write an essay on something if you don’t understand the question. But sometimes you try to and you think "Oh it’s done, it’s on time and I’ll hand it in."

The emphasis placed on the need to understand the material being learned was not evident in Susan’s initial interview conducted in year 1, yet this was clearly an important theme by the time she was in year 3. There continued to be little emphasis on the achievement of high grades, however. Susan saw the purpose of understanding the material as enabling her to improve her function as a teacher, thus the vocational focus represented in her reflective journal, was a major motivating force.
Interviewer: Have your goals changed much over the time you’ve been at Uni?

Susan: Yeah I think - I think probably heaps. It’s more of an interest now and you really - like when you first start, I don’t think you really think that much about teaching - like actually when you finish - I don’t - it seems so far away, you don’t really think about the end product as much. But now you really want to be a good teacher, like you don’t want to let the kids down and - um like who cares what marks you get. I mean you’ve got to pass obviously, but really who cares about what - whether it’s a Pass or a HD - you know - it’s how much you know and how confident you are and how well organised you can be - just yeah I guess - I think what it all comes down to now is like that - will I be good when I actually get out there?

Susan emphasised the irrelevance of grades on another occasion during the interview. Her emphasis was on the practical application of skills acquired in a realistic setting. Whilst her pursuit of meaning had developed through the course, the concept of understanding from her view, related specifically to issues relevant to her function as a teacher in the classroom environment.

Despite her stated lack of concern about grades, her achievement in the course had in fact improved considerably from first to third year. Throughout the course, Susan had failed one subject, withdrawn with a fail penalty from three others, and withdrawn without penalty from one other. All of these failures, and failures to complete, occurred in the first three semesters of the program and during this time all other grades were at Pass level. During the final three semesters of the course, she achieved one Distinction grade and three Credit grades, with the remainder being at Pass level. No failures or withdrawals occurred after the third semester.

There is no specific indication from Susan’s responses about whether the positive changes in her approaches to learning through the period of the course resulted from modifications made to the course design and delivery. She appears to indicate that the development of her learning was a result of a maturation process,
beginning with familiarisation, developing through a perception of cohesion and linkages of course material, to the purposeful acquisition of information and skills to enhance performance in authentic settings.

In her initial interview in year 1, Susan did report that she responded positively to the problem-based learning task. The components of the task, including its continuous nature, multiple smaller tasks and group process, were identified as helping to motivate her to engage in the learning process. She also raised the benefits of group-work in her final interview in year 3. While it remains unclear in this case whether the developmental path Susan described was driven by the altered learning contexts, aspects of the program modifications were favoured by her and appeared to complement the change in her learning approach.

6.3.1.3: Summary of Students with High Initial Surface Approach

The students interviewed, who began with patterns of responses on the SPQ dominated by surface methods, responded differently to the modified program. All of these students demonstrated an improvement in deep approach use and a reduction in the use of surface approaches, in SPQ responses from the first to the final administration of the surveys. Qualitative differences were noted, however, among these students.

Students in the original cluster 1A both progressed to the final cluster 2A. The original cluster was defined by students who reported the use of mainly surface approaches combined with moderate deep and achieving approaches and the final destination cluster was characterised by high deep with moderate surface and achieving approaches. Susan, who exemplified this pathway, showed
development in the desired areas with increased deep, reduced surface and stable
achieving approaches. During her interview, she emphasised apparent linkages
between learning materials and practice, used discussion as a major learning
method and preferred group problem-based assignments. She expressed some
frustration that these methods eluded her for the first half of the course and
recommended that such approaches, especially the drawing of links between
subject areas, be made explicit early in the course. This student’s learning
development was in the desired direction but no specific evidence was available
from the qualitative data to definitively link her development with the program
modifications.

Sonya, the student interviewed from initial cluster 1C, demonstrated very high
surface approach scores initially, coupled with moderately high deep and
achieving approaches. Her final survey scores, placing her in final cluster 2D,
indicated the use of very high deep and high achieving approaches, coupled with
moderate surface approach usage. This student reported a major focus on active
linking of content across subjects studied and from theory to practice. These links
were derived from interpersonal discussion and intrapersonal reflection and were
attributed to the program modifications. This student’s development was
consistent with the ideal goals of the project.

The student interviewed from cluster 1K, Sharon, demonstrated minor change in
learning approach, however the change in this instance was less than ideal. Her
original cluster grouping was characterised by moderate surface approaches and
low deep and achieving approaches. Her final cluster grouping, cluster 2B, was
defined by low achieving approach scores combined with moderate surface and
deep scores. Sharon’s low achieving orientation was maintained but her use of surface approaches decreased and deep approaches increased to a small extent.

Sharon’s experience in the course at times involved a struggle to accommodate the requirements of learning tasks. She preferred a context which provided clear structure, in which assignment requirements were straightforward and content was clearly related to practice. She often responded passively to attempts by her tutors to encourage her to engage in the desired learning process and felt unprepared to teach at the conclusion of the course.

Connectivity with practice was a common theme with each of the students in this group. Sonya and Susan preferred the tasks developed as part of the modified program because they encouraged understanding through relevant problem analyses and group learning processes. They were both relieved that fewer exams were used as assessment methods. Sharon was also pleased by the reduction in examinations but found the modified assessment tasks daunting.

**6.3.2: High Deep Approach**
Seven students who were considered predominantly guided by the use of deep approaches to learning in year 1 comprised clusters 1E, 1F and 1I. Only the single student in cluster 1F, however, was exclusively guided by the use of deep approaches. The students in the other clusters, 1E and 1I, provided profiles that were high on both deep and achieving scales. The 5 students in cluster 1E yielded learning approach means of SA = 43.60 (SD = 4.34), DA = 54.00 (SD = 3.16) and AA = 53.60 (SD = 2.70). The single student in cluster 1F yielded a very low SA score of 30, a very high DA score of 59 and a low AA score of 32. The single
student in cluster 1I produced a moderate SA score of 40, a very high DA score of 63 and a high AA score of 54.

Four students were selected for interviews from these three cluster groupings. These included the single students from clusters 1F and 1I, together with two students from cluster 1E. All of these students attended the initial interviews at the designated times. The student from cluster 1F however (case 16), did not continue with the course following the completion of the first year. She was a mature-age student already qualified as a nurse and had a young family. She withdrew from the course because of family pressures. One of the students from cluster 1E (case 58) took leave from the course at the completion of year 1 because she had to relocate temporarily, to Sydney. She returned in the following year and joined Cohort 3 of this study. Consequently, final interviews were not available for these two students.

The SPQ scores obtained by the students interviewed from the clusters predominantly characterised by the use of deep and deep-achieving approaches are detailed in Table 6.3. This table reports the SPQ scores and deciles at the time of the first and final interviews, where available, together with the students’ initial and final cluster membership. The initial ‘D’ used for pseudonyms identifies these students as beginning the course with predominantly deep orientations, to assist in later comparison with students from other clusters.
Table 6.3. Initial and Final SPQ Scores of Interview Respondents (Deep Approach Clusters)

<table>
<thead>
<tr>
<th>Case</th>
<th>Pseudonym</th>
<th>Score</th>
<th>Initial SPQ</th>
<th>Final SPQ</th>
<th>Initial cluster</th>
<th>Final cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Deborah</td>
<td>Raw score</td>
<td>36</td>
<td>52</td>
<td>52</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
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<td>8</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>58</td>
<td>Doreen</td>
<td>Raw score</td>
<td>44</td>
<td>54</td>
<td>49</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
<td>1</td>
<td>10</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Donna</td>
<td>Raw score</td>
<td>30</td>
<td>59</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td></td>
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<td>SPQ decile*</td>
<td>1</td>
<td>10</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Deidre</td>
<td>Raw score</td>
<td>40</td>
<td>63</td>
<td>54</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
<td>5</td>
<td>10</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

* Deciles based on SPQ norms for University (Education - females) (Biggs, 1987b, p. 33)

Table 6.3 indicates that the two continuing students in the clusters characterised by deep and achieving approaches maintained the essential pattern of their responses in the SPQ from first to third year. Surface approaches remained low, dropping considerably in Deidre’s case. In Deborah’s case all scores reduced somewhat, by three raw score points on the surface and deep scales and by six points on the achieving scale. This general reduction may have been indicative of a generalised decline in learning engagement, or a reassessment of the relative values of points on the Likert scale used. Nevertheless, these students began and completed the course with their learning approaches guided predominantly by deep and achieving orientations.

6.3.2.1: Qualitative Responses – Year 1

The students from the deep approach clusters described long-held motivations for enrolling in an Early Childhood Education degree. They each had prior experience in an allied field and were definite in their commitment to achieving their goal. Deidre had entered the course on a mature-aged basis following some years in other occupations. She had worked in family day care and in preschools for several years as an untrained helper. Because of this experience, and on the advice
of the preschool director, she became motivated to gain the qualifications to be a teacher. She then worked in several positions concurrently over a three-year period to save the money to come to university. Her commitment was based on achieving her long-term goal and making her prior sacrifice worthwhile.

Deborah had come to university immediately after completing the Higher School Certificate. She was motivated to enter the early childhood teaching profession after several years experience of teaching acrobatics to young children. Her own experience and the feedback she had received from the owners of the training school and the parents of her students, had convinced her that she possessed the necessary personal qualities to be an early childhood teacher. She continued teaching acrobatics throughout her first year at university and was by this time managing the training school. Her entry goal was to complete her initial three-year degree and then complete the fourth year so that she could become the director of her own preschool.

Donna stated that she was looking for a career change after fourteen years as a nurse. Nursing did not allow her enough flexibility to provide appropriate time and consistency for her two young children. She decided on entering teaching because she wanted to make a difference in the lives of other children as well as provide more consistency for her own.

Given that the prior backgrounds of these students all involved a considerable workload, the work pressure experienced at university was not a major concern for them. Deidre, for example, expressed the following views of the workload she had experienced since enrolling.
Deidre: It’s quite good. I thought the work would be harder. I thought the workload would be a lot heavier. I’m used to working, well, 38 hrs a week and - you know - all weekend. My day at home starts at 5:30 and I knock off work at 6:30 at night and then I go home and do horses and stuff. This is the best holiday I’ve had in years. Um seventeen hours face to face plus whatever extra hours you do.

Interviewer: And I suppose that’s in fits and starts really, when you’ve got assignments due?

Deidre: No, I try to stick to about six to eight hours a day and that gives me weekends off.

Although ‘work’ was the keyword used in Deidre’s initial interview with greatest frequency, it was predominantly used in a similar context to its use in the above extract. The second most frequent keyword she used was ‘learn’. These two terms appeared to be linked concepts as illustrated by the following extract.

Deidre: You only get out whatever you put in. - yeah um - If you don’t do the work. I try not to study for an exam. I try to understand it all the way through.

The students who used surface approaches were typically overwhelmed with the workload in the first year and saw the quantity of work required as a burden to be endured. Deidre, on the other hand, saw work as the tool through which learning could occur. Learning was driven by consistent application of work, not just a response to assignment or assessment requirements. Because of her past experiences the workload at university was viewed as comparatively light.

Deidre’s mature age may have assisted her in making the transition to university. Deborah, having come directly from school found the workload initially daunting, but reported to have managed to organise herself and adjusted without undue distress. Her early anxiety appeared to dissipate once she was able to organise herself to meet the requirements. ‘Organise’ was the highest frequency keyword
used in Deborah’s interview. Once she was able to plan her time to meet
requirements her initial feeling of being overwhelmed diminished. In the absence
of similar planning, the students in the high surface group generally reported a
continuation of this sense of pressure, but such an experience was not evident in
the clusters characterised by high deep approaches.

Donna’s perception was that, even with the modified program, too much structure
was provided. She reported that the excessive spoon-feeding the students had
received, especially in the first semester, had interfered with her ability to learn in
her preferred way.

*Donna:* What expectations did I have? Well, I didn’t really understand what
I was doing, as in I didn’t understand what Early Childhood
involved. I thought that it would be a lot less spoon-fed than it is. I
thought we - I presumed that we would take control of our own
learning anyway, but it seems we’re very spoon-fed.

*Interviewer:* Right?

*Donna:* We had first semester extremely so and it’s dropped off a bit now,
but it was. - you know - We’ve all been shepherded here and
shepherded there and told what to learn and how to learn it and this
is what you need for exams and all of that, which was amazing.

*Interviewer:* Oh right yeah. Is that a good thing or a bad thing for you?

*Donna:* I think it’s a bad thing because I’m not then as motivated to learn a
lot of stuff. I tend - they tend to almost put you into being a surface
learner by telling you what to learn and - you know - what you need
for exams and stuff, rather than “This is the curriculum you learn
the lot.”

In the first semester, the course included several lectures and tutorials on study
skills, which taught processes such as note-taking, essay writing, researching,
studying for exams and the like. The first semester was also more highly directed
in an effort to ease the transition from school to university for the majority of
students. Given Donna’s prior nursing studies, she would have progressed beyond this stage in her academic development, possibly to the level of post-graduate study. Hence the level of direction provided for the others was unnecessary in her case and presented a level of interference in her learning approach.

Her preference for an unstructured learning environment certainly contrasted with the environment preferred by those students with high surface orientations, who perceived an absence of structure in the program and expressed, at times, considerable frustration as a result. The need for structure was not as important to students in the deep approach clusters. Detailed information, positive relationships, varied presentation formats, accessible language, and learning experiences that involved student participation and provided alternative perceptions, were preferred learning contexts for these students. These students responded to the question about the characteristics of good and bad lectures in the following manner.

Donna: Um it becomes almost like a group learning situation. [name of lecturer A] is wonderful. We’ve - well I’ve personally learnt an awful lot from her because it’s a - it’s not “I am giving you this information” – “We are discussing information and if you’ve got anything important to say then please do say it.” Where other lecturers tend not to be as encouraging as she is - she’s extremely encouraging.

Donna clearly preferred a more hermeneutic rather than didactic style of lecturing. Her perception of a productive learning environment was more akin to a constructivist model, rather than the transmission approach expected by those students with higher surface approaches.

Deidre: ... Make the lecture understandable. Make it um - I like the fun lectures. I like it when you have a bit of say in them. [name of
lecturer B’s lectures are good. She’s more into asking questions. Quite often you sit there and go [inaudible] - you don’t know what you’re talking about, but you’re given that chance to get into it and have a go and um [name of lecturer A] she’s just really good we get up and do finger plays and dance and that.

Deidre had a similar view to Donna. She preferred classes in which questions and discussion were welcomed. These features added to her understanding of lecture material, which she saw as her central goal. Participation was not limited to discussion and her engagement was enhanced by humour or alternative activities, and particularly by a feeling of acceptance from the lecturer.

All of these students mentioned the need for learning to include a relationship of acceptance between the lecturer and student. Ineffective lecturers were also identified as those who created a distance and through that approach, stifled discussion. Open relationships were preferred because they encouraged the student’s participation. Students with surface orientations also preferred lecturers who were accepting of them, but their reasoning for this preference differed. Lecturers who communicated respect for the students with high surface approaches prevented them from feeling foolish if they asked naive questions. The students with deep orientations focused on relationship as a tool to encourage discussion.

Primary study methods used by this group also differed from the students with high surface orientation. These methods involved the formation of study groups, discussion groups and library research. Though these students did cite the rewriting of notes as a procedure used, the purpose was to understand the content and they emphatically rejected memorisation as a technique.
Deidre: ... We learn by bounding things off each other and having arguments or discussions and getting together afterwards and going through it again and - um like, quite often at my place making scones and having a big study session around the kitchen table about what’s happened ... and um we learn more by doing that, than going into our room getting the books out and reading and reading and reading and reading. It doesn’t work. We get out and we chew each other out about it and talk.

Doreen separated the methods she would use depending on the method of assessment in the subject. She made a distinction between studying for exams and studying when assessments were made up of essays and seminars.

Doreen: Um for an exam I will sit down, have the whole subject in front of me, go through the subject outline - sort of on the back of each, and gather all of that information together. Then I will go through and put that in my own words, and once I’ve done that with all of it, then I’ll go through with a highlighter and highlight headings – mainly headings and some important words and that’s my attempt.

There was also evidence of adaptability in Doreen’s approach. By judging from the feedback she received from exam results she was prepared to adjust the methods she used.

Doreen: Like I’m still trying to figure out a way that suits me to do exams. The um – I’ll find it one day because the style I’m using at the moment – I’ll see how that goes and if it doesn’t work, I’ll find another one.

For the purpose of completing essays and seminars Doreen described a process of reading as many books as she could and ‘sifting’ through as much relevant material as possible. She had some concerns however, that her perception of relevance did not always match those of the lecturer. Donna described an approach that incorporated features similar to Doreen and Deidre, including the use of informal discussion and the compilation of meaningful notes.
Anxiety about failing exams that were heavily weighted was a theme shared by the students who used high surface approaches and those with high deep approaches. Susan and Sharon, for example, thought exams created undue anxiety and introduced a dimension of luck. While Deborah agreed with this view, she also focused on the effect of exams in restricting her ability to study widely.

Deborah:  

I mean exams are the worst you know 20 – 30% they're not bad, but um - you know - our last exam was 50% and so was our assignment.

Interviewer: What do you think makes the difference between um - you know - say, doing seminars for example and exams? What - is it just the stress, or is there something else?

Deborah:  

Well basically seminars you’ve got one topic which you can sort of - you know - expand on. Like you can do some reading, like you’ve also got your notes from the lecturers at tutes, but um - and you can just like share information about the topic. But in the exams you are pretty stressed and plan all your study and hope.

While, the same 50% exam was raised by Susan and Sharon as an example of an anxiety provoking experience, the learning benefit of other assessment methods was Deborah’s focus. Doreen’s view concurred more closely with the students from surface approach clusters. She expressed a concern about a risk of failing exams and this perception may have been linked to her uncertainty over the efficiency of her study methods reported earlier. At this stage in her university career she was still experimenting with alternate approaches and was prepared to adjust her methods depending on the feedback she received. A lesser weighting would assist her experimentation. Donna saw some validity in the use of exams insofar as they could be used to inform lecturers of the efficiency of their teaching. While their use as an evaluation tool was identified, she too mentioned the impact of exams on the learning approach adopted by students.
Donna: I don’t think exams should be um the whole mark, or a major part of the mark, because that only encourages you to learn facts and figures as opposed to understanding what you’re doing. But I think exams are important for lecturers to gauge what you learn and what they’re teaching - and is it effective? I mean, I think exams should also be a two-way thing for lecturers as well.

The process of learning, from these students’ perspective, appeared principally to involve methods of relating to the material that enhanced its meaning and the development of new understandings. These processes include an emphasis on discursive opportunities and exposure to alternative perceptions. Learning environments preferred, were ones that typically enhanced hermeneutic opportunities whether these comprised formal or informal structures. The students selected for interview described a well-organised application to study. Workload pressure was not an issue for them. They preferred assessment items that allowed expression of their viewpoint and facilitated broad research. They found the context created by heavily weighted examinations discouraged their search for understanding. Each of these students predicted at least Credit grades, but expressed the view that the grade was a secondary consideration. The choice of elective subjects to build skills that were perceived as lacking was common within this group of students.

These findings are largely consistent with previous research defining the characteristic perceptions, preferences and concerns of students who use deep approaches to learning (Biggs, 1987a, 1993a; Entwistle & Tait, 1990; Entwistle & Waterston, 1988; Ramsden, 1992). As such, these current findings provide further evidence to support the validity of the learning approach measures used in the present study, specifically in relation to the identification of deep learning approaches from the SPQ.
**6.3.2.2: Response to Program Modifications**

The two students interviewed from this group who remained with the program throughout, generally maintained their initial distribution of learning approaches as measured by the SPQ. Deep approaches remained predominant. While there appeared to be some diminution of achieving orientation for both students, it also remained in the high range. Deidre reduced her surface approach markedly between the first and final surveys, from the moderate to the low range respectively. Her deep and achieving approaches remained in the high range on both surveys. Deborah’s relative distribution in the final survey administration remained similar to that identified in the initial survey with deep and achieving approaches in the high range and surface approaches in the low range.

Generally the students within this group had little difficulty with the reflective journal task and enjoyed the opportunity it provided for them to consider the multiple issues that confronted them each week. They also each expressed positive reactions to the context of small-group problem-based learning and the peer assessment methods. Donna’s perception of the problem-based exercise completed in year 1, changed as the process unfolded. Initially she was apprehensive about its worth and concerned that the outcome requirements were not as clear as she liked. As she engaged further in the process her perception altered, especially because of the multiple views that became available to her.

*Donna:* In the beginning Trina was just ridiculous. It was. It didn’t really make any sense to anybody and it was like you had to - also a big problem of distance between people, because it was group work you had to actually try and find people somewhere - you know - in holidays and breaks and stuff. The first - it was a three part thing - the first part was really – “I don’t understand this.” The second part, where we identified issues that were going on in this situation analysis um made a lot of sense, and then when we all got together
as the class and reported our findings, that was when it really hit home that people see things totally differently and that was really, really good, because there was a lot of issues identified that I didn’t even consider, but the rest of the group as a - you know - as a whole, considered all these other things and it was really good.

Principally the discovery of alternate viewpoints, the facility to discuss the components of the task and share ideas with a partner or small group, the authentic setting of the task and the provision of a wide range of feedback from peers, were valued components by students in this group. Initial confusion about task requirements, maintenance of communication over class holiday breaks and in some instances, the equitable sharing of workload were concerns. Deidre’s case is described below to illustrate the impact of the modified program on her learning approach. Since both students reported little change to their method of learning this single case was considered adequate to illustrate the impact of the program.

6.3.2.2.1: Deidre
Deidre indicated in her final interview that her awareness of being part of the current research project had led her to consider her learning approach. She decided not to change it because she was satisfied with the outcomes she gained from the approach she used.

*Interviewer: Has being - the knowledge of actually being part of the research project itself, has that influenced you at all?*

*Deidre:* It made me think about how I learnt in first year and really what it made me think about was “OK, what do I exactly do?” I didn’t change anything just to be - you know - pretend to be a deep learner or pretend to be a surface learner or whatever and just did it. I have no idea what I am but really couldn’t care. - you know - It works! I know it and I understand what I’m doing - so that’s like -

Examination of Deidre’s learning journal from first year identified several entries in which the issues concerning learning approaches were discussed at length. An
extract from the first of these is included below and supported the views she
expressed in year 3 about her processes of self-appraisal.

...The man, whose name escapes me [the researcher], who came into the third
lecture, made me sit up and really take notice. His theories, or explanations, of
learning styles has me very interested. I believe that I am one of the deep
learners. At least I hope that I am because the skills I will learn at Uni will be a
major part of my success as a teacher. To teach well I need to understand and be
confident. I do believe that the only way to do this is to be a deep learner. My
learning at Uni is something I want to remember for many years to come, not just
long enough to get me a pass in an exam.

By having this lecture follow [name of lecturer C]’s lecture on motivation, it is a
great way to start the semester. I have now been pumped with information about
motivation from [name of lecturer C] and what a deep learner is from the other
lecturer. I know how to get motivated and which path my learning should take. ...

One of the features of Deidre’s journal is the length of her entries. She regularly
devoted several pages to the discussion of weekly issues, integrating material
from lectures in most subjects, assessment tasks, observations from practice
teaching and personal experiences. Most of her entries would have been classified
as relational on the SOLO taxonomy (Biggs & Collis, 1982) and she regularly
considered her own learning and processes that facilitated her own learning, as
part of the relational base. The following extract is the complete entry for week 5
of semester 2 of the first year. It is reproduced in its entirety to demonstrate the
complexity of her consideration of weekly issues, so that comparison can be made
with the entries of students from high surface approach clusters.

Journal extract: Deidre – August 25, 1996
This week’s Ed Psych lecture on thinking raised some puzzling questions.
Questions such as should thinking be taught at school? My answer would be YES!
I feel that children need to know how to think for themselves. Regardless of
whether the child wishes to be a brain surgeon or a brick layer, they will need to
think quickly and accurately. Children need the ability to think for themselves not
only in their adult life, but also in childhood. Children need to think to be able to
work out how to do up the buttons on a shirt, take the lid off a jar, how to write
their name and the list is endless. For every single thing that a person does throughout their life, they will have to think about it, this is why thinking should be taught in schools.

When I was looking back over my notes to write this journal entry I noticed that all the principles need to incorporate this thinking process. Principle #9 especially helps in the notion that children need to be able to think for themselves to work out their learning disciplines. A lesson may be given while children are washing their hands, but it may be about maths (why does the soap get smaller each day?). Children need to remember this concept and be able to use this information later, if children are not taught how to think then how are they to make connections and work things out for themselves.

Principle #9 is an issue we have also been discussing in Play [Play and the Learning Environment]. We have been asked to plan for handwashing, meal times etc., so that few learning opportunities are missed throughout the day. This makes sense to me and it also backs up [name of lecturer A]’s favourite saying “Make everything count at least twice.” There really is no point in teaching disposable information. We need to conserve and recycle information so that connections can be made and we can make sense of our complicated world.

The ‘Trina’ [problem-based learning] issue is one place where we, as students, need to have the ability to think and use knowledge from different discipline boundaries. First of all we need to be able to think of the issues. These issues may be discovered by using information gained in Play and the Learning Environment, AMA, Child Development, Creative Arts, or Intro to EC. These issues do not only come from the Practice of Teaching subjects, but all of the subjects we are learning. To complete this task we need to be motivated, interacting with others to find information, use our prior knowledge, use our memory and process information. All these above aspects come from the lectures so far, but these are not the only skills we need to complete the task. The list is too long to list here but please know that to be able to think and make links is a crucial factor.

In this entry, Deidre has considered the central theme of the Educational Psychology class, illustrated it with examples from her observations and generalised the concept. She has identified a similar theme running through the Practice of Teaching subject and the topics under discussion in the subject Play and the Learning Environment. She has then personalised the theme by relating it to her own experience in attempting the problem-based learning task, where she illustrated the necessity of drawing from information across subjects and from other sources, in order to arrive at a comprehensive solution to the problem.
Deidre was positively influenced by lecturers who maintained an informal and approachable relationship with her. She appreciated those who recognised her, held high expectations and were enthusiastic about the subjects they taught. She had maintained her work ethic throughout the course. Her original linking of work and learning had remained in the final interview. She described the process she applied to her learning succinctly in the final interview.

*Deidre:* ... *The process is: begin with some sort of a stimulus from the lecturer - you go away - you go through it - you nut out every little possible scenario - then you work out what works best for you, and you sit down and you write it.*

A continuing reliance on social engagement was also described as a condition that helped her learning. In the initial interview, Deidre had focused on the use of informal study groups. Although these groups were not mentioned in the final interview, the assistance provided by the ability to discuss issues with others remained.

*Deidre:* *What else helps? If my friends are doing the subject that I’m doing but aren’t - actually it probably helps if they’re not - a couple of them aren’t in my actual tutes, but I’ve got a next door neighbour who we bounce things off all the time. We’ve been doing it for three years. It works really well. We go for a walk in the morning and we just nut out whatever needs to be done - go home and do our own thing.*

Deidre expressed confidence in her ability to manage the pressures of teaching. Some of the practicum placements, by her own choosing, had been difficult. She reported her view was that if she could “… survive those, she could survive anything.” Her perception of the characteristics of a good teacher included many of her preferences for lecturers and also included the need to continue learning.
When asked to describe the characteristics of a good teacher, Deidre responded with the following statement.

*Deidre:*  ... *The same things that make a good lecturer really. Someone who - you walk in and they’ve got a smile on their face and they say “G’day” to you. Someone who - if a ball comes their way in the playground they’ll kick it back. But not only that, they’ve also got to challenge you. They’ve got to know you well enough to know what you’re interests and your needs are, so that you can really get that child going and um. I think that’s what you need, enthusiasm but also lots of knowledge. You’ve got to keep up to date with everything. That’s hard! How many times do I spend reading and reading and reading, but it will be worth it in the end.*

The use of a deep approach to learning appeared to be unaffected by the modified program. There was no frustration with the program evident in Deidre’s interview or journal responses, as had been the case with Susan and Sharon. She had responded to the program by reducing the moderate level of surface approaches she used initially. Since surface approaches were of reduced value in the program, she had little call to use them. She had found that the deeper approaches worked in producing the results she desired. Her desired results were to understand the content of the subjects studied and integrate that knowledge in application to assignments and classroom practices. In this sense, her approach to learning appeared strategic.

*6.3.2.3: Summary of Students with High Initial Deep Approach*

Four students were initially identified as having learning approaches characterised by deep or deep-achieving orientations. The learning motives preferences and strategies described by these students during their initial interview were consistent with the findings of previous research. Of these students, two remained with the original cohort at the conclusion of the program. In year 3, both remaining
students were again located in clusters described by deep or deep-achieving approaches. The modified program had not interfered with these students preferred learning methods and aspects of the program may have facilitated the continued suitability of their application.

### 6.3.3: High Achieving Approach

Eight students were identified as using high achieving approaches to learning in year 1. These students comprised clusters 1G and 1H, which identified them as high across all approaches or high surface-achieving respectively. With high scores across all approaches, the students in cluster 1G \((n = 5)\) were considered to be the most strategic in the application of those approaches. Because of their high achieving orientation, it was expected that they would seek to apply whatever learning approach was necessary to meet the requirements of the task, in order to attain high grades. Due to this anticipated flexibility in learning and the motivation to do so, it was also expected that these students would respond productively to the modified program, since it encouraged and rewarded the application of deep approaches. The students in cluster 1H \((n = 3)\), on the other hand, were expected to have greater difficulty adapting to the requirements of the modified program because of their more practised use of surface approaches to meet their achieving motivation. These students may have required additional assistance to meet the modified requirements, through either explicit instruction or counselling.

The 5 students in cluster 1G yielded high learning approach means of \(SA = 53.60\) \((SD = 1.52)\), \(DA = 56.80\) \((SD = 4.76)\) and \(AA = 58.00\) \((SD = 1.22)\). The 3 students in cluster 1H yielded a high mean SA score of 52.33 \((SD = 4.04)\), a moderate
mean DA score of 43.00 ($SD = 1.73$) and a high mean AA score of 57.33 ($SD = 1.53$). Four students were selected for interviews from these two cluster groupings, with two students representing each cluster. All of these students attended the initial interviews at the designated times and all remained in the program at its conclusion. The SPQ scores obtained by the students interviewed from these clusters are detailed in Table 6.4.

### Table 6.4. Initial and Final SPQ Scores of Interview Respondents (Achieving Approach Clusters)

<table>
<thead>
<tr>
<th>Case</th>
<th>Pseudonym</th>
<th>Score</th>
<th>Initial SPQ</th>
<th>Final SPQ</th>
<th>Initial cluster</th>
<th>Final cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>Anne</td>
<td>Raw score</td>
<td>Surface 51</td>
<td>Deep 63</td>
<td>Achieve 58</td>
<td>Surface 32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>46</td>
<td>Ashley</td>
<td>Raw score</td>
<td>Surface 54</td>
<td>Deep 60</td>
<td>Achieve 60</td>
<td>Surface 39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>25</td>
<td>Amber</td>
<td>Raw score</td>
<td>Surface 57</td>
<td>Deep 44</td>
<td>Achieve 56</td>
<td>Surface 47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
<td>10</td>
<td>4</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>42</td>
<td>Alison</td>
<td>Raw score</td>
<td>Surface 50</td>
<td>Deep 41</td>
<td>Achieve 59</td>
<td>Surface 40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
<td>9</td>
<td>3</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

* Deciles based on SPQ norms for University (Education - females) (Biggs, 1987b, p. 33)

The initial ‘A’ used for these students’ pseudonyms identifies them as beginning the course with high achieving orientations. It should be noted that the scores obtained from the initial survey administration for these students represent extreme scores in many instances. For Ashley and Anne, extremely high scores across all approaches defined the nature of their initial cluster membership. For Alison and Amber, extremely high scores in surface and achieving approaches defined their initial clusters. Because of their positions on the extremities of the scale, an expected outcome of any repeated administration of the survey would involve some regression to the mean.
Anne’s score on the deep approach scale from the initial administration of the survey for example, represented the maximum score for the cohort. Similarly, Ashley’s initial score on the achieving approach scale represented the maximum score obtained. Thus, it is extremely unlikely that these scores could increase with a repeated administration of the survey and more likely that any variation in scores obtained would represent a reduction. Apparent changes of this nature represent error variance within the survey, rather than a measure of real decline. Comparison with the SPQ norm referenced decile bands, in conjunction with relative changes in raw score patterns across the three approaches, may provide more useful indices than comparative changes in absolute scores for any one approach.

The distribution of scores from the initial to final administration of the SPQ for Anne indicated a marked reduction in surface orientation and maintenance of deep and achieving approaches. This pattern of change was evident in raw scores as well as SPQ deciles. Ashley’s response to the program was similar. She demonstrated a reduction in surface orientation from the very high range to the moderate range. Deep and achieving approach scores remained in the high to very high range respectively. The pattern of scores across the three approaches in the final administration for these two students indicated the use of a deep-achieving approach.

Amber’s use of surface approaches remained in the high range, in the final administration of the SPQ. Her use of deep approaches increased from the moderate range to the high range, while achieving orientation remained in the very high range. Her learning approach appeared to shift from a surface-achieving
orientation initially, to a more strategic pattern at the end of the program. Alison demonstrated a reduction in the use of both surface and achieving approaches. While both of these approaches shifted from either the high or very high ranges to the moderate range in the final survey, her use of deep approaches increased from the low range to the moderate range at the end of the program. Alison shifted her learning approach from one that initially met the criteria for a surface-achieving student and finally became moderately strategic.

6.3.3.1: Qualitative Responses – Year 1
The students from cluster 1G described strong motivations for enrolling in an Early Childhood Education degree. They had both worked in a child care facility for the year prior to coming to university and thereby tested their motivation and affirmed their commitment to achieve their goal.

Anne: ... I don’t want to waste my life doing that [changing courses]. So, I thought well why not do the research - see what the jobs about - what it entails um - and what I think about is it’s something I’m going to do for the rest of my life and that’s it. I submitted my application in - and then I went around to all the different Universities that were offering the courses and met various lecturers and sort of - didn’t like Macquarie, didn’t like Wollongong, and I thought I’m in love with Bathurst when I came here [inaudible] yeah bit far from home but.

Once they had confirmed that they had chosen the right profession, Anne and Ashley also engaged in considerable research to identify the course and the university that would suit them best. As Anne described, she visited each of the universities, while Ashley visited some, telephoned others and sought the advice of her school’s Careers Adviser to determine her choice. Alison and Amber were both committed to living locally due to the proximity of family and the reduced cost of attending the local university. Their choice of course was determined by
their past experience with children as babysitters and, in Amber’s case, some experience in summer school programs and church activities.

As would be expected, the predominant theme expressed by the students in these clusters was the attainment of high grades. Keywords such as ‘marks’ and specific grades (High Distinction, Distinction, Credit) were the ones most commonly cited. Amber expressed the importance of gaining high grades as a driving force in the following extract.

Amber: Well like I said I think I’m a mixture between deep and achievement because I want to get good marks and that’s sort of the centre of everything. You can’t hide from that um yeah …

Amber labelled herself as a deep-achieving learner twice in the initial interview, perhaps in an effort to impress the researcher. She was aware that this approach to learning was a preferred outcome of the research project. One of the strategies identified by Alison in the following extract was to reproduce the lecturer’s preferred view as a method of attaining higher grades. Amber may have used a similar strategy during the interview, despite the fact that the interview had no grading outcome and all information provided was held in confidence.

Alison: … I find that everyone said to me um “You just find out what - you know - the lecturers and tutors want to hear, and then you give them what they want to hear, because you’re not going to get the marks otherwise.” - and that’s what I came in – sort of, you know - thinking I’ve got to do, and when I sort of deviated from that, I found that my marks did go down. I got a Grade-Pending when I did a partner work - you know - I like to think that I can work with a group, but I prefer to do it my own way - but we did part of the - and we got a Grade-Pending for something that we worked really hard on, but it wasn’t what they wanted to hear.
Ashley expressed a desire to be in control of her own work as an important theme and this reflected other students’ mixed views about collaborative tasks. Amber saw the accommodation and compromise required to take account of another’s views and methods of addressing the problem as a frustrating aspect of group-work.

*Interviewer: And you found it okay working with the partner?*

*Amber:* Hard at times, because I’m a person who - I don’t know - sometimes just want to sit down at home - just do it. But you have to arrange a time and get together and you’ve got different ideas and she likes this way and you - so in that respect -

*Interviewer: You’ve got negotiation and compromise and -*

*Amber:* Yeah in that respect I hated it. But in another way it was really good cause we both had different ideas that we could bring to it.

The majority of these students also expressed considerable concern about exams. Their apprehension appeared to be drawn from similar concerns to those expressed by Sonya and Susan. They were afraid that despite the extensive study they may have done, exams might bring lower grades.

*Ashley:* Oh with the assessments I find I’m more comfortable with assessment tasks than exams, so when it comes to - time for exams, I feel that I know the work and I’ve learnt it, but I just get real nervous and you know - when it comes to exam time - so yeah, my assessment tasks I do fairly well in though, because - you know - you have the time and you can research it and get other people’s views ...

The concern of knowing the work but possibly not being able to reproduce it sufficiently well in an exam with time pressure was a consistent theme expressed by Ashley and Anne, while Amber’s concern focused more on the fear of failure. Unlike the others, Alison was unconcerned about exams, feeling that she had the situation under control by choosing appropriate study methods that suited the
circumstances. She expressed a greater concern with essays and assignments that had multiple subtasks. She was not confident in her skill in expressing an argument, especially where word limits applied. With assessments that were comprised of multiple subtasks, such as the first problem-based learning exercise, she perceived a reduction in personal control, because she felt unable to weigh relative component worth and thus monitor her progress adequately.

Alison: ... I can't quite fathom which one that I'm supposed to be doing and concentrating more on - and what are worth what - and I find it quite confusing ...

The terms ‘clear’ and ‘control’ were the second and third most commonly mentioned keywords in Alison’s initial interview. She preferred assessment items that were explicit in their expectations and ones for which her organisational skills gave her a sense of control over the task, so she could distribute her effort efficiently.

Common processes used to study amongst these students included organised methods of obtaining lecture notes and structured methods of managing them for active exam preparation, with the purposes of enhancing recall. The memorisation processes were identified as ‘surface methods’ by two of the students, but they considered them appropriate for circumstances such as exams.

Ashley: ... With learning, I have to write things down. Like, when I study, I might have heaps of study notes, but I write it down and writing down helps me learn it more. Like, I can remember in the HSC, I would have had three lots of notes with the same information, but just each time I wrote it I um learnt more - you know - it sunk in. So that’s the way I learn is take notes, writing it down, reading it and keep reading it.
Only Anne described different methods of learning. She reported incorporating an organised and systematic approach with reading widely and integrating theory with practice.

Anne: I know I do all my readings, which - I probably read them once or twice. And I do - I don’t think I could ever sell my text books. They’ve all got highlighters and pencil marks all over the page.

Interviewer: You’d probably be able to charge more for them.

Anne: Yeah, I never thought of it that way. Um, I try and get other books out to find out what – um, pick bits and pieces - maybe its something I didn’t understand - and try the set readings the lecturer says. I do read over my lectures and even my [inaudible]. Maybe different ways that - I know some people sort of take - not all of them – but, try to find the links between what’s actually being taught and what’s being read. That way I try and relate it back to what I would do as a teacher...

The methods these students described are consistent with previous research defining the characteristic perceptions, preferences and concerns of students who use achieving approaches to learning (Biggs, 1987a, 1993a; Entwistle & Tait, 1990; Entwistle & Waterston, 1988; Ramsden, 1992). They also describe the greater flexibility available to the students whose approaches were identified as strategic compared to the relatively greater rigidity of students using surface achieving methods. As such, these current findings provide further evidence to support the validity of the learning approach measures used in the present study, specifically in relation to the use of the SPQ in the identification of achieving approaches to learning.

6.3.3.2: Responses to program modifications
The four students interviewed from these initial clusters modified their balance of learning approaches by the final administration of the SPQ. All students reduced
their use of surface approaches and generally maintained or increased their use of deep approaches. Ashley’s small reduction in her deep and achieving approach scores on the final survey were considered likely to reflect regression to the mean from her very high original scores. Achieving approaches were also maintained at very high levels, with the exception of Alison, whose achieving approach fell to the moderate range. Responses to the modified program for this group were largely in line with predictions and in the desired direction.

Amber’s response to the small group problem-based learning task conducted in year 1 was highly positive.

**Interviewer:** So, the other people that I’ve been speaking to today were talking about Trina. Is that what it’s called? Was that good?

**Amber:** Yeah! I think they’ve really thought about what you’ve been saying in that subject. Oh it’s really obvious to me that they’re trying to change things. Like we just had to do a presentation based on this Trina situation and we did the markings for our - like marked our peers. It was really good ‘cause it was spread out, and you have a partner to work with, and they varied it. Like one part was a presentation of your findings, um you had to do a mid term letter for parents and that was really good ‘cause it was totally different from academic writing and I really enjoyed doing that.

This reaction contrasts with the view expressed by Alison who perceived the identical task as highly problematic. Even though Alison and Amber represented the same initial cluster, described largely similar methods of learning and expressed similar anxiety over assessment tasks, their anxiety apparently emanates from different sources. Amber became concerned when she was faced with fewer large assessment pieces, whereas Alison’s concern came from her apparent loss of organisational control in a shared task, with less clear guidelines and multiple components. Amber had noticed that the problem-based learning
exercise was part of the modified program, and her positive assessment of it may have encouraged her in the process of change. Alison’s frustration with the exercise may have had an interference effect.

Alison’s interview and journal data are further explored below because her case is of particular interest due to the reduction in her achieving orientation. The impact of the modified program on Ashley is then more briefly reviewed with evidence from interview transcripts because Amber’s complete first and final interviews are fully reproduced as sample transcripts in Appendix F.

6.3.3.2.1: Alison
The initial entry in Alison’s reflective journal was a response to a planned activity conducted in the first week of these students university career. The activity required the students to identify the three most important conditions for their own effective learning and their initial impressions of the Early Childhood program. Alison’s perception of the requirements for her own learning are consistent with those expressed in the interview conducted some eight months later.

Journal extract: Alison – February 25, 1996
For me to learn effectively, I must be organised. I must know what I am doing, what is expected and the approach I am going to take towards completing work, or assignments and my own personal preparation. If I am unorganised and I don’t know what I am doing or unsure about my approach, learning becomes difficult. I also need to feel that the teacher is organised so that I can settle into a routine or program that has little disruption or surprises.

Secondly, for my own effective learning, the information I am receiving must be clear. If the information comes in bits and pieces and is poorly communicated the effectiveness of my learning is considerably lowered. For example moving from one point to another, then back to a previous one and so on, really hinders learning. [continues with another condition based on interest]
Alison needed the requirements of assessment tasks to be precisely defined so that she could implement a planned approach to achieve the task without fear that the strategy would be disrupted. She saw learning as the transmission of information in an organised linear sequence, which she would absorb through the application of planned study strategies. The modified program delivered throughout the course would clearly interfere with most of the conditions Alison specified. Assessment tasks were often presented with deliberately unclear boundaries to enable their content and the processes required to be negotiated with the students and continually evolve. They were designed to enable students working in groups to deliberate about task requirements and develop alternate perceptions in problem identification and intervention techniques. Learning was viewed holistically and students were required to integrate material from multiple sources and construct their own interpretation of its meaning. The journal task itself required students to consider linkages between subjects presented separately and consider implications for practice.

Alison managed the requirements of the journal well, however. The tasks were clear, despite their constructivist basis and Alison was able to develop a strategy to meet their specified requirements. Each week she produced an entry with a similar structure. First, she produced a summary of the Educational Psychology lecture followed by a generalisation about the major theme. She then summarised the Practice of Teaching lecture and identified commonality between its major theme and that of the first lecture. Usually she would then provide an example from her practicum experience to illustrate the major theme and occasionally conclude with a progress statement concerning the main problem-based activity in year 1, the Trina exercise.
Alison’s journal entries concerning the Trina exercise were consistently positive, indicating little concern and a relaxed approach to the task. For example, her entry in week 4 included the following reference to Trina.

**Journal extract: Alison – August 15, 1996**

[structured description of Bruner, Ausubel and Vygotsky] … The tutorial covered the issues raised in our situation analysis, as we presented our questions and statements randomly around the room. Some very original issues were raised, a good learning experience.

Later in the semester, as the exercise drew to a close, Alison reported on the final task of Trina and concluded with a positive summation.

**Journal extract: Alison – October 12, 1996**

[structured description of effective classroom practice] … Tutorials this week entailed us presenting the final part of our situation-based analysis – the culminating activity. It was fun and interesting to see the different ways in which groups chose to present their information. I found it difficult to get in touch with my partner [Sharon], who doesn’t live in Bathurst, during the holidays which I think was the only drawback to the activity. Otherwise it was lots of fun.

In direct contradiction to these journal entries, Alison responded to the ‘Trina’ question at the initial interviews by describing her frustration and negative feelings about the exercise, at considerable length. It was also apparent during the interview that her negative feelings about the exercise had been active for some time, certainly well before her positive summation was written in the journal.

*Alison:* … I know that Trina - I had a lot of problems with that Trina situation analysis - just a lot of problems. I did not enjoy doing that task. I had a lot of problems doing that task. Um, um I really - I suppose I think more feedback needs to be given on the spot like, to an individual level um because I know that we went to see [name of lecturer D] about our situation back in August and said we were having trouble getting information, relevant information, etc etc, and we were sort of pointed in the right direction and given the example of questions and stuff like that and um. Nothing was said to us that we were going heading off on a waylay when we um - when we actually read our you know our things out in class before we handed
them in. Nothing was said then that we were heading in the wrong direction and that should not have been done or - you know - that’s not quite detailed or anything. Those sort of little bits of feedback that are necessary instead of giving us a whack in the face and saying here’s a GP [Grade Pending] it wasn’t good enough …

This response was spoken with increasing volume, pace and pitch indicating intense feeling. In response to the evident emotional dimension, the interview then took the form of a counselling session with the researcher responding with reflections of feeling and affirming statements until Alison had reached a conclusion. Her comments in relation to the Trina exercise continued for five pages of interview transcript. She concluded with the comment that she would be able to put that behind her, because she had complained and was taken seriously by the lecturers in the subject. From the content and paralinguistic features of her response, it was clear that the problem-based learning activity had provided a considerable source of frustration for her. Yet, despite these strong feelings of frustration, Alison continued to make the positive comments about Trina in her weekly journal. In the final week of the activity, Alison’s journal entry described her view of the process of peer assessment applied to the culminating activity for the problem-based learning task.

**Journal extract: Alison – October 19, 1996**

[structured description of co-operative learning] … *In tutorials this week we continued presenting our culminating activities. I like the idea of being assessed by our peers, it really gives us a chance to be involved and to see how difficult it is for the lecturers and tutors to mark everyone. There also have been some very interesting and original presentations!!*

Earlier in the interview, she was also asked about her perception of the peer assessment process applied to the culminating activity. The view expressed in the interview again differed from the view expressed in the journal.
Interviewer: How did you find that peer assessment process?

Alison: Oh I don’t know, we haven’t actually got our marks for that yet. I found it good that we had an input – like, that we had a say. I thought that was really good, but um I don’t know. There are ulterior motives for those sort of things. ‘Cause you - if you know someone’s like on a High Distinction - like a High Distinction average, you don’t want them to get a High Distinction - you know - you give them a - you know - I think there could be - I mean - I’m not saying everyone does that but I know that’s something I think about. It’s not something I judge on, it’s definitely not. I think that’s really unfair, but there definitely are ulterior motives for those kind of things.

The concerns she held about the fairness of the peer assessment process were not mentioned in the relevant journal entry. Her journal entries contradicted the view she appeared to genuinely hold and expressed at the interview. The journal was an assessable task for the subject, and the lecturers assessing the journals were also the lecturers co-ordinating the problem-based activity. In the interview, Alison had expressed the view that in order to obtain high marks, it was necessary to work out what the lecturers wanted and “… let them hear what they wanted to hear.” It seems likely that her journal entries were designed to meet this end.

If Alison’s strategy of giving lecturers what they want to hear was generalised to all, or most assessable items it would be difficult to determine what level of learning had taken place. If the purpose of learning is to gain high grades alone, by whatever means, then the very high achieving orientation Alison initially reported may not be a desirable approach, nor compatible with those the intervention sought to foster. Biggs’ (1993a, p. 76) comments about the problems inherent in the use of achieving approaches are exemplified by Alison’s strategy. This approach, according to Biggs, is not a preferred learning approach, because it may, or may not, lead to genuine task-engagement. Thus, the achievement of
outcomes designed to accrue from engagement with the task may also not be attained, despite the student’s application of a strategy successful in achieving high grades.

During her final interview conducted in year 3, Alison described the changes she’d made to her learning approach. She was aware that her achievement goals had altered.

Alison: In my first semester I started off pretty well - like HD and D and Credits. Second semester was pretty ordinary - a couple of D’s and a Credit – but um Credit average, and that’s what I aim for now. I mean, I say to everyone I aim to pass and I really would - you know - if I’ve done a pretty ordinary assignment or I think “Errrr”, I’d be happy to pass, but I often get sort of Credits, Pass Plus, Credits and um. ...

Alison did attain Credit average grades in her final transcript. She attributed the change in her attainment goals largely to social factors and the fact that on entering university, she’d come directly from the Higher School Certificate and automatically adopted similar study strategies that she’d used for those examinations. Her view of learning had also changed somewhat by the time she’d entered year 3. By this time she was motivated to learn through her interest in the material and because its practical relevance matched a perceived professional deficit on her behalf.

Interviewer: ... Why did you put them [electives] down as first preference?

Alison: Because they were the things that I thought I would be deficient in, or things that I hadn’t found - I didn’t think I knew enough about them, and would probably benefit from.

The learning methods Alison described in her final interview were consistent with the SPQ results. She had become somewhat more adaptive in her approach,
modifying her methods to suit the assessment tasks. For exams she described
processes similar to those in the initial interview, but in subjects that were
assessed through essay or problem-based assignment work, she described methods
of gaining additional material and reading widely in an active attempt to
understand the content so she could form a cogent argument. She also expressed
favourable reactions to journal tasks, group work and peer assessment because
each of these reduced the pressure she felt. In the final interview, it appeared that
Alison’s original achieving orientation may not have markedly reduced, but
instead may have been refocussed on the attainment of high achieving goals as a
teacher.

**Interviewer:** *What would be the central goal that you’d have as a teacher?*

**Alison:** Well professional goal is to be able to achieve - personally achieve um professionalism in such a manner that - you know - it’s absolutely appropriate to the setting that I’m in. So if I decide to go into a pre-school, day care - to adapt the professionalism and to be able to - you know - communicate on the right level, to be part of the team. All those sorts of things that are um required to be to run a quality centre or to run a quality – you know - classroom as well um. … That’s what the professional goal is, but personally I really want to see my kids achieve. I want to see my teaching being enjoyable. I want to see them - you know – achieve. It doesn’t matter what they achieve really, as far as - you know - whether they achieve excellent marks here, or whether they achieve creatively, or um it’s not a matter of how much, but I really want them to achieve, in what they feel comfortable in, and of course you need to run by the syllabus - you know.

Because of her concentration on developing high level teaching skills, her
approach to study had become one through which she aimed to master these skills,
rather than attain high grades. Alison expressed considerable confidence in her
abilities as a teacher. She intended to follow her university studies into fourth
year, but was confident that she could manage the pressures of teaching immediately if she needed to.

Despite lowering her academic attainment goals from Distinctions or High Distinctions, to Credits it was considered that this adjustment was productive in promoting Alison’s academic engagement and learning outcomes. The three most important conditions for her effective learning expressed in the final interview were “relaxed, relevant and interesting.” While she still described a largely transmission view of the teaching and learning process at the final interview, her change of focus from a highly efficient and rigid surface approach appeared to enable her to interact more freely within learning environments on a more genuine basis.

6.3.3.2.2: Ashley
Ashley’s responses to the modified program were consistently positive. She responded well to the reflective journal task, providing extended discussion on a weekly basis. Her journal entries included detail from each of the classes with central themes, identification of emerging links between class topics illustrated by practicum anecdotes. Topics were regularly related to her own experience as a learner and comments were made about how activities, such as problem-based learning, fitted within the theory discussed during the week. Additional readings from newspapers, magazines and journals were often attached and a commentary included about their relevance to the early childhood teaching profession, or about aspects of educational psychology theory.

Journal extract: Ashley – August 28, 1996

...Throughout this semester in practically every subject the notion of needing a very good knowledge base to think creatively has been brought up. As [name of
lecturer A] mentioned, that there isn’t a line drawn between where one subject stops and another subject begins. It has become clearly visible that each subject interlinks.

In Literacy we need to know about ‘scaffolding’ and this was also brought up in the lecture on 13.8.96 (Learning). I have become more aware of the relationships between everything that I study at university and through my experience in childcare, I often find myself relating back to my experiences and discovering different ways of approaching things.

After studying the situation-based analysis on Trina (concerning particular issues eg. food/rice for play), I thought back to using coloured pasta shells for collage, at Peppercorn Child Care. I found myself looking closer at the issue and seeing if there were any alternatives other than pasta (food) …[extended discussion of alternatives and contents of Practice of Teaching lecture].

Driven by her high achieving orientation, Ashley may also have adopted a strategy of providing the lecturers with what she perceived they wanted. Certainly high attainment was by large measure a gauge she used in her positive evaluation of the problem-based learning task during the initial interview.

Interviewer: One of the assessment tasks I think that everybody has mentioned was Trina - ah how did you find -?

Ashley: Oh we were doing it really well. We got a HD for the first part, and then a Distinction Plus for the second. We don’t know what we did for the last one and – [name of student] and I did it. We loved it. It was really good working together in groups and um - no it was interesting to get the other persons point of view and then both to get a bit - to come to a conclusion or just “Oh that’s – yeah, that sounds good” but - you know. No, I found that really good. What have other people said about that?

Her high achievement orientation was rewarded and the task enabled her to apply the requisite skills, since she was capable of drawing strategically from surface or deep learning approaches depending on task requirements. It is unclear however, whether Ashley’s positive response to the initial problem-based activity was related to the nature of the activity or the grades she received. She may have felt equally positive about any assessment piece that allowed her to excel.
Nevertheless, it may be that Ashley would react by choosing the learning approach appropriate to the context and with her high achieving orientation, that context may be defined principally by assessment requirements. By constructing assessment methods that encourage the use of deep learning approaches, a student such as Ashley may be more likely to increase her use of these methods, and reduce the use of surface approaches. Productive learning engagement may thus be an outcome encouraged through the medium of an achievement motive. Thus, in Ashley’s case, the more explicit the preference for students to use deep learning approaches, and the more explicitly they are rewarded through assessment, the more likely she may be to adopt the preferred learning practices. Adoption of the preferred approach should not cause the frustration evident in Alison’s case because the use of deep approaches was already part of Ashley’s repertoire.

The encouragement of metacognitive engagement in students’ own learning approaches adopted during the course, was incorporated as part of the modified program. Feedback about the results of the surveys conducted was provided to the whole group and individual feedback was provided to students who requested it at the conclusion of the initial interviews, in accordance with the methods described by Biggs (1987b, pp. 18-20). The use of a deep learning approach as the preferred model of learning was made explicit and the purpose of assessment design in the encouragement of this approach was described repeatedly throughout the course. Evidence of reflection on her own learning was contained in several of Ashley’s journal entries, particularly when feedback sessions occurred.

**Journal extract: Ashley – September 11, 1996**

...Because this is my journal of LEARNING I would also like to add that I have learnt a lot in the past year here at university. I have learnt a lot about myself as
a person, and how to live with others. I have achieved some great results and others a bit disappointing but above all I have learnt quite a lot.

Concerning the lecture on Tuesday with Chris Gordon’s results from the survey we filled out, I found it quite interesting but I am slightly confused. I don’t know what type of approach I take in my learning, personally I feel that I take a combination of all three. I aim to get good marks, I put the work into it, but I still at the same time learn about what I am doing and attempt to relate it back to my own experiences and situations. Confused, so am I!!! …

Ashley’s own reflection had resulted in the accurate observation that she was able to incorporate features of all approaches in her learning. The learning processes she described in the final interview in year 3 differed markedly from the methods she had adopted in first year. No mention was made in the final interview of methods such as the writing and rewriting of lecture notes that she’d identified earlier. Instead, her principal learning methods relied on applying skills in authentic settings, modelling, connecting theory to practice and having fun. Throughout the interview, Ashley emphasised the practical nature of subjects as a learning preference. Her definition of a practical subject may however differ from the definitions of other students. When asked about her choices of electives she stated that she’d chosen them because of interest and relevance to practice.

Ashley: I think basically that’s what it comes down to the interest it’s got, ‘cause that’s the thing too - you’ve got to be practical, but that’s how children would learn too. It’s got to be interesting and like applicable. There’s no use learning stuff that we’re not likely to teach, or that’s not going to be useful I think it’s really got to be appropriate to what we’re doing so.

She had chosen subjects such as Drama, Literature and Philosophy as electives and was able to describe their relevance to practice. Other students who had chosen subjects they labelled as ‘practical’ had included Discipline and Classroom Management, Painting and Drawing, Programming for Key Learning Areas and
the like, where clear links to practice are more apparent. It appeared that Ashley’s learning approach had altered from her first year perceptions. While her achieving orientation had remained, its comparative impact appeared to have reduced. When asked how hard she’d found the course, she responded as follows.

Ashley: Yeah like it’s been really good like I - you know - I haven’t got - you know - top marks all the time, or HD’s, - like that’s very hard to do all the time - like I don’t expect to do that. I just hope to go well for myself, so I feel like I’ve answered the question or done it to the best of my ability...

Ashley had performed very well in the course throughout. She had consistently achieved Distinction grades. Of the 24 subjects she completed for her degree, 15 had been awarded Distinctions or High Distinctions and only 2 had been awarded Pass grades.

At the conclusion of the course, Ashley described the sharing, negotiation and accommodation process in group problem-solving as being a particularly beneficial learning context. Although she did express some reservation about the accuracy of the grades awarded, she also held positive views of peer assessment process included in the program as a preparation for future professional development through peer feedback.

Ashley: ... I think peer assessment’s important, because I think once I’m out teaching, I’d like to ask people - if they were to see me teach or something like that - ask them for their opinions to see “OK how do you think I did that? How can I improve?” and things like that. Because even - it comes in with your programming, because they’re going to have to do that, especially in the first few years, someone has to oversee your programming. So you want comments, you want feedback, you want to know how you can improve, where it was really good - things like that - so yeah peer assessment’s really good. We’ve done it straight from first year, so that was good - peer assessment.
Ashley offered high praise for the course and for the lecturers involved in teaching her. She expressed considerable confidence in her ability to teach in the following year and had already been offered a teaching position. She intended to further her studies in future years by distance education as her mother had done. Her experience in the course had been highly successful and the change in her learning approach through the process of the course appeared to have benefited her learning.

6.3.3.3: Summary of Students with High Initial Achieving Approach

Four students were initially identified as having learning approaches characterised by high achieving orientations. Two of these students initially reported surface-achieving approaches, while the remaining two reported very high levels of all approaches. The learning approaches described by these students during their initial interview were consistent with the findings of previous research and appeared driven by a high need to achieve. By year 3, all of these students had reduced their reliance on a surface approach and had either increased their use of a deep approach, or maintained its use at a high level. Most students in these groups had retained their very high achieving orientations, with the exception of Alison. Alison’s reduction in her very high surface-achieving approach was considered appropriately adaptive, since a concomitant moderate increase in the use of deep approaches also developed. The altered program appeared to assist these students to modify their learning approaches in line with a more productive deep orientation.
### 6.3.4: Low Achieving Approach

Only two students comprising cluster 1D were considered as having a low achieving orientation in year 1. Both students were selected for interview and remained with the program throughout, progressing to cluster 2B by year 3 of the course. The final cluster was also defined by a low achieving orientation and thus little change in these students’ learning approaches was recorded.

#### Table 6.5. Initial and Final SPQ Scores of Interview Respondents (Low Achieving Approach Clusters)

<table>
<thead>
<tr>
<th>Case</th>
<th>Pseudonym</th>
<th>Score</th>
<th>Initial SPQ</th>
<th>Final SPQ</th>
<th>Initial cluster</th>
<th>Final cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Linda</td>
<td>Raw score</td>
<td>46 50 33</td>
<td>41 43 27</td>
<td>1D 2B</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
<td>8 7 3</td>
<td>6 4 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Lauren</td>
<td>Raw score</td>
<td>42 46 31</td>
<td>40 48 30</td>
<td>1D 2B</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
<td>6 5 2</td>
<td>5 6 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Deciles based on SPQ norms for University (Education - females) (Biggs, 1987b, p. 33)

The initial ‘L’ used for the pseudonyms in Table 6.5 identifies these students as beginning the course with predominantly low achieving orientations. Both students began the course reporting moderate to high usage of surface and deep approaches to learning and low achieving orientation. By the end of the program, Linda’s scores had reduced across all dimensions and this may have resulted from an altered perception of the relative weights given to the Likert scale, or because of the relative proximity of the Higher School Certificate to her initial survey. Nevertheless, a similar pattern emerged in the relative scores across the three approaches. Lauren’s scores at the conclusion of the program were almost identical to her entry scores.
6.3.4.1: Qualitative responses – Year 1
These students’ motivation for entering the course appeared confused and lacking in purposeful direction. Lauren reported that she had previously attended another university studying music, but had become bored and returned to her home because she couldn’t find work near that university. She’d decided to enter the teaching degree as an alternative to going overseas. Linda’s motivation was similarly without consistent direction.

Interviewer: So what um what brought you here [name of student]? How’d you end up at this place?

Linda: Um well I don’t really know. I decided like the day before I came up that I was actually coming um. I wanted to go to university I didn’t know what course, but I wanted to go to uni, and my mother did hers up here.

Interviewer: Oh right [inaudible].

Linda: Yeah and my parents didn’t want me to move away from home - And I wanted to get away from [name of home town] so it was a good opportunity.

Given this dubious initial commitment it is not surprising that the pursuit of high attainments was not an important consideration for these students. Both students described disorganised study methods which included minimal planning, the absence of structure, attending to tasks only when they become due, and an evaluation of the importance of tasks to assess whether the expenditure of effort was required. Both students relied on attending lectures to gain information and attempted to remember the lecture content without taking many notes. Linda borrowed other people’s notes to use for study purposes but Lauren had confidence in her well-developed memory skills.

Interviewer: Can you broadly just tell me the main ways then, that you sort of go about learning here?
Lauren: Generally um. Hard to say - Um it probably depends on the task. With things like exams and stuff um - I think - I don’t know if I’m lucky or what, but I tend to take in a lot of information in the lecture and I have a pretty good memory where that’s concerned. So um with my note taking, I think it’s fairly efficient. I don’t tend to write down whatever’s there. I’ll filter it a lot and sort of put in my own little comments or whatever in my notes and I think that keeps it in there.

Interviewer: Yes, ’cause you’re actually actively thinking about it?

Lauren: Yeah I find - like I probably cram just before exams but a lot of it’s in there anyway, so I find when I do study notes, I sort of go through and think “I know that. I won’t bother about writing it down” - or it’s just the stuff that I’m not quite sure on that I write down and I might go back to a text or something and read on it and then - you know - have rough notes and cram a bit before an exam, but most of it seems to be in there.

There is some evidence here of active listening, comprehending and recording material considered important, rather than the methods used by Sonya or Susan in attempting to record the complete lecture content. While there is also evidence of the use of some surface approaches to study for exams, there appears to be a lack of purpose in directing either approach. In response to the same question, Linda’s disorganisation was more apparent.

Linda: Um well I’m really unorganised and always the night before and um I dunno -

Interviewer: Does it depend how the subject’s being assessed as to what approach you’d take?

Linda: That, and how much time I have with other subjects, and also what I think of the subject. Like if I like a subject I’ll actually sit there and listen in the lecture and pay attention and think about it and stuff. If not, I’ll just like - you know - write my notes and just before the exam get them out and try and learn them. ... and in an exam and stuff, I’d try and borrow notes. It’s really weird but I can understand other people’s lecture notes more than my own like ... They say “Oh yeah, can I borrow yours back?” and then I give it to them and they can’t make a word of sense.
Both students reported that they didn’t mind exams and Linda preferred multiple choice exams above other forms of assessment because she believed her memory skills enabled her to achieve well with minimum effort. Lauren was at ease with essays but would prefer discussing them with the lecturer than having to expend the effort to complete the writing task. These students also described disorganised methods of approaching assignment tasks. They preferred assignments that had very clear guidelines and usually left them to the due date to complete. Both justified this approach by the statement that they work better under pressure, though in their choice of elective subjects they aimed for stress reduction.

Interviewer: Ah, so what when you choose something like an elective what sort of things do you look for to inform that choice?

Linda: Oh well most of the time it was just pressure - cause I’m really bad at art and music and for the first semester, I think nearly all of them were something to do with art or music - and then there was a maths one but if you hadn’t done two unit maths in your HSC you had to do that, so I didn’t do that one. Then I like talked to one of my friends who lives at the dorm - basically got rid of all the ones were the really, really hard work was which sounds really bad but.

Lauren also used the parameter of minimising pressure in her choices and sought subjects in which she had prior knowledge or skill, such as music, in order to attain well with little effort. Both students preferred subjects in which they were interested and where the lecturer took a relaxed approach.

Interviewer: Some lecturers are good and others aren’t, what makes the difference between the good ones and the bad ones?

Lauren: Um. I suppose the whole thing of being easy going - like I said and approachable, that’s the difference between a good lecturer yeah - um and just what you’re interested in I suppose.
They also preferred lectures to be delivered in a structured format, with clear content and a varied presentation style so that interest could be maintained. They liked content to be practically oriented so that the purpose of learning the material was clear.

Interviewer: *When you’re in lectures or tutes, are there activities or the ways things are presented that you find really helpful - for you to learn?*

Lauren: *Probably if there’s a balance of all the different ways you can present information - like if you’re in a lecture and it’s mostly someone just talking at you, well then I’ll switch off and if there’s a whole heap of overheads of the same thing. But um if you’ve sort of got a balance between the two, that’s probably when I - and if it’s really put out in a straight forward way “This is what we’re going to have to know bam bam bam and that’s all it is” - and then - you know - a summary at the end.*

Linda also described the need for varied presentation and made the point that lectures that concentrated on theory were unlikely to gain her attention. She reported for example, that the only reason she attended the Child Development lectures was because she was required to report on them in her learning journal, otherwise she would avoid their theoretical content. If these students experienced a problem understanding information in class they both reported that they may ask the lecturer to repeat it during the tutorial, or ask a friend to explain, but only if they considered the information was necessary to know.

Learning was not only seen as the transmission of information by these students, but they also saw their role in the learning process as largely passive. The lecturer was seen as responsible for stimulating and maintaining their interest and their own active engagement in the learning process was avoided where possible. The explanation of their learning approach provided by Lauren and Linda clearly meets Biggs’ (1987b, p.16) description of students with low achieving orientation.
6.3.4.2: Response to Program Modifications
Linda and Lauren varied in their response to the problem-based learning task completed in year 1. Lauren initially found the lack of structure in the assignment difficult to manage. Linda, however, found the task continued well beyond her ability to maintain interest. She found that the multiple tasks concerning different aspects of the same problem led to boredom.

Linda: Trina! Oh that dragged.

Interviewer: You didn’t like that? That dragged, yeah?

Linda: Oh it was a um - there was an article - like a page article, which was about a situation in a child-care centre I think [inaudible] and then we had to do three tasks on it and one was, we had to research - like think of like three or four of - I don’t know - issues that came out of it, and then go to the library and try and find current information on those issues, which was impossible - and then write a like a sort of justice of that - had to write down - and then we had to pick out a couple of those issues and research and then go and write an essay, and then we had to do a role play of - like a presentation sort of thing - on the essay basically and just - like and you had to do it in pairs - and it just dragged so much - I never want to hear about Trina again.

Linda perceived the task as burdensome whereas Lauren was initially concerned about the apparent lack of structure. Neither student enjoyed the activity. Both students reported that they found the small group work difficult to manage because they tended to socialise with their partner rather than work. Linda was also displeased about the peer assessment component because her peers generally assigned low grades to her presentation. Lauren’s view of the peer assessment was more positive. She felt that the students had a greater appreciation of the task requirements and could recognise the effort. It also provided her with an opportunity to compare her own effort with those of others in the course.
Lauren:  It [peer assessment] was good really ‘cause they probably had more of an idea of how to assess us than lecturers in a way, because like - you know - looking at themselves and what they did. I don’t know I suppose it’s just -

Interviewer: You can relate more to what -?

Lauren: Yeah that’s right, and it helps you assess yourself as well because you can look at everyone else’s and sort of say “Well they’ve obviously put heaps more work in than us.”

These students’ level of engagement with the problem-based learning task was clearly less than ideal. Other tasks may have led to the expenditure of less effort but been evaluated more highly by them, partly because less effort was required. Linda and Lauren did not appear to perceive learning as effortful behaviour. It appeared effort was expected only during the process of assessing learning outcomes. Thus the purpose of encouraging learning through the Trina exercise, may have eluded them, since they perceived it principally as an assessment mechanism and believed these requirements could have been met by less tedious means.

6.3.4.2.1: Linda

Linda’s response to the modified learning environment was characterised by initial confusion followed by an accommodation that enabled engagement in learning activities to be reduced or avoided where possible. The program however, managed to force some limited engagement with some of the structures applied. For example, Linda did attend the lectures in Child Development in semester 1 and Educational Psychology in semester 2. She stated in her initial interview that if it weren’t for the journal requirement that she comment on those lectures weekly, she would not attend them.
Her early journal entries describe the confusion she felt with the notion that subjects could be combined and that their content could be related. She’d have preferred them to be separate subjects, but accepted the requirement that links needed to be identified in her journal writings as well as reflections about her own learning. Some evidence of personal reflection was contained in several entries. For example in the first week of semester 2, the notion of ‘locus of control’ was introduced in the Educational Psychology lecture.

**Journal extract: Linda – August 2, 1996**

*I’m writing these 2 weeks as one entry because I didn’t really understand what was happening in this whole subject let alone what I was supposed to write in this journal so I didn’t make an entry at the end of the first week...*[further describes her confusion about the integrated subjects]*

*The idea of ‘Locus of Control’ is very interesting to me. A lot of the time I blame things that happen to me on other people and conditions around me, but by hearing the 1st lecture I am beginning to see that I must take control of my own learning and motivation and not blame my lack of motivation on other people and this way maybe I will put more into my classes.*

*Prac was a good experience ...I thought that it would have been more useful for me if my supervising teacher was the teacher in the classroom rather than the director or a mix of both of them. As the director was really busy and really didn’t have the time to talk to me or spend time to explain things to me and the teacher in the room I was in had no idea what was expected from me until half way through the week when she read my handbook ...*

The contradiction between the personal reflection on locus of control and her identification of the source of problems during her practicum was not apparent to Linda, despite the fact that she had written the two paragraphs in sequence. It is doubtful that she benefited greatly from engagement in the personal reflection about her own learning through the journal.

Later journal entries comprised descriptions of problems she encountered with the problem-based learning task and some discussion of lecture content, which was
largely disconnected and often misunderstood. While some further reflections on
her own learning were evident in later entries, these also appeared to have little
impact on her learning behaviour. Another entry on October 12, 1996 dealt with
her need to take responsibility for her learning during practicum placements. In
her final entry, Linda indicated that the journal task may have encouraged her to
expend some greater effort than other activities, but this effort was still considered
burdensome.

Journal extract: Linda – October 22, 1996
... Well I dreaded writing this journal. I think it’s a good part of this particular
course as it makes you actually think about what has been taught. But one
suggestion, if this journal is used in other years it may be a help if a list of 3 or 4
questions were given out for each week so that it’s easier to write especially in the
1st few weeks. These questions could be given with the option to write about them
or anything else the student wants to mention.

Effort reduction through the provision of an external structure or advance
organiser was the focus of her final summation in the journal. The purpose of
unstructured personal reflection on learning, that the journal task was intended to
serve, was either still not apparent to Linda or evaluated below the effort required
to complete the task. In her final interview conducted in year 3, Linda described
similarly deficient methods of learning as she described in her initial interview

Interviewer: Broadly, can you describe the way you’ve found to go about learning
here? What do you actually do to learn?
Linda: Um I don’t know. What do you mean, sorry?
Interviewer: Well um you’ve obviously had to get through this early childhood
course somehow or other, and in doing that I imagine you’ve
developed some methods that you think are more useful than other
methods.
Linda: Ah um I dunno, mostly just summarise lecture notes and stuff.
Later in the interview Linda reported that she hadn’t actually summarised lecture notes this year because many of her classes were presented in tutorial mode and many involved practical assignments for which lecture summaries were unnecessary. She still tended to schedule her work poorly and would be suddenly surprised by assignments that had become due. When asked what results she would predict for the final semester, she responded:

*Linda:* Well probably just pretty much Passes, maybe a Credit - not very good cause I kind of lost my motivation to study and stuff.

*Interviewer:* Oh, what happened to it?

*Linda:* I don’t know – like, I think it’s also ’cause - like last semester we had a lot of assignments and a lot of things due before we went on prac. This semester it’s – like, I don’t have much due but they’re spread out more - like - and so I think “Oh I can relax” - and then find out my assignment’s due tomorrow and I’m like “Ahhhh!”

She had continued to choose electives by discussing their content with past students to identify ones considered easier, or by choosing subjects in which she had prior knowledge or considerable interest. This procedure stands in contrast with the methods used by Ashley, Alison, or Deidre who chose subjects based on their practical worth, or their fit with perceived areas of personal weakness.

Linda preferred assignments that were clear in their requirements and practical in their application. She particularly disliked seminars, or other presentations to her peers, for fear that her inadequacies may be publicly exposed. Continued external attributions were also evident in several responses during the final interview. Not surprisingly Linda did not express a great deal of confidence in her ability to manage the pressures of teaching at the end of the program and she was
particularly concerned about the amount of work a career in teaching would involve.

*Linda:* Well the last prac, I remembered “Wow, I’ve got six months and then I’m a real teacher. God, how am I going to do that?” Like, I didn’t think I was at all ready, but then my teacher on prac was really good – like, she was really supportive and stuff and for the last two weeks she just said like “You’re the teacher, do whatever you want” - and like, I found that I managed like, well. But I didn’t have much of a life outside of teaching. I’m going “God, if I finish uni, is that what I’m gonna do - like go to school come home do my work go to bed get up the next morning and do the same thing again?”

Linda decided to continue at university for a further year to complete her Bachelor of Education degree. Throughout her Bachelor of Teaching course, the focus of the current study, she typically attained Pass grades. She did receive two Distinction grades for elective subjects in information technology. She had chosen these electives principally because she held prior knowledge of computers and reduced effort would be needed for her to succeed. While Linda was unsure of her reaction to the modified program, she did identify the use of journals as having assisted her learning.

*Linda:* Other lecturers say that they’ve changed the courses like, because of like what you’ve said, but I don’t know what they’ve changed.

*Interviewer:* You don’t know what was there before?

*Linda:* You know what I mean, yeah - but um, a lot of the - like you had to do a lot of journals about like, what we’re learning and stuff like that - and I felt - I felt that’d be a bit stupid and I’d just be writing down stupid things, but yeah. I actually found - like they did help me a lot with learning – like, looking at what I’d been told in class and writing down exactly what I thought and not thinking like, I’d be marked down if I didn’t agree with the lecturer kind of thing. It did help a lot, so that was good, thinking about it.
It appears unlikely that the modified program made any perceptible impact on Linda’s learning approach, or her learning outcomes. It seems to the researcher somewhat remarkable that she managed to complete the program at all, without any failures or withdrawals. Her later results in the fourth-year program were however, somewhat surprising. She had chosen the ‘Professional Induction’ strand of the fourth-year program, which comprised six subjects, two of which were each of two-subject equivalence. In that course, Linda attained three Distinction grades, one Credit, and only one Pass grade. She also gained a satisfactory grade for her extended internship program.

It is unclear what occurred to cause such a large and sudden change in her attainments. No data were gathered from these students after their completion of the target course. The fourth-year course was taught by the same lecturers involved in the current research and subjects were structured and taught similarly to the undergraduate Bachelor of Teaching program. Perhaps the imminence of entering the teaching profession and the absence of further options to avoid teaching had markedly improved her motivation to succeed. It would appear, however, that Linda always had the ability to succeed if she desired to do so. Her learning deficits throughout the Bachelor of Teaching course appeared largely the result of a dubious commitment and poor motivation to achieve.

6.3.4.3: Summary of Students with Low Initial Achieving Approach
Two students were initially identified as having learning approaches characterised by low achieving orientations. The learning approaches described by these students during their initial interview were consistent with Biggs’ (1987b) description of the characteristics of low achieving students. Essentially, they
appeared to see themselves in passive roles as learners, had few firm goals and sought to manage the learning environment in order to reduce the effort required. There was little evidence of active engagement in learning tasks and where it occurred, it was often begrudgingly applied.

In year 3, these students continued to report similar learning behaviours with stress reduction and task avoidance appearing as major themes. The altered program appeared to have little impact in assisting them to improve their motivation to learn, or to modify their learning approaches in line with a more productive deep orientation. Linda had achieved academic success in the fourth year, but there is no specific evidence to link her later achievement to preparation provided by any feature of the modified undergraduate course. The absence of an achieving orientation appeared to militate against a beneficial impact from the modified program.

6.3.5: Mid-Range across All Learning Approaches
Twenty-four students reported the use of learning approaches that fell within the mid-range of scores across all three dimensions, in year 1. These students comprised cluster 1B. Students in this cluster yielded learning approach means of $SA = 44.58$ ($SD = 2.84$), $DA = 46.38$ ($SD = 3.05$) and $AA = 42.92$ ($SD = 3.54$). Four students were selected for interviews from this cluster grouping. All remained with the program throughout and all attended both first and final interviews. The SPQ scores obtained by the students interviewed from this cluster are detailed in Table 6.6. This table reports the SPQ scores and deciles at the time of the first and final interviews, together with the students’ initial and final cluster membership.
Table 6.6. Initial and Final SPQ Scores of Interview Respondents (Mid-Range across all Approaches)

<table>
<thead>
<tr>
<th>Case</th>
<th>Pseudonym</th>
<th>Score</th>
<th>Initial SPQ</th>
<th>Final SPQ</th>
<th>Initial cluster</th>
<th>Final cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Raw score</td>
<td></td>
<td>Surface</td>
<td>Deep</td>
<td>Achieve</td>
</tr>
<tr>
<td>14</td>
<td>Margaret</td>
<td>42</td>
<td>48</td>
<td>43</td>
<td>36</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>Matthew</td>
<td>44</td>
<td>49</td>
<td>39</td>
<td>43</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>35</td>
<td>Matilda</td>
<td>41</td>
<td>49</td>
<td>47</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Mark</td>
<td>43</td>
<td>50</td>
<td>45</td>
<td>31</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPQ decile*</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>2</td>
</tr>
</tbody>
</table>

* Deciles based on SPQ norms for University (Education - females)
+ Deciles based on SPQ norms for University (Education - males) (Biggs, 1987b, pp. 32-33)

The initial ‘M’ used for the pseudonyms in Table 6.6 identifies these students as beginning the course with predominantly mid-range scores across all learning approaches. Table 6.6 indicates that these students varied in their response to the program across the three learning approaches. Surface approaches dropped considerably in the cases of Margaret and Mark. In Matthew’s and Matilda’s cases surface approach usage remained at their original levels. Deep approaches increased for all students except Matilda, who again maintained her original level of use. A marked increase in deep approach was apparent for Margaret and Mark. Small increases in the use of achieving approaches were noted for Mark and Matthew, and decreases of a similar magnitude were noted for Margaret and Matilda.

At the beginning of the course, no particular learning approach appeared to dominate for any of these students, with the possible exception of Mark. Mark’s initial achieving approach score, while mid-range in raw score terms, produced a decile of 9 on the corresponding SPQ norms. This high decile is however, an artefact produced because of his comparison with males in similar courses. Since...
all except three students in the current program were female, his achieving approach score would not place him in an exceptionally high grouping.

At the end of the program, three of these four students appeared predominantly guided by the use of a deep approach, and for two students, this was combined with an achieving orientation. Margaret modified her approaches such that the deep approach appeared to guide her learning, but with a moderate achieving approach maintained. Mark’s learning approach at the conclusion of the program was predominantly guided by a deep-achieving orientation. Matthew tended in a similar direction but to a lesser degree. His original level of surface approach use was maintained, but deep and achieving approaches both increased to an influential level. Changes recorded for Matilda in relative SPQ scores were minor and could well have resulted from error variance within the survey instrument. She retained her original mid-range pattern. The program thus appeared either positive or neutral in its effect for these students. Half of all the students (12) originally located in cluster 1B, moved to cluster 2A on the final administration of the survey indicating that this pattern was common amongst the mid-range cluster.

Descriptions of learning approaches, experiences and preferences of the students interviewed in this cluster have not been reported here because these influences have been previously illustrated by students representing the clusters with high surface, deep or achieving approaches. The students interviewed from the mid-range cluster all described similar approaches to learning, in varying combinations to those already reported. While their responses to the program modifications were also largely similar to students from other groups in varying degrees, unlike Alison or Sharon, no frustration was evident with the students in this cluster.
None reported any concern with requirements in the modified program. The use of journals, problem-based learning, portfolio assessment, group projects and the relative absence of exams were features of the course identified as highlights by these students. When asked if he had any advice on how we could improve the course in future, Mark responded:

Mark: We’re really understanding what we’re doing instead of just - you know - studying for a test and handing it in. And the way they’ve done that is the journals, - and, I like the journals, though it took me a year and a half to figure out to do them every week, journal’s a really good idea, that was a learning process there - and then even more so with - like, case studies and like we did this year - start of this first semester - you know - we did um journals and we did case studies. We did a learning portfolio up - you know - we did our philosophies up and so this - OK, anyone can write a philosophy, but then to actually explain why your philosophy is that, that’s your deep - that’s where your deep learning really comes through. So I’d stick with that. Don’t go back to the testing.

Margaret also described how the research had precipitated her own self-questioning and brought about an influence on her teaching as a result. While Margaret’s final interview was not recorded due to a failure of the recording equipment, notes of Margaret’s responses were written by the interviewer immediately at the conclusion of the interview, when the equipment failure became apparent. The following is an extract from those notes, in response to the final interview question.

Interviewer: Has the knowledge of being part of this research had any impact on you?

Margaret: Yes definitely! I am constantly asking myself how I am approaching learning. I don’t know if I’d have done that anyway, but when I came I hadn’t thought of different approaches to learning. Now I think about it constantly. It also has influenced how I am as a teacher because I think “How am I encouraging these children to learn?”
To a lesser extent, Matthew and Matilda reported minor influences. Matthew had also related the learning approach concept to his teaching by using it to decide whether children had understood his lessons, and how he managed to encourage that understanding. Matilda thought that the regular reference to the research purpose throughout the course had provided a background influence, but not an influential one.

The students who began with mid-range scores across all learning approaches responded to the program modification by either improving their deep approach usage and reducing surface approach usage, or by maintaining their original distribution of approach scores. Negative effects were not identified amongst this group.

6.4: Teaching Outcomes
Results in the final six-week practicum conducted in year 3 indicated that the students in the treatment group of the current study performed at particularly high levels.

*Their results in the practicum indicated the unusual strengths of this cohort with 15% of these students receiving the ‘Outstanding’ grade and 48% receiving the ‘Above Average’ grade. These results represented the highest achievement in any one cohort for many years* (White & Gordon, 2000, p. 288).

In her interview with the researcher, conducted at the conclusion of the course for this cohort, the course co-ordinator indicated that, in her experience with previous groups of approximately equivalent size, the achievement of between five and eight ‘Outstanding’ grades was the usual outcome in the final practicum. Eleven
‘Outstanding’ grades were allocated to the current cohort. Although she had not maintained a record of the prior attainment of ‘Above Average’ grades, it would be unusual for 63% of any cohort to attain ‘Above Average’ and ‘Outstanding’ grades for practicum performance.

These students also performed well in interviews with the New South Wales, Department of Education and Training (DET) conducted to determine their employability status. With two exceptions, all students in the cohort received employability status and some 35% of this group were identified as ‘targeted graduates’. Targeted graduates are graduating students identified for immediate employment during the next DET staffing operation. This result mirrors the high practicum outcomes and represents an unusually high result in comparison to past course experience (White & Gordon, 2000). In her interview with the researcher, the course co-ordinator made the following comments about the employability prospects of the course graduates.

Interviewer: And the outcomes you’ve mentioned to me, the percentage of them that became targeted graduates what -?

Co-ordinator: About twenty six out of the seventy three that were interviewed which were certainly the largest number that we’ve had and - you know - hopefully that will mean - I mean they will be employed I have no doubts about that [details of meeting with DET omitted].

Interviewer: You’re going to harass the Department on Friday?

Co-ordinator: What’s happened? Well I think they’re - you know - very foolish if they don’t pick up some. I think for example [details of one student] who would have been excellent for the Department and has just accepted a job with a Catholic School in [name of town] with Year 1. I still think if the Department came up with something [she/he]’d probably go with it, but I mean, I think some of these people quite rightly are being snapped up by other teaching organisations and groups and - you know - the Department will miss out on some quite stunning people.
The Course Co-ordinator was concerned that despite identifying many of these students as ‘targeted graduates’ the DET was slow in making them firm offers of employment for specific teaching positions. Earlier in the interview she qualified her statements about the unusually strong performance from this group, in terms of teaching outcomes and interview performance, with the comment that she was unsure how to attribute the outstanding results. She perceived that the results could have been because of the modified program they had experienced, or this cohort may have simply been an unusually talented group. She considered that her perceptions might also have been coloured by the fact that she had been involved with the current research project from its inception.

While these and other potential threats to validity identified by the course co-ordinator have been previously discussed in Chapter 4, two points are pertinent in the current context. Firstly, the teaching practice outcomes were based on recommendations made by the students’ supervising teachers in schools, who were unaware of the research being conducted. Their recommendations were then assessed by lecturers from the university, who may have belonged to any teaching team, and may or may not have been involved in the research project. Secondly, the interviews for the DET were conducted by a team of principals and senior teachers employed by the DET, who were independent of the university and unaware of the research. As these assessments emanated from sources outside the university, the absence of any awareness of the current research would have limited its influence on the judgements made. Such judgements conducted by external sources add weight to the view that the modified program appeared to have a very favourable effect for the students involved.
6.5: Chapter Summary
With only minor exceptions the students interviewed from each initial cluster grouping described learning intentions, behaviours and concerns consistent with the distribution of scores they had obtained across deep, surface and achieving subscales on the prior administration of the SPQ. Similar features of the major learning approaches were also displayed consistently through entries in student learning journals and other behaviours, such as interview attendance. The consistency of these findings across major groupings formed from the cluster analysis provides strong evidence of the concurrent validity of the SPQ with the intentions and study behaviours of students who participated in the present research.

Changes in cluster membership for each student across the course of the modified program indicated that, on the basis of SPQ profiles, most students either maintained their original learning approach or changed their approach in a direction desired by the program. The evidence provided by the interviews conducted at the conclusion of the program further suggested that, in many cases where a change in learning approach occurred, the modified program may have assisted that process. Despite evidence that the modified program led some students to struggle with requirements initially, no students were identified whose learning quality suffered as a result of the intervention.

Students interviewed with initially high surface orientations described gains in response to the program. All of these students interviewed had reduced their reliance on surface approaches and improved their use of deep approaches, and most had agreed that they had benefited from the program modifications. One
student in this group continued to demonstrate ineffective learning behaviours at the end of the program and this appeared to be driven by a low motivation to achieve. Despite some favourable changes in her SPQ scores, she displayed little effortful engagement with learning tasks.

Students who displayed initially high achieving approaches reported at interview considerably stronger gains from the program modifications than those students whose initial achieving orientation was low. Some students in this grouping reported that they easily adapted to the requirements of the modified assessments, maintaining high grades through the use of deep strategies. One student, who began with a relatively inflexible combination of high surface and achieving methods however, found the modified program provided considerable frustration early in the course. While her comfortable adaptation resulted in a lowering of her achievement goals, the quality of her learning may have nevertheless improved.

Those students who showed high deep approaches on entry to the course maintained that orientation throughout, without reporting interference effects from the program. These students were able to attain their learning goals through meeting the requirements of a program that encouraged them. Learning outcomes as indicated by final practicum performance and success at employment interviews, suggest that the changes in learning approach produced by the treatment program overall were highly successful in promoting quality learning.
7.1: Overview of Study Purpose and Data Collection Procedures
The central task undertaken in the current study was to create successive contexts for learning that might encourage students to reduce their reliance on surface learning approaches and progressively adopt deeper learning approaches in an undergraduate teacher education program. The achievement of this outcome was considered desirable in itself because the definitions of deep and surface learning approaches imply that those students who followed this pattern would exit the course having achieved higher quality learning than those who maintained high reliance on surface approaches.

It was expected that higher quality learning in a preservice teacher education program would translate into improved practice in the teaching role, and greater self-confidence in the teacher’s capacity to manage teaching tasks. For this reason, an increased use of deep learning approaches on behalf of the students in the course was expected to result in improvements to teaching self-efficacy. Because these personal beliefs would be based on a well-formed understanding of personal skills and task requirements, it was anticipated that the self-efficacy beliefs of the graduates from the program would be well-considered and realistic. Thus it was speculated that, as beginning teachers, they would demonstrate a greater resilience to the threats to self-efficacy documented to impact heavily on new entrants to the
teaching profession. The use of deep learning approaches was also considered likely to build students’ skill in the processes of self-regulation of learning, which may equip them with the knowledge and skills necessary to apply appropriate self-regulation in teaching.

The current study was limited to measuring the longitudinal development of these students from their entry to university until completion of their course. Developmental trends in learning approaches and teaching efficacy, in response to modifications applied to the teaching and learning context, were the principal foci of this investigation. The students’ further development as teachers would need to be the subject of future investigations.

7.1.1: Development and Implementation of Program Modifications

Altered learning contexts were developed through the application of action research methodology involving core members of the teaching team, and with periodic participation of other lecturers who taught single subjects within the course. The researcher’s role in the action research group changed over the course of the study, in line with Zuber-Skerritt’s (1992, 1993) developmental model. The researcher assumed responsibility for negotiating change and generating alternatives in the early stages of the program, followed by a gradual withdrawal from this role as the responsibility assumed by other team members grew. The researcher moved through the roles of facilitator, consultant and collaborator within the action research group, over the course experience of Cohort 2.

Modifications were made explicit to the students and applied pervasively throughout the program, within and across subjects, and with linkages created
across semesters. The major goals of the research, and the lecturers’ intended approach to teaching, were also explicit to the students. Regular feedback was provided to the students and lecturers, from a whole-group perspective, to inform them of their progress toward the goals and the students were repeatedly challenged to examine their learning approach in their response to learning tasks. These efforts were made in order to influence ‘presage’ factors in Biggs’ (1993a) ‘3P model’ of teaching and learning in an attempt to foster students’ and lecturers’ perception of the learning environment as one in which deep approaches to learning were unambiguously favoured.

These processes were also intended to impact on each stage of the self-regulation process applied to learning, as described by social cognitive theory (Bandura, 1986, 1991b). The explicit goals of the research and teaching intentions were designed to influence students’ forethought in goal setting and strategy selection. The explicitation of the project goals and the challenges made for students to examine their learning approach during task completion, represented attempts to refocus students’ attention during self-monitoring of task performance from the achievement of end-products, to engagement in quality learning processes.

Lecturers’ feedback to students on completed tasks was often focused on evidence of learning process as well as product. The process feedback attempted to influence students’ self-evaluation and self-reactions so that engagement in deep learning methods was increasingly considered as part of student forethought as they approached subsequent tasks. A cyclic growth in the use of deep learning approaches was thus intended, in line with Zimmerman’s (1998b) view of self-regulated learning cycles. Further feedback of group responses to the goals of the
research project was designed to influence students’ and lecturers’ self-evaluations and self-reactions as they judged their progress towards longer-term goals.

Modified learning activities were designed with a heavy focus on co-operative small-group problem-based learning, which included multiple subtasks requiring variable outcome presentation modes including essays, seminars, presentations, teaching performance, and the production of simulated authentic documents such as newsletters. Some presentations were to a variety of audiences including peers, other student groups, practising teachers and other faculty members in the form of pseudo conference papers and poster sessions. In conjunction with group tasks, linked individual reflection was encouraged by the use of personal learning journals and learning portfolios. In many of these tasks students were required to provide critical analyses of their own learning processes used during the completion of the tasks, from individual and group perspectives. Methods of assessment used included lecturer, peer and self assessment, depending largely on the nature of the learning task. Often assessment methods were integrated so that subtasks within larger ones were assessed using combinations of methods. On other occasions, multiple methods were used with single tasks.

Practicum performance was partly governed by the creation of personal learning objectives established individually by the students from their identification of personal strengths and weaknesses and from developmental reports provided by mentors in earlier practicum experiences. Every practicum experience was linked with an academic component and for three of the four practicums these components were further linked with companion subjects, either through common
assessment tasks or by a full combination of the subjects. The academic components of the practicums and linked subjects provided a further focus for the development of personal practicum objectives. Individual case-based projects completed during practicum experiences were required by the linked academic subjects.

The contextual features created by the manner of subject delivery and task requirements represented attempts to intervene at the ‘process’ level in Biggs’ ‘3P model’. The intentions behind these interventions were to provide learning contexts that were logically related to the interventions applied at the ‘presage’ stage, to facilitate the adoption of deep learning approaches, and to obviate the application of surface approaches. Because of the dynamic and interactive relationships between stages in Biggs’ model, logical consistency between ‘presage’ and ‘process’ was further intended to reinforce student perceptions of the learning environment as one that required the application of deep learning approaches (Entwistle, 1986; Prosser & Trigwell, 1999). The logical connections in the program developed were seen as consistent with Biggs’ (1996) concept of constructive alignment which he has emphasised as central to the encouragement of deep learning approaches in later writings (Biggs, 1999, pp. 25-27).

From a self-regulatory perspective, these interventions in the learning context were designed to impact on students’ processes of self-evaluation and self-reflection following performance in required tasks. These processes would inform future goal-setting, strategy selection and self-efficacy considered during forethought for future tasks. It was anticipated that some of these students might have a poorly developed sense of self-efficacy for the use of deep learning
approaches. They may have held higher self-efficacy for the use of surface-
achieving approaches, given the nature of the learning context created by their
immediately prior high school experience and their successful matriculation. It
was therefore considered critical that students’ early engagement with the learning
tasks was undertaken in a supported environment with sufficient instruction,
modelling and formative feedback provided so that early phases of self-regulatory
cycles would be non-threatening, leading to a building self-efficacy for the
application of deep learning approaches.

Direct intervention at the ‘product’ stage of Biggs’ ‘3P model’ was not considered
feasible since learning outcomes are the result of the interactive engagement of
‘presage’ and ‘process’ stages in the model. Through the interventions applied at
earlier stages however, indirect attempts were made to influence the ‘product’
stage by encouraging self-evaluation of learning outcomes from the students’
perspective, and of teaching outcomes from the lecturers’ perspective. Through
feedback pathways from ‘product’ to ‘presage’, students and lecturers were
encouraged to evaluate learning outcomes as satisfying, when evidence was
available of meaningful integration of material, metacognitive consideration of
teaching and learning processes, and where performances in teaching roles
indicated linkages to theory and personal reflection. The encouragement of self-
evaluation with explicit linkage to course-based goals of encouraging deep
learning approaches, was also seen as consistent with fostering appropriate self-

Learning approach theorists (Biggs, 1993a, 1999; Entwistle, 1986, 1998; Prosser
& Trigwell, 1999; Ramsden, 1992, 1997) contend that learning outcomes attained,
bear a direct and substantial relationship to the approach students adopt in pursuit of those outcomes. They further contend that the approach adopted is a result of students’ intent, which in turn is largely influenced by their perception of the learning context. The aim of the present study therefore, was to construct an achievable, integrated, course-based ecosystem (after Biggs, 1993a) within the constraints applying to a university course in a naturalistic environment (Ramsden, 1994), that through repeated cycles of operation, would influence students to adopt deep learning approaches and abandon surface approaches. The students’ cognitive processes applied through these repeated cycles were interpreted in accordance with the operation of self-regulatory internal logic (after: Bandura, 1986, 1991b; Zimmerman, 1989, 1998b).

7.1.2: Research Design and Sources of Data

The research design employed longitudinal quasi-experimental methods across three cohorts of students studying a preservice, early childhood teacher education degree program at a single university in rural Australia. The students comprising Cohort 1 represented the contrast group who principally followed a traditional program. Cohort 2 was the main treatment group to whom the modified program was presented throughout their three-year course. Cohort 3 represented a comparison group enabling a partial replication of the study across their first two years.

Student data were gathered from multiple sources including repeated measures on the non-equivalent dependent variables (Cook & Campbell, 1979) of learning approach, teacher efficacy and attributions for academic success and failure. In addition, reflective journals, field observations and transcripts of interviews taken
at the beginning and conclusion of the course for selected students from Cohort 2, were used to clarify students’ approaches to learning and their responses to program modifications. Staff data included responses to the approaches to teaching inventory and an interview with the course co-ordinator, both taken at the conclusion of the study.

Confirmatory factor analyses were conducted with each of the survey instruments administered to the students and subsequent modifications were made to improve their construct validity in the context of the current study. Each of these instruments was developed for use with diverse groups in broad contexts. Their suitability for application with the relatively homogenous group in the specific context of the current study required scale modifications. As a result of the confirmatory factor analyses, the deep and surface, motive and strategy subscales of the SPQ (Biggs, 1987b) were combined into single scales measuring deep approach and surface approach respectively, and the achieving motive subscale was deleted from the analysis. The personal and general subscales of the TES (Gibson & Dembo, 1984) were modified by the deletion of two items that loaded poorly on their respective subscales. The four attribution measures of ability, effort, context and luck were selected from the achievement subscale of the MMCS (Lefcourt, 1981), because the two-dimensional construct of internality and externality, originally suggested by Lefcourt, was not supported by confirmatory analysis.

These modifications produced instruments with acceptable goodness of fit statistics for the data obtained from students in each year of study. Some problems with reduced reliability of the surface approach subscale of the SPQ and the
general teaching efficacy subscale of the TES remained, however, with first-year students. Interpretation of the results obtained from these measures with first-year groups needed to be interpreted in light of these limitations.

Students from Cohort 2 were selected for interview on the basis of an hierarchical cluster analysis conducted on year 1 data provided by the original SPQ scores, prior to the scale modifications outlined above. These clusters represented the use of varying combinations of surface, deep and achieving approaches to learning. Students were identified for interview because they displayed distribution of scores typical of their respective cluster. Interviews were then conducted with these students in year 1 and year 3. Additional qualitative data from their year 1 reflective learning journals were also examined. A further cluster analysis was undertaken with year 3 data for Cohort 2, enabling the movement of all students from initial to destination clusters to be tracked.

Interview data and journal entries were analysed according to emergent themes and key words condensed to form thematic matrices (after Miles & Huberman, 1994) and supported by field observations. These data were then compared with the students’ individual SPQ scores to assist in the determination of the study’s internal validity, through the triangulation of findings from multiple data sources (Burns, 2000, pp. 419-420). Data from students whose SPQ scores indicated a change in learning approach from year 1 to year 3 were further examined and compared to those students whose responses indicated little change, in order to provide further insight into the differential impact of the program modifications.
Fidelity of implementation was investigated by measuring the approaches to teaching of the principal staff at the conclusion of the study using the Approaches to Teaching Inventory (Prosser & Trigwell, 1993, 1999), an interview conducted with the course co-ordinator and an examination of subject outlines which describe subject structure and assessment procedures.

7.2: Discussion of Major Findings

7.2.1: Learning Approach
The initial research question sought to investigate whether the altered learning contexts applied in the current study could effect a change in the learning approaches adopted by the students in the course. Specifically, the study sought to examine whether the use of surface approaches could be reduced and deep approaches increased, and how these trends would be represented across the duration of the course.

Results from the MANOVA applied to the learning approach data for Cohorts 1 and 2 revealed that the students in Cohort 2 responded differently from the students in the contrast group (Cohort 1). From a multivariate perspective, both groups began their course reporting a heavy reliance on the use of surface learning approaches, but the main treatment group (Cohort 2) completed their course with their learning engagement largely guided by the use of deep approaches. While the students in Cohort 1 also modified their use of these learning approaches in a favourable direction, indicated by some convergence of deep and surface approach scores, compared to Cohort 2, relatively minor change was reported.
Univariate analyses of these results indicated that students in Cohort 1 reduced their surface approach use in the latter half of their course. This change was statistically significant ($t = 2.61, p = .012$) and represented a shift of slightly more than a third of a standard deviation in mean scores ($d = .39$), suggesting a small to medium effect (Cohen, 1988, 1992). Although they displayed a trend of rising use of deep approaches, this change was not statistically significant and produced a small effect ($d = .17$). Thus some change was reported by students in Cohort 1 in the relative use of deep and surface learning approaches, but these were generally small overall, mainly affecting the use of surface approaches in the latter half of their course.

Some contamination of the traditional program from the modified program was noted during the final year of the course for Cohort 1. Some of the lecturers, who applied program modification to Cohort 2, also subsequently taught Cohort 1. Their perception that the teaching methods used with Cohort 2 represented improvements to the traditional approaches, led them ethically to apply some of the modifications during their teaching with Cohort 1 (see Chapter 4, section 4.6.1.6). It was expected that the extent of the contamination would have been small, because modifications to the traditional program for Cohort 1 occurred only following their first use with Cohort 2. They may have affected Cohort 1 in their final year, however, and since this was the period of most substantial change in the learning approaches used by Cohort 1, the extent to which these changes represent responses to the traditional program is unclear.

The pattern of learning approach development demonstrated by the Cohort 1 results in the present study are in line with previous research (Marton et al., 1993;
Regan & Regan, 1995b; Vermunt, 1996), which suggests that students typically enter the first year of university using predominantly surface approaches, especially when they have progressed directly from their final year of secondary education. There is some evidence in the literature that high levels of surface approach are subsequently maintained throughout the students’ course experience (Entwistle & Tait, 1990; Gow & Kember, 1990; Marton & Saljo, 1997; Ramsden, 1987; Watkins & Hattie, 1985), with other studies indicating that initially high surface approaches are reduced in favour of increasing deep approaches in later course years (Eklund-Myrskog, 1997; Marton et al., 1993).

Univariate analyses conducted with the Cohort 2 data indicated a pattern of considerably greater change than had occurred with Cohort 1. Surface approach usage underwent rapid decline with Cohort 2, and this decline was continued throughout the term of the course. The reduction in the use of surface approaches across the full three years of the course was highly significant (\( t = 7.72, p = .001 \)) and represented a large effect size of more than one full standard deviation in mean scores (\( d = 1.08 \)). In their first three semesters, students in Cohort 2 reduced their use of surface approaches to almost the same extent as the reduction evident with Cohort 1 across the full six semester program (\( t = 2.58, p = .013, d = .36 \)). This pattern was continued in the final three semesters with Cohort 2 students reporting an even more rapid decline in surface approach usage and a medium to large effect size (\( t = 3.98, p = .001, d = .78 \)).

Coupled with reducing use of surface approaches, the students in Cohort 2 also reported a growth in their use of deep approaches. This growth was evident however, only in the latter half of their course, with no change reported during the
first three semesters. In the final three semesters of the program Cohort 2 students reported a medium to large increase in their use of deep approaches \((t = 3.00, p = .001, d = .63)\). These findings are also consistent with previous research which indicates that responses to modified programs designed to promote the use of deep approaches may impact on surface approaches in the short-term without discernible improvement in the use of deep approaches (Ramsden, 1992; Trigwell & Prosser, 1991a). Improvements in deep approaches are suggested to involve latency effects and are most likely to be noticeable only over the long-term. Indeed Vermunt (1998), suggested that changes in learning behaviour may need to precede changes in learning orientation toward a more constructivist view.

These results indicate that changes in the use of learning approaches occurred in the treatment group, in the predicted direction, that the effect of these changes would be readily noticeable (Cohen, 1988) and were unlikely to have occurred by chance (Wilkinson, 1999). The pattern of development in learning approaches also differed in the desired direction within the treatment group, compared to the contrast group. This pattern of initial reductions in surface approach followed by delayed gains in deep approach was consistent with previous findings reported in the literature.

While the difference in learning approach development between these cohorts is a necessary condition to conclude that the modified learning context was helpful in improving quality learning amongst Cohort 2, by itself it is insufficient as a basis for attributing the cause of the observed effect to the intervention. The attribution that the changes in learning approaches in Cohort 2 were caused by the modified teaching program also depends on the extent to which the modifications impacted
pervasively on the students, the relative impact of other extraneous factors that were not controlled in the study, and the ability of these findings to be replicated (Thompson, 1999). Evidence of the pervasiveness of the program and the impact of extraneous variables was provided by the data concerned with the fidelity of implementation, the information obtained through interviews and other qualitative data gained from the students in the treatment group, and the differential impact noted on the non-equivalent dependent variables used in the study. The partial replication of the findings with Cohort 3 also provided evidence to assist in the determination of cause and effect (Yin, 1994).

Data obtained concerning the fidelity of implementation indicated that lecturers of core subjects within the program held views about their approaches to teaching that were principally guided from a constructivist frame at the conclusion of the course. These were derived from the administration of the ATI and were consistent with the development of deep learning approaches among students, identified in earlier research (Prosser & Trigwell, 1997, 1999; Trigwell & Prosser, 1996b; Trigwell et al., 1999). Some evidence that the approaches to teaching from these staff members may have changed in response to the implementation of the program modifications applied in the study was provided by the course co-ordinator. Differences were noted on her ATI scores at the conclusion of the course, compared with those obtained from an earlier version of the instrument administered at the beginning of the course. Additionally, during the interview conducted with her at the conclusion of the course, she identified changes that had occurred in her own approach to teaching and indicated that similar development had also occurred with other members of the principal teaching staff as a result of the program.
During her interview, the course co-ordinator also indicated that the intervention was applied pervasively across the course and that, from her view, it had impacted on the students’ learning behaviour and perceptions of the learning environment. She identified, for example, the cohesiveness of the students in Cohort 2 and their willingness to assist one another in their learning, as features distinct from the competitiveness apparent in earlier cohorts. She also indicated that these students held expectations that modifications such as co-operative learning and peer assessment approaches would be applied in subjects studied and that the students in Cohort 2 would, for example, question the application of assessment approaches that did not include student input.

An examination of the outlines of subjects modified for Cohort 2 indicated general compliance with the Biggs’ (1996) principle of constructive alignment. By the course co-ordinator’s quotation from an advance copy of Biggs’ (1996) paper in the subject outline of one of the early core subjects studied by Cohort 2, some evidence is provided that constructive alignment formed a guiding principle from the beginning of the program with Cohort 2. All students selected for interview indicated that they were aware of the research project and its purpose. Several students stated that they had thought about the research purpose and had actively monitored their learning to increase their use of deep learning approaches. Others stated that their awareness of the continuing research was stimulated only when the researcher provided the planned feedback sessions, but many of these students had noted that they had adjusted their methods of learning in response to the teaching methods, assessment techniques and their perceptions of the lecturers’ requirements.
In her interview, the course co-ordinator reported that the students in Cohort 2 were noticeably different from previous cohorts of students in the same course, both in their behaviour as students, and by virtue of the higher levels of teaching skill they had demonstrated during practicum placements. While she suggested that these differences could have been the result of the modified teaching context applied in the study, she also identified several other possible explanations. Staff perceptions may have been different because of their involvement in the research resulting in a form of experimenter bias. The cohorts may have differed from the beginning of the program, with Cohort 2 presenting as a more able group. The students in Cohort 2 may have shared a special bond because they were the final cohort of the existing course, with subsequent cohorts enrolling in a newly designed program. One of the program modifications applied, brought the production of professional curriculum vitae forward to a time prior to the final practicum and this may have focused the students' attention on professional issues during the final practicum more than earlier cohorts, leading to improved teaching performance. Since these potential threats to the internal validity of the study were made by the staff member most closely associated with the students throughout their program, they needed to be carefully considered as possible alternative explanations for the observed effect.

The principal basis for the identification of a difference between Cohorts 1 and 2 came from the surveys completed by the students, and these data were supplemented by student interviews, the findings from which were consistent with the survey data. The effect on learning approach identified in the study was thus derived from student perceptions, rather than staff perceptions. While it is likely
that staff perceptions did alter during the course of the study, these would have had little effect on the measures used.

Potential cohort differences in learning approaches were considered during the analysis of data. Some small differences in the entry values for deep and surface approaches between Cohorts 1 and 2 were noted, but these were not statistically significant. The relative strength of deep and surface approaches was similar for the contrast and treatment cohorts on entry to the program. The mean tertiary entrance rank (TER) for Cohort 1 was 62.1 ($SD = 11.2$, $n = 34$) and for Cohort 2 was 55.6 ($SD = 12.3$, $n = 31$). While the TER was available for only some of the students in each cohort (see Table 4.8), the two distributions suggest that it would have been unlikely for Cohort 2 to have been a more able group on entry to the course.

The students in Cohort 2 represented the final group in the three-year, Bachelor of Teaching degree. Cohort 3 and subsequent cohorts enrolled in the new four-year, Bachelor of Education course. During their interviews, some students did mention that they felt privileged to have completed the three-year program because of the practical focus of several elective subjects which were available to them in the final semester of the old course, but were no longer available in the new course. They reported that they pitied the students enrolled in the new course because they would have fewer opportunities to build practical skills than the students in Cohort 2 had received. Since the contrast group and the treatment group completed the same course, no practical difference in terms of subject availability existed between them. Some qualitative difference could have existed as
suggested by the course co-ordinator, since the students in Cohort 2 clearly were aware that they represented the final group.

The partial replication of the study with Cohort 3 however, produced similar effects to those identified with Cohort 2, across the first three semesters of the new program. Thus, despite the changes to the course structure impacting heavily on the comparison group (Cohort 3), very similar patterns of change were noted when compared with the main treatment group, and similar differences were noted when compared with the contrast group. Since Cohort 3 would not have been affected by the same unusual conditions as those potentially affecting Cohort 2, it would appear unlikely that feelings associated with being the final group in the course impacted on the learning approaches used in the main treatment group.

The final threat to the internal validity of the study suggested by the course co-ordinator concerned the relocation of the requirement for the students in Cohort 2, to produce curriculum vitae earlier in the program, prior to the final practicum. Since this was one of the modifications made for the treatment group, for the purpose of increasing the students’ incentive to engage in reflective practice during their final practicum, the impact of this change would be considered as a treatment effect, rather than a threat to validity. It is considered unlikely nevertheless, that any one of the modifications made in the program would have been so powerful as to outweigh the effect of the others. The relative effect of any single modification cannot however, be determined in the present study. Rather, the cumulative effect of multiple modifications on student perceptions of the learning environment was considered necessary to produce the sustainable effect on learning approaches in the long-term.
Two remaining threats to the validity of attributing the changed learning approaches observed in Cohorts 2 and 3 to the modified learning contexts were also considered. One of these represented the potential for Hawthorne effects and the other was brought about by changes in staffing over the period of the study, which may have led to spurious outcomes in the treatment, contrast and comparison groups.

An attempt was made in the research design to partially control for Hawthorne effects and to enable the estimation of their likely impact. Since the application of altered learning contexts was made explicit to the students, as were the anticipated effects on learning approaches, and since the group responses to annual survey administrations were reported to the students as a feedback mechanism, the potential for Hawthorne effects to mimic the desired outcomes of the study was considered a major threat. It was not considered likely that actual behaviour change in relation to methods of study would have been sustained in the long-run, simply by virtue of the students’ knowledge of the study’s purpose. The students may however, have altered their behaviour initially and continued to report such changes, or exaggerated the changes, in surveys completed during the latter part of the program.

The partial control was implemented by providing information about the purpose of the study and feedback concerning survey outcomes to the contrast group in a similar way to the manner in which the treatment and comparison groups were informed. This process however, provided only a partial control mechanism because modifications to the learning context were not applied to Cohort 1 (see Chapter 4, section 4.6.2.2). The estimation of the impact of Hawthorne effects
was made through the inclusion of non-equivalent dependent variables, specifically the subscales of the MMCS. The MMCS measures causal attributions that were anticipated to exhibit relative stability over the course of the study, but this information was not reported to the students or the lecturers involved in the research project. Should they be present, Hawthorne effects were expected to impact on the MMCS subscales similarly to their impact on the measures of learning approach. Thus significant change in measures of causal attribution by the treatment group may have indicated the presence of a threat to internal validity. Since no statistically significant changes in any of the four subscales of the MMCS were observed for any cohort over the course of the study, it was concluded that Hawthorne effects were unlikely to have operated in the present study. According to Cook and Campbell (1979 pp. 118-120) the application of non-equivalent dependent variables in this way strengthens quasi-experimental design and enables the exclusion of most threats to internal validity.

Student descriptions of their study behaviour during interview were highly consistent with their reported behaviour on the surveys. Observations reported by the course co-ordinator during her interview also indicated actual changes in study behaviour by the students in Cohort 2, consistent with the survey and student interview data. Derived from multiple sources, these data produced triangulated evidence that, because of its consistency, improved confidence that the results obtained from repeated survey administrations genuinely reflected changes in students’ approaches to learning.

The composition of the teaching staff within the program remained relatively stable over the course of the study with only two changes in the core teaching
team during the four-year period in which the research was conducted. The first change occurred when a long-term vacant position was filled at the beginning of 1996. This new, inexperienced staff member taught Cohort 2 students during their first year, in conjunction with the course co-ordinator. She was part of the original action research team but retired due to illness after only one year on staff. Her position remained vacant throughout 1997 and was again filled at the beginning of 1998 by an experienced lecturer who transferred from another university. This second change affected Cohort 2 in their final year of study, but neither of the new staff members taught Cohort 3 during their time in the research project. Both changes therefore may have affected Cohort 2, but not Cohort 3. Therefore, since the results obtained by the partial replication of the study with Cohort 3, showed similar patterns of development across the first three semesters to those obtained with Cohort 2, it is considered unlikely that these minor staffing changes impacted unduly on the study.

None of these threats to internal validity appeared to represent a likely alternative explanation to the effects on learning approach observed in the current study. It was therefore concluded that the most plausible explanation for the differential development in learning approaches experienced by the students in the contrast, treatment and comparison groups, was as a result of the treatment applied.

The program modifications, as expected, produced differential effects with individual students. Changes in membership of cluster grouping from year 1 to year 3 suggested that almost half of the students who remained in the program derived some benefit measurable by the surveys conducted. These students either reduced their use of surface approaches, raised their deep approaches, or both.
They were largely from initial clusters that were characterised by high surface or achieving approaches. No clusters in the year 3 analysis were characterised by a predominance of surface approach usage, while 3 clusters, comprising 20 students, were so described in the initial cluster groupings in year 1.

Another group of approximately equivalent size appeared to demonstrate little change as a result of the program modifications. These students were drawn largely from initial clusters that were characterised by even distributions of moderate strength across all learning approaches, clusters characterised by high initial deep approaches, or those with low initial achieving approaches. None of the students who began the program reporting a high use of deep approaches were affected adversely. Only one student appeared to modify her learning approach in a manner considered unfavourable. While she reduced her surface approach and raised her initially low deep approach usage in line with the aims of the study, she also reduced her achieving orientation leading to a final pattern of apparently lowered engagement with the learning environment.

Student interviews revealed that characteristics of the modified program such as: the formation of clear links across subjects; links between theory and practice; the use of reflective journals; problem-based learning; co-operative small group approaches; the reduction in formal examinations; student presentations; peer assessment methods; the explicit goals of the research project; and the feedback provisions for students, were all cited as factors contributing to the enhancement of students’ learning approaches. The approachability of the lecturing staff was also cited by students across clusters as a feature that enhanced their learning engagement.
These factors were identified as positive in all clusters, with the exception of the cluster characterised by a low achieving orientation. This latter group of two students reported that they remained largely unaffected by the modified program. Their reduced desire to achieve appeared to militate against any incentive to genuinely engage with their learning. Of two other students who expressed discomfort in their interactions with some learning tasks, one was drawn from an initial high surface cluster, and the other from a high surface-achieving cluster. Both of these students struggled with the problem-based learning tasks in the first half of the course, and one experienced considerable difficulty with the reflective journal task. Both students eventually managed to accommodate the new processes but experienced, at times, considerable frustration in attempting to do so. Apart from these four students, all others interviewed from all clusters; expressed largely positive views in response to the modifications applied and reported that their learning had benefited from the program.

From the perspective of Biggs’ ‘3P model’, presage factors, including students’ entry perceptions of the learning environment, were altered for many students involved by the presentation of the adaptations made to the learning context. Possibly because teaching intentions were made clear, with an explicitly stated goal of providing the students with the opportunity to modify their methods of learning engagement, they were tentatively able to suspend prior expectations about methods of successful process. Their perceptions appeared to be further developed in the desired direction by their engagement with compatible processes, through modified learning tasks and methods of assessment. Periodic feedback provided from survey data appeared to be convincing to the students and allowed them to gauge their progress toward the stated process goals, encouraging further
suspension of prior expectations. Learning outcomes, in terms of teaching practice performance and performance at interview, showed strong skill development, though these were not specifically compared to the contrast group in the current study.

From a self-regulatory perspective, evidence that the goals of the research affected forethought, performance monitoring, and self-reflection was provided in the interview and journal responses of those students who showed strong gains in the use of deep approaches and those students who began the course using high levels of deep approaches. Adjustment of goals because of lecturers’ explicit preference for deep learning approaches was reported by some students who began the course with high achieving orientations, moderate levels across all approaches, and one student who initially relied heavily on surface approaches. The students interviewed who began the course reporting high deep approaches described processes of self-monitoring during learning tasks with an analytic purpose to assess their own compatibility with the stated learning approach goals. This process was then reported to be followed by periods of self-reflection on learning to inform any necessary modifications to personal goals in future learning engagement. Some evidence was therefore provided by these students that self-regulatory processes may have been involved in facilitating adjustments to students’ learning approaches predicted by Biggs’ ‘3P model’.

7.2.2: Teaching Self-Efficacy
The second major focus of the present study sought to investigate whether the changes identified in learning approaches affected students’ perceptions of their competence in performing the tasks required of teaching, and their perceptions of
the ability of teachers generally to impact on student learning and behaviour, despite other influences. The study sought to examine specifically whether growth in the use of deep approaches and reductions in the use of surface approaches would be associated with, and lead to a strengthening of, students’ personal PTE and GTE. Strengthening of the PTE dimension for Cohort 2, compared with Cohort 1, was considered more likely as a result of improved quality learning produced by greater reliance on deep approaches (Biggs, 1993a, 1999; Prosser & Trigwell, 1999; Ramsden, 1992). The GTE dimension was expected to remain relatively more stable across the course for both cohorts because it was anticipated that students of teacher education would have held relatively high initial expectations of teachers’ general impact on learners (Gorrell & Hwang, 1995; Herbert et al., 1998; Walker & Richardson, 1993).

The MANOVA used to investigate the developmental pattern of scores obtained from repeated administrations of the Teacher Efficacy Scale indicated that PTE and GTE for all cohorts followed a similar sequence. Little change in either efficacy dimension was noted in the first half of the program, but strong growth in both dimensions was observed in the latter half of their course. The first half of the course focused principally on the development of basic teaching skills and initial orientation into the teaching role during practicum placements. The latter part of the program provided increasing experience in classroom teaching within a framework of greater responsibility for teaching tasks and a course-work focus on the development of advanced teaching skills. It is not surprising therefore that greater involvement in multiple teaching tasks and progressive mastery of basic skills were associated with stronger growth in teaching self-efficacy. This pattern of development is consistent with Bandura’s (1986, 1997) view that mastery
experiences provide the strongest influence on developing concepts of self-efficacy. Early stages of a teacher education program would rely more heavily on techniques of verbal persuasion and modelling to inform developing self-efficacy, which according to Bandura, represent weaker influences.

The expected pattern of higher scores being demonstrated by Cohort 2 in the development of the PTE dimension on the Teacher Efficacy Scale did not emerge. Despite a larger effect size in the growth of PTE for Cohort 2 ($d = .78$), the difference between their pattern of development and that of students in Cohort 1 ($d = .48$) was not statistically significant. Thus this apparent difference could have resulted from chance effects or as an artefact of the significant cohort difference in PTE, identified between these groups. Cohort 2 reported higher PTE scores than Cohort 1, across all occasions when survey data were collected. Alternatively increases in PTE by Cohort 2 may have been concealed by scale ceiling effects.

The development of GTE followed a similar pattern, with no change in the first half of the program, followed by strong growth for both cohorts in the final stage of the course. It seems that for both groups, the perception of teachers’ ability to overcome other influences on children’s learning and behaviour, developed in consort with student teachers’ developing perceptions of their personal competence in performing teaching tasks. No cohort differences were found with this belief construct. Though the size of the effect appeared again to be greater with students in Cohort 2, the difference between the growth in GTE for Cohort 1 ($d = .37$) and that reported by Cohort 2 ($d = .74$) was not statistically significant. Thus, potential chance effects could not be excluded.
The perception of GTE as being a relatively more stable belief is not substantiated from the current research. It appeared that as students developed their beliefs in their own competence, a concomitant view of teachers’ influence in general also grew. The development of these two dimensions in consort is a positive outcome insofar as concordance in personal and general efficacy, especially at higher levels, is reported to assist teachers’ resilience to pressures within the profession (Ashton & Webb, 1986; Bandura, 1997; Labone, 1995).

Investigation of the relationships between the teacher efficacy and learning approach variables however, identified differences in the manner in which PTE, in particular, was developed in these cohorts. Path analysis of the inter-relationships between the learning approaches used by Cohort 1 and their contribution to the PTE and GTE developed by the conclusion of the course, indicated that the students’ approach to learning had a minimal influence on either dimension of teaching efficacy. Together, the use of all three learning approaches across all years of study, explained approximately 7% of the variance in final PTE scores and 5% of the variance in final GTE scores, for Cohort 1. The way students in this cohort went about their learning had little relevance to the development of their beliefs in personal teaching competence or general teaching influence. Other influences, such as modelling and mastery experience during practicum placements, may have informed their personal efficacy beliefs, but these were not investigated in the current study.

These relationships differed amongst Cohort 2, with a significant path identified from the use of deep learning approaches to final PTE, largely contributing to the 36% of the variance in PTE explained in the analysis (see Figure 5.7). The
relationships between learning approaches and GTE remained similar to those for Cohort 1, explaining again only 5% of the variance in this variable. The development of beliefs about personal teaching competence among students in Cohort 2 was informed to a considerable extent by their use of deep learning approaches. Other influences such as modelling and mastery experiences may well have contributed further to their perceptions of PTE and may have remained the principal influence in the development of general efficacy beliefs.

Further investigation into the developing relationship between the use of deep learning approaches and PTE indicated that for Cohort 2, the use of a deep approach directly informed PTE in each year of the course. The strength of this influence was equal to, if not greater than, the influence of prior beliefs about teaching self-efficacy on each occasion, and together these influences explained some 43% of the variance in PTE at the conclusion of the course. Investigation of indirect effects on PTE from years 1 to 2 and years 2 to 3 additionally indicated that the influence of deep approaches on the growth of PTE met the criteria for the operation of a mediating variable (Baron & Kenny, 1986) in both developmental sequences. The strength of the mediation effect of deep approach on PTE was also noted to grow throughout the course for Cohort 2. Thus, it was concluded that the influence of deep approaches on the development of PTE was at its strongest during the final year, the period of greatest growth in PTE.

No similar relationships were identified between the use of deep approaches and the development of PTE with Cohort 1. Only the use of surface approaches influenced PTE in this cohort, mainly during their second year of study, and with some influence in the third year. These effects were direct and no approaches to
learning measured by the SPQ mediated the development of PTE. It appeared that the development of PTE in Cohort 1 was principally influenced by PTE beliefs held in previous years, and other factors not investigated in the current research.

These findings indicate that the development of PTE in Cohort 2 was strongly and increasingly influenced by the use of deep learning approaches, but this influence was not evident in Cohort 1. Despite, the apparent similarity between these cohorts in the quantitative measures of PTE, qualitative differences in the development of the construct may be represented by the learning approaches contributing to its development.

Learning approach theorists maintain that students who use deep approaches to their learning achieve higher quality learning outcomes (Biggs, 1999; Entwistle, 1998; Prosser & Trigwell, 1999; Ramsden, 1993a). Such outcomes, by definition, are based on a meaningful understanding of the focus of the learning. In this instance, with the focus of learning being teaching, the theory implies that students who used deep approaches would develop greater understandings and more detailed perceptions of the multiplicity of tasks that comprise teaching. These students would construct well considered declarative, procedural and conditional knowledge (Biggs, 1993a, 1999). In such circumstances, their perceptions about their own competence in performing teaching tasks may take a different perspective from those who followed surface approaches.

Self-efficacy beliefs depend to a large extent on an individual’s perception of the task and the personal requirements necessary for its successful performance (Bandura, 1997; Zimmerman, 1998a). Evidence reviewed from the research
literature suggests that students who use different approaches to learning conceptualise the learning environment differently (Clarke, 1996; Dart et al., 1999; Entwistle & Tait, 1990; Ramsden, 1987; Trigwell & Prosser, 1991b). Some evidence was also reported which suggested that students who vary in their use of approaches to learning, similarly form different conceptions of the teaching environment (Christensen et al., 1995). Thus, those students who engaged in deep approaches to learning may have formed fundamentally different conceptions of the tasks of teaching and the necessary personal requirements to execute those tasks.

Students who developed a high sense of personal efficacy under these circumstances may demonstrate a greater resilience to the pressures of teaching and a greater capability in meeting the complex requirements of successful teaching. These capabilities may include an improved capacity to self-regulate in practice and to use problem-solving processes in novel settings. Students who engaged in their learning through the use of surface approaches may have developed superficial notions of teaching and learning, conceiving of the process in transmission terms (Christensen et al., 1995). Because their learning approach was likely to consist principally of the limited reproduction of declarative and procedural knowledge (Biggs, 1999), their performance in novel or challenging circumstances may be less than ideal, placing their personal efficacy at risk, especially during the early stages of their teaching careers (Ashton & Webb, 1986; Loughran, 1996; Wideen et al., 1998).

Students in Cohort 2 reported a similar pattern of teaching self-efficacy development to students in Cohort 1, but the students in Cohort 2 informed their
developing PTE from their use of deep learning approaches, a relationship not evident in Cohort 1. Higher usage of deep learning approaches was chosen by students in Cohort 2 and these predominantly guided their learning in the latter part of their course. These outcomes were produced from modifications made to the learning environment aimed at enhancing deep approaches to learning and inhibiting the use of surface approaches. The results obtained demonstrate progress towards the resolution of problems identified in the preparation of professionals through higher education cited by Aulich report (Senate Standing Committee on Employment Education and Training, 1990) and supported by similar concerns reviewed in the literature (Daly, 1994; Gibbs, 1994; Ramsden, 1994).

7.2.3: Mature-Age Entry

No determination could be made in the current study concerning the research questions aimed at investigating potential differential effects of mature-age entry on the adoption of learning approaches on entry to the course, or in response to program modifications. Some evidence was reported in the literature that indicated students of mature age may adopt deeper learning approaches because of a motivation to understand the wider implications of their study (Regan & Regan, 1995a; Richardson, 1994b; Vermunt, 1996; Watkins, 1986). No consistent definition of mature age is however reported with some studies using an age of 25 years and others an age of 21 years.

Students enrolled in the course, which was the subject of the current study, were not specifically designated as mature-aged by the university. The majority of students enrolled in the course directly following the completion of their
secondary school careers. Others enrolled after some period undertaking studies, such as Childcare Certificates in other post-secondary institutions, or working for some period in related fields such as childcare centres. Several students were also enrolled following interview by the course co-ordinator. While a number of these students could be considered to have attained mature age on entry, the majority had undertaken these other activities for periods of only one or two years prior to seeking entry to the university. In the current study it was therefore not possible to identify groups of approximately equal size across cohorts on the basis of maturity. The relative differential entry characteristics of students who vary on a maturity dimension reported in the literature could not be identified in the current study, nor could any potential differential response to the altered learning contexts be determined. There were no indications in the current study however, to suggest that students belonging to either mature-age or regular-age groups were disadvantaged by the program modifications applied.

7.3: Limitations of the Study
The current study was limited to investigating the effects on students’ adoption of deep, surface and achieving learning approaches in response to modifications made to the teaching context in a single university, preservice teacher education program. Consequent effects on the principal outcome measure of students’ developing sense of teaching self-efficacy were also investigated. Further effects extrapolated to performance in teaching roles once these students entered the teaching profession represent conjecture based on learning approach and teaching efficacy theory. As such these further effects remain to be substantiated in future research since they were beyond the scope of the current study.
The study was also limited to the investigation of student responses to the altered learning contexts. Investigation of lecturers’ responses was confined to anecdotal observation and post hoc analysis of approaches to teaching for the purpose of ensuring fidelity of implementation. With the growing body of literature identifying a close connection between lecturers’ approaches to teaching and students’ approaches to learning (Prosser & Trigwell, 1998, 1999; Trigwell et al., 1999), a closer examination of the development of lecturers’ perceptions would appear warranted. The decision to limit the study to student responses was made deliberately in order to confine the study within manageable boundaries. In hindsight, an investigation of the parallel development of staff and student responses to the altered learning contexts may have provided a fuller description of the interdependent influences of all participants in the program, allowing connected ‘presage’ conditions (Biggs, 1993a) to be identified.

The embedded action research methodology employed in the current study appeared to yield productive results through the development, implementation and review of program modifications. The application of this methodology however, did not include student representation within the action research team. It was thus not applied in accordance with the full emancipatory paradigm (Zuber-Skerritt, 1993). The decision not to include students in the process used to create the modified context was also deliberate. The researcher believed that the inclusion of students in this process may have inhibited full and frank discussion and restricted the scope of idea generation, especially because this study represented the first experience of an action research approach for several of the staff involved. Student participation would also have increased the level of formality required for
collaborative processes and correspondingly reduced the facility for ad hoc
discussion, preferred by the other participants.

It now appears unlikely that any such inhibition would have occurred had students
been included and their participation in the action research process may have
provided a number of benefits. Such benefits could have included the provision of
alternative perspectives on the development and implementation of modifications,
but possibly more importantly, the communication to the students of the clear
intention that learning was viewed as a partnership between teachers and learners.
The clarity of such communication could have reinforced more quickly, the
genuineness of the lecturing staff to create an environment conducive to the use of
deep learning approaches. This may have affected student perceptions of the
learning environment and hastened the development of desired learning
approaches on their behalf.

Three questionnaires were used as the primary source of quantitative data in the
current study. Each of these instruments produced some problems in the analysis,
largely due to the modifications necessary to demonstrate adequate construct
validity. A problem largely generic to the measurement of unstable constructs was
noted with the SPQ. This scale represents an attempt to measure attitudes and
behaviours that are predominantly context dependent and thus variable across
settings. Because of the variability of student views produced by their reaction to
these specific contexts, it is probably not possible to develop a scale which
demonstrates stability across contexts (Biggs, 1993c).
While the scale allows a broad spectrum of responses that may be applicable in a variety of settings, it would appear necessary that an investigation of its construct validity should occur on each application. This is not a criticism of the scale per se, rather an acceptance that different items may load differently on the constructs measured, depending on the context. There is nothing in a particular study behaviour for example, that characterises it as surface, deep or achieving. It is the intention for which the behaviour is used that determines its nature as one or other learning approach (Biggs, 1987a, 1993c, 1999). Thus, items used in the intended corresponding ‘motive’ and ‘strategy’ subscales in particular, may not always load as anticipated because of differing contextual characteristics. Modification of the scale in this light however, reduces its usefulness in allowing comparisons across studies. Comparison of the results of the current study with previous and future research on student learning approaches, is thus so affected.

The TES could also have been improved. While the scale appeared appropriately sensitive to distinguish changes in efficacy beliefs on both personal and general dimensions, the task perceptions on which those beliefs were based may not have been uniformly construed by students who used deep and surface approaches. This problem is not related to the issue of task specificity identified in the literature (Bandura, 1997; Pajares, 1997; Tschanne-Moran et al., 1998), but rather to the individual’s conceptualisation of the task requirements and may be centred in individual epistemological orientation. For example, one student may conceive of the teaching process in transmission terms and another in a constructivist frame. In this case, the identical scenario suggested by the scale might produce widely differing perceptions of the skills and resources required to successfully undertake the task. These alternate perceptions may lead to different
self-efficacy assessments unrelated to the students’ perception of skill, but rather to their perception of what the task demands. Students with a deeper understanding of the complexities of the task, or who construe more complex task requirements in the same setting, may assess their efficacy lower, despite higher levels of actual skill and confidence in the implementation of those skills.

In the current study, differences were identified between students in Cohorts 1 and 2, in the source from which teaching self-efficacy beliefs were informed. Because students in Cohort 2 developed their PTE beliefs to a large degree from their use of deep learning approaches, it was argued that their greater understanding of teaching tasks would have led their beliefs to be better considered, more realistic and relatively stable. This argument, however is inferential, since no differences in the pattern of growth in actual PTE scores was identified from the use of the TES. Had this scale also included some information about the respondents’ perception of task requirements, a further level of insight could have been gained into students’ PTE development and such differences may have been discerned. For example, if students responded normally on the Likert scale to items from the TES such as: *If a student mastered a new maths concept quickly, this could be because I know the necessary steps in teaching that concept*, but were then additionally asked to broadly describe the strategies they would use, a view could have been formed about relative similarities of the students’ perception of task requirements. Judgements may then have been possible about how the use of different learning approaches impacted on the tasks perceived.

The researcher’s role evolved through the course of the study from an initial position of observer-as-participant to that of participant-as-observer. Principally
this evolution occurred during the period in which Cohort 2 was involved in the research and the researcher’s main involvement as a participant concerned the course experience of Cohort 2. It is recognised that the researcher’s changing role with respect to Cohort 2 may have introduced a threat to the validity of the final interviews conducted with these students. Although the researcher had no role in the assessment of students’ work in their final semester, he did assist the course co-ordinator in her teaching and assessment design, by partly providing the methodology and by helping to teach intensive interview techniques to the students (White & Gordon, 2000). The threat to validity produced by the researchers’ closer than intended involvement with the students in Cohort 2 was however considered to be small. As the principal source of data came from the repeated administration of the surveys and Hawthorne effects were excluded, the considerable consistency of the survey and interview data, along with other outcome observations, such as practicum performance, attested to the overall validity of these measures. Some individual students nevertheless, may have coloured their responses during the final interviews by a consideration of their knowledge of the research goals and their closer identification with the researcher.

Any longitudinal research with voluntary participation is exposed to a threat to validity by virtue of participant attrition and the current study was no exception. While initial survey return rates were high, between 84% and 98% across all cohorts, attrition resulted in participation rates of 69.9% for Cohort 1, 74.3% for Cohort 2 and 68.5% for Cohort 3. Although these continuing participation rates were considered adequate for the purposes of the current study, they do not represent a complete picture of the development of all students who entered their
course in year 1. Attrition was caused in the most part by students exiting the
course or taking leave from the university for defined periods.

The university in which the study was undertaken is located in rural New South
Wales. The majority of students were not originally from the local community.
Consequently, attendance required considerable expenditure for accommodation
which was not required if the students returned home to attend a local university.
The majority of students who exited the program prior to completion did so
because they had managed to transfer their enrolment elsewhere for these
economic reasons. Others took leave for periods of up to a year, usually in order
to gain employment to subsidise their future studies, but were no longer
considered to belong to their original cohort. These students, mainly from Cohort
1, could not be included in the data for later cohorts because they had been
exposed to both the original and modified programs. Several other students left
the course because of personal considerations, such as responding to family needs,
and a small number of others had failed some subjects resulting in delayed
progress. Perusal of the data supplied by students who left the course indicated no
observable pattern. While these students appeared to vary in their original survey
responses in a similar way to those who remained in the program, some
unidentified relationship between those who exited the course and their potential
responses on future surveys could not be excluded.

Some modifications intended for use with the treatment group (Cohort 2) were
applied to the contrast group (Cohort 1), during the final year of the program.
These changes to the original program were relatively minor but involved some
use of problem-based learning, small-group processes and explicit statements to
the students concerning the desire of the lecturing staff to promote deep learning approaches. These newer approaches to teaching were applied to Cohort 1 because the lecturers involved in the research believed that these methods were improvements to their traditional teaching approaches. These teaching modifications nevertheless, represented a partial contamination of the traditional program intended for Cohort 1 to enable these students to fulfil a contrasting role with the treatment groups in the current research.

Final year data for Cohort 1 may have been affected therefore, by some treatment effects. It is likely that any such effects would have had the result of initially lowering scores on the surface approach, and such results were observed with this group in their final year. It was expected however, that this compensatory equalisation of treatments (Cook & Campbell, 1979) would have had relatively small effects since the program modifications applied were partial, non-pervasive and short-term. Any impact from equalisation of treatments across groups would have had the effect of reducing the difference between comparative outcomes of the treatment and contrast groups, leading to a higher likelihood of a type II error. Since significant differences were identified between these groups, particularly in their use of surface approaches to learning, it was concluded that the effect of this contamination was small. Nevertheless, the results of the current study need to be interpreted in this light, allowing open the possibility that differences between treatment and contrast groups may have been greater than observed, had the contrast group genuinely been exposed to the traditional program, throughout its three-year course of study.
The current research represented an investigation of the effects of a treatment regimen using a quasi-experimental design, applied to sequential cohorts in a single course in one university. As such, the results of this study have limited external validity. An experimental design, using random assignment to treatment and control groups would not have been possible given this naturalistic setting and the nature of the intervention. Treatments applied were dynamic, evolving during the study, in response to action research requirements. Part of the purpose of the research was to demonstrate that effective modifications could be made within the constraints applying to a regular university program. Major departures from the naturalistic environment, resulting from the use of experimental designs, would have reduced the attainment of this purpose. The use of experimental designs would also have necessitated the simultaneous application of traditional and modified teaching methods to subgroups of students, and given the problem noted earlier with compensatory equalisation of treatments, such a process would create problematic practical and ethical concerns.

While the results of the current research may be tentatively generalised to other similar programs in similar settings, the manner of program implementation may have had unique characteristics, dependent upon the teaching styles and personalities of the lecturing staff for example. The relative impact of components within the treatment applied cannot be distinguished, as global effects only were measured. The research itself was part of this global learning context, possibly providing greater salience to the intent of other program modifications. External validity and the relative contributions of components within the program can therefore only be established through the replication of the study in other settings and under altered conditions.
7.4: Implications for Theory
The results of the current study are consistent with the principal tenets of learning approach theory. Evidence was provided to support the differentiation of approaches to learning into surface and deep approaches (1976a; Marton & Saljo, 1976a, 1997; Ramsden, 1992), with the further identification of the associated use of achieving strategies in conjunction with either or both surface and deep approaches (Biggs, 1988a, 1993a, 1999; Entwistle, 1991, 1998). Results from the survey data identifying these relationships were also consistent with student descriptions of study behaviour obtained at interview.

Earlier findings that students on entry to university may be more likely to adopt surface approaches based on their prior experience as learners from high school were also supported (Marton et al., 1993; Ramsden et al., 1988; Regan & Regan, 1995a; Vermunt, 1996). The students in the current study varied in respect to their preferences for features of the learning environment consistent, in the main, with the learning approach they had adopted (Biggs, 1993a; Clarke, 1995; Clarke & Dart, 1994; Dart et al., 1999; Entwistle, 1991, 1994). Students who adopted surface approaches preferred environments that were highly structured and closely related to practice. They wanted tasks to be clear and composed of multiple smaller components that were achievable and reduced the potential for failure through lowered grade weightings. They preferred lecturers who gave clear structured notes, used plain English, and established a warm and approachable relationship with the students. Students who adopted deep approaches preferred environments in which discussion was fostered and tasks were challenging and open-ended. They preferred tasks that involved library research or observations.
from practice and allowed for variety in presentation formats. They also preferred lecturers who established approachable relationships with students.

Students’ adjustment of their learning approach in response to the altered learning contexts established in the present study were explained with reference to Biggs’ (1993a, 1999) ‘3P model’. Three major tenets of this model propose firstly, that student approaches to learning are malleable, and represent a choice on their behalf to engage in their learning using behaviours that are consistent with their perceptions of the learning environment (Biggs, 1993a, 1999). Secondly, that these perceptions are established, and thus can be modified, partly through contextual features such as task variables, assessment variables and lecturers’ assumed intentions (Biggs, 1999; Prosser & Trigwell, 1999; Ramsden, 1987; Trigwell & Prosser, 1991a). Thirdly the ‘3P model’ asserts that all effects between elements in the model are interactive within an ecological frame and equilibrium may be developed and maintained at a desired level of engagement through the consistent alignment of components within the model (Biggs, 1996, 1999). The outcomes of the current research are consistent with these tenets. The approaches to learning adopted by the students changed as a result of the modified context towards more desired engagement. The alignment of the components of the learning context was a central platform of the modifications applied. Although the differential contribution to the outcome attributable to constructive alignment (Biggs, 1996) per se, could be determined, such alignment was a feature of the modifications applied.

The current study extends the findings of past research by providing evidence of the direct and mediated contributions of the use of a deep learning approach to a
measure of learning outcome, beyond the outcomes of immediate task performance. The use of a deep approach to learning contributed markedly to the development of personal teaching efficacy for students in the modified program, a construct associated with performance in teaching roles.

A favourable effect with students who used a variety of learning approaches was also demonstrated. While some students did struggle with the implementation of altered task and assessment items, almost all students benefited from the program. Evidence reviewed from the learning approach literature suggested that students may have responded differently to the altered program depending on their preferred learning approach (see for example: Clarke & Dart, 1994; Entwistle, 1998; Entwistle et al., 1991a; Vermunt, 1998). Thus it was suggested that a program established to increase the use of deep approaches, such as the one reported here, might have acted differentially on individual students. Some may have found the modified approach facilitative, while others may have experienced it as a hindrance. Thus, the same context may not have facilitated the adoption of deep learning approaches for all students.

With few exceptions, these predictions were not observed in the current study. One student who began with a high surface orientation experienced early frustration with the course and lowered her achieving approach. Two other students who began the program with low achieving orientations appeared to avoid effortful engagement in learning tasks and maintained their original unfavourable approach. While, clearly these students were not encouraged by the contextual changes to improve their approach to learning, they also expressed similar difficulties with unaltered components of the program. All other students
interviewed indicated that they had responded positively to the modified program. No interference was evident for students who began the course using predominantly deep or deep-achieving approaches and other students who began with high surface or surface-achieving approaches adjusted their learning in a desirable direction.

A pattern of change in student learning approaches over the long-term is also evident here that underscores previous findings indicating that short-term modifications, or those involving alterations to single parameters, may have reduced effectiveness in fostering the growth of deep approaches (Dart et al., 1996; Gordon & Dunshea, 1996; McKinnon et al., 1996; Pollard, 1993; Qin, Johnson, & Johnson, 1995; Trigwell & Prosser, 1991a). Typical patterns reported in these studies involve reductions in the use of surface approaches with limited concomitant gains in the use of deep approaches and such changes may not be sufficient to substantially improve the quality of student learning. Current outcomes provide support for the view that interventions likely to promote growth in deep learning approaches need to address multiple components within the learning ecology and be applied pervasively over the long-term (Biggs, 1988b; Marton & Saljo, 1997; Ramsden, 1992, 1997).

On the basis of the current research, Biggs’ (1993a, 1999) ‘3P model,’ appears to adequately explain the interaction of variables within the learning ecology affecting student perceptions, learning behaviours and outcomes. The model however provides little explanation of the intrapersonal processes contributing to the development of student perceptions of the learning environment, informing their choice of behavioural engagement with it. Some evidence was provided in
the present study to support the incorporation of social cognitive theory of self-regulation within Biggs’ model, to explain these processes. Indications of the cyclic application of forethought, volitional control, evaluation of performance, and self-reflection, followed by future planning for subsequent task engagement (Bandura, 1991b; Zimmerman, 1998a, 1998b) were identified by students at interview in their explanations for their choices of learning processes, and through their reflections provided in learning journals. Such an interpretation of intrapersonal processes would provide some direction to inform the anticipated impact of interventions designed to modify student perceptions and approaches to learning engagement. Tapping student reflections following task performance, for example, could allow refinement of teaching or assessment methods during the process of implementation. Such adjustments made at the ‘process’ stage may enhance the likelihood of the attainment of desired learning outcomes at the ‘product’ stage.

The current research identified a link between the manner in which the students learned in this preservice teacher education program, and their resultant teaching self-efficacy. While quantitative outcomes did not differ between the groups, in terms of the absolute growth in teaching efficacy scores, these outcomes were informed through different processes. The argument was made that growth in teaching self-efficacy partially mediated by a deep approach to learning is likely to be qualitatively different. As discussed earlier however, alterations to the measurement of teaching efficacy in undergraduate students are required to discern such potential qualitative differences.
Students with more simplistic notions of task requirements during teaching and learning interactions may rate their efficacy more highly, perhaps because of a unidimensional view of the task. An increased understanding of the complexity of the teaching role informed through the use of a deep learning approach, could raise the students’ perception of the personal resources required to meet the task demands. Such a perception of task requirements could potentially lead to a reduced assessment of self-efficacy, even though personal resources are in fact higher in the latter case. It is suggested here that student teachers in the former situation could be more likely to succumb to the threats to efficacy reported in the literature to impact heavily on beginning teachers (Ashton & Webb, 1986; Benz et al., 1992; Evans & Tribble, 1986; Hoy & Woolfolk, 1990; Kemis & Warren, 1991; Soodak & Podell, 1997; Walker & Richardson, 1993) while students in the latter situation may demonstrate greater resilience. Perceptions of personal teaching efficacy informed from more accurate assessments of the tasks of teaching and the personal requirements necessary to undertake these tasks successfully, would presumably reflect individual skill more accurately and be more sustainable in practice. The instrument used in the current study did not reflect these qualitative differences in perception. Future research would therefore be necessary to identify the nature of the relationships suggested here and their impact, if any, on the relative resilience of teaching self-efficacy developed through deep approaches to learning.

7.5: Implications for Practice
The results of the current study suggest that the methods adopted to improve the quality of teaching and learning in the focus program were effective in meeting its major goals. Strategies were developed to meet the requirements of the local
context through the application of action research methodology. They were also
designed to apply pervasively across the course, rather than being subject specific
or restricted to single semesters. As such these results conform to the outcomes of
earlier research (Kember & McKay, 1996; Newble & Hejka, 1991) and to
outcomes predicted by theory (Kember & Gow, 1992; Zuber-Skerritt, 1993).

Previous research has however, involved major course redesign in the application
of altered teaching methodologies, whereas the current research applied modified
learning contexts within the constraints of an existing program. One of the
functional goals of the current study was to provide an exemplar of best practice
in higher education applied in a naturalistic environment, creating minimal
disruption or intrusion to the global course structure. The anticipated outcome, if
this methodology proved successful, was to enable the study’s use as a model for
others within the university to apply in other courses. The results were to be
promulgated through the university’s staff development mechanisms, so that
quality learning across the university might be improved (see Appendix A.1).
With this purpose in mind, it was considered necessary to constrain modifications
to those that could be applied within the requirements of the existing program and
within existing resources and teaching allocations.

Specific teaching techniques used in this study may not be applicable in other
contexts. Teaching practices and assessment methods for example, may require
further modification to be adapted in other courses of study and other methods not
applied to the current program, may need to be developed. Some key aspects of
the program described here however, would be recommended in the development
of program modifications for a similar purpose in other courses of study. These
recommendations are drawn principally from data derived from student interviews and reflective journals, and comprise the central themes students described as aspects of the program that facilitated the development of deeper approaches to learning.

The pervasive nature of the modifications across subject and semester boundaries was an important feature for students who modified their approach. Coupled with the explicit goals of the research, these features appeared to provide the students with a parameter to gauge the success of their learning and enabled them to maintain a focus for personal adjustments made through self-regulatory processes.

The explicit formation of links between the content of complementary subjects and between theory and practice appeared to provide a scaffold for students unused to the application of deep approaches to learning. The active formation of linkages were requirements of many tasks students completed, in particular the reflective learning journals, and these appeared to enable students to focus on meaningful features of the material studied, rather than the surface features of the immediate subject. Small-group problem-based learning provided students with avenues for discussion about major themes covered in subjects studied and a process that was facilitated by the formation of linkages across subject boundaries and between theory and practice. The purpose of linkages appeared to be become clearer through such case-based analyses. Many of the students reported their appreciation of the relevance of these processes and described surprise and considerable enlightenment at the variety of solutions constructed by independent groups.
The variety of assessment tasks and processes, some of which included group-based and peer assessment strategies, were reported by the students as influential in their reflection on their own performance and the processes they employed to complete the task. While several students reported that they had concerns about the grading standard their peers might use and about the consistency of their own standards, most believed the process enabled them to look critically at the work of others and in doing so, reflect on their own process and performance. The relative absence of stress provoking assessment procedures, such as heavily weighted examinations, was also reported to have influenced many students to abandon surface approaches. The use of learning journals assisted most students interviewed, in developing the skills for reflection. While many reported initial confusion about the content of the journals, and some required extended direction in the early stages of their application, by the end of the course almost all students interviewed identified the journals as a highly productive component of the modified program, assisting with the development of deep approaches.

Most students also identified the approachability of lecturing staff, as a central feature that promoted their interest and maintained their motivation to apply desired learning approaches. Because these staff members made the students feel comfortable about asking for assistance when required and were able to communicate to the students in a language they found accessible, the students reported that they were more active in applying the requisite effort to resolve the problem at hand.

While the application of specific learning tasks and assessment approaches used in the program reported here may not be applicable nor practicable in other
settings, the process used to generate those program features should find applicability in most settings. Few of the modifications applied in the current study were directly imported from other programs or from the research literature. Most were generated or substantially modified through the process of discussion amongst teaching staff, trialed and then further modified following an evaluation of their effectiveness. Some were initially piloted with other groups of students to assess their suitability (see for example: Gordon, 1993; Gordon & Dunshea, 1996; Gordon et al., 1997a; Gordon et al., 1998a; McKinnon et al., 1997; McKinnon et al., 1996; Ritter, 1997) and later modified before implementation in the program reported here, or rejected as an option.

From this researcher’s view, the use of an action research team comprising lecturers who are motivated to develop a program to improve quality learning and teaching, provides the core methodology for replication of the program’s central features. While members of this team may need to have a preparedness to inform their approach to teaching from the perspective of conceptual change (Prosser & Trigwell, 1999), such an approach may itself develop as part of the lecturers’ course experience. When constructing teaching and assessment strategies the outcomes would appear to be enhanced if the team maintained a commitment to the principles of constructive alignment (Biggs, 1999) and aimed to develop tasks in which the application of a deep approach would clearly provide efficiency gains to the students.

7.6: Implications for Further Research
The current research employed a longitudinal quasi-experimental design using non-equivalent dependent variables and multiple sources of data from quantitative
and qualitative perspectives. The study also included a partial replication enabling comparison with early patterns identified amongst these data in the main treatment group. The combination of these features in a single study assisted considerably with the study’s ability to produce interpretable results. The use of non-equivalent dependent variables within quasi-experimental design is considered a powerful combination (Cook & Campbell, 1979). The differential outcomes observed amongst these variables also enabled the exclusion of Hawthorne effects, which otherwise would have represented a difficult exercise, despite the partial control applied and the assumed difficulty in maintaining essentially artificial behaviours over a long period.

Studies using quasi-experimental design with intact cohorts, comprising relatively small numbers, are susceptible to cohort effects being identified as treatment effects, and treatment effects being concealed within cohort effects. While the present study identified small cohort effects, the cohorts were clearly not identical on all measures used. Observed effects, assumed to be treatment effects, thus may not have been as readily interpretable without the partial replication with the third cohort (Thompson, 1999). Without the partial replication, alternative suggestions representing cohort differences could not have been excluded (Yin, 1994).

The scales used to obtain quantitative data contained imperfections, very largely due to the contextual variability of the constructs the scales were designed to measure. This was particularly pertinent with the SPQ. Modifications to the scales were necessary to maintain construct validity and the acquisition of data from multiple sources, especially those data obtained from qualitative sources, were necessary to ensure concurrent validity through the process of triangulation.
(Burns, 2000). Data derived from quantitative and qualitative sources also provided alternate perspectives on student perceptions. Both were measures of the students’ view of their own learning approaches in the main, but each provided a complementary perception.

Changes in scores derived from quantitative measures and subjected to multivariate and path analysis provided a picture of overall trends and comparisons across cohorts. The clustering of students who used largely similar processes enabled observations of differential effects among subgroups within the treatment cohort as their cluster transitions were identified (Alexander & Murphy, 1998). Similarly, the transitions of individual students could be monitored through this process. Detailed descriptions provided by students selected for interview allowed further insight into their motivation and reasoning and some understanding of the relative impact of multiple course modifications. On their own, each data source and method of analysis would have provided a restricted view, either by depth of understanding in reference to the quantitative measures, or by the number of participants surveyed in reference to the qualitative data (McKinnon, 1995; Miles & Huberman, 1994). The comparatively more complete understanding of the processes that occurred and the factors impacting on those processes were obtained only through the combined use of these data sources. The use of several complementary methods of analysis also provided multiple perspectives on these data enabling a more complete picture of potential interactive conditions to be assembled.

The longitudinal design of the study, covering the entire length of the course for the two main cohorts, was also a feature enabling the identification of important
changes. Had the study covered a shorter period in these students’ development, the growth observed, for example, in the use of deep approaches to learning amongst the students in Cohort 2 would not have been observed. Their results would have mainly reflected the changes observed within Cohort 3 and the conclusions drawn could have suggested that the modified learning contexts impacted by reducing surface approaches only, without encouraging a corresponding growth in deep approaches. Only by constructing the study to cover the length of the course were the latter changes observed. The use of short-term longitudinal studies may be a cause for the inconclusive evidence in the literature suggesting that some altered learning contexts impacted only on the use of surface approaches (Marton & Saljo, 1997; Ramsden, 1992; Trigwell & Prosser, 1991a).

The outcomes of the current research suggest that consideration should be given to the incorporation of each of these features in similar future research.

Three major issues remain unresolved in the current research. The first relates to differences observed in the way in which the development of PTE was informed. The development of PTE for students in Cohort 1 was unrelated to their learning approach. It was speculated here that the information they gathered to inform their developing sense of efficacy may have emanated largely from practicum experiences, and since their course was less explicit in providing links between theory and practice, the contribution of learning approach may have been minimised. The students in Cohort 2, however, informed their developing sense of PTE quite substantially from their use of deep approaches to learning. It was further speculated that this contribution of meaningful learning to teaching efficacy development in Cohort 2, should lead to these beliefs being more
realistic, with a more accurate assessment of task demands and resource requirements.

Further research is necessary to determine whether this is the case. Modifications to the measurement of PTE beliefs were suggested, to enable the incorporation of qualitative assessment of task perceptions. It was noted that the evaluation of efficacy beliefs on the basis of situational descriptors, regardless of the specificity of the task described, may be affected by perceptions of individual requirements because of differences in the conceptualisation of the teaching and learning interaction. Some evidence that beginning teachers may conceive of teaching along different dimensions depending on their learning approach orientation has been provided (Christensen et al., 1995). Whether such differences apply to the conceptualisation of tasks in the process of forming efficacy beliefs would assist in the evaluation of efficacy beliefs as suitable outcome measures for teacher education programs.

It was further suggested that beginning teachers whose efficacy beliefs were formed on the basis of deep learning approaches, may demonstrate greater resilience to the threats to efficacy identified to impact on teachers in their early years in the profession. The current study was restricted to the undergraduate experience of the students who took part. Investigation of students’ conceptions of efficacy, learning approaches and responses to the pressures of teaching in the early years, would assist in clarifying the currently assumed importance of developing high PTE and deep approaches to learning, during undergraduate years.
The third issue suggested by the outcomes of the current study which requires clarification through future research, concerns a detailed descriptive analysis of the mechanisms of self-regulation, in relation to the use of different learning approaches. Some evidence of self-regulatory change was provided through the qualitative data available in the present research, but this was largely incidental, since the clarification of these processes was not a primary goal of the research. Clarification of self-regulatory processes associated with the use of deep learning approaches may assist in the monitoring phase, where contexts assumed to encourage deep learning are applied. Information pertaining to the relative use of desired learning approaches during the process of implementing a contextual modification may allow for adjustments to be made prior to task completion, when such information can be readily observed through the production of learning outcomes. Earlier identification of processes in use or the encouragement of key elements may increase the effectiveness of interventions designed to promote deep learning approaches.

7.7: Chapter Summary
This chapter provided an evaluation of the findings reported in Chapters 5 and 6, in connection with the research questions proposed for the current study. It also linked these outcomes with previous findings reported in the literature and the principal tenets of the theories underpinning the study. Limitations to the study’s internal and external validity were identified and discussed as were the central implications of the current findings for future directions in theory, practice and research.
Major findings indicated that the modified learning contexts applied in the study impacted on students’ choice of learning approaches in the desired direction by reducing their reliance on surface approaches in conjunction with increasing the use of deep approaches. Such outcomes were consistent with theoretical assumptions and prior research. These results were considered satisfying in themselves, since by definition, improvements in the use of deep learning approaches result in improvements in the quality of learning outcomes. The study also provided some indications of the intrapersonal self-regulatory processes students used to respond to the changing contextual demands. Intrapersonal processes would benefit from further exploration in future research because they have the potential to lead to developments in learning approach theory and improved practice.

Despite indications from some sources of improved teaching practice amongst the treatment group, such as higher outcomes in final practicum performance, quantum results in measures of PTE and GTE were not observed to differ between the traditional and modified programs. Differences were identified however, in the sources of efficacy information between the treatment and contrast groups used in the study. The treatment group developed their sense of PTE mediated partly through their use of deep learning approaches, whereas no consistent relationship between learning approach and PTE was evident in the contrast group.

It was argued that because of Cohort 2 students’ more meaningful understanding of teaching conditions, they may have established a more realistic assessment of task demands and personal requirements. Absolute measures of PTE appeared to be unaffected by the program, but qualitative differences brought about by
differences in task perceptions from meaningful learning may have been present. Further research is required to clarify differences in the perceptions of efficacy on behalf of students who use deep approaches to learning and this research may require modifications to instrumentation used to determine the development of the PTE construct.
CHAPTER 8

Conclusions

This thesis detailed a study in which contextual modifications were implemented in a preservice teacher education program to improve quality teaching and learning. Specifically these modifications were designed to increase students’ use of deep approaches to learning and reduce their reliance on the use of surface approaches. Because of the way the teaching and learning environment was conceptualised, in accordance with Biggs’ (1993a) ‘3P model’, such an outcome was dependent on altering the students’ perception of the learning environment from one that rewarded the reproduction of transmitted declarative knowledge to one that encouraged the meaningful construction of integrated concepts across artificial subject and theory/practice boundaries.

The creation of change to student perceptions of the learning environment required changes to students’ conception of the process of learning and their intentions in learning engagement. In addition, because of the interactive ecology perceived to operate within the learning system, complementary development of lecturers’ conceptions of teaching was a necessary precondition (Trigwell et al., 1999). The creation of these presage conditions also required consistent modification to teaching and learning processes which included, in particular, learning tasks and assessment requirements aligned with the desired learning approach. Biggs (1996, 1999) asserts that a key principle relating to the
modification of learning environments in order to encourage desired learning approaches, resides in the notion of constructive alignment. The logical relationships within an aligned system between learning objectives, task requirements and assessment practices may affect student perceptions in such a way as to convince them of the necessity to engage in the learning process differently.

It was anticipated that most students would enter the program with highly developed surface approaches based on prior experience in formal learning environments. Student accommodation to new perceptions of teaching and learning which required potential changes in learning behaviour for the majority of students, toward deeper approaches, was conceptualised in accordance with cycles of self-regulation (Zimmerman, 1998b). This perception of students’ internal processes required explicit goal setting and mechanisms for the provision of feedback so that self-regulatory practices could be successfully undertaken.

The extensive attitudinal and behavioural change required for students to alter their learning approaches as a result of changed conceptions of teaching and learning was expected to require a considerable developmental period. On the basis of previous research, a developmental pattern involving a short-term reduction in the use of surface approaches to learning followed by a growth in deep learning approaches discernible in the longer term was expected. Thus the implementation of the modified learning context needed to be maintained over the long-term, which in this case was conceived as the entire length of the course. In addition, these modifications were required to be made within the constraints of a pre-existing university course in a naturalistic environment. Wider ecological
factors such as course structure, subject content, entry requirements, resource allocation, teaching staff, teaching facilities, and university assessment requirements, needed to remain unaltered. Some of these requirements were anticipated to militate against the intent of the study; for example teaching subjects in traditional lecture theatres, in large groups combined with students from other courses, by lecturers outside the core teaching team, was expected to encourage the perception of teaching as the transmission of information. The antithetical impact of such structures that exist in most universities and in most courses needed to be overcome in order to achieve the goals of the study.

The development and implementation of an intervention program that would address this multiplicity of factors consistently throughout the students’ course experience and be implemented by a number of different members of the teaching staff was a complex endeavour, requiring the use of action research as a method of creating and sustaining change, embedded within the quasi experimental multiple cohort research methodology. Action research was also seen as necessary in order to generate a sufficient variety of teaching and learning tasks and assessment items such that no set of methods became overused. The overuse of methods known to assist in the development of deep learning approaches, such as journal writing or problem-based learning for example, could have introduced an anticipation of tedium into the students’ perception of the learning environment and diminished the effectiveness of the process. Additionally, action research methodology was employed as a mechanism of creating and maintaining lecturers’ conceptions of teaching and learning within the frame of conceptual change. By the application of this methodology the researcher hoped to create a process that could be applied in other university programs. While it was expected
that the specific modifications applied in the course selected for the study would have limited general applicability, the method of generating these modifications may be applicable elsewhere.

Five main processes applied in the current research appear to hold some promise for the successful translation of contextual modifications designed to promote deep learning approaches in other courses and institutions. These include the use of action research as a developmental tool to identify and promote the co-ordinated implementation of contextual modifications; adoption of teaching and learning processes, such as objectives, learning tasks and assessment methods consistent with the principle of constructive alignment; the implementation of program modifications by lecturers who hold a pedagogical orientation towards conceptual change; the clear explication of the goals of proposed course modifications to the students in terms of the processes they need to apply to learning and the learning outcomes they should expect; and the provision of feedback enabling students to gauge their progress towards these explicit goals. From the researcher’s perspective, these components in the current study were critical in the development of its successful outcomes. Once these elements are included in future applications choices can be made from teaching, task and assessment variables, which can be variously generated, or trialed and modified as fits the circumstances of the local context.

The results of the current research indicated that the modifications to the teaching methods, task requirements and assessment processes applied to the treatment group, encouraged changes in their approaches to learning by firstly reducing their use of surface approaches and later effecting an increase in the use of deep
approaches. These changes were observed in measures aggregated across the
treatment group and were found to be broadly effective for the majority of
students when their individual changes were tracked. The early pattern of results
available from the comparison group (Cohort 3) also showed a similar
developmental trend. Very few students in the treatment group retained
approaches to learning that were considered undesirable and these students
appeared predominantly guided by low achieving orientations. As such it is
doubtful that any program changes could have encouraged greater effortful
engagement in learning.

Because the students in the treatment group had relied more heavily on the use of
deep approaches to learning than those in the contrast group, it was argued that
their conceptions of teaching and learning developed as a result may have affected
their perception of the process of learning from their complementary role as
beginning teachers. Teachers who have engaged in their own learning through the
use of deep approaches may perceive the role entails a constructivist pedagogy
and seek to create learning environments for their own students that enhance their
development of deep learning approaches. They may also anticipate a complex
classroom environment and develop a more resilient sense of personal teaching
efficacy based on a realistic understanding of task demands and the personal skills
to resolve unforeseen problems. Such students may have developed greater
expertise in the process of self-regulation (Zimmerman, 1998a, 1998b) because of
the metacognitive processes that the use of a deep learning approach entails
(Biggs, 1988b, 1993a) and a greater capacity to apply problem-solving processes
in the generation of novel solutions for novel problems in the profession.
One of the more puzzling outcomes of the current research involved the influence of growth in the use of deep learning approaches on students’ developing personal teaching efficacy beliefs. It was anticipated, consistent with learning approach theory, that improvements in quality learning as evidenced by a growing use of deep learning approaches, would bring about improvements in these students’ teaching skill and consequently raise their perception of their own competence in performing the tasks of teaching. While some evidence was available that these students’ skill as teachers had developed to very high standards, the measure of personal teaching efficacy failed to detect a growth in this construct beyond that of students who had experienced the traditional program. The personal teaching efficacy of students in the treatment group did grow as a result of their course, but similar growth was also observed by students in the contrast group.

Differences were noted between the treatment and contrast group in the sources that informed personal teaching efficacy development. The use of deep approaches to learning mediated this growth in the treatment group but were unrelated to the development of teaching efficacy in the contrast group. It was suggested that because teaching efficacy was informed from a basis of meaningful understanding in the treatment group, that their conceptions of teaching may differ. With more complex understandings of teaching and learning interactions the students in the treatment group may have perceived the tasks described in the measure of teaching efficacy differently. Likewise their better developed understanding of the tasks, may have provided them with a deeper understanding of the personal resources required to successfully perform the tasks. With a perception of greater task complexity and higher skill requirements, potentially higher perceptions of competence as teachers may have been concealed by the
measure used. With such an interpretation, the absence of a diminution of personal efficacy in the treatment group, would be a favourable outcome. These possible counterbalancing conditions relating to the development of deep learning approaches and teaching task perceptions require clarification in further research.

The outcomes of the current research indicate that considerable value lies in the careful construction of learning environments in teacher education, with the aim of enhancing students’ adoption of deep learning approaches. The nature of the task is complex, multifaceted and context specific, most likely requiring the development of unique solutions in each environment. The contextual dependency of elements within a learning system, such as that described by Biggs’ ‘3P model’ suggests that any search for universal methods to promote deep learning approaches may be unsuccessful. Nevertheless, the current research has demonstrated that tailored solutions can be developed and applied within the prevailing constraints of a pre-existing course, without the need for major redevelopment of course structures, and has provided some direction toward the application of a process successful in developing such solutions.
References


