AN EXPLORATION OF A STUDENT STRING QUARTET AS A
MODEL OF COOPERATIVE LEARNING

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ABSTRACT

This descriptive case study explores the functioning of a student string quartet during rehearsal. Through the theoretical lens of social constructivism, this study seeks to develop a meaningful interpretation of the phenomenon of student chamber music rehearsals. Using a qualitative methodology, this study employs the data collection techniques of non-participant observation, group and individual interview to construct a rich description of the interactions and processes which make up the participants' rehearsal environment.

The data indicate that rehearsals are a complex phenomenon and involve: the musical and social coordination of the group, an agreed sense of leadership, a regular rehearsal structure, and the group members' individual and collaborative construction of meaning through verbal discussions. External factors, such as upcoming concerts and master classes, appeared to have a positive effect on the group's perceived level of mental focus during rehearsals. The group's democratic style of leadership was found to permeate most aspects of the rehearsal process, in particular their mutual construction of meaning. Comparisons are made with the similar functions, leadership and achievements of cooperative learning groups, leading to speculation about further educational implications of this study.

ACKNOWLEDGEMENTS

The audiences who listen to us cannot imagine how earnest, how petulant, how accommodating, how wilful is our quest for something beyond ourselves that we imagine with our separate spirits but are compelled to embody together.

Vikram Seth

An Equal Music

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CHAPTER ONE: INTRODUCTION

Current Australian music education practices place emphasis on the acquisition of knowledge through student-centred learning activities. By engaging with music in the areas of performance, composition and listening, students become active in the learning process (Board of Studies NSW, 2003). Cooperative learning is a small group teaching technique that encourages active learning whereby teachers have a role of facilitating learning rather than instructing students in the learning process (Barry & King, 2003).

Active learning is a central paradigm of cooperative learning and is inextricably linked to the constructivist philosophy of education. Constructivism focuses on the ways in which humans construct personal meaning (McInerney & McInerney, 2002). It can be further defined as the learner's active and continuous process of constructing and restructuring meaning through learner-centred learning experiences (Tynjala, 1999). Constructivism, in the context of music education and performance, is concerned with an individual's interpretation of the music and the unique learning processes involved in mastering the repertoire, rather than a focus on the technical actions involved in creating music (Stubley, 1992). Social constructivism is a branch of constructivism which focuses on the construction of shared knowledge in a social environment (McInerney & McInerney, 2002). Cooperative learning is a social constructivist approach that emphasises the individual's construction of knowledge through "collaborative inquiry" (McInerney & McInerney, 2002, p. 4).

Chamber music groups, such as string quartets, could be seen as models of cooperative learning groups. The absence of a conductor requires musicians to chair their own rehearsal sessions and coordinate playing during performance. This autonomy provides musicians with the opportunity to contribute to the decision-making processes of rehearsal and to shape the music during performance. This is a task that requires self-regulation – a challenge for any group of musicians but none more so than for student musicians (King, 2006). In chamber music, group performance is affected by the individual actions and beliefs of the group members,

and thus group identity is in turn shaped by self-identity and vice-versa (Stubley, 1992).

The management of student quartet rehearsals and the interaction between individuals during rehearsal form the basis of this study.   Through discussions with a student string quartet and observations of their rehearsals, this study attempts to develop a meaningful interpretation of the rehearsal process from the perspective of student musicians. The qualitative nature of this study enabled the direction of the research process to be responsive to the emergent data. Analysis was therefore not predetermined but used an inductive approach in which the coding schemes were refined based on the emerging data (Creswell, 2003).

Outline of the study

This qualitative study investigates the interactions between members of a student string quartet during rehearsals and their perceptions of the rehearsal process. Through the observation of the quartet's rehearsals and discussions with the quartet members, this study hopes to develop an interpretation of the rehearsal process of a "self-governing" small group (Murningham & Conlon, 1991, p. 165).

The aim of this study is to develop an understanding of the rehearsal processes of student chamber musicians through group discussion and observation of the rehearsal environment. The findings are then compared with the literature on cooperative learning to assess the possible similarities between cooperative learning in the classroom and cooperative learning in a chamber music ensemble.

To investigate these aims, the following research questions have been constructed:

1. How does the quartet structure rehearsals?

2. How do the quartet members interact during rehearsal?

3. What themes emerge in the verbal content of rehearsals?

4. What are the factors the quartet members perceive as important to the functioning of the quartet?

Chamber music group interaction and rehearsal techniques have been the subject of a number of empirical studies. Research into individual roles (Ford & Davidson, 2003; King, 2006), leadership (Blank & Davidson, 2007; Murningham & Conlon, 1991), and musical and social coordination between musicians (Davidson & Good, 2002; Ginsborg, Chaffin, & Nicholson, 2006; Williamon & Davidson, 2002; Young & Colman, 1979) have all focused on chamber music groups in rehearsal. Many of these studies share a common methodology of observation, and place emphasis on the researcher's interpretation of group processes.

King (2006) for example, analysed the quartet participants according to a set of roles which used a mixture of existing terminology and roles that were newly created in response to the emergent data. As a result, each participant was analysed to be portraying a role, such as 'leader', corresponding to the researcher's interpretation of their behaviour during rehearsal. There is an opportunity to expand the current body of research to build greater understanding of the knowledge and perspectives of student musicians.

The string quartet as a cooperative learning group

The string quartet is a chamber music ensemble comprising (typically) two violins, a viola and a cello. As the string quartet evolved throughout the eighteenth century it was the works of Joseph Haydn (1732-1809), particularly his Op.33 string quartets

(1781), which saw the "culmination of the classical string quartet" as a unique art form (Parker, 2002, p. 2). Goethe likened Haydn's string quartets to "four rational people conversing" (Bashford, 2003, p. 4). String quartet performance can be described as a *gesture* of conversation with the four instruments acting out a drama displaying such human behaviours as individuality, cooperation and conflict (Baron, 2002). These musical features are also key features of the rehearsal session with individuality, cooperation and conflict of the four musicians permeating the decision-making processes.

Just as the string quartet comprises four individual musical lines it also presents four different musical ideas which need to be coordinated into one collective concept of the piece. Through discussion, the quartet has to make decisions as to the musical and artistic aspects of the piece. Similarly, cooperative learning is a teaching method which sees students organised into groups to work collaboratively at a task (Emmer, Evertson, & Worsham, 2006). An integral part of the learning process is self-regulation, where students consciously select learning strategies to help contribute to the completion of a task (Barry & King, 2003). In classroom settings teachers facilitate the learning process just as tutors monitor the progress of student chamber music groups in the preparation of repertoire for performance.

In string quartet rehearsals each member can be seen as capable of providing an insider's view of their own musical part, which then can contribute to the group's conception of the piece as a whole. Through communicative group processes such as the negotiation of individual roles and group goals, the rehearsal process can be focused.

Research context

This study has been conducted at the Sydney Conservatorium of Music, a faculty of the University of Sydney, Australia, and focuses on the experiences of a student string quartet in the Conservatorium's chamber music program. Chamber music is an elective offered by the Ensemble Studies Unit and is a compulsory component of

the Bachelor of Music (Performance) degree, which stipulates four semesters of chamber music as part of the requirements of a degree in performance. The Conservatorium Handbook (Sydney Conservatorium of Music, 2007) summarises the expectations of the chamber music units of study:

> Each group is required to attend six 1-hour tutorials per semester and a minimum of nine independent rehearsals. It is expected that students prepare and rehearse to professional standards of performance. Tutors are responsible for recommending suitable groups to participate in high-profile concerts, recitals, country tours, master-classes and professional engagements. (p. 112)

The Conservatorium has developed a set of graduate attributes which includes the categories *Personal and Intellectual Autonomy* and *Communication*. These categories outline qualities that are expected to develop during a student's time at the Conservatorium. The common feature of these attributes is the development of students as independent and "lifelong learners" (Sydney Conservatorium of Music, 2007, p. 2). These graduate attributes are reflected in the expectations of the chamber music program which describe key chamber music skills as including the development of entrepreneurial skills such as the organisation and promotion of concerts.

Significance of study

There is an opportunity to expand the current body of research to develop a greater understanding of the knowledge and perspectives of student musicians. This study uses group and individual interviews to directly interact with participants and develop a better understanding of the rehearsal process from the point of view of participants. These methods of data collection will better inform the researcher of the social context of the observed rehearsals, without which the misinterpretation of student behaviours and rehearsal management of the observed rehearsals may result. In previous studies, few connections have been made between group musical performance and music education in the classroom. This similarity between the functioning of chamber music groups and other small cooperative learning groups allows for an exchange of research findings which promote positive music education

practices as a whole.   Through in-depth discussions with the participants, this study will explore how student musicians construct meaning from their musical experiences and what features they perceive as important to their learning processes.

Definition of Terms

Chamber Music – Chamber music can be defined as small group ensemble playing involving between three and ten musicians, operating without a conductor (Sydney Conservatorium of Music, 2007).

Cooperative Learning – For the purposes of this study, cooperative learning will be defined as a learning environment in which students work collaboratively in small groups. It is a teaching approach which promotes the independent learning of students through active participation and construction of their own knowledge (Cohen, 1994; Emmer et al., 2006).

Thesis Outline

The structure of this thesis is divided into three main sections. The first section, Chapters One to Three, examines the background to the research focus and outlines the methodologies employed. The second section, Chapter Four, presents a discussion of results while the final section, Chapter Five, will evaluate the findings and the implication for music education and will identify areas for further investigation.

CHAPTER TWO: REVIEW OF RELATED LITERATURE

There are a number of studies that have investigated the functioning of small chamber music groups: string quartets (Blum, 1986; King, 2006; Williamon & Davidson, 2002; Young & Colman, 1979), wind quintets (Ford & Davidson, 2003), piano duos (Blank & Davidson, 2007; Williamon & Davidson, 2002) and mixed ensembles (Ginsborg et al., 2006). These studies focus predominantly on the musical and social coordination between members in chamber music group rehearsals. There is not a consistent theoretical framework linking these studies but there are commonalities in the employed methodologies. An emphasis on observable variables is a feature of both chamber music and cooperative learning studies. Studies of cooperative learning groups have centred their processes of data collection on non-participant and participant observation and on the content analyses of verbal communication. As is the case for studies of chamber music groups, cooperative learning studies have also examined numerous types of group composition from mixed ability (Hooper & Hannafin, 1988), mixed gender (Gillies, 2004) and mixed ethnic groups (Shachar & Sharan, 1994).

This review begins with an outline of the literature on constructivist and cooperative learning and some of the current practices in chamber music education. The nature of string quartets as musical ensembles is then explored followed by an overview of the processes that occur within rehearsals. The review concludes with a summary of the teaching and learning implications of the current literature and the identification of areas in need of further investigation.

Constructivist Learning

Hendry (1996) suggests seven principles for constructivist learning in the classroom including the notion that meanings or interpretations are dependent on a person's existing knowledge. This principle suggests that students construct their own

meaning based on their existing knowledge and beliefs. Furthermore, students may construct different meanings from the same material depending on their prior knowledge (Hendry, 1996). This principle is of relevance to group music making because of the different musical experiences and knowledge individuals bring to the rehearsal process. Another principle put forward by Hendry (1996) is that knowledge is constructed from within and in relation to the world. In doing so, students construct meaning in relation to the many types of interactions that they encounter both inside and outside the classroom. It should be made clear that constructivism is a philosophy of learning and not a teaching technique. Tasks that stimulate constructivist learning "provide a rich context within which meaning can emerge and evolve" (Hannafin, Hannafin, Land, & Oliver, 1997, p. 109).

Cooperative Learning in the Classroom

Cooperative learning can be defined as the organisation of students into small groups engaged to work collaboratively towards a common task objective (Emmer et al., 2006). The small group size promotes active participation from the students and involves minimal interference from the teacher (Cohen, 1994). The role of the teacher is no longer that of *instructor,* as is often associated with the whole-class teaching approach, but the role of *facilitator* of learning (Emmer et al., 2006). As a result, the objective of cooperative learning is to create a learning environment that promotes the independent learning of students through discovery, inquiry and the "mutual construction of meaning" (Emmer et al., 2006, p. 114).

Cooperative learning groups have been implemented from primary schools through to tertiary educational settings (Gillies, 2003). There is no specified size for cooperative learning groups. Bennett and Dunne (1991) support the British education tradition by specifying groups comprising 4-6 students. Dyadic groups have also been considered to be cooperative learning groups as the two group members work in collaboration to complete a task (Cohen, 1994).

Positive outcomes that have been attributed to cooperative learning have included improved social behaviour among students, the development of higher order cognitive skills and as a way of encouraging positive social interaction in classrooms of diverse abilities and cultural make-up (Cohen, 1994; Hooper & Hannafin, 1988; Shachar & Sharan, 1994). While cooperative learning has been found to be advantageous in its contribution to a generally high level of on-task behaviour and subsequently high levels of task achievement, certain conditions are needed to support the learning process (Cohen, 1994). On-task behaviour can be defined as a student's attention to the subject matter during the allocated working time (Barry & King, 2003). By providing structure for group tasks and teaching the social skills of positive interaction, teachers can effectively guide the students to creating a productive work environment (Gillies, 2003).

Johnson and Johnson (1987) pioneered the research into cooperative learning and subsequently developed their five principles of cooperative learning: positive interdependence, individual accountability, group reflection, small-group skills and face-to-face interaction. Each of these principles is linked to group interaction and highlights the importance of social skills, particularly those of communication, as well as the cognitive skills that are needed to succeed in cooperative learning groups. Jolliffe and Hutchinson (2007) identified the principles of positive interdependence and individual accountability as being central to the success of cooperative learning. Positive interdependence was defined as the need for all group members to be involved in order to complete the task. The group's finished product was therefore dependent on the individual accountability of the contributions of group members. This concept is not unlike Cohen's (1994) definition of group productivity as being related to the group's "equal-status interaction" (p. 3).

Cooperative learning is dependent on group interaction for the completion of the common task objective. Research has found that the types of interactions between group members are related to the type of task and learning objective (Cohen, 1994). Similarly, Bennett and Dunne (1991) believe that the success of cooperative learning is reliant on the development of language and communication skills of those involved. Tasks with a wide range of possible answers, such as the process of

interpretation of a musical work, call for effective group interaction in which there is a mutual exchange of ideas. Talk analysis has subsequently been a feature of several studies of cooperative learning (Bennett & Dunne, 1991; Gillies, 2003; Hogan, Nastasi, & Pressley, 1999; Shachar & Sharan, 1994). A case in point is Bennett and Dunne's (1991) study of cooperative learning in British primary school classrooms, which revealed a link between the verbal interaction of group members and the type of task being completed. This study also found that the interaction of group members stimulated verbal discussions which were, for the majority of the time, highly relevant to the task.

Given the strong focus on group interaction in cooperative learning, it has been recognised that students perform better in such groups when they have been given specific guidelines to assist in completing the task and have been trained in the social skills needed for effective group interaction (Cohen, 1994; Gillies, 2003; Jolliffe & Hutchinson, 2007). Gillies' (2003) study compared the performance of primary school students who were taught how to cooperate in small groups and those who were not taught how to cooperate. The study found that students who were taught skills in cooperative behaviour displayed more cooperative behaviours than their untrained classmates. In a later study of similar design and focus, Gillies (2004) found that students who were given cooperative learning tasks on a regular basis showed an increased awareness of group cohesion and greater sense of individual accountability for learning than their classmates who were not given regular practice. Cohen (1994) supports the findings that students function more effectively in cooperative learning groups if they have been taught the social skills to interact in this environment. She also suggests that students who have not been taught these skills may generally only reach a concrete level of understanding. Therefore, teachers who want their students to be able to operate at a higher order of thinking are recommended to develop their students' verbal communication skills (Cohen, 1994).

Contrasting findings come from Hogan and Pressley (1999) study of the similarities and differences between teacher-guided and peer-guided discussion groups in the context of secondary school science classes. It was found that teacher-guided

discussions promoted a greater proportion of higher order responses than peer-guided discussions, which were characterised by more exploratory verbal contributions. It should be noted, however, that the talk among student-led groups was more varied and in some cases these groups achieved high order discussions. While this study deliberately formed the participants into heterogenous groups based on cognitive ability and gender, the study's relatively small scope – four groups of three students – make it difficult to generalise these findings.

Studies have explored the effects of cooperative learning on the performance of diverse student groups including those of mixed ability (Hooper & Hannafin, 1988) mixed gender (Gillies, 2004) and mixed ethnicity (Shachar & Sharan, 1994). Cooperative learning groups with students of mixed ability have been found to be beneficial for low ability students who were able to work with students of high ability (Hooper & Hannafin, 1988). The mixed groups were found to have little effect on the level of achievement of high ability students, showing that heterogeneous cooperative learning groups do not disadvantage either high or low ability students. Similarly, gender did not appear to be a distinguishing feature of cooperative learning groups. Instead, it was the students' development of social skills that had a stronger impact on a group's ability to achieve task objectives than other variables such as gender (Gillies, 2004). Shachar and Sharan's (1994) study of a culturally diverse school in Israel found that students of all backgrounds contributed equally to cooperative learning group discussions. This was in contrast to the distribution of talk during teacher led discussions at the culturally diverse school, which was found to be dominated by students of Western backgrounds.

Research into cooperative learning as a classroom teaching method has found many benefits for cognitive, social and personal student outcomes (Barry & King, 2003). Positive outcomes of cooperative learning include the increased participation of students in the learning process, a greater opportunity for teacher feedback on student learning and achievement and the development of both interpersonal skills and higher order thinking skills (Cohen, 1994; Emmer et al., 2006).

Chamber Music Education

The teaching and learning of chamber music at a school and tertiary level is an area of limited empirical research and as such this study will review suggested teaching practices put forward by music educators in such publications as *The American String Teacher* and *The Music Educators Journal*. While these are not all empirical studies, they serve to highlight current perspectives in the area of chamber music education.

Students are introduced to chamber music at various stages in their musical education and early experiences could include playing duets with their music teacher (Hambourg, 2000) or participating in small ensembles at school (Griffing, 2004; Rudoff, 2000). The self-regulatory nature of chamber music rehearsal and performance means students need to be educated in both the musical and social aspects of chamber music functioning. Some music educators place importance of the musical and technical aspects of chamber music over the social aspects, such as leadership – (Celentano, 2000; Hambourg, 2000; Romer, 1998), while other music educators recognise the need to teach the two areas concurrently.

Chamber music is seen by some music educators as a learning experience that contributes to greater musical responsibility, leadership and interpersonal skills (Celentano, 2000; Griffing, 2004; Latten, 2001; Rudoff, 2000). Musical responsibility can be defined as the individual's commitment to his or her own part and awareness of how it interacts with other parts and is a skill which requires aural awareness, understanding of structure and harmony, and the technical mastery of the individual part (Latten, 2001).

Literature on the education of students in the social issues of chamber music playing is largely restricted to secondary school settings in the United States of America. Rudoff (2000) suggests that employing a constitution which outlines student responsibilities and accepted codes of behaviour can help to educate students in the social issues of chamber music performance and rehearsal.   Similar articles by Griffing (2004) and Latten (2001) outline the facilitating role of teachers in the

rehearsal process. Teachers can assist in forming chamber ensembles, scheduling rehearsals and selecting suitable repertoire.

Social and musical interaction in chamber music groups

Leadership

The string quartet has often been viewed as an exemplar of the small working group. Much literature has explored the social issues of leadership and how it contributes to the success of a chamber music group (Blank & Davidson, 2007; Ford & Davidson, 2003; King, 2006; Murningham & Conlon, 1991; Young & Colman, 1979). Non-musical fields have turned to the small "intense work groups" of string quartets in an effort to gain an understanding of how these "self-governing" and "reciprocally interdependent" groups successfully function (Murningham & Conlon, 1991, p. 165).

Instrument roles in string quartet writing are equalised in a "four-part discourse" (Eisen, 2007) while string quartet rehearsals can be described as existing somewhere along a continuum between autocracy and egalitarianism. The direction of rehearsals by one member and the involvement of all members characterise the two extremes of leadership styles evident in string quartets.

An extensive study of twenty professional British string quartets was carried out by Murningham and Conlon (1991). This qualitative study involved the semi-structured interviewing of all 80 individuals. Questions such as "To what extent are problems solved democratically?" (Murningham & Conlon, 1991 p. 185) were aimed at obtaining an insider's view of the working relationship of professional string quartets. This study found that the most successful string quartets (for example as measured by the number of concerts performed and albums sold) treated the first violin as the leader of the quartet.

One contrasting case study, is the working relationship of the world-renowned Guarneri Quartet who believed that it is the music and not a set individual – such as the first violin – that dictates musical decisions (Blum, 1986). Consequently, the Guarneri Quartet did not discuss leadership in terms of its social function but as a consequence of the musical writing. It could be inferred that because of their extensive professional career (twenty years at the time of publication) the Guarneri Quartet had developed their own system of approaching and resolving issues of conflict. The Guarneri Quartet believed that an individual's musical role is a strong determinant of the appropriate level of influence in coming to a musical decision. In other words, the decision-making processes of the rehearsal are highly influenced by the piece of music being performed.

In contrast to string quartets, wind quintets traditionally share responsibility for leadership. Evidence of this can be seen in the way wind quintets experiment with seating arrangements to achieve different blends of sounds (Ford & Davidson, 2003). The wind quintet practice of employing deputies when regular players cannot attend a rehearsal or performance demands flexibility in leadership responsibilities (Ford & Davidson, 2003). Similarly Blank and Davidson (2007) observed this notion of shifting roles in their observations of piano duos. The player with more experience of the piece being studied would lead the decision making but it was noted that the leadership was only temporary.

The notion of leaderships being temporary was a finding of King's (2006) study, which investigated the shifting roles of student musicians in string quartets. This study identified the perceived team role/s of each quartet member across three rehearsals by using a model adapted from Belbin's nine team roles (1993). Labels such as *leader, contributor* and *inquirer* were chosen to describe the behaviour of individuals during each rehearsal. The analysis of the three quartets found that stable team roles favoured consistent progress in rehearsals. Of most importance was the consistency of the group's leadership figure. The study found that the quartet which had the most success at an assessed performance had an individual (the first violin) who displayed a sense of leadership over the three rehearsals.

Musical Coordination

The musical coordination of chamber music involves how a performance is put together to form a cohesive whole. The development of shared performance cues and non-verbal communication are two aspects of musical coordination which have been the subjects of empirical research. In a group performance, cues are selected and shared among musicians to coordinate the various musical layers. Ginsborg, Chaffin and Nicholson (2006) define performance cues as specific elements of the score which are highlighted as being of basic, interpretive, metacognitive or structural importance to the performer. Basic elements, referred to the technical mastery of the music, including comments made regarding dynamics, tempo and phrasing.

An analysis of the annotations in the scores by individual chamber musicians in a study by Ginsborg et. al. (2006) revealed that there was a varying emphasis in the performance cues chosen by the performers. As part of the analysis process the purpose of each cue was defined and included such categories as interpretive and metacognitive cues. In this study one musician was found to have a predominant focus on personal metacognition while another was more concerned with more technical aspects of the performance. Although the study does not link the difference in performance cues to the overall ability of the group's performance, it does highlight the need for effective communication between group members.

The implementation of performance cues is an area examined by Williamon and Davidson's (2002) study of a piano duo and their findings provide another perspective on the purpose of cues and how they can be effectively communicated to the rest of the group. In this study the term 'performance cue' was replaced by 'gesture', to indicate the physical movements performers use to coordinate the musical layers. These movements included non-verbal communication such as eye-contact and body sways. The researchers worked in consultation with the participants to decide what gestures were important or less important during a performance. Using video observation, frequency counts were made to identify the

rate at which gestures were employed during a performance. It was found that the number of important gestures increased at key structural points in the music.

The Guarneri Quartet discussed their use of performance cues using the term 'leads' rather than 'gesture' (Blum, 1986). The quartet saw the distribution of 'leads' in a performance as a reflection of balanced leadership and describe them as being subtle and shared among the group. The leads the quartet identified – such as bow speed and finger placement – indicated an emphasis on peripheral vision rather than on direct eye contact.

Williamon and Davidson's (2002) study of the rehearsal preparation of two expert pianists found that in the duet rehearsal sessions over 90% of the rehearsal time was spent playing. Similarly, Blank and Davidsons's (2007) study of piano duo collaborations found that 82% of the participants estimated that they would spend 75% of the rehearsal playing. This is also consistent with the finding of Murningham and Conlon (1991) that successful string quartets spend the majority of the rehearsal time playing rather than talking. If successful chamber music groups spend 75-90% of the rehearsal time playing, then non-verbal forms of communication may be more efficient.

Conclusion

Cooperative learning is an area of extensive research, encompassing a variety of cultural and educational perspectives, but there is yet to be a focus on music education. In contrast, there has been much research into the musical and social interactions which make up the functioning of a chamber music group in both student and professional groups. It has been found that professional chamber music groups use an extensive range of performance cues and non-verbal communication to coordinate performances but research on the use of such gestures has not been extended to student musicians. Empirical research on student musicians predominantly refers to undergraduate students, leaving an opportunity to extend current research into the area of high school and even primary school music-making

in small groups. It would be beneficial to compare the largely American and British studies with the Australian music environment.

There is a weakness in the existing literature on the area of student chamber group rehearsal technique. Music teachers' journals have suggested various teaching approaches but a broader examination of current teaching strategies is needed. While these articles aim at providing teachers with advice on how to better instruct student chamber music groups, they are not based on empirical research findings. Further study is required to explore different teaching approaches and to compare their success. There is also a need to better understand the knowledge and perspectives of student musicians by employing a wider use of data collection methods such as interviews and questionnaires to balance the observations of the researcher. It can be concluded from this review that existing literature establishes how chamber music groups function but more research is needed in the transfer of this knowledge to music education.

CHAPTER THREE: METHODOLOGY

Outline of the research design

The foundation of this study is a qualitative research approach which reasons that reality is imbued with individual meaning and interpretation (Burns, 2000). One of the main principles of this methodology is to construct a clearer "experiential memory" (Bresler & Stake, 1992, p. 76) of a phenomenon rather than trying to achieve an objective understanding. Consequently, there is an emphasis on identifying and describing processes rather than on determining consequences or forming explanations (Breakwell & Rose, 2006; Eisner, 1979). The study's epistemological emphasis is thus centred on phenomenological and hermeneutic inquiry. Phenomenology is concerned with the exploration of the lived experiences of participants while hermeneutics refers to how the experiences are interpreted by the participants (Creswell, 2003; Smith & Eatough, 2006). Therefore, it can be said that this study involves a "double hermeneutic" (Smith & Eatough, 2006, p. 324) – a dual interpretation process – whereby meaning is also constructed based on the researcher's interpretation of the participants' experiences and perspectives.

A case study can be described as a form of research inquiry which focuses holistically on a group or individual with the intention of capturing the complexity of the phenomenon being studied (Rossman & Rallis, 1998). Non-probability purposive sampling was used in the recruitment of the participants because of the specialised nature of this study and thus a limited pool of potential participants. Purposive sampling is defined by Casey (1992) as the deliberate selection of participants of specific interest for a study. The case chosen for study was a string quartet enrolled in an undergraduate music degree.

As this study seeks to construct a meaningful interpretation of the student string quartet rehearsals, the data collection process is mostly inductive. This study used multiple methods of data collection in the desire to come as close as possible to establishing an insider's view of rehearsal processes. This study involved the video observation of the quartet for a period of two rehearsals and, through the use of one

researcher-guided group interview and four individual interviews, the study attempted to provide a rich description of the rehearsal process from the perspective of the musicians involved. The interviews took place after the video observation of the two rehearsals as the rehearsals were used as a stimulus for structuring the focus of the interviews. The video observation of rehearsals and the interviews with the quartet aim to provide a range of opportunities for participants to reflect on the processes of rehearsal. By triangulating these data collection methods, the study can be examined from multiple viewpoints thus reducing the possibility of bias. Methodological triangulation can be defined as the use of two or more data collection methods which examine the same area of investigation (Denzin, 1978). Not only does triangulation provide multiple sources of data but it can also enhance the level of research validity by allowing data to be viewed in reference to alternative sources (Mathison, 1988). As a means of contributing to a faithful representation of the participants' statements, the four quartet members were individually interviewed to verify the interpretation of their previously made comments.

The participants

The string quartet at the core of this case study was officially formed in Semester 2, 2006 when the group registered with the Conservatorium chamber music program. The individuals that comprise the quartet were in their first year of study as undergraduates and came to play together as a group after having established friendships during their first semester at university. The formation of the quartet was student initiated as it was organised solely through the students' own motivations and its membership was not affected by Conservatorium staff. The group displayed further initiative by forming ahead of the recommended commencement of chamber music studies, beginning the subject in their first year rather than their second year of study.

For privacy purposes the participants in this study will be referred to by the following pseudonyms:

Violin – Monique

Monique's chamber music experience included being a member of a string quartet and a piano trio while at high school. Both groups were female only. Monique had extensive orchestral experience having been the captain of the school orchestra, a long serving member of regional and national youth orchestra organisations.

Violin – Amy

Amy's chamber music experience included being a member of a string quartet while at school. This was organised by her violin teacher with the aim of providing her students with chamber music opportunities including public performances and paying jobs. The string quartet was comprised of two males and two females. Amy also had extensive orchestral experience having played with local and regional youth orchestras and school groups.

Viola – Beck

Beck's chamber music experience is more extensive than her orchestral experience, having served as a long term member of a school string quartet. The quartet was comprised of four girls.

Cello - Erin

Erin's orchestral experiences have been with local and regional community ensembles in addition to school music groups. She attended a co-educational high school and has been a member of mixed gender chamber music groups.

This quartet shares the role of first violin between the two violinists. In the first observed rehearsal Monique is first violin and in the second observed rehearsal the first violin part is taken up by Amy.

Role of the researcher

The researcher is a string player with numerous chamber music experiences, including being a member of a string quartet. This prior knowledge has been beneficial in the interpretation of previous literature on chamber music group functioning and has helped in relating to some of the musical and social issues raised by the case study participants. The researcher was a friend of the participants prior to this study but had associated with them indirectly as a co-student at the Conservatorium of Music.

Procedure

In the objective of constructing a detailed description of the student string quartet's rehearsal processes, multiple methods of data collection were carried out. Firstly, the string quartet was video-taped for two rehearsal sessions. Four weeks later, following the preliminary analysis of data from the recorded observations, the researcher hosted a semi-structured group interview with the quartet. The purpose of the interview was to enable the quartet to reflect on their processes of rehearsal including their approach to group interaction and rehearsal structure. A set of broad questions was developed from the initial analysis of the observed rehearsals to stimulate discussion. Following the analysis of the group interview, individual interviews with the quartet enabled the participants to elaborate on earlier comments as well as verifying the validity of the researcher's interpretation of these comments.

Video Observation

Non-participant observations of the quartet's two rehearsal sessions were recorded by video camera. Observations were unstructured with the date and length of each rehearsal left to the discretion of the quartets, as was the material being rehearsed. This was in an effort to make the rehearsals as close as possible to their natural

settings. To further increase the reliability of data, through minimising the level of researcher interference, the researcher was not present during the filming.

The camera was positioned in the rehearsal venue prior to the start of the rehearsal and when recording began the researcher exited the room. The camera was set up on a tripod and positioned in the centre front of the quartet, enabling all four participants to be in the frame.

Group Interview

The semi-structured group interview was based on an open inductive approach which allowed the research to be directed by the emergent themes in raw data rather than be solely directed by the research objectives. By beginning the interview with more conceptual open-ended questions before progressing to more specific questions, the participants' responses directed the flow of the interview. Questions elicited an understanding of the quartets' general attitudes to rehearsal in the areas of conflict resolution, variation in group dynamics and strategies used to keep rehearsals on-task. The interview was approximately 30 minutes in duration and was audio recorded to aid the analysis process. A full transcription of the discussion was made to allow for further analysis. A sample of interview questions is provided in Appendix A.

Individual Interviews

Individual interviews were carried out with the participants four to six weeks following the group interview. The interviews were informal in nature, taking place by telephone, with the purpose of authenticating the researcher's interpretations of the observed rehearsals and group interview. Verifying the conclusions with the participants has been recognised as an important stage in the analysis process, and helps to contribute to a more accurate interpretation of participant statements and to identify areas that may have previously been overlooked by the researcher

(Breakwell, 2006; Dallos, 2006). Continuous note-taking was the method of data collection used during the phone interviews and each interview had a duration of approximately 30 minutes. A sample of interview questions is provided in Appendix B.

Method of data analysis

Methods of data analysis vary widely between case studies (Rossman & Rallis, 1998). In keeping with the study's qualitative perspective, this study used an inductive approach to data analysis (Creswell, 2003). The analysis process can be described as on-going as it was carried out throughout the research process, beginning with the video observation then followed by the group interview and finally the individual interviews.

Analysis began with the preparation of the data, either through the writing up of a transcription (group interview) or open note-taking (video observations and individual telephone interviews). The researcher then became familiar with the data by re-reading and re-watching the collected material. Initial thoughts and interpretations of the data were made and recorded, with the writing of comments in the margins of the typed transcriptions and open-notes. At this point, the data were then analysed for emergent themes and patterns. Coding can be defined as the categories chosen to be analysed in observational research (Dallos, 2006). Having established the main themes, the themes were then broken down into smaller, more detailed categories which later appear as findings in the discussion of results chapter. Narrative passage was used to present the findings. The coding process saw the identification of a range of code types, including context, situation, relationship, process and strategy codes (Phelps, Sadoff, Warburton, & Ferrara, 2005), indicating the complexity of the rehearsal process.

Video observations

Video recordings were made of the two quartet rehearsals: the first was 55 minutes in duration while the second was 30 minutes. The repertoire for Rehearsals 1 and 2 was respectively the first movement of *String Quartet Op.59 No.1* by Beethoven and the first movement of *String Quartet Op.64 No.3* by Haydn. Firstly, written observations were made by the researcher using an open note-taking technique and some direct quotations were transcribed. A preliminary analysis was also undertaken to identify the proportion of talk and play during rehearsal by using a stopwatch to time the length of each stop of play. This initial analysis was a means of providing an outline of the rehearsals' basic structures. Following this, the researcher became familiar with the data by re-watching the video observations and refining the open notes. Initial comments and interpretations were recorded in the margins of the notes. An analysis of the rehearsals' verbal discussions was then carried out to identify initial themes and this was done by re-watching the video data. Selected quotations were transcribed to represent each emergent theme.

Initial coding schemes were generated from a focus on the verbal behaviours of the participants during rehearsal and during this preliminary analysis, 13 specific talk topics were defined: group coordination, bowing, vibrato, intonation, articulation, interpretation/phrasing, dynamics, tempo, immediate rehearsal planning, future rehearsal planning and reflection. Modelled on Ginsborg et al.'s analysis process, these topics were then amalgamated into five larger categories: group coordination, technical issues, artistic issues, rehearsal planning and reflection. This is in reverse to the analysis process of the interview data where the categories are broken down into smaller, more detailed categories. Below is a description of each category and example quotations which are representative of the categories:

Group Coordination: This category refers to the quartet's verbal dialogue regarding the coordination of the four musical lines to present a cohesive ensemble.

> Beck: We all have the same four bars. We should make it the same when we come in. [Rehearsal 1]

> Erin: I'm getting better at watching [the] movements of each other. I think that's what people notice, like when Erin and I have our bit…

Beck: It's also a visual thing. The audience, when they see us look at each other will then listen for us. [Rehearsal 2]

Technical Issues: This category is comprised of dialogue exchanges regarding the technical issues related to string playing such as bowing, vibrato and fingering as well as the technical issues related to the repertoire including dynamics, tempo and articulation.

Monique: The first two bars are in the one bow. [Rehearsal 1]

Amy: Are you changing to a one [first finger] at all? [Rehearsal 1]

Erin: The first time we slowed down it was at B.
Amy: I thought it was at A. [Rehearsal 2]

Artistic Issues: This category relates to the issues of musical interpretation including phrasing and stylistic details.

Erin: I don't think you have to be afraid of going straight into it. I think you can take a bit of time.   [Rehearsal 1]

Erin: I don't know what's going on there. I don't understand what we're meant to be doing…there are long chords there. Are we meant to be a cushion for you [Monique]? I think we should decide what our role is. [Rehearsal 1]

Beck: It's mainly a dynamic thing to help the character...the character would sound more unified if we all did the same dynamic. [Rehearsal 2]

Rehearsal Planning: This category describes comments related to guiding the direction of the rehearsal and to discussions about the planning of future rehearsals.

Monique: Yes how about we go from that bit where you guys have [sings passage]. [Rehearsal 1]

Beck: I think we should move on. We just need to fix up each bit and then run it through a few times. So if we keep going do you want to go from 69? [Rehearsal 1]

Monique: Should we do it again with the metronome? [Rehearsal 2]

Reflection: This category describes the verbal feedback the quartet often gave each other during rehearsal.

Beck: I really like all of that part after 60. [Rehearsal 1]

> Beck: I reckon that's awesome! [Rehearsal 1]
>
> Erin: It had so much character! [Rehearsal 2]

Using the analysis technique of Ginsborg et al. (2006), these categories were further analysed to find the frequency of each category of discussion per individual. The results of these frequency counts have been presented in graph form with narrative discussion.

Combined Interview Data

The group and individual interview data underwent similar processes of analysis and will be outlined together. To begin, the audio recorded group individual was transcribed by the researcher. A difficulty in carrying out the transcription was the occasions when the participants talked over the top of each other, making it problematic to distinguish exact dialogue and the speakers. In the case of the individual interviews, the open notes taken during the interviews were immediately typed up and refined following each interview. The researcher became familiar with the data through multiple listenings of the recorded interview and repeated readings of the transcription and open notes. Personal thoughts and early interpretations of the data were recorded in the margins of the written transcription and open notes.

Following the familiarisation of the data, the initial coding process was undertaken and emergent themes were identified. For the group interview emergent themes included: *motivation, concentration, friendship, leadership* and *rehearsal structure.* In addition to the existing themes identified in the analysis of the group interview, the following new themes emerged from the individual interviews: *past musical experiences, educational benefits* and *group dynamics*.

Further analysis of the initial themes was carried out and relationships between codes were identified. For the group interview they included:

Motivation – intrinsic, extrinsic, personal, group

Concentration – group focus, long term, short term. Related to *motivation* and *friendship*

Friendship – past, present. Related to *concentration* and *leadership*

Leadership – democratic, leaderless, tutorage. Related to *friendship, motivation* and *rehearsal structure*.

Rehearsal Structure – regular routine. Related to *motivation* and *concentration*.

Further analysis of initial themes from the individual interviews identified the following codes in addition to those already outlined by the group interview. They included:

Past musical experiences – chamber music, orchestral

Educational benefits – leadership experience, artistic independence, decision-making, individual accountability

Group dynamics – personalities, developing friendships, shared experiences

The quartet's perceptions of the rehearsal process are presented in narrative form in the discussion of results, combining the quotations with the researcher's interpretations.

CHAPTER FOUR: DISCUSSION OF RESULTS

The presentation and discussion of results in this chapter will be structured around five themes which emerged from the data. Each theme will integrate the findings of the video observations and quartet interviews. The first theme *Rehearsal Structure* will examine the nature of the quartet's long term rehearsal planning and the organisation of rehearsal content. Second, *On-task Behaviour* during rehearsals explores the quartet's perceptions of the influencing factors, such as group concentration, on the group's on-task behaviour. Third, *Group Interaction* between quartet members outlines the nature of the quartet's leadership. Main factors influencing group interaction were found to be the repertoire being rehearsed, the group's friendship and the continuity of the quartet's leadership. *Issues Raised During Discussion* looks at the different areas of verbal discussions during rehearsal. This theme presents the analyses of the observed rehearsals and examines the varying contributions of quartet members and the influence of rehearsal context and technical demands of repertoire. Speculations were made between the varying levels of contributions and possible leadership patterns in the group.

1. "Where should we go from?": Rehearsal structure

Individual rehearsal structure

The quartet rehearsed each week for an hour and a half on a regular basis. However there had been ongoing difficulty in finding rehearsal times which did not conflict with individual timetables and non-university commitments. Subsequently, the quartet had been unable to extend their rehearsals to two sessions per week, as was hoped for this academic year. These somewhat "sporadic" (Beck *Individual Interview*) rehearsals had made the planning of content across successive rehearsals a challenge. As a result the group had developed a reasonably regular structure to their rehearsals as a means of assisting them in determining the content of each rehearsal:

> Beck: We start off by playing and then we'll talk about it and then we'd play again and then…

All: Talk about it! [Group Interview]

This broad structure was evident in the quartet's two observed rehearsals, with both rehearsals beginning with an extended period of playing followed by alternating shorter periods of discussion and play. This observed similarity indicates that this broad structure may be a feature of many rehearsals.

It should be made clear at this point that the two observed rehearsals had some significant contextual differences which may have impacted on the results of both rehearsals. Firstly, the instrument roles were different between the rehearsals: in Rehearsal 1, Monique was first violin and in Rehearsal 2, the role of first violin was taken up by Amy. The music being rehearsed also varied with the different organisation of players. In Rehearsal 1, the repertoire was the first movement of *String Quartet Op.59 No.1* by Beethoven whereas in Rehearsal 2, the music studied was the first movement of *String Quartet Op.64 No.3* by Haydn. The purpose of Rehearsal 1 was the preparation of the movement for a tutorial that was scheduled for the following day. Therefore the quartet was not restricted by time in any way and continued to rehearse once the camera observation had ceased after a period of 55 minutes of filming. This was not the case for Rehearsal 2, however, because the intended one hour rehearsal was cut short by the discovery of a compulsory performance to be presented within the hour. As a result, the quartet only had 30 minutes in which to rehearse before the concert[1].

The differences in rehearsal context may explain the slight variation in the periods of discussion and play between the two rehearsals. In Rehearsal 1, 43% of time was utilised by playing, and the second rehearsal, by comparison, saw 53% of the rehearsal time spent playing. The reason for the slight variation between the proportions of verbal discussion and playing in the two observed rehearsals may lie with the need for the group to perform immediately following the second rehearsal. In this situation, the quartet responded to the external pressure of the upcoming

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[1] It should be noted that the quartet was not aware of their need to present a piece at the informal concert and the subsequent shortened rehearsal was not due to any miscommunication between the quartet and the researcher.

concert and was able to adapt their structure of rehearsal accordingly. The slight difference between the two rehearsals shows a degree of flexibility in the quartet's rehearsal structure. It also suggests that the quartet preferred to utilise their time during a final rehearsal by playing more than talking.

Figure 1 illustrates the differences between the content of both observed rehearsals.

Figure 1. Allocation of rehearsal time

Rehearsal 1

Duration (minutes)

Rehearsal 2

Duration (minutes)
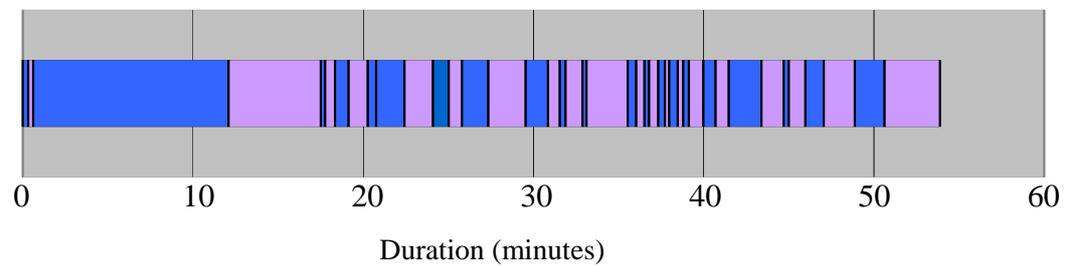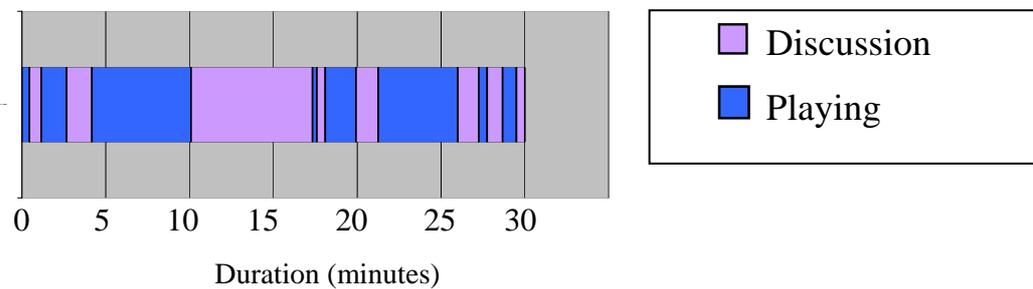
As can be seen, the first rehearsal started with an initial uninterrupted playing period of nearly 12 minutes, whereas in the second rehearsal the period of play at the start of rehearsal was divided by two short periods of discussion. In Rehearsal 2 the quartet attempted to start with a 'run-through' of the movement but a noticeable slowing down in the tempo forced them to begin again with the aid of a metronome. The quartet, therefore, had the intention of conducting the rehearsal according to their usual routine but was impeded by a technical issue.

The initial 'run through' typical of the beginning of rehearsals was seen by the quartet as important in directing the focus of the rehearsal:

> Beck: At the beginning of our rehearsal we'll play through something to get a feel for what we need to work on. [Group Interview]

By this definition, the attempted run-through of the Haydn String Quartet in Rehearsal 2 was successful in drawing the quartet's attention the technical issue of tempo.   It also demonstrated that the quartet's rehearsal structure was responsive to the challenges of the repertoire. The run through was seen by the quartet as particularly important during periods of irregular rehearsing when content of previous rehearsals was not 'fresh'. According to Beck, in these situations the run-through helped to clarify what needed work.

Amy believed that the quartet was still finding out through "trial and error" (Amy *Individual Interview*) which rehearsal strategies better suited the group's work habits. Through experimentation, the quartet found rehearsals one and a half hours in length to be their most productive use of time.

Long term rehearsal planning

The planning of rehearsals from week to week emerged as being a problematic task. Although the quartet planned to rehearse on a regular basis – for one and a half hours per week – the scheduled rehearsal was often disrupted by various commitments of the group members. As a result, the quartet was concerned that there was limited continuity between rehearsals, impacting on the time management of individual rehearsals and the group's overall progress. Beck was of the opinion that if chamber music rehearsals were made part of the University's personalised timetable system it would assist greatly in long term rehearsal planning.   She suggested that if formal timetables were introduced, it may allow for a more "linear" (Beck *Individual Interview*) development of the group. This arrangement would make the organisation of chamber music rehearsals akin to orchestral studies, where there is a fixed time and venue for weekly rehearsals.   This suggestion seems to contradict the initial attraction of chamber music playing communicated by the participants – musical and social independence. The ability to have a direct impact on the musical

decisions which affect the group and each player having an independent part were described by Monique as the motivating factors in the formation of the group. Surrendering the choice of rehearsal time and venue to an outside mediator would reduce the group's independent functioning. It appears that the group members have allowed their individual commitments to conflict with the set weekly rehearsal times. From this perspective, the group needs to have greater individual accountability of its group members in their commitment to attending the set rehearsal time. Johnson and Johnson's (1987) principle of individual accountability in cooperative learning groups is in relation to the need for each member to be responsible for carrying out their role in the group. In the case of the quartet, this responsibility also extends to their time outside of rehearsals.

Influence of organised tutorials

In contrast to the rehearsals scheduled by the quartet are the tutorials organised by the Ensembles Studies Unit at the Conservatorium. Special Projects Week is a biannual chamber music workshop, during which the student chamber groups participate in an intense week of tutorials, master classes and concerts. The quartet had taken part in master classes and tutorials with the Grainger String Quartet, who were guest artists during Special Projects Week, Semester One, 2007.

The quartet believed that most tutorials were beneficial in helping them to structure their own rehearsals. According to Amy, a good tutorial "not only inspires you about the music but also shows you how to do it by yourself – to make you more independent" (Amy *Individual Interview)*.   The rehearsal strategies demonstrated in these tutorials can thus be transferred to the practice room. In one such tutorial, the quartet was taught how to "pull it [the piece] apart" and how to rehearse it once they were on their own. In this situation the tutor was facilitating the learning of the quartet by providing strategies to enable them to carry out the task independently. This is similar to the role of the teacher in cooperative learning environments where students are guided in their learning rather than instructed (Emmer et al., 2006). To

use Amy's words, the quartet could "see our way forward" (Amy *Individual Interview)* as a result of the tutorial.

2. "Everyone just has to be focused": On-task behaviour

Group focus

During discussions the quartet placed considerable emphasis on the concept of group *focus*. Focus was defined as being:

> Monique: Our level of understanding and what we value when we play together. If we value something highly we will focus – concentrate – on it more. [Individual Interview]

From this definition, the concept of focus is associated with the group's ability to concentrate on a task and the degree to which this is achieved. The quartet was unanimous in their belief that for rehearsals to be constructive "everyone just has to be focused" (Amy *Group Interview)*. Amy later expanded on her concept of group focus, by comparing it to her individual practice sessions. She treats her focus during quartet rehearsals with the same importance as her concentration during her own practice sessions. The difficulty, however, is coordinating the mental energies of four individuals at the same time which she describes as being "ten times harder" (Amy *Individual Interview*) than during individual practice sessions.

The emphasis on the collective *we*, in Monique's comment "we will focus", implies the presence of a common objective to harness the group's attention. In the two observed rehearsals, on-task discussion accounted for 97% and 99% of total verbal discussions by the quartet, indicating that both rehearsals shared a very high level of group focus. Consequently, it emerged from discussions that the quartet's ability to create a constructive rehearsal environment was strongly linked to their motivations to rehearse. External influences such as chamber music assessments, master classes, and concerts were identified by the quartet as important in focusing the individuals to work towards a common goal:

> Monique: In the occasions where we've had a concert coming up or a pressing need to rehearse, those are fantastic rehearsals because everyone's focused on what needs to be done. Everyone has the same level of concentration. [Individual Interview]

The two observed rehearsals are examples of rehearsals in which the group was positively motivated by external influences. In Rehearsal 1, the quartet was motivated by the need to prepare for a tutorial chaired by a member of the Grainger Quartet, while Rehearsal 2 was the quartet's final rehearsal before a performance in front of peers, staff and the Grainger Quartet.

In contrast, rehearsals with no external goal were described by the quartet as being characterised by unfocused behaviour and poor use of rehearsal time. These situations were identified as being frustrating environments in which to work. In the extract below, Monique recounts an experience of an unmotivated rehearsal:

> Monique: We get nothing done really. For the last two weeks we've been choosing a Mozart String Quartet. That's all we've done. It's kind of frustrating. No one's concentrating when we play stuff through either so it sounds awful. [Individual Interview]

From the quartet's reflections on their varying levels of rehearsal focus it was apparent that they were conscious of the effect motivation had on their rehearsals. Monique put forward the suggestion that an "outside tutor" (Monique *Individual Interview*) would be a great benefit to the group's ongoing challenge for more consistently focused rehearsals. She felt that the group may need an external person such as a tutor to increase motivation.

It should be acknowledged that the intrusion of the video camera in the rehearsal may have had an effect on the quartet's abilities to focus during rehearsal, yet the participants rarely looked directly at the camera. The quartet commented that they felt that the camera's presence was a positive influence on the rehearsals because it encouraged them to stay in the room and rehearse. The quartet normally rehearsed in small practice rooms but in order to accommodate the recording equipment, the observed rehearsals took place in a larger ensemble room normally used for tutorials. This change of venue may also have had an effect on the nature of the rehearsals as

the participants passed comment on the space of the ensemble room and how it was a good place in which to play.

Friendship

Evidence of the quartet's friendship was observed in the relaxed atmosphere and body language of the quartet's rehearsals. During times of playing, the quartet would sit on the edge of their seats and demonstrate appropriate performance posture. Periods of discussion showed the quartet changing to much more informal body language, including: sitting crossed legged on the chair, leaning back in the chair, legs outstretched with instrument resting on lap and sitting hunched with arms draped over the cello. This body language is coupled with the relaxed atmosphere of the rehearsals, evidence of which includes: the contribution from all members during discussion, the frequent asking for and giving of help, laughing at their own mistakes, smiling and looking at each other at times when playing and giving positive reinforcement to individuals and the group as a whole. The following extract of conversation during Rehearsal 2 highlights the nature of the quartet's relaxed discussions. In this extract, the quartet was excited at how well the rehearsed section was performed and talked over the top of each other in their eagerness to express their opinions:

> Erin: I like that bit at the beginning when you come in and it sounds like [sings passage while pretending to play the violin in the air using her cello bow]. It sounds like you're just making it up!
> Amy: Really?
>
> *The quartet laughs and Beck and Monique try to sing the passage as well, but are giggling.*
>
> Beck: C is my favourite bit in the whole piece
> Erin: Yeah, same.
> Beck: And also that part where I don't play before F. [Rehearsal 2]

During discussions the quartet made frequent reference to the importance of friendship in their working relationship and how this has affected the group's on-task behaviour. The quartet share the belief that they consider themselves to be friends as

well as colleagues and that their friendship has continued to be strengthened throughout their time together. With this growing closeness, however, their rehearsals have often become the time to "catch up a bit" (Monique *Group Interview*) and this has had a negative effect on on-task behaviour. Beck was of the belief that this was exacerbated by the group's tendency not to socialise outside of rehearsal. Contrary to the comments of the quartet, the observed rehearsals did not present any examples of this type of distracted behaviour.

In contrast, in some circumstances the group's friendship has improved the on-task behaviour of individuals during rehearsal. Both Beck and Monique reported that by playing with their friends they do not feel the pressure of performance and can better focus on the artistic rather than the technical aspects of a piece:

> Monique: I'll feel comfortable playing with them…each time I'm not thinking 'Oh no, hope I don't mess up'. [Individual Interview]

Beck also valued the effect the quartet's friendship has had on her playing outside of chamber music rehearsals. During an assessed solo performance, Beck was thankful for the support the quartet showed by attending her performance:

> Beck: They're more supportive of me than other people in my year because they are also my friends [Individual Interview]

3. "What do you guys think?": Group interaction

Leadership

There is significant difference of opinion among string quartets as to the most effective form of leadership ranging from first violin as leader to the quartet acting as a democracy (Blum, 1986; Murningham & Conlon, 1991). The notion of first violin as leader was not congruent with the quartet's practice of sharing the role of the first violin between the two violinists. This act in itself is democratic on the part of the violinists as the role alternates for each change of repertoire. The violist in the

quartet was supportive of the violinists' decision to share the part of the first violin because she believed that "both can contribute their strengths to each role" (Beck *Individual Interview*).   This practice is uncommon among professional string quartets, such as the Borodin, Tokyo, Amadeus, Brodsky, Guarneri and Jerusalem quartets, where the violins usually maintain fixed roles. The Emerson String Quartet, is one of the few professional quartets to alternate the position of first violin between the two violinists (Emerson String Quartet, 2007). Instead, the quartet's flexibility of roles reflects the leadership practices of other chamber music groups such as wind quintets and piano duos (Blank & Davidson, 2007; Ford & Davidson, 2003)

During discussion, the quartet placed noticeable emphasis on their egalitarian approach to group interaction. It was observed, during both the group interview and the two rehearsals, that no individual presented herself as an obvious leader either through word or action. Instead, each of the individuals contributed during the group interview reflecting the participation by all members in rehearsal discussions. It was during the group interview that the quartet made explicit their 'leaderless' approach to group interaction:

> Monique: We're all pretty good at talking, like giving our opinion
> Amy: But it's fairly equal
> Beck: It's very balanced
> Erin: So if that's working well then the rehearsal goes well [Group Interview]

From this dialogue it was made clear that the quartet placed value on each others' opinions and contributions of ideas during rehearsal. The similarity in the choice of words used to describe the nature of the interaction – "equal" (Amy) and "balanced" (Beck) – pointed to the quartet's sense of agreement on this issue. The quartet's democratic group functioning was not unlike that of the Guarneri Quartet who did not advocate for one musician to assume more leadership responsibility than another (Blum, 1986).

The quartet was strongly opposed to the suggestion of a group leader in place of their egalitarian approach:

> Amy: It [the quartet] would be greatly affected…I think we need each other. I don't think it would be half as good, the end result, because four heads are better than one. [Group Interview]

Amy's response indicated that the quartet had never experienced any alternative leadership style as she only speculated on the possible effects of a leadership change on the group. The quartet however, did not express any negative comments regarding their interaction except to say that too much interaction (talking) could lead to off-task behaviour. Amy's prediction contrasts with Bennett and Dunne's (1991) observation that small groups are able to cooperate in a variety of successful ways. This research suggested that various forms of leadership could be equally successful in a cooperative learning group environment.

Despite its different educational context, Bennett and Dunne's (1991) findings could be seen as supporting the success of varying styles of quartet leadership. The degree of success of a string quartet's leadership has been measured in different ways, from the quality of an assessed performance (King, 2006) to the number of concert tickets sold and recordings produced (Murningham & Conlon, 1991). These external measures could be effective in assessing the quality of a quartet performance or a group's estimated market value, but do not take into consideration the nature of a group's development. In contrast, the quartet's development since their formation in 2006 was viewed by the quartet as being more important than an assessed performance. The quartet was of the belief that although a group of four musicians could master their parts individually and then perform with minimal rehearsal of ensemble, this was not in the spirit of quartet playing. This is encapsulated in Beck's comment that "four outstanding individual players do not make a quartet" (Beck *Individual Interview*).

Exchanges during verbal discussions

During the group interview, when the quartet was asked to estimate how much time they would spend playing during a typical rehearsal, they responded with an estimate of 70% playing and 30% talking. This figure overestimated the proportion of playing seen in the two observed rehearsals – 43% and 53% respectively – and raises

the question of the degree to which the quartet was conscious of their rehearsal structure.

In contrast to this study's findings, previous studies in chamber music have found that professional chamber music groups spend the majority of the rehearsal time playing (Blank & Davidson, 2007; Murningham & Conlon, 1991; Williamon & Davidson, 2002). In these cases, the term *majority* is associated with proportions of playing 75% and greater of the total rehearsal periods. This figure presents a marked difference between professional groups and the observed student group and leads to speculation of the ability of professional groups to function effectively without the need for as much verbal communication as student groups. The higher proportion of talking among the observed student string quartet may indicate their need for verbal discussion and their lesser reliance on non-verbal means of communication.

The finding that the quartet overestimated the extent to which they played during rehearsal may also be true for other studies. Williamon and Davidson's (2002) empirical observations of a professional piano duo found the group to be playing for over 90% of rehearsal time. In contrast, the chamber musicians in Murningham and Conlon (1991) and Blank and Davidson's (2007) studies were not observed but instead estimated that they would play for 75% or the majority of the rehearsal, respectively. Given the findings of this study it may be appropriate to treat the estimated figures in previous studies with a degree of caution. The overall higher ratio of playing to talking in professional groups compared with the estimate put forward by the quartet, highlights a marked difference in the rehearsal structures between this student group and those of professional groups. One cannot however, discount the possible effects of other variables such as group type, size, gender, age, repertoire and rehearsal context.

The periods of discussion were characterised by an open dialogue between the quartet members during which there were dynamic exchanges of ideas. Each discussion focussed on at least one technical aspect of the piece and was usually immediately followed by the playing of the section for reinforcement. The extract of

dialogue below demonstrates the quartet's exchange of ideas and how it shaped the rehearsal process.

Erin: Does it sound like we're doing the same [bow strokes]?

Erin demonstrates her spiccato bow strokes.

Monique: I think yours are more off [the string].
Beck: Let's just try two bars of that [spiccato stroke].

Violin II, Viola and Cello play open string spiccato bowing to match articulation

Quartet then plays the discussed passage [Rehearsal 1]

The quartet's self-described "equal contribution" (Beck *Group Interview*) of individuals to group discussions may play a role in extending the length of discussions. The group stated that they had no set time limit for discussions but rather they were considered to have a natural flow, moving between talk and play as necessitated by the repertoire. It emerged from the observed rehearsals that the quartet often used demonstration as a means of conveying their particular musical ideas. The follow extract of conversation from Rehearsal 1 highlights the group's interaction during discussion and the use of demonstration as a rehearsal process:

The quartet has stopped playing to discuss the bowing direction for a passage where the violins are imitated by the lower strings.

Amy: So we're going [demonstrates passage slowly, emphasising the bowing direction]

When Amy finishes playing, Monique leans over to see Amy's score and comments:

Monique: At [bar] 142 the first thing is slurred
Erin: So those minims, we've decided up, down, up, down?
Monique: Yes, and when we get to the forte [it is a] down.
Erin: Should they be really up in the upper half?

Erin demonstrates her bowing slowly for the other members to see. Beck joins in, also playing in the upper half of the bow.

Amy: It doesn't matter if you guys choose another bowing
Monique: You can be upside down.
Amy: It's not like we [violins and lower strings] play at the same time
Erin: Yes, but I reckon that they need to have the same sound anyway.
Monique: Yes, but I reckon you guys can do down, up, down, up.

Erin demonstrates her bowing and articulation by playing in the upper half of the bow with a soft, brushed articulation. At the same time, Amy in contrast, demonstrates her bowing as using the extremes of the bow – both the upper and lower halves. Erin exclaims an impatient sounding "Anyway!", which is immediately echoed by Monique, indicating that it is time to move on.

Monique: How about we go back to 136 then go on?
All: Yes

The repeated passage sees the viola and cello remain in the upper half of the bow, as they had previously demonstrated, while the violins continue to use more of the bow, extending to the lower half as the phrase crescendos. The two halves of the quartet maintained their different bowings.

The quartet also demonstrated their different ideas by singing instead of playing, particularly if they were talking about each other's parts. The extract below shows how singing drew attention to an identified problem and the way in which a possible solution was conveyed:

Amy: You're right, we do slow down heaps
Beck: Yeah, and I'll tell you where it is. It's in the first line. Erin you need to pick it [the tempo] up a bit more I think in the [sings passage]. Don't you reckon? Whatever tempo is at that bit sets it up.
Erin: Alright
Monique: Yeah, I think we're allowed to push forward. Once we have dragged then I think we can push it forward at that bit. There was also, just quickly, at the tenth bar of C, two sforzandos.
Beck: On the quaver and crotchet?
Monique: Yeah, we always seem to miss one.
Beck: So it goes [sings passage].
Erin: Should we make more of those as well? So come back more after the attack?
Monique: Yeah
Beck: Yeah [sings passage to reinforce her idea].
Erin: Should we try it again the second time?
Amy: Yeah, do you want to go from C? [Rehearsal 2]

Effects of repertoire on group interaction

The quartet outlined a link between the musical material and group interaction, believing that discussion was stimulated by the musical ideas:

Beck: I think that from our individual instruments we can contribute something different from each of our own parts. [Group Interview]

The "four-part discourse" (Eisen, 2007) which characterises quartet writing has clearly been a key factor in directing the quartet's general philosophy of democratic interaction. Just as important as the four individual parts in shaping the quartet's interaction is the repertoire itself. Beck explained that different styles of music have an impact on the way the music is approached during rehearsal. She cited the heavily detailed scores of Beethoven as causing the quartet to stop more frequently to interpret the finer performance indications of each part. Haydn, on the other hand, was easier to "grasp what we were doing" (Beck, *Individual Interview*) partly because of the fewer score markings but also because of its light-hearted character which she saw as flowing on to the performers.

The rehearsal of Beethoven Op.59 No.1 saw the frequent stopping of the quartet to interpret and discuss the detailed score:

Beck:	We have exactly the same thing, exactly the same dynamics
Amy:	Yeah it's funny how they're [the dynamic markings] really exact, on each particular note
Beck:	Yeah, I think we have to pay really close attention to them because we all do have the same ones
Amy:	And there are lots of crescendos and then suddenly it's piano
Erin:	Yeah, well that's Beethoven, he's really particular [Rehearsal 1]

This concept of content directing interaction was found to be not only a feature of music groups (Blum, 1986), but also small groups in education settings where group interaction has been found to be influenced by task content (Bennett & Dunne, 1991). The importance of democracy in the quartet may be explained by the group's self-described similar musical standards and prior playing experience. It is possible that there was no defined leader because there was no one in the group with more advanced skills than the rest of the group.

Beck:	With the repertoire we've chosen, there's not one person who is particularly knowledgeable about the music. We're all learning together. [Group Interview]

This comment again demonstrates the link between content and interaction while also acknowledging that prior knowledge and experience influence the way in which individuals interact.

The quartet also identified a relationship between rehearsal productivity and effective group interaction. Erin's comment "if that's working well then the rehearsal goes well" suggested that the quartet's interactions had a direct impact on the success of the rehearsal. Continuity in leadership over a number of rehearsals was found by King (2006) to be a determining factor in the successful performance of chamber groups. The limited scope of this study however, did not allow for this relationship to be investigated and could be an area of further research.

4. "I don't understand our role here": Issues raised in rehearsal discussions

As was demonstrated in Figure 1, discussions were an integral part of the quartet's rehearsals, accounting for 57% and 47% of total rehearsal time for Rehearsals 1 and 2 respectively. During discussions, the quartet freely expressed that they were conscious of the amount of talk that occurs in their rehearsals.

> Beck: We'll talk our way through a rehearsal but so we can get certain things done. [Group Interview]

To further investigate the quartet's discussions, the task-related talk of the observed rehearsals was analysed for emergent themes. Using the approach of Ginsborg et al. (2006) ten comment topics were identified in the combined rehearsals and these were then grouped into five larger categories: *group coordination, technical issues, artistic issues, rehearsal planning* and *reflection*. This analysis process generated categories similar to those of Ginsborg et al. (2006), and also used frequency counts to identify the number and type of comments made per rehearsal by each individual musician. The distribution of comments in the two rehearsals is illustrated in Figure 2.

Figure 2. Discussion themes of observed rehearsals
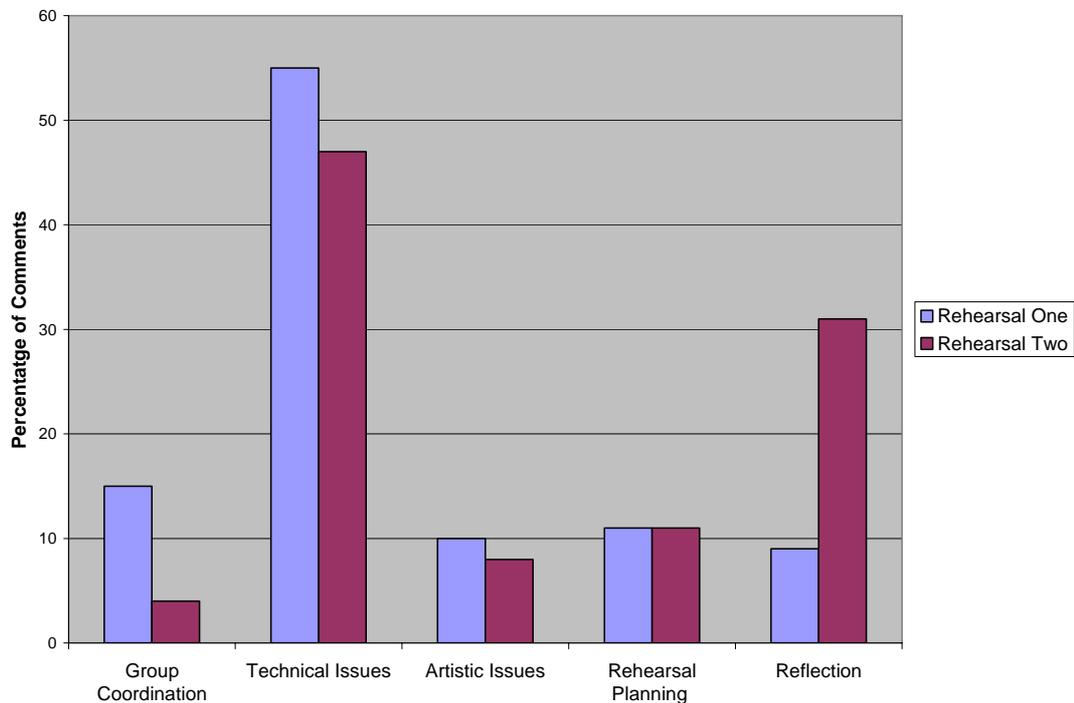
As can be seen, the discussion of technical issues dominated both rehearsals, accounting for 55% and 47% of total task-related comments in Rehearsals 1 and 2 respectively. The finding that technical comments were most prevalent in the first rehearsal could be attributed to the fact that it was one of the initial rehearsals of Beethoven Op.59. A similar finding was made by Ginsborg et al. (2006) and Williamon and Valentine (2000) who both reported that technical mastery was the focus of early observed practice sessions. This suggests that the focus of early rehearsals is on the mastering of the musical parts themselves.

During discussions, the quartet reflected that even during the early stages of learning new repertoire, artistic issues would shape their rehearsals more than technical issues:

> Beck: Even when we start learning a piece, we'll talk about the technique and stuff like that but right from the beginning we'll always have the overall picture. [Group Interview]

In contrast to the quartet's comments made during the group interview, artistic issues were among the least talked about themes in both rehearsals. Figure 2 demonstrates that artistic comments accounted for just 10% of the comments made during the first rehearsal, suggesting that perhaps the artistic issues were not able to be adequately addressed until technical issues had been resolved. The smaller number of artistic comments made in Rehearsal 2 compared to technical, is in contrast to the findings of Ginsborg et al. (2006) which reported that interpretative issues become more frequent closer to the group's performance. It could be said, however, that while the group may not have made many explicitly artistic comments, their technical comments were informed by their stylistic understanding.

Unlike the more exploratory first rehearsal, the second rehearsal during which the quartet worked on Haydn Op.64 was essentially a dress rehearsal as it immediately preceded a performance. This difference in rehearsal context could account for the high focus on reflection (31%) in Rehearsal 2. In this rehearsal, reflective comments were often those of positive reinforcement such as: "That was so much better" (Beck *Rehearsal 2*), and appeared to function to boost the group's confidence going into the performance. Reflective comments, as demonstrated in Figures 3 and 4, were most often the contributions of the cellist. King's (2006) study of individual roles in quartets did not provide any links between group interaction and musical parts other than the first violin role of leader.

To examine the differences in the types of comments made by individuals during rehearsal, each individual's talk was analysed as being part of the five categories. Figures 3 and 4 illustrate the proportion of discussion theme per individual. Given the traditional view of first violin as leader it is interesting to observe that in both rehearsals, and thus both alternative violin leaderships, the first violins did not dominate any of the five categories of discussion. In the first rehearsal, the second violin, viola and cello were the most frequent contributors, with the viola dominating discussions in three themes.

Rehearsal planning was an area to which the viola particularly contributed in comparison to the other musicians. Comments such as "Let's just try two bars of

that [off the string bowing stroke]" (Beck *Individual Interview)* shows how she tried to guide the direction of the rehearsal. This was also a prominent role for her in the second rehearsal, perhaps indicating the consistency of her role as rehearsal planner. While from Figure 3 it appears that the first violin was a lessor contributor to issues of a technical nature, from the observations it appeared that the first violin was a focal point of these discussions. Suggestions and comments put forward by other members were seemingly passed by the first violin for approval during Rehearsal 1. One such example is as follows:

> Beck: What should we do for bowing? I've got all these bowings marked in.
> Erin: I reckon we should do up, up, up, down (playing as she talks)
> Amy: Could you [Monique] just play it for me from 19?
> Erin: Do we all do the same thing?
> Amy: I don't think we do exactly the same thing
>
> *Monique plays her part slowly to emphasise the bowing changes while Amy and Beck copy the bowing into their parts.*

In Rehearsal 1 it appeared that the first violin did often act as a focal point for advice while the majority of the contributions came from the other group members.
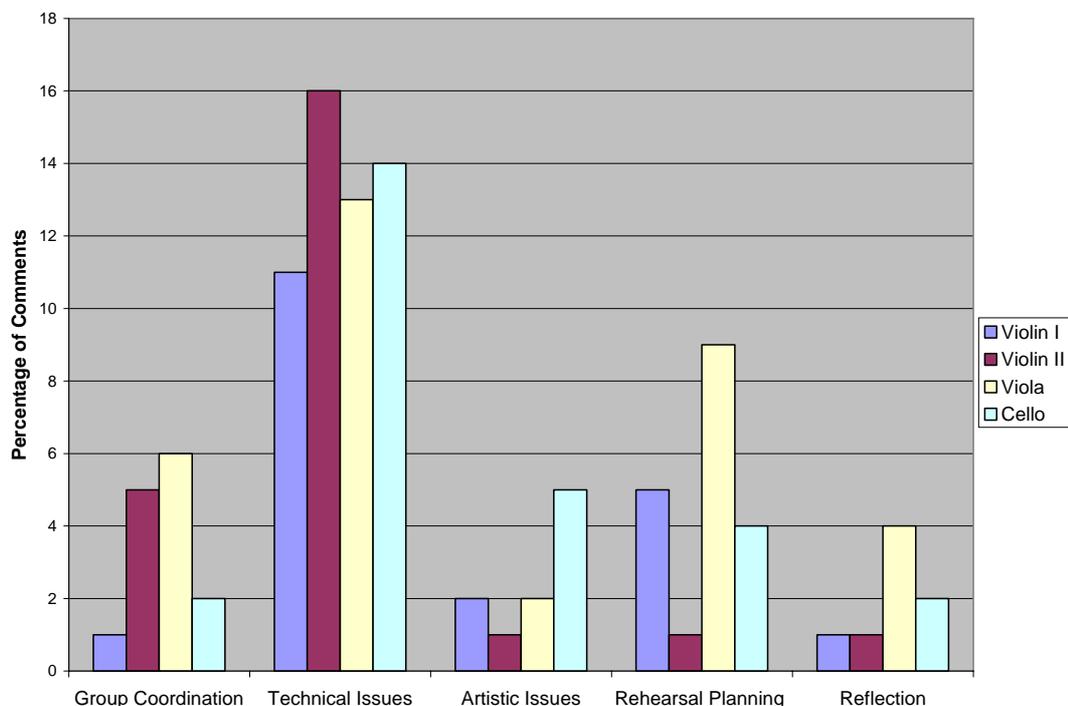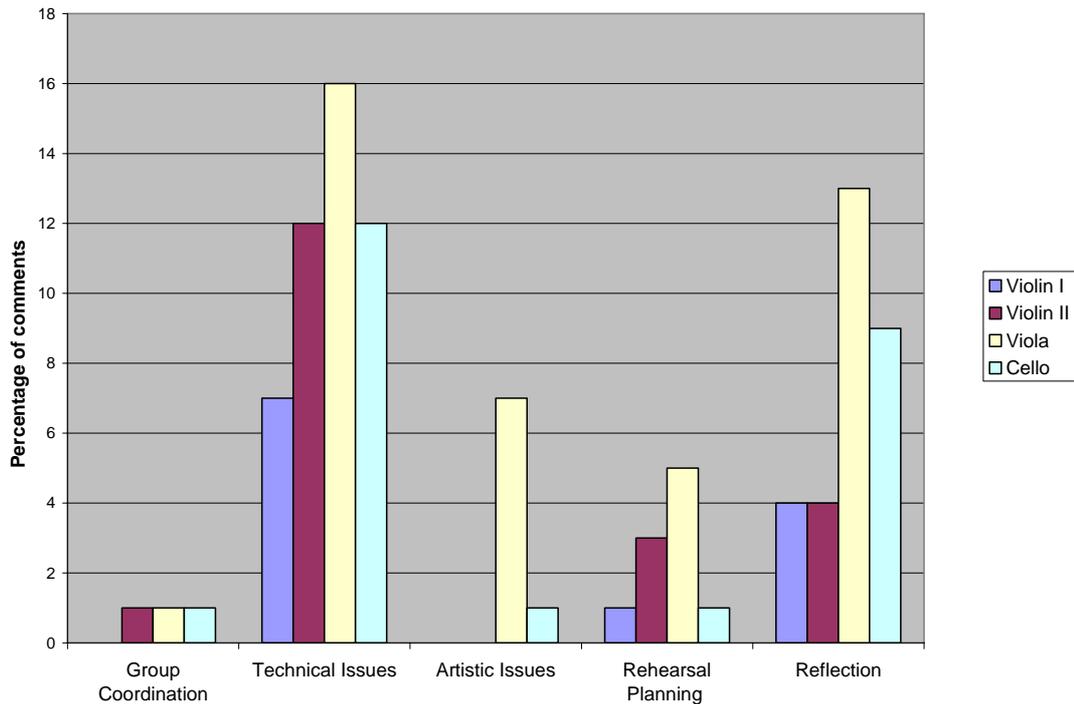
Figure 3. Rehearsal 1 themes per individual

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Figure 4. Rehearsal 2 themes per individual

Rehearsal 2 saw the viola emerge as the quartet's leader. She was frequently at the forefront of discussion, and like the first violin in Rehearsal 1, she was a point of reference for advice and approval. As can be observed from Figure 4, in Rehearsal 2, the viola contributed more than any other individual in all discussion areas. Of particular interest is the high level of reflective comments made (13%), particularly those of positive reinforcement, suggesting that the violist played a significant role in developing the group's sense of confidence in the lead up to the performance. Following the quartet's first complete play through of the movement during the rehearsal, Beck exclaimed: "Hey that was cool guys!", to which the group smiled and laughed at their praised efforts.

The violist was also prominent in addressing technical and artistic issues in the second rehearsal. Both of these issues were not as prominent for the viola, compared to other musicians in the first rehearsal. The apparent change of emphasis for the viola may be explained by the decrease in input by other musicians, particularly in artistic issues. King's (2006) study investigated this phenomenon of changing roles in student quartet rehearsals and found that it was not unusual for individuals to

display varying degrees of leadership across different rehearsals. The reason for this was explained as that they are intuitively compensating for changed behaviour and level of contribution by other members. The decreased input from both violins in Rehearsal 2 could therefore be seen as a stimulus for increased contributions by the viola and cello.

Of particular note is the distribution of comments regarding group coordination. In both rehearsals, the first violinists made the least contributions compared to the other musicians. This is again in conflict with the traditional view of the first violin as leader because of the nature of the instrument writing. In both pieces it should be made clear that although there was much interaction between the four parts, the technical demands of the first violin parts were noticeably greater. Perhaps the difficulties of the parts prevented the first violinists from focusing on the ensemble's coordination.

Conclusion

It can be concluded that student string quartet rehearsals are a complex phenomenon, requiring the experimentation and implementation of rehearsal structures and processes. This study has found rehearsals to be affected by the individuals' relationships, repertoire, rehearsal context and external motivating factors such as performances. Continuity in this dynamic environment appeared to be achieved by the quartet's democratic approach to leadership which permeated most aspects of rehearsal.

CHAPTER FIVE: CONCLUSION

This chapter is comprised of three sections: conclusions, educational implications and areas for further research. It will begin with a summary of the significant findings of the research, followed by a discussion of the educational implications of the findings. The chapter will then close with a suggestion of areas for further research in the area chamber music education.

Key Findings

Chamber music education has been the focus of little empirical research, in particular regarding the ways in which student musicians construct meaning from rehearsals. The objective of this descriptive case study was to construct an informed interpretation of a student string quartet's rehearsal process and the factors which the quartet members perceive as important in contributing to the functioning of the group. By employing a range of data collection methods, this study has generated findings which have explored both emic and etic perspectives (Bresler & Stake, 1992) of the phenomenon of student quartet rehearsals.

The observations of the student string quartet rehearsals provided insight into their rehearsal processes and group interactions. The interpretations of the observed rehearsals were informed by the in-depth interviews with the quartet members. Although the researcher's interpretations of the rehearsals were mostly supported by the participants' interview statements, there were some discrepancies between what was observed and the participants' perceptions of their typical modus operandi. Firstly, a higher proportion of talking was observed than was estimated by the quartet. This may not be a notable discrepancy given that the quartet's estimation was for their proportion of talking in rehearsals in general and was not in specific reference to the observed rehearsals. In addition, the findings could indicate that the observed rehearsals were not typical of other rehearsals, perhaps a result of being filmed. Another possible explanation is that the individuals may lack an awareness of their talking habits and therefore were unable to provide an estimate that was reflective of the observed rehearsal. The possible discrepancies between what is

reported by participants and what is actually occurring may be a feature of previous studies which use similar self-reporting measures. In particular, it may affect some of the larger scale studies, whose size prevented the triangulation of self-reports with researcher observations (Ford & Davidson, 2003; Murningham & Conlon, 1991). (Richardson (2004) for example, has found student self-reporting in questionnaire-based research to be unreliable).

Regardless of these few discrepancies, the interviews revealed that the participants had an overall sense of their metacognition regarding rehearsal processes. Through discussions, it became clear that the group had an established rehearsal routine and an understanding of the factors which contributed to or detracted from a constructive rehearsal. A notable finding of this study was that rehearsals that were perceived to be constructive were strongly influenced by external motivating factors, such as master classes and performances. The quartet believed that the pressure of an upcoming performance or master class, for example, had a positive effect on focusing the group's concentration towards a common goal. In contrast, the group acknowledged their difficulty in maintaining on-task behaviour in rehearsals without a tangible goal. The quartet's awareness of their learning patterns shows their ability to function as independent learners.

Although the quartet sought a greater number of tutorials to assist in the group's long-term focus, it may be that they would benefit from more focused instruction on the structuring of rehearsals – such as the agreement of rehearsal objectives – and on the development of social skills. The quartet had identified tutorials which taught them how to rehearse the repertoire independently as valuable in helping them to structure their own rehearsals. Perhaps these tutorials need to not only provide students with strategies of how to rehearse the repertoire independently, but how to interact effectively and how to structure long and short term rehearsal objectives. Previous studies in cooperative learning have found that groups which are given additional structures, in the form of teacher guidance and/or the explicit teaching of social skills, have displayed more successful group performance than groups which are not given these structures: Bennet and Dunne (1991), Cohen (1994), Gillies (2003; 2004), Jolliffe and Hutchinson (2007).

Displaying further understanding of their own learning processes, the quartet conveyed a sense of perspective in regard to their progress over time. The quartet saw their friendship as a positive development in the group's musical performance. Two of the participants, for example, believed that the group's close friendship had created a supportive rehearsal atmosphere which encouraged them to play without self-consciousness.   While friendship was seen by the participants as being important for rehearsal, it may not be as pivotal a role in contributing to their on-task behaviour as they thought. Previous research has suggested that while cooperative learning is more successful than other types of teaching strategies in creating an inclusive learning environment for diverse groups of students, it may be the nature of the tasks themselves which have a greater effect on verbal discussions (Bennett & Dunne, 1991). Therefore, it could be speculated that it is the nature of the individual rehearsal task, such as the choice of repertoire and its performance context, which influences discussions. It may be that the quartet's friendship and democratic-style of group interaction provides a sense of group cohesion between the varying nature of individual rehearsals, including the shifting roles of the violins.

The participants' self-described attitude of "equal contribution" (Beck *Group Interview*) during rehearsal discussions was epitomised in the quartet's sharing of the first violin role. However, while the quartet members each contributed to rehearsal discussions, the viola player emerged in the second rehearsal as demonstrating a greater degree of leadership responsibility than the other group members. It could be interpreted that the violist was trying to compensate for the significantly lower number of contributions from both violins during that rehearsal compared to their contributions of the previous rehearsal. This interpretation of the quartet's variation in verbal contributions is supportive of King's (2006) theory of temporary team roles. The quartet's dramatic shift in verbal contributions between the two observed rehearsals highlights the flexible nature of the quartet's interactions and thus possible leaderships. It could be speculated that if the quartet had more stability in their interactions, notably their team roles, the group may reach a higher level of performance.   This speculation was made in response to King's (2006) finding that the stability of team roles was a predictor of successful group performance.

The quartet believed that individual musical parts allowed for different ideas to be contributed and thus this may account for some of the differences in the topics of talk. A social constructivist view of this may suggest that the prior knowledge and musical experiences of the individuals may shape the way in which they contribute to the discussions and thus construct their collective knowledge of the piece of music being rehearsed. Furthermore, the similarity in prior musical experiences between the participants may contribute to the ability and desire of the group to function democratically. Monique believed that the shared experiences of the quartet members, such as their Australian heritage, gender, similar age and musical training, may make it easier for them to communicate both verbally and non-verbally during rehearsal.

The quartet identified different repertoire as having an influence on the group's interaction. A similar reflection was made by members of the Guarneri Quartet, whose subtle leads were directed by the repertoire and shared among the group members (Blum, 1986). In both cases, the task itself – the repertoire – was seen as directly impacting on the group's interaction. This finding provides support for Bennett and Dunne's (1991) suggestion that the task influences the group's interaction.

Educational Implications of the Research

The data indicate that chamber music rehearsals are a complex phenomenon that require the negotiation of agreed leadership, the development of long and short term rehearsal structures, purposeful interaction between group members and the direction of collective effort towards a common objective. These are factors which need to develop over time. The strengthening of friendships since the quartet's formation, for example, was seen as important in the development of positive group dynamics. Similarly, their democratic approach to leadership appeared to evolve over time and without any explicit instruction from outside. Given the range in the styles of quartet leaderships, from leader-focused to democratic functioning (Blum, 1986; King,

2006; Murningham & Conlon, 1991), groups may naturally gravitate to their own style of leadership, as demonstrated in this case study. In effect, time and experience of playing together facilitated the group's growth in their understanding of their own learning. Amy used the term "trial and error" to describe the group's experimentation with different aspects of rehearsal, such as the length of time they are able to work productively and their decision to alternate the first violin role.

While some cooperative learning studies advocate the structuring of the learning environment and the teaching of specific social skills to aid interaction (Bennett & Dunne, 1991; Cohen, 1994; Gillies, 2003, 2004; Jolliffe & Hutchinson, 2007), it could be argued that too much outside interference may encroach on a group's discovery of their own learning processes. But, it is clear from this research and that of previous studies, that cooperative learning groups do need an element of structure to guide students in the learning process. From this case study, it appears that the balance between independent learning and teacher guidance was not achieved, with the quartet feeling the need for an increased teacher presence. The quartet did not specifically cite the need for more assistance for rehearsing the repertoire but rather as a means of motivating the group to maintain regularly planned and focused rehearsals. If motivation was the prime factor in the quartet's desire for more structure, this could also be achieved through the use of alternative strategies such as a formally timetabled rehearsal time and venue, as suggested by one of the quartet members.

Music educators have put forward numerous teaching strategies that can be used in chamber music education, such as teacher supervision in the organisation of rehearsal times and venues (Griffing, 2004; Latten, 2001), and the creation of a constitution to reinforce teacher expectations of a group's behaviour (Rudoff, 2000). Although these suggestions were made in the context of secondary school music teaching in the United States, the idea of a teacher overseeing a group's rehearsal planning may have a positive effect on a group's sense of accountability. While tertiary music students may not welcome outside intrusion to their independent group functioning, it may be more appropriate to clearly outline the expectations of student groups. By setting out guidelines for what is expected of the group, such as the

frequency of rehearsals, groups may hold themselves accountable for their actions. This strategy maintains the group's independence while also providing a supportive framework.

The quartet felt that they benefited by tutorials which taught them how to approach the repertoire once they were in their own rehearsal environment. Clearly, the teaching of rehearsal strategies was valuable to their independent learning. The role of tutor as facilitator rather than instructor, contributed to a distinction between tutorials which were seen as useful and those which were not useful to their ongoing progress. Previous research in cooperative learning groups has drawn attention to the benefits of providing groups with additional structure and the social skills needed for purposeful interaction (Bennett & Dunne, 1991; Cohen, 1994; Gillies, 2003, 2004; Jolliffe & Hutchinson, 2007). Social skill development, as a component of chamber music education, could entail strategies for conflict resolution, minimising off-task behaviour (such as introducing a time limit for talk), delegating responsibilities for rehearsal organisation and taking time to reflect on group processes. These strategies are also transferable to small group music-making in the classroom where teachers can introduce the concept of purposeful interaction with social skills as simple as listening and sharing.

Suggestions for Areas of Further Research

This descriptive case study was exploratory in nature, investigating the functioning of a single student string quartet. This study's use of non-participant observation of rehearsals and the interviewing of quartet members was in keeping with the methods of data collection of previous studies of both cooperative learning groups and chamber music groups. As this was not a longitudinal study, it would be valuable to extend a similarly designed study for a longer period of time to monitor changes in group processes and the perceptions of the participants. A means of obtaining richer data of the musicians' perceptions could be the interviewing of musicians immediately following the observed rehearsals.

The study's design could also be replicated with participants in different types of chamber music groups such as a wind quintet or piano trio, to compare the perceptions and rehearsal processes of other student musicians. Different sized groups may provide an interesting comparison, particularly in the area of group interaction. As a string quartet has the potential of being unable to resolve issues democratically because of its even makeup of 4 musicians, groups of 3 or 6 musicians, for example, may experience the problems of 'taking sides'.

Given the scarcity of empirical research on school chamber music groups, an important extension of this study would be its adaptation to examine the rehearsal practices and perceptions of high school and even primary school small ensembles. In addition to this, the processes and views of students in informal music making settings, such as garage bands, may provide a useful comparison to student musicians in more traditional, Classical settings.

Tertiary institutions ultimately strive to facilitate the transition from student to professional musician. Further study is needed to investigate the ways in which learning is scaffolded to support newly formed groups and how or if this is modified as groups develop. It is revealed however, from this study, that student musicians need to be supported in the early stages of their chamber music studies as they discover through the variety of their experiences, the ways in which they learn effectively as a group. The dynamic environment of student string quartet rehearsals has provided a fascinating insight into a unique exemplar of cooperative learning.

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APPENDIX A

Semi-structured group interview protocol

How long have you been together as a quartet?

How did you form?

How do you feel your friendship has helped or hindered your rehearsals?

How would you describe the amount of talking you would generally do in rehearsals?

How do you share your time between discussing the music and playing the music?

How does the quartet decide on what to do during rehearsals?

How does the quartet deal with conflict resolution?

When you stop to discuss a piece, what sort of things may you talk about?

Are some things more important to discuss as a group than others?

In your opinion, what sort of things contribute to a rehearsal being productive?

If an individual was to act as a leader in your quartet, how do you think rehearsals would be affected?

APPENDIX B

Semi-structured individual interview protocol

What prior musical ensemble experiences have you had?

Has string quartet playing got a different attraction than say orchestral playing?

In the group interview you compared the quartet's social environment to that of a professional group. Could you please explain what you mean by that comparison?

In the group interview the quartet talked a lot about "group focus". I was wondering what you mean by the term "focus".

You mentioned have previously mentioned that the quartet's rehearsals before a concert are constructive because of that immediate focus. What are rehearsals like when you do not have a concert coming up?

In the group interview, you mentioned that if the quartet was unsure about a musical decision, that you would as for "higher advice". Who would you normally approach in this situation?

In the group interview, you said that the good thing about the group's workings in that you can "laugh off everything". What do you mean by this?

APPENDIX C

Confirmation of ethics approval

The University of Sydney

NSW 2006 Australia

Human Research Ethics Committee
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Telephone: (02) 9351 4811
Facsimile: (02) 9351 6706
Email: gbriody@usyd.edu.au
Rooms L4.14 & L4.13 Main Quadrangle A14

Human Secretariat
Telephone: (02) 9036 9309
(02) 9036 9308
Facsimile: (02) 9036 9310

5 February 2007

Mr James M Renwick
Sydney Conservatorium of Music
Building C41
The University of Sydney

Dear Mr Renwick

Thank you for your correspondence dated **15 January 2007** addressing comments made to you by the Human Research Ethics Committee (HREC). After considering the additional information, the Executive Committee at its meeting on **1 February 2007** approved your protocol entitled *"With or without an elected leader? Perceptions of student string quartet players regarding their rehearsal productivity"*

Details of the approval are as follows:

Ref No.:   02-2007/9796
Approval Period: February 2007 to February 2008
Authorised Personnel: **Mr J Renwick**
                                      Ms L Curotta

The HREC is a fully constituted Ethics Committee in accordance with the *National Statement on Ethical Conduct in Research Involving Humans-June 1999* under *Section 2.6*.

The approval of this project is **conditional** upon your continuing compliance with the *National Statement on Ethical Conduct in Research Involving Humans*. We draw to your attention the requirement that a report on this research must be submitted every 12 months from the date of the approval or on completion of the project, whichever occurs first. Failure to submit reports will result in withdrawal of consent for the project to proceed.

<u>Chief Investigator / Supervisor's responsibilities to ensure that:</u>

(1) All serious and unexpected adverse events are to be reported to the HREC as soon as possible.

(2) All unforeseen events that might affect continued ethical acceptability of the project are to be reported to the HREC as soon as possible.

(3) The HREC must be notified of any changes to the protocol. All changes must be approved by the HREC before continuation of the research project. These include:-

- If there are any changes to investigators (e.g. Leaving the University)
- Any changes to the Participant Information Statement and/or Consent Form.

(4)   All research participants are to be provided with a Participant Information Statement and Consent Form, unless otherwise agreed by the Committee. The Participant Information Statement and Consent Form are to be on University of Sydney letterhead and include the full title of the research project and telephone contacts for the researchers, unless otherwise agreed by the Committee and the following statement must appear on the bottom of the Participant Information Statement. *Any person with concerns or complaints about the conduct of a research study can contact the Senior Ethics Officer, University of Sydney, on (02) 9351 4811 (Telephone); (02) 9351 6706 (Facsimile) or gbriody@usyd.edu.au (Email).*

(5)   The HREC approval is valid for four (4) years from the Approval Period stated in this letter. Investigators are requested to submit a progress report annually.

(6)   A report and a copy of any published material should be provided at the completion of the Project.

Yours sincerely

**Associate Professor J D Watson
Chairman
Human Research Ethics Committee**

cc   Miss Laura Curotta, suppressed for privacy reasons

Encl:
        Participant Information Statement
        Participant Consent Form