

Economics students' perceptions of their learning context

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Since the late 1960s, economics educators have carried out many research studies designed to explain variations in learning outcomes in economics. Most of these have utilised the input-output approach. Underpinning this approach is the assumption that there is a direct connection between learning inputs and learning output. However, the results obtained in these studies have mostly been found to be inconsistent. This paper argues for a re-focusing of research on the process of learning in economics. It reports on the development of an instrument to measure economics students' perceptions of key elements of their learning context. Confirmatory factor analysis validates a four-factor model. Differences in students' perceptions of three economics units in this study will also be discussed.

INTRODUCTION

Over the last three decades, economics educators have carried out a large amount of research directed at explaining variations in learning outcomes in economics. In their review of a total of 469 economics education research studies, Siegfried and Fels (1979) and Siegfried and Walstad (1990) report that these research studies all 'emphasise the same production function analysis' (cited in Becker 1997, p. 8). These efforts have been predominantly concerned with constructing learning production functions to look for the explanatory variables, using econometric methodology (Dancer 2002; Dancer & Fiebig 2005; Gordon & Dwayne 1994; McCosker 2000; Shanahan & Meyer 2001; Tay & Peter 1994). Shanahan and his colleagues label this research methodology as the 'input-output' approach (Shanahan et al. 1997). Underpinning this input-output approach is the belief that there is a direct connection between learning inputs (such as student aptitudes, gender, effort) and learning output (student results), which can be modelled using econometrics.

In his review of research studies on learning in economics undertaken since 1968, Becker (1997) observed that 'the *only* consistently significant and meaningful explanatory variables of the post-TUCE¹ score are the preaptitude measures such as the pre-TUCE and SAT/ACT² scores' (p. 8, emphasis added). In a separate review, Shanahan and his colleagues (Shanahan et al. 1997) found contradictory results regarding the effects of a host of learning and teaching input variables on students' examination results. For example, there is no consistent evidence to support the claim that small class size is better than large class size for 'retention of knowledge, critical thinking and attitude change' (p. 23). On the effect of prior economic knowledge, the research findings in their review ranged from a significant positive impact, slight positive impact, to no effect at all. In a study carried out by McCosker (2000), the effect

of prior economic knowledge on performance in introductory university economics was found to be negative. The finding of contradictory research outcomes is because ‘an econometric approach which assesses the impact of easily measurable independent variables on a single dependent variable may simply ‘miss’ important responses to teaching change’ (Shanahan et al. 1997).

This paper will firstly examine two contrasting perspectives in educational research. It will argue for a shift in research agendas away from ones that focus only on inputs, to those that look at the learning process from students’ perspectives. The paper will go on to report on the development of an instrument for measuring students’ perceptions of key elements of their learning environment. Finally, some preliminary findings will be discussed.

PERSPECTIVES OF EDUCATION RESEARCH

The input-output learning production approach is still widely used in economics education studies in Australia. For example, in a recent one-day teaching and learning workshop in business, economics and commerce at the University of Melbourne (11 February 2005), six of the nine presentations involved empirical studies of learning outcomes, and all utilised the same input-output analysis. Gibbs et al. (1982) characterise this educational research methodology in the following way:

We (the researchers) observe the learner and describe him as we see him and we observe the learner’s world and describe it as we see it. We frequently relate *our* description of the student to *our* description of his world and generally do this within an explanatory framework (Gibbs et al. 1982).

They term this research framework the first order perspective, which refers to the observer examining a phenomenon from his/her own perspective. It is based on the assumption that the observer and the person being observed experience the phenomenon and perceive the context in more or less the same way. The researcher’s definition of the research problem, the research questions to ask, and the type of data to collect and measure, are determined by the position from which the researcher perceives the phenomenon of interest. In formulating a learning model in economics, the input-output researcher often describes the student in terms of their aptitude, age, gender, maths and economics background, language proficiency, parental occupations, et cetera, which are believed to be determinants of success in learning economics. Also, there is a clearly defined body of knowledge to be taken in, and the outcome of learning is quantifiable – how much is learnt. These relations are treated as explanations of learning. The research results are typically expressed in the form of statistical relations specified in the model.

Gibbs and his colleagues (1982) label the statistical relation established in input-output research as an ‘external relation’. It is external to the student, since in the researcher’s explanatory framework, no account is taken as to how the various aspects of the learning process are experienced by and related to the student. It is taken for granted that since the same material is taught by the same teacher, in the same setting and assessed in the same way, the content of learning will be experienced and understood in more or less the same way by the students. The differences in examination results, therefore, can be accounted for by individual differences – age, gender, interest, ability, effort and other relevant backgrounds.

An alternative framework is to look at learning from the standpoint of the learner. That is, learning as experienced by the learner rather than as what the researchers think it should be. This perspective is known as the second-order perspective. From the perspective of the student, the ‘why’ (motivation), ‘how’ (strategy) and ‘what’ (outcome) of learning are all functionally related (Biggs 1989; Marton 1981; Ramsden 1987). For example, a fragmented learning outcome presupposes an atomistic way of approaching the learning task. The atomistic approach is the product of a learning motivation to reproduce knowledge. The student’s motivation is the result of interaction of the student’s backgrounds (age, work experience, past learning habit/style, and language) and his perception of the learning context (such as teaching method, workload and assessment). From this research perspective, how the learner experiences and responds to the content and context of learning, and what meanings he gets from it, is empirical and the focus of research.

Input-output analysis based on the first-order perspective, however, bypasses these process variables, by linking outcome variables directly to input variables. Its fundamental weakness is that it only measures variables that are quantifiable (Shanahan et al. 1997), and selects input variables for explanation from the researcher’s perspective – its external orientation. Shanahan and his colleagues’ (1997) call for a focusing on students’ experiences of learning equivalent to a focus on the internal (as opposed to external) relationship of learning. Examining students’ experience of learning allows us to re-examine assumptions about teaching and learning.

An example is used to illustrate this point. Thomson and Falchikov (1998) and Ramsden (1988) show that there is often a discrepancy between the claimed learning objectives (espoused theory) and the type of knowledge actually assessed (theory in use). Imerie also observes that although ‘most academics intend to teach understanding, the examinations they set can often be dealt with ... by adopting a surface approach to learning’ (Imerie 1998, p. 182). Hence misalignment of teaching objectives and assessment practice exists (Biggs 1996). The misalignment occurs when teaching aims to induce deep learning, but the assessment measures lower cognitive levels of performance.

The dominance of assessment in influencing students’ learning approaches is well-documented (Ramsden 1992). When students form the perception that it is detailed knowledge they are expected to reproduce in an examination, this perception will tend to elicit surface rather than the intended deep learning behaviours. We can now understand why in researching teaching it is often found that educational innovations which aim to promote deep learning fail to produce the expected learning outcomes. This understanding of the learning process from the student’s perspective can potentially provide an explanation for many of the contradictory empirical findings in economics education research (cited above), which utilise input-output analysis without taking into account students’ responses to factors in the learning context.

In his summary speech in the above mentioned one-day conference, Associate Professor Mark Freeman commented critically on the input-output approaches utilised by the research studies reported in the workshop, and called for more research effort to investigate the internal relationships in the process of learning in economics if research was to have impact on teaching and learning.

THE STUDY

The first author of this paper is currently undertaking a research program to investigate the process of learning in economics. More specifically, this program examines how students perceive various important aspects of the learning environment, and how the interactions of key input and process factors determine learning outcomes, utilising a multi-method approach. The empirical study, on which the present paper reports, represents a part of the research program. The aim of this study is to develop an instrument to tap into students' perceptions of their learning context in economics. The instrument allows us to investigate, for example, differences in student perceptions in different economics units, and how differences in perceptions affect learning approaches (Meyer & Parsons 1989). It can also be used to study the relationship, say, between a teaching innovation and learning approaches, with the student's perception as a moderating variable (Shanahan et al. 1997).

Among the many aspects of the learning environment, such as textbook, workload, teaching, relevance to career, use of technology and class size, four have been found to have great impact on the motivation and strategies of learning – assessment, teaching, content and workload (Ramsden 1992). Further distinctions can be made between these factors with regard to their general versus specific influence on learning. While students' perceptions of teaching method, teaching effectiveness, subject content and workload will have a general influence on students' approaches to a learning task, the perceived demands and nature of the specific assessment task may have an overriding impact on learning approaches (Scouller 1998). Therefore, to study students' perceptions, we have to develop instruments for measuring both general and assessment-specific factors. This paper will document the development of an instrument used to measure students' perceptions of general contextual factors. A separate instrument is used to measure students' perceptions of three different types of assessment commonly used in economics (multiple choice questions, essay assignment, essay examination), and the development of this instrument will be reported in a separate paper.

The instrument

The instrument covers three broad areas: content, teaching and workload. Three sources were used for constructing the items of the instrument: Paul Ramsden's Course Experience Questionnaire (CEQ) (Ramsden 1991), a survey conducted by the Learning and Teaching Support Network (Economics) in the UK (Unknown Author 2002), and empirical data collected in student surveys.

The CEQ asks graduates to evaluate the quality of curriculum, workload and teaching at the course level, and is commonly used in Australian higher education (Eley 2001). It has five sub-scales – good teaching (GT), clear goals and standards (CGS), appropriate workload (AW), appropriate assessment (AA), and generic skills (GS). Items in the GT, AW and AA sub-scales are found to be suitable for measuring students' perceptions of the general teaching context in economics. Five items from the GT scale, two items from the AW scale, and one item from the AA scale are adapted with modifications for the instrument used in this study. The modification mostly involves re-wording to make the items more relevant at the unit level. For example, item twenty in the CEQ: '*The teaching staff worked hard to make their subjects interesting*' was changed to '*In this unit the*

teaching staff work hard to make the topics interesting'. Since the CEQ is constructed for measuring the overall effectiveness of a degree program, items in the CGS and GS scales are found to be not directly relevant for our research, which is subject-specific.

The questionnaire used in the Learning and Teaching Support Network (LTSN) survey is primarily based on the CEQ, with additional items relevant to undergraduates' experiences in economics programs. Two content items and one workload item are adapted from the LTSN questionnaire. The LTSN survey also asked students to give written comments on the course. One teaching item is adapted from a LTSN student statement.

In order to construct an instrument based on students' authentic learning experiences in economics at university, five written questionnaire and two focus group surveys were conducted involving introductory and intermediate level economics students in the middle of Semester 2, 2003. In these surveys, students were asked to freely express in writing or orally various aspects of their experiences about the curriculum, assessment and quality of teaching in their economics unit. From this empirical data, we developed four content items, ten teaching items and three workload items. These items were constructed independently of the CEQ and LTSN surveys.

A draft version of the instrument was piloted with two small groups of economics students in their last lecture in the Summer Semester 2003. After examining the factorial structure obtained from preliminary exploratory factor analysis, one teaching item was deleted because of its ambiguous loadings, and the wordings of several items were modified to clarify their meaning. Appendix 1 presents the revised version of the instrument used in the present study. The table in Appendix 1 also contains the sources and labels for all 22 items in the instrument. It can be seen that there is considerable overlap between the empirically derived items and items adapted from the CEQ and LTSN surveys, which lends support for the content validity of the instrument.

The subjects

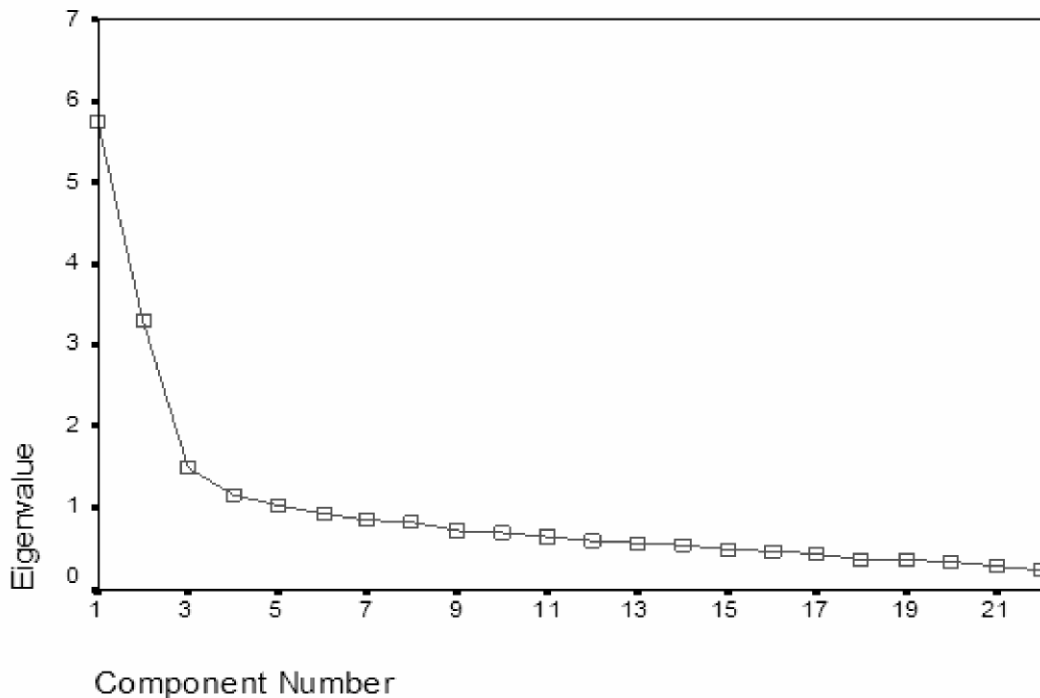
The revised instrument, consisting of five content items, eleven teaching items and six workload items, was administered to students attending their last lecture in two introductory economics units (Economics 1 and Economics 2) and one intermediate economics unit (Business Cycles and Economic Growth) at a Brisbane university in Semester 1, 2004. Introductory economics is offered in this university as two one-semester units (Economics 1 and 2). The course is organised in such a way that both microeconomics and macroeconomics are taught in Economics 1, and dealt with in greater depth in Economics 2. Economics 1 is a compulsory faculty core unit for all Business students; Economics 2 is a core unit of three majors – Economics, Banking and Finance, and Accountancy. Business Cycles and Economic Growth (BCEG) is intermediate macroeconomics, and a core unit for Economics, and Banking and Finance majors. The numbers of valid responses from the three units are 453, 114 and 81 respectively.

ANALYSIS AND FINDINGS

Exploratory factor analysis

Exploratory factor analysis (EFA) was conducted on the whole sample ($n = 648$), using the principal axis method of extraction and direct oblimin rotation. Cases with missing data were deleted from the analysis, resulting in a final sample of 629. The Kaiser-Meyer-Olkin³ (KMO) index of 0.881 indicates that the items in the instrument are very suitable for factor analysis (Kline 1994). The Scree plot in Figure 1 suggests a four-factor solution.

Figure 1: Scree plot (22 items)



The pattern matrix of the four-factor solution is presented in Table 1.

Before discussing individual factors, it is noted that the content items (C1 to C5) do not form a coherent factor. Instead, they load on three separate factors (factors 1, 3 and 4). This is not a surprising result, as these items relate to different aspects of a unit. In the discussions that follow, the reader is asked to refer to the instrument presented in Appendix 1. Items C1 and C3 describe the abstract aspect of economics as experienced by students. C5 is about the amount of theory taught, and C2 and C4 concern its intellectual relevance to real-life experience. The fact that they load on their respective factors in a meaningful way (to be elaborated), further substantiates the integrity of these factors, the exception being C4, which will be discussed below.

The first factor is Workload (WL) comprising five workload items (WL5, WL3, WL2, WL1 and WL7, in descending order of loadings) all with loadings above 0.6, and two content items (C4 and C5) both with smaller loadings. This factor describes workload as experienced by students. Of the two content items in this factor, C5: *'This unit contains*

too much theory' relates to the amount of theory students have to learn. A theory in economics (and in other disciplines) serves to abstract from real-life observations, and to provide a conceptual basis with which to understand and analyse the large amount of information we have to deal with in our real world. However if students are unable to make these connections then learning theories, instead of illuminating, will become laborious, adding workload to their studies. This substantive relationship lends validity to the statistical association (factor loading of 0.421) between this item and the workload factor.

Table 1: Pattern matrix of a four-factor solution

	Factor			
	1	2	3	4
WL5	.868			
WL3	.761			
WL2	.746			
WL1	.650			
WL7	.634			
C5	.421		.234	
C4	.319		-.227	
T11		.760		
T12		.685		
T6		.648		
T9		.510		.240
T10			.550	
T7			.483	
WL6	.281		.379	
T5			.357	
C1	.217		.328	
C3	.261		.309	
T1				.731
T2				.685
T4				.653
T3				.617
C2				.348

Only loadings > 0.2 are shown.

While the loading of C5 on the workload factor makes perfect sense, the loading of C4 (0.319) on this factor is unexpected. The term 'challenging' in C4: '*The unit is intellectually challenging*' is supposed to describe a favourable aspect in economics, but appears to be (mis)interpreted by students as meaning 'difficult', which therefore adds to their workload. Due to this possible double interpretation, this item is deleted in further analysis.

Factors 2, 3 and 4 all relate to teaching. Factor 2, consisting of T11, T12, T6 and T9, describes a teacher who is interested in students and understands their academic needs, and is labelled as ‘Facilitating Teaching’. The defining item – the item that has the highest loading, is T11: ‘*In this unit, the teaching staff give me helpful feedback on my work*’.

Three teaching items (T10, T7 and T6), two content items (C1 and C3) and one workload item (WL6) load on factor 3, all with loadings greater than 0.3. A detailed examination of the teaching and content items conveys a coherent theme. They describe students finding teaching abstract and difficult to understand, and hence feeling that they are forced to memorise and regurgitate the material for assessment. This factor is labelled as ‘Abstract Teaching’. It is observed that WL6: ‘*There are too many assessments (such as tests, projects, assignments etc.)*’ has significant cross loadings – it has a low but significant loading also on factor 1. Furthermore, separate EFA conducted for the three groups indicates that WL6 has unstable loadings. Given this instability, WL6 is deleted in subsequent analysis.

The four teaching items (T1, T2, T3, and T4) in factor 4 describe an enthusiastic teacher presenting the material in an interesting way. We label this factor ‘Good Presentation’. Note that item C2: ‘*This unit contains topics that are largely relevant to the real world*’ has a small but significant loading of 0.348 on this factor. This finding has an important implication for teaching. It is not uncommon to observe that economics educators (and those in other disciplines) who are experts in their fields often find it difficult – or are reluctant – to go down to the level of the students, and provide relevant learning experiences to help students make connections. This has partly to do with their transmissive conception of teaching, as a result of which they make an unwarranted assumption that since the content is relevant and stimulating to them, it must also be relevant and interesting to their students (Biggs 1999; Entwistle 1997). The association of C2 with the good presentation factor indicates that the perception of relevance in economics (and other disciplines) is not an inherent quality of the content, but very much depends on how it is presented and related to the student.

Table 2: Factor correlation matrix

Factor	1	2	3	4
1	1.000	-.123	.342	-.116
2	-.123	1.000	-.102	.471
3	.342	-.102	1.000	-.364
4	-.116	.471	-.364	1.000

These four factors clearly are not orthogonal. Referring to the factor correlation matrix in Table 2, factor 1 (workload) and factor 3 (abstract teaching) are positively correlated as expected, and so are factor 2 (facilitating teaching) and factor 4 (good presentation). Note also that factor 3 (abstract teaching) and factor 4 (good presentation) are negatively correlated. It is expected that a higher-order factor will emerge from a second-order confirmatory factor analysis. Since this paper focuses on the factor structure of the instrument, findings from the second-order analysis will not be reported here.

Testing for factorial invariance across groups

So far, by conducting an EFA on the whole sample, we have found that students' perceptions of the learning context can be described as consisting of four inter-related dimensions. The next question is: would this factorial structure apply across the three sub-groups – Economics 1, Economics 2 and BCEG?

The first step in testing for multi-group equivalence is to establish a baseline model using first-order confirmatory factor analysis (CFA) (Byrne 2001). Before the process of establishing the baseline model is explained, the method of dealing with missing data in this multi-group analysis will be discussed. The dataset contains nineteen cases with one or more missing values. The usual method of dealing with cases with missing values is to delete those cases – listwise deletion. In multi-group analysis, it is necessary that the factorial structure is tested for each sub-group of students, and listwise deletion would further reduce the relatively small sample size of Economics 2. Therefore, full-information maximum likelihood estimation of missing values was used instead of listwise deletion. This method of replacing missing values produces the least bias, by maintaining the mean and variance of the original data (Holmes-Smith et al. 2004).

In the EFA results presented earlier, we argued that two items should be deleted – C4 due to its possible misinterpretation, and WL6 due to its unstable cross loadings. The revised model was subject to independent CFA for each group of students to test for the validity of the factorial structure. A scrutiny of the modification indices⁴ revealed the existence of large to exceptionally large correlations between the error terms for items T3: *'In this unit, the teaching staff are enthusiastic'* and T4: *'In this unit, the teaching staff work hard to make the topics interesting'* for all three groups. Examination of the two items reveals substantive overlapping in their meanings, and thus the error correlation is justified on both substantive and statistical grounds. Therefore the error covariance of the pair was specified as a free parameter, and the final model (Appendix 2) was validated by CFA using AMOS 5 independently across the three sub-groups.

Table 3 compares selected AMOS model fit indices for the revised model (without error covariance) with the final model (with error covariance).

Table 3: Selected AMOS output for independent testing of hypothesised models

		DF	χ^2	χ^2/DF	CFI	RMSEA
Economics 1	Revised model	164	443.458	2.704	0.913	0.061
	Final model	163	388.933	2.386	0.929	0.055
Economics 2	Revised model	164	238.412	1.454	0.906	0.063
	Final model	163	217.206	1.333	0.931	0.054
BCEG	Revised model	164	231.812	1.413	0.906	0.072
	Final model	163	218.932	1.343	0.923	0.065

Holmes-Smith and his colleagues (2004) recommend the following interpretation of these indices:

	Good fit	Reasonable fit
Normed Chi-square (χ^2/DF)	1–2	2–3
Comparative Fit Index (CFI)	> 0.95 (but < 1)	> 0.9
Root Mean-Square Error of Approximation (RMSEA)	< 0.05	0.05–0.08

The AMOS output in Table 3 shows that while both the revised and final models fit the data reasonably well, the final model that includes the error covariance has improved significantly in terms of all three indices for all three groups over the revised model without error covariance. Hence, the final model was used to test for factorial invariance.

After independent single sub-group analysis to refine the model, the final model obtained was subject to a multi-group analysis to generate baseline statistics against which subsequent tests for factorial invariance were carried out. Table 4 presents the AMOS output for the baseline (unconstrained) model.

Table 4: Selected AMOS output for multi-group analysis – unconstrained and constrained models

	DF	χ^2	CFI	RMSEA
Unconstrained model	489	826.745	0.928	0.033
Constrained model	541	914.011	0.921	0.033

The CFI value of 0.928 and the RMSEA value of 0.033 indicate that the hypothesised four-factor model of students' perceptions of the learning environment fits the data well for the three groups (Byrne 2001). Having established statistics for the baseline, we next tested for the invariance of factor loadings, factor variances and covariances. That is, we want to find out if these parameters are equivalent for the three groups. We performed the test by constraining the values of these parameters to be equal for all three groups. The constrained model has 541 degrees of freedom and a χ^2 value of 914.011 (Table 4). A comparison of the constrained model with the non-constrained baseline model yields a χ^2 difference of 87.266 with a difference in degrees of freedom of 52. It indicates a significant difference between the constrained model and the non-constrained model at 0.005. The null hypothesis of equivalent parameters is therefore rejected, meaning that the parameters are *not* equivalent across the three groups. The next step is to locate the source of non-equivalence.

A similar multi-group analysis involving Economics 1 and Economics 2 students only was conducted. We compared the χ^2 statistics of the non-constrained and constrained model, and obtained a χ^2 difference of 45.005 with a difference in degrees of freedom of 26, which is non-significant at 0.01. At this level of statistical significance, we can say that the final model is equivalent for the Economics 1 and Economics 2 groups. This means that the non-equivalence is between Economics 1 / Economics 2 and BCEG.

Further tests for factorial equivalence were not conducted since the sample size of the BCEG group is too small to obtain stable results.

Preliminary comparisons

So far, we have established that the factorial structure of the final model to measure students' perceptions of workload and teaching is valid across the three groups. Due to inadequate sample size, we are unable to further test for the equivalence of parameters between BCEG and either of the other two groups. This prevents us from calculating and comparing the factor scores by incorporating the regression weights. However, we can still compute simple composite scores to compare the three units as perceived by students in terms of the four dimensions measured by the instrument. The comparisons between Economics 1 and Economics 2 reveal no significant difference on all scales at 0.05, and therefore the statistics are not reported here. Tables 5 and 6 present results of independent *t*-tests on the composite scores for each scale between BCEG and Economics 1 / Economics 2.

Table 5: Independent *t* tests – Economics 2 vs. BCEG

	Group	<i>n</i>	Mean	Std. deviation	Sig.
Workload	Econ 2	114	3.2690	.82623	.100
	BCEG	81	3.0761	.76922	
Good presentation	Econ 2	114	3.2860	.63857	.000
	BCEG	81	3.7185	.79106	
Facilitating	Econ 2	114	2.9508	.73839	.000
	BCEG	81	3.3333	.70156	
Abstract teaching	Econ 2	114	2.6805	.57583	.146
	BCEG	81	2.5506	.65919	

Table 6: Independent *t* tests – Economics 1 vs. BCEG

	Group	<i>n</i>	Mean	Std. deviation	Sig.
Workload	Econ 1	453	3.1429	.78977	.482
	BCEG	81	3.0761	.76922	
Good presentation	Econ 1	453	3.4042	.64595	.000
	BCEG	81	3.7185	.79106	
Facilitating	Econ 1	453	3.0380	.70412	.001
	BCEG	81	3.3333	.70156	
Abstract teaching	Econ 1	453	2.6483	.59378	.180
	BCEG	81	2.5506	.65919	

The tables show that on workload and abstract teaching there is no significant difference between BCEG and Economics 1 / Economics 2, although the direction is in favour of BCEG. However, in terms of good teaching (good presentation and facilitating subscales), BCEG was perceived as better than the two introductory economics units ($p = 0.001$ or lower). The perceived differences as revealed by the scale scores can be further substantiated by qualitative data obtained in focus groups conducted in Semester 2, 2003. Before we present this qualitative data, it must be noted that the comments by the focus group participants refer to the three economics units offered in Semester 1, 2003, whereas the data used in this study were collected in Semester 1, 2004. Despite this time difference, the content, assessment and teaching staff in these units changed very little between the two semesters. Therefore the statements provided by students in 2003 can be taken as valid descriptions of the three units in 2004. Furthermore, these statements are typical of the views expressed in the focus groups:

(In BCEG), (he) brings things together, I think (his) conversation style is good. People build a rapport ... and making jokes, just have that connection with students (Shona, on BCEG).

I think the syllabus can be quite dry and as a result when the lecturer has taught the subject year in and year out, they don't change a great deal. So, they kind of lose a bit of enthusiasm for work ... it's not dynamic in the way it's taught (Natalie, on Economics 1).

Personally, I switched off in lecture, cos I find it really boring especially when it's (Mr. XXX), I can't stand it. I might as well go home and do it myself and get more out of it (Kirsten, on Economics 2).

These excerpts paint a picture consistent with the quantitative results – the teaching in BCEG was perceived as better than in Economics 1 and Economics 2, in spite of similar perceived workload and abstractness in content.

CONCLUSION AND FUTURE RESEARCH

In this paper, we presented the theoretical basis on which an instrument was developed to measure students' perceptions of key aspects of their learning environment in economics. The psychometric properties of the four scales comprising the subject-specific instrument were found to be adequate for modelling purposes. Multi-group testing shows that the four-factor model applies to the three different groups of economics students in this study.

The results of preliminary comparisons based on composite scores are supported by interview data obtained from focus groups, which gives the instrument further content validity. However, we are aware that the majority of the students in the sample are not majoring in economics. Therefore the findings in this study may be sample specific. In other words, the factorial structure established in the present study may not apply to economics majors, whose perceptions of aspects of the learning context might have a different structure. Hence, given the background of the students participating in this study, the factorial structure of the scale has to be validated using samples from other universities. Moreover, a larger sample of intermediate and advanced-level economics students is needed to determine the equivalence of the parameters across different levels of economics units.

As illustrated in this study, the instrument can be used to compare the learning contexts of different economics units as perceived by students, in terms of workload and the ways in which they are taught. It provides a starting point for identifying areas in need of improvement. It can also generate objective data on the impacts of teaching innovations in the environment of teaching and learning, through the eyes of students. This instrument, as mentioned earlier, is one of several being developed for an on-going research program. The development of this instrument represents a first step towards investigating the so-called 'black box' (Shanahan et al. 1997) that is the process of learning in economics. Two instruments are being developed for measuring students' perceptions of the types of abilities assessed, and their approaches to learning in different assessment regimes. Future investigation in this research program will include the development of a causal model that links students' perceptions to their approaches to learning in economics. This will provide empirical evidence to enable us to better understand how students' perceptions influence the ways they go about learning, which impacts the quality of their learning outcomes.

NOTES

1. TUCE stands for Test of Understanding in College Economics.
2. SAT stands for Scholastic Assessment Test, and ACT for American College Test.
3. KMO is a measure of how much the items have in common. A KMO value close to one indicates that the variables have a lot in common.
4. The modification indices range from 12 to 48. Interested readers can contact the first author for the full AMOS output.

REFERENCES

- Becker, W.E. 1997. Teaching economics to undergraduates. *Journal of Economic Literature* 35 (3): 1347–73.
- Biggs, J.B. 1989. Approaches to the enhancement of tertiary teaching. *Higher Education Research and Development* 8 (1): 7–25.
- Biggs, J.B. 1996. Enhancing teaching through constructive alignment. *Higher Education* 32: 347–64.
- Biggs, J.B. 1999. What the student does: Teaching for enhanced learning. *Higher Education Research and Development* 18 (1): 57–75.
- Byrne, B.M. 2001. *Structural equation modelling with AMOS*. New Jersey: Lawrence Erlbaum Associates.
- Dancer, D. 2002. The gender issue revisited: A case study of student performance using economics and econometrics. Paper presented at the ninth annual teaching economics conference, Economics in the classroom and beyond: challenges and opportunities, July 3–5, University of Queensland.
- Dancer, D., and D. Fiebig. 2005. Modelling students at risk. Paper presented at the one day workshop on the empirical analysis of teaching and learning at the tertiary level in business, economics and commerce, February 11, University of Melbourne.
- Eley, M. 2001. The course experience questionnaire: Altering question format and phrasing could improve the CEQ's effectiveness. *Higher Education Research and Development* 20 (3): 293–312.

- Entwistle, N. 1997. Contrasting perspectives on learning. In *The experience of learning*. 2nd ed. Edited by F. Marton, D. Hounsell and N. Entwistle. Scottish Academic Press, 3–22.
- Gibbs, G., A. Morgan, and E. Taylor. 1982. A review of the research of Ference Marton and the Goteborg group: A phenomenographical research perspective on learning. *Higher Education* 11: 123–45.
- Gordon, A., and B. Dwayne. 1994. The determinants of success in university introductory economics courses. *Journal of Economic Education* 25 (2): 99–118.
- Holmes-Smith, P., L. Coote, and E. Cunningham. 2004. *Structural equation modelling: From the fundamentals to advanced topics*. School Research, Evaluation, and Measurement Services.
- Imerie, B.W. 1998. Assessment for learning: Quality and taxonomies. *Assessment and Evaluation in Higher Education* 20 (2): 175–89.
- Kline, R.B. 1994. *An easy guide to factor analysis*. London: Routledge.
- Marton, F. 1981. Phenomenography – Describing conceptions of the world around us. *Instructional Science* 10: 177–200.
- McCosker, M. 2000. Results from results – An analysis of the factors influencing performance in introductory economics. Paper presented at the scholarship of teaching economics conference, July 13–14, University of Melbourne.
- Meyer, J.H.F., and P. Parsons. 1989. Approaches to studying and course perceptions using the Lancaster Inventory – A comparative study. *Studies in Higher Education* 14 (2): 137–53.
- Ramsden, P. 1987. Improving teaching and learning in higher education: The case for a relational perspective. *Studies in Higher Education* 12 (3): 275–86.
- Ramsden, P. 1991. A performance indicator of teaching quality in higher education: The Course Experience Questionnaire. *Studies in Higher Education* 16: 129–50.
- Ramsden, P. 1992. *Learning to teach in higher education*. London: Routledge.
- Scouller, K. 1998. The influence of assessment method on students' learning approaches: Multiple choice question examination versus assignment essay. *Higher Education* 35: 453–72.
- Shanahan, M., C. Findlay, J. Cowie, D.K. Round, R. McIver, and S. Barrett. 1997. Beyond the 'input-output' approach to assessing determinants of student performance in university economics: Implications from student learning centred research. *Australian Economic Papers* Special issue: 17–37.
- Shanahan, M.P., and J.H.F. Meyer. 2001. Variation in student's engagement of learning economics. Paper presented at the scholarship of teaching economics conference, July 13–14, University of Melbourne.
- Tay, R., and K. Peter. 1994. Students' performance in economics: Does the norm hold across cultural and institutional settings. *Journal of Economic Education* 25 (3): 291–301.
- Thomson, K., and N. Falchikov. 1998. Full on until the sun comes out: The effect of assessment on students approaches to studying. *Assessment and Evaluation in Higher Education* 23 (4): 379–90.
- Unknown Author. 2002. *Student survey 2002 report – A nationwide survey of students' experiences in studying economics*. Economics Centre of the Learning and Teaching Support Network, UK.

APPENDIX 1*Items, sources and labels of the final version of instrument*

Statements	Source ^a				Label
	CEQ	LTSN	FG	WS	
<i>About the content of this unit: This unit ...</i>					
... uses too many graphs.			✓		C1
... contains topics that are largely relevant to the real world.			✓		C2
... contains too much maths.		✓ ^b	✓		C3
... is intellectually challenging.		✓ ^b			C4
... contains too much theory.			✓		C5
<i>About teaching in this unit: In this unit, the teaching staff ...</i>					
... are extremely good at explaining things.	✓				T1
... present the content in a way that is meaningful to me				✓	T2
... are enthusiastic.			✓	✓	T3
... work hard to make the topics interesting.	✓ ^b			✓	T4
... teach us in an abstract way, unrelated to real world experiences.			✓		T5
... make a real effort to understand difficulties I may be having with my work.	✓		✓		T6
... seem more interested in testing what I have memorised than what I have understood.	✓			✓	T7
... motivate me to do my best.	✓ ^b		✓		T9
... put too much emphasis on passing examinations, and not enough emphasis on understanding the content.		✓ ^c		✓	T10
... give me helpful feedback on my work.	✓ ^b				T11
... are genuinely interested in helping students.			✓		T12
<i>About workload in this unit: In this unit, ...</i>					
... the workload is too heavy.	✓				WL1
... the pace is too fast.		✓			WL2
... the volume of work to be got through meant it couldn't all be learnt thoroughly.	✓ ^b				WL3
... there is too much material to learn in this unit.				✓	WL5
... there are too many assessments (such as tests, projects, assignments et cetera).				✓	WL6
... there is too much content assessed.				✓	WL7

^a FG = Obtained from Focus Group; WS = Written Statement obtained from questionnaire surveys.^b Modified. ^c Adapted from a student written response to LTSN survey.

APPENDIX 2

The final model (with error covariance between T3 and T4)

