

# Cooperative learning in postgraduate lectures: Possibilities and challenges

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## **Abstract**

The aim of this article is to report on the strategies which were used to teach research design to Masters students, as part of my professional development as higher education practitioner. The focus is on exploring the use of cooperative learning as a vehicle to facilitate the acquiring of knowledge and skills in terms of research methodology. This is an action research project guided by the research question: *To what extent can cooperative learning be used to assist students to acquire and develop research knowledge and skills?* Included in the article are the various activities which I undertook in order to provide students with the opportunity to practically apply theoretical knowledge and thus to improve the understanding of what research entails and how the various elements fit together. Findings indicate that students enjoyed the approach to teaching and learning and found the activities used 'enriching'. Furthermore, there was a clear progression in which students moved from being 'reactionary and see[ing] themselves more like empty vessels to be filled with knowledge' to participating as stated by a student 'group work activities expect more of the learner than just sitting and listening to a lecturer'. This method of teaching enables students to decide on the 'way we learners have to construct our own knowledge'.

## **INTRODUCTION**

Very often in higher education, partially due to large classes and partially due to a lack of understanding, lectures start with the students settling down ready to

feverishly copy from a transparency. Often it is reported in study guides that under no circumstance are the lectures supposed to be a time where students can see how fast they can copy notes from a transparency. Walk past those very lectures one finds the lecturer standing in front rambling constantly referring to the transparency while students gaze transfixed as if there is not tomorrow. In the words of Stringer (2004, 37) too 'often, students move through routinised reading and writing tasks, engaging their hands, and to some extent their heads, but without having their hearts in it. Educators likewise move mechanically through a teaching routine, maintaining order as they "keep the kids quiet" and "cover the content of the curriculum" with their hearts disengaged.'

This situation often makes me wonder, as I am also guilty, as Zuber-Skerritt (1992, 9) states despite 'the extensive literature on student learning and adult education, lectures and final examinations are still the most frequently used methods in HE'. As a lecturer I wanted to be able to improve my own teaching practice and to break away from the traditional lectures and forms of assessment. I wanted to find a way in which students would be able to grow and develop, flourish as young researchers. How often have I not stood in front and watch how students lose interest as all that meets my enthusiasm on mixed methods, for example, is a room full of blank faces. Edward and Thatcher (2004, 195) state that 'institutions acknowledge that students find courses in research methods difficult and challenging' while Hardcastle and Bisman (2003) attribute difficulties to poor performance, negative attitudes towards research and questions about the relevance of research. The goals of any research module should be to help students to develop an understanding of the how to use research, to know about qualitative and quantitative methods, to develop critical skills but possibly more importantly to prepare students to contribute to the generation of knowledge based on sound practices (Berger 2002). Perhaps if a more 'student and activity centred' (Edward and Thatcher 2004, 197) approach is adopted there would be 'engagement with, internationalisation and understanding of subject'.

In any event what is clear, in the words of Tashakkori and Teddlie (2003, 74), is that 'there is a need for the teaching of research methodology to change'. According to Tashakkori and Teddlie research methodology is in a state of rapid change as the type of questions being asked in research projects are becoming all the more sophisticated and complex. This raises the questions such as how then could I respond to the challenge of changing the way I teach research methodology in response to the developments in the field? How could I include thinking styles that would cater for all students?

It is against this backdrop that I decided to undertake an action research project specifically to explore the possibilities of using cooperative learning as a vehicle to prepare students. In the words of Zuber-Skerritt (1992, 9) '... the ultimate aim should be to improve practice in a systematic way and, if warranted, to suggest and make changes to the environment, context or conditions in which practice takes place, and which impede desirable improvement and effective future development'. This research project was guided by two questions namely:

## What prior knowledge do students bring?

*To what extent can cooperative learning be used to assist students to acquire and develop research knowledge and skills in the context of whole-brain thinking?*

I wanted to become a reflective practitioner, identifying good teaching practices and trying them out to see what would work for me as well as my students. Thus I was provided with a unique opportunity to explore the relationship between theory and practice and in doing so develop my teaching practice as a research-based profession (Costello 2003). The latter links directly with the notion of teaching scholarship and its interrelatedness with research scholarship as outlined by the Carnegie Foundation for Teaching (2000). My scholarship development is facilitated by the Postgraduate Certificate in Higher Education (PGCHE) for which I was currently enrolled for. The programme expected me to investigate my own professional development by means of action research (Du Toit 2006). Furthermore, the project is in line with the Department of Education's view of an educator in terms of the seven roles that should be fulfilled such as learning mediator, interpreter and designer, leader and manager, researcher, assessor, subject specialists and pastoral role (Department of Education 2000).

The PGCHE is exemplary of a research-based programme. While it is expected of students to do action research of their practices, the implementation of the programme is monitored by means of action research. Other principles of adult learning, such as learning style flexibility (Du Toit and Van Petegem 2005), are also applied as demonstration to students how to go about innovating their practices. The following report serves as case study of the overarching action research project on the PGCHE, done by my supervisor and co-author of this article.

## LITERATURE REVIEW

The cornerstone of this research is taking a whole-brain approach to learning. Ned Herrmann (1996) developed a model based on research in which thinking styles can be thought of as a combination of what he calls 'four different thinking selves' (Herrmann 1996, 6–7):

- The A-quadrant Analyzer: Logical thinking, analysis of facts, processing numbers
- The B-quadrant Organiser: Planning approaches, organising facts, detailed review
- The C-quadrant Personaliser: Interpersonal, intuitive, expressive
- The D-quadrant Visualiser: Imaginative, big picture thinking, conceptualising.

Active learning is emphasised in which connections are made by means of tapping into both hemispheres and thinking selves (On Purpose 2004). However, learning is dependent on personal preferences. Figure 1 provides an overview of learning styles by quadrant including forms of delivery for successful learning. In the words of Herrmann (1996, 152), 'there is a balanced distribution of learning preferences,

with each quadrant'. The key to success following a whole-brain approach would be to facilitate key learning points in three or four different ways, each accommodating a different learning style.

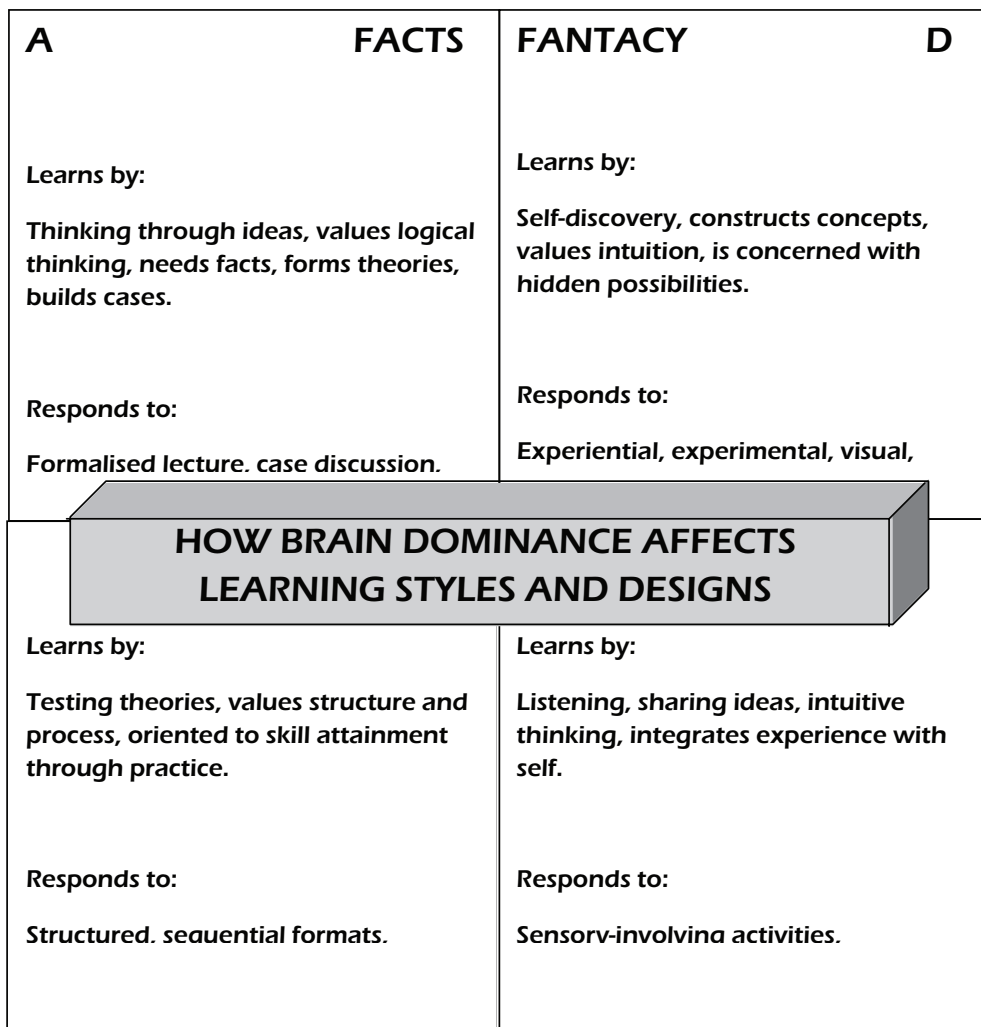


Figure 1: Learning style model including learning styles by quadrant (Herrmann 1996)

Cooperative learning is explored in this research project against the backdrop of whole braining thinking. According to Bitzer (2004, 41) ‘... cooperative learning is not just a new version of small group discussions in teaching, but that it is a way of applying sound educational principles such as student involvement and responsibility, and reflects contemporary research on student learning that has brought us a new perspective on how learning in higher education can be best effected’.

Cooperative learning is a generic term that refers to methods for organising and conduction classroom instruction (Johnson, Johnson and Stanne 2000). Cooperative learning methods share the idea that students need to work together to learn and are responsible for each other's learning as well as their own (Slavin 1991; Marr 1997; Garrett 1998; Johnson et al. 2000; Killen 2000; Siegel 2005). Thus cooperative learning involves both individual accountability and group effort (Garrett 1998) including a cooperative task and a cooperative incentive structure (Killen 2000).

According to Slavin (1991, 75) cooperative learning methods are among the most extensively evaluated alternatives to traditional instruction' and it has been found that the use of cooperative learning activities has resulted in better achievement results (Slavin 1991; Lindauer 1997; Marr 1997; Langlois 2001; Siegel 2005). However, academic achievement is not the only positive outcome as the social development of students is also fostered by means of cooperative learning (Slavin 1991; Marr 1997; Siegel 2005). According to Marr (1997, 10) many 'studies have been conducted to determine the effectiveness of this technique [cooperative learning], and the research evidence to support it is very strong. Students make significant academic gains ... . Also as a result of the collaborative nature of cooperative learning activities, they develop higher levels of thinking skills ... and ... show greater prosocial behaviour, such as increased cooperation with peers, on-task behaviour...'. This view is aligned with one of an array of critical cross-field outcomes stipulated by SAQA (1996) that expects students to be able to work effectively as a member of a group.

Cooperative learning has been widely used for teaching statistics (Garrett 1998; Potthast 1999; Langlois 2001), with much success, and entails thorough and thoughtful preparation (Killen 2000). According to Garrett (1998, 241) 'the principles of cooperative learning work very well in both undergraduate and foundation research classes'. Even though cooperative learning has been shown to enhance learning, on a higher education level it is often met with apprehension (Phipps, Phipps, Kask and Higgins 2001). In terms of methods authors such as Slavin (1991), Johnson et al. (2000), Killen (2000) and Marr (1997) provide an overview. Four cooperative learning methods are highlighted, namely jigsaw, teams-games-tournament, cooperative pairs, learning together and student teams-achievement division.

In *jigsaw* students are assigned to cooperative teams working on material that has been broken down into sections. Each section is assigned to a member of the team. Members of different teams who have been allocated the same section meet in expert groups to discuss the relevant material. Once this has been done they return to their initial group and take turns teaching the other members (Slavin 1991; Lindauer 1997; Bitzer 2004). Thus there is a home group and an expert group (Langlois 2001). Langlois (2001) has found that students who have completed a jigsaw activity discover confidence in their ability. While in *teams-games-tournament (TGT)* members of teams compete against other members to contribute to the team score (Slavin 1991; Lindauer 1997; Bitzer 2004). *Cooperative pairs* or dyadic cooperative learning as the name suggests encompass students working together in pairs. One strategy is to give students a piece of work and to divide it up into sections. Each section

is read one at a time and after each section, one student has to explain what the section entails. The students take turns explaining sections and then quiz each other to clarify any misconceptions (Killen 2000). *Learning together* involves students working together on assignment sheets, the group hands in a single sheet (Slavin 1991). Finally, *student teams-achievement division* students are assigned to teams. The facilitator provides the learning task as well as an overview of the outcomes. The students then work together to master the outcomes that were assigned to them. Each student is then individually assessed on the outcomes. The individual scores are summed to form a team score (Slavin 1991; Bitzer 2004).

In conclusion, in cooperative learning students are not just required to do something, they are required to learn something and in the end, team success depends on individual learning thus it is necessary for students to help each other (Killen 2000).

## RESEARCH METHODOLOGY

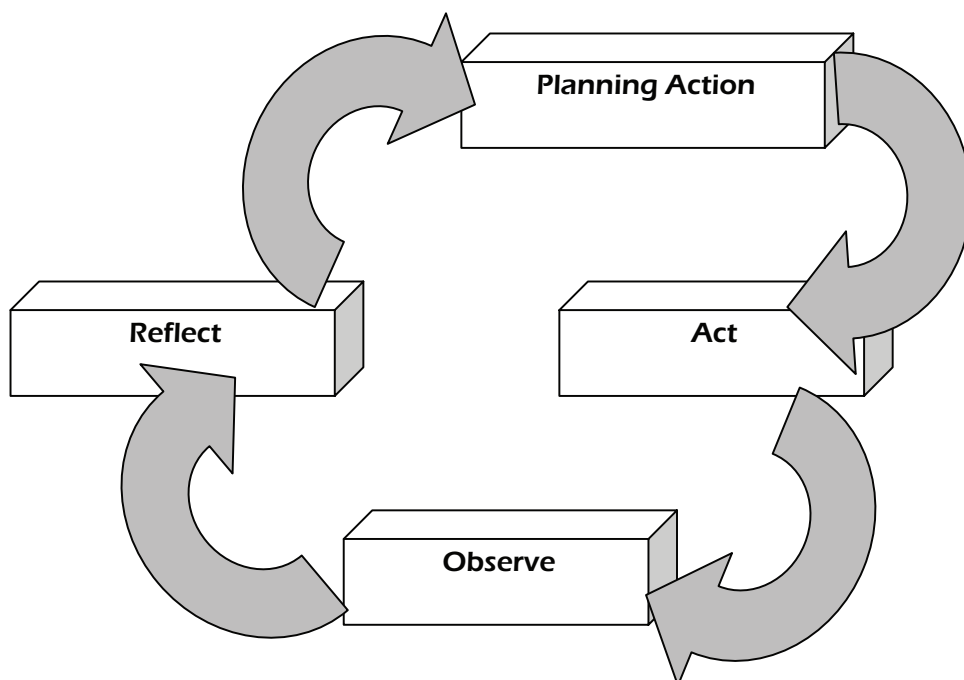


Figure 2: Action research cycle

Action research was undertaken. Action research is concerned about practice and essentially is aimed towards quality enhancement through improvement of practice (Kember 2000) undertaken by means of systematic inquiry by the teacher (Mills 2003) – in this case me as lecturer. The aim of an action research project is to gather information on how to teach and how students learn (Mills 2003). Action research follows a cyclic approach (refer to figure 2) that is characterised by various phases,

namely planning action, implementing, observing and reflecting (Kember 2000; Costello 2003).

The phases or steps are characterised by identifying a focus area, collecting data, analysing and interpreting the data and developing an action plan (Mills 2003). Improvement is brought about by a series of cycles incorporating information from previous learning opportunities. However the phases may overlap and often there is a shifting between the stages in a back and forth motion (Kember 2000).

**Table 1:** Summary of concepts in action research

	Characteristic
Who undertakes action research?	By lecturers
Where does action research take place?	In the classroom or lecture
How is action research undertaken?	Using mostly qualitative methods in order to describe and understand
Why is action research undertaken?	To take action and effect positive action

I have used a practical action research approach (Mills 2003). This approach is underpinned by the notion that the lecturer is autonomous and therefore can determine the nature of the investigation. The main aim of a practical approach to action research is professional development in which the lecturer wants to reflect in a systematic manner on her practice. Furthermore, a practical approach to action research assumes that the lecturer-researcher will choose the focus, determine data collection techniques, analyse and interpret data, and finally develop action research plans based on her findings (Mills 2003). This practical approach to action research means that the insights gained from the research are not only of theoretical importance but also leads to practical improvements in my teaching practice not only during the research process but afterwards as well (Zuber-Skerritt 1992).

## Sampling

Master's students enrolled in the Research Design and Tools module participated in the study. Informed consent was obtained and eight students participated of which one was male. Three students were asked to keep a journal while the remaining five students were interviewed.

## Data collection

Data was gathered by means of semi-structured interviews and journals. The purpose of the semi-structured interviews was to point the interviewees towards areas of interest but also to allow the interviewees to raise any issue they felt were relevant (Kember 2000). Eight questions were included in the semi-structured interviews revolving around aspects of the lectures which such as descriptions of students'

participation, how students experienced working with others in groups and thoughts on how the lectures could be improved.

Students who were not interviewed were asked to keep reflective journals. The journals comprised of regular entries on thoughts pertaining to the lectures, observations and initial reflections on cooperative learning. The students were also asked to respond to the same questions as were asked during the interviews.

The final data source was my own reflective journal. This included entries on thoughts pertaining to the lectures, observations and initial reflections on cooperative learning, planning and records of action taken. In addition to reflections on and personal opinions about the actions taken and reactions to them, results were obtained from observation techniques, references and other notes. Table 2 provides an overview of the data sources according to the research questions. Both qualitative and quantitative data sources are included, however only the qualitative data is elaborated on in this article.

**Table 2:** Data sources according to the research questions

Research Questions	Data Sources		
	1	2	3
What prior knowledge do students bring?	Self assessment questionnaire	Quiz	
To what extent can cooperative learning be used to assist students to acquire and develop research knowledge and skills in the context of whole-brain thinking?	Interviews	Student journals	My reflective journal

### Data analysis

A two-phase approach was used in the analysis of the interview transcriptions and journals. The interview transcriptions were analysed in *Atlas ti* in order to identify the main themes and develop a framework. This framework was then used to code the journals.

Thematic content analysis was undertaken. It is an analytical method that makes use of a set of procedures in order to draw valid inferences from text (Weber 1985) or for analysing the content of text where the content refers to words, meanings, as well as themes and text refers to anything written, visual or spoken (Neuman 1997). Thematic content analysis was used in this research to analyse interviews as it provides the necessary tools from which the chunking and synthesising of data can take place in order to create a new whole and is a process by which interviews captured verbatim were coded according to different units of meaning (Henning et



al. 2004). Codes are the tags or labels, which refer to pieces of data. The pieces of data could be words or paragraphs. The aim of assigning these tags or labels was to attach meaning, to index the data. Open coding was used as the initial stages of analysis in which data was broken up in order to generate theoretical possibilities within the data, some of which were targeted by the interview schedule, to develop categories and eventually themes (Punch 1995). The following guidelines were used when coding (Berg 1998):

1. Asking the data specific and consistent questions such as how the information is relevant to the research problem, or to what extent the data contributes to the objectives of the research.
2. Thorough analysis of the data as this is the initial coding procedure.
3. Frequent interruptions of the coding process in order to write theoretical notes, thus, one is able to keep a record of similar comments and concepts that seem to convey the same idea and that was in line with the original purpose.

Once the open coding phase of the analysis was completed, a coding frame or scheme was developed in order to organise the data, identify findings, and provide a framework from which the journals could be analysed (Berg 1998). The coding frame defined the recoding units, which provided a framework of what aspects of the texts were classified. These aspects of text were then grouped together to form categories. These categories began to show the themes that were constructed from the data (Henning et al. 2004). The categories and themes were used to draw conclusions.

### **Evaluating the quality of the data**

For the purposes of this study, credibility of the study was maintained by means of triangulation and peer debriefing. Triangulation involved the use of multiple data collection methods while peer debriefing involved discussing the research with colleagues (Tindall 1990; Stringer 2004; Cohen, Manion and Morrison 2004). The dependability or trustworthiness of the study implies that the research processes were clearly defined and open to scrutiny. An inquiry audit was undertaken in order to make inferences on the dependability of the study (Stringer 2004).

### **Discussion of results**

My story on the use of cooperative learning begins with a desire to know what students feel they can and cannot do. This, I felt, would have an impact on the way in which I approached the lectures. In order to provide some idea I asked the students to complete a self-assessment questionnaire. Generally students felt some capacity with regard to the theory underpinning research methodology. My aim was then to take what they know and build on it.

It was with great excitement that I embarked on this action research project exploring cooperative learning against the backdrop of whole-brain thinking. On the outset I must admit that I felt ‘overwhelmed by what needed to be done’ (Personal reflective journal entry) however I started to plan each session meticulously drawing on the work of Slavin (1991), Lindauer (1997), Johnson et al. (2000), Killen (2000), Marr (1997) and Bitzer (2004).

From the interviews as well as journals several themes seemed to emerge. The themes can be directly related to the guiding research question: *To what extent can cooperative learning be used to assist students to acquire and develop research knowledge and skills in the context of whole-brain thinking:*

1. Ways of knowing
2. Structure of cooperative learning tasks
3. Experiences with regard to cooperative learning groups
4. Challenges to cooperative learning
5. Suggestions on improvement

Each of the themes are discussed separately in the section to follow.

### *Ways of knowing*

The lectures were structured in such a manner that the four quadrants as discussed in section 2 would be catered for. Within the structure of cooperative learning you have an individual within the group. Each individual within the group has to do his or her part if the group is to succeed. What did emerge from the interviews and student reflective journals is the idea that a whole brain approach was followed:

Yes, I am interested in brain dominances and the different methods of learning and I can say out of experience that you apply these methods. There is space for left and right brain individuals in the class, not just with regard to the lectures but the activities themselves. Especially tonight’s concept map, that was cute, well done, as it is often difficult for me to see the big picture with regard to different theories and I don’t always have an idea as to how these things fit together (Personal Communication, Interviewee 1).

Succeeds in following a whole brain approach and a constructivist approach Tell me and I’ll forget, show me and I may not remember, involve me and I’ll understand (Student Reflective Journal 1).

Perhaps elaborating further on the idea of whole-brain thinking, what did emerge from the data is the identification of the learning process itself, making connections between information. Key aspects highlighted were how the concept maps were used, providing a visual representation of the material covered during the session.

By means of using concept maps persons who prefer to function in Quadrant D are stimulated as these individuals respond to visual learning (Herrmann 1996).

I think for me the highlight was putting the concept map together and linking different ideas together in the concept map. More often we learn about this, but how they link together is always a problem. And linking it together in a concept map like this, clarified it for me, you know, how they link with each other (Personal Communication, Interviewee 4).

Building the concept map was an interesting activity. One definitely learnt from it (Student Reflective Journal 1).

Furthermore the sharing of ideas and group discussions would naturally appeal to persons who prefer to function in Quadrant C as these individuals learn by sharing ideas and respond well to group interaction (Herrmann 1996).

I learn a lot from other group members ... . Through discussions you can exchange ideas (Personal Communication, Interviewee 5).

I personally like to work on my own, work at my own pace do as I please. However, I have come to realise the benefits of group work (Student Reflective Journal 1).

In order for the group to succeed in the tasks, individuals have to contribute. From the interview data and reflective journals the idea of the individual making sense of the information, formalised lectures or seminar did emerge (Herrmann 1996). This approach would appeal to learners where Quadrant A is the dominant Quadrant.

Each one got a different section and then they had to come back to the group and contribute and they had to give something back to the group (Personal communication, Interviewee 2).

It is quite interesting for you to involve us a lot. Instead of you giving us the information, we have to find the information ourselves, so we are learning better (Personal Communication, Interviewee 3).

I think methods like seminars where we read and come to the lesson to discuss is better (Student Reflective Journal 2).

The structure provided during the cooperative learning tasks was an essential component for the activities to succeed. However, the structure provided would also appeal to individuals in that Quadrant B is dominant as these individuals value structure and process and respond well to structured sequential formats (Herrmann 1996).

The material that you provided was leading. If you read, it was given to you step by step, and you were able to get the answers (Personal Communication, Interviewee 4).

The materials are adequate in that it sort of structure your time, so that by the time that you finish you must have covered almost everything that is needed (Personal Communication Interviewee 5).

### *Structure of cooperative tasks*

For cooperative learning to succeed a proper learning environment has to be created. In general the outcomes have to be specified beforehand, the cooperative learning needs to be explained and the materials have to be meticulously prepared (Killen 2000). These key elements were highlighted during the course of the interviews and student reflective journals:

I seem to have high hopes for this module. It is based on very real outcomes, that will really build on my research skills (Student Reflective Journal 3).

The materials were adequate (Personal Communication, Interviewee 4).

### *Experiences with regard to cooperative learning groups*

The experiences of the students were key to ascertaining whether cooperative learning would be effective in a postgraduate setting. It is clear from the experiences of the students that this is a worthwhile approach to follow:

Every time I attend these lessons, when I go home I am feeling changed with regards to knowledge. So I would propose that this continues (Personal Communication, Interviewee 5).

Instead of you giving us the information, we have to find the information ourselves, so we are learning better (Personal Communication, Interviewee 3).

It was a fun atmosphere in which to learn (Personal Communication, Interviewee 2).

Everyone is prepared to give an input (Student Reflective Journal 1).

I think we learn from each other (Student Reflective Journal 1).

That by the time we finished answering we had a full understanding (Student Reflective Journal 2).

Most lectures, if they ever make use of group work would be listen quickly discuss this in a small group and report back (Personal communication, Interviewee 2).

This is really something that I have not done before (Personal communication, Interviewee 1).

Clearly students felt that by means of cooperative groups additional insights were gained. By means of helping each other they were able to make sense of the material and internalise the knowledge gained. Previous experiences of working in groups did influence the students in the beginning as comments like 'I trust myself' (Personal Communication, Interviewee 2) and 'I prefer working on my own' (Student Reflective Journal 1) were made but there was a shift as the sessions continued which resulted in comments like 'I prefer working on my own . . . However, I have come to realise the benefits of group work' (Student Reflective Journal 1).

### *Challenges to cooperative learning*

In any learning situation various challenges are faced and although attempts are made to create a receptive learning environment (Killen 2000) other factors do play a role. For example, the Master's classes are scheduled in the evenings from 5:00 to 8:00. Many of the students enrolled for the course work full-time and have family obligations. The following concerns were highlighted:

Three hours concentrating (Personal communication, Interviewee 1).

It was interesting evening but also exhausting (Student Reflective Journal 1).

... the tired factor comes in (Personal communication Interviewee 2).

Furthermore, personal characteristics can also make working in a group difficult such as feelings of not contributing or finding it difficult to work with others, as the following:

At the end I could not contribute to the group discussion (Personal communication, Interviewee 1).

... It is definitely a challenge to work together in this way (Personal communication, Interviewee 2).

However, there were aspects of the learning environment which were highlighted that could be addressed such as time allocated to activities, the way in which activities are explained, the amount of activities included and the load of the module more generally:

Too little time (Student Reflective Journal 1).

It is only that this module is too packed, so you have to be rushing through, and if they somehow leave you behind, you have to find a way of catching up (Personal communication, Interviewee 4).

Perhaps too many activities (Student Reflective Journal 1).

Worried about the workload (Student Reflective Journal 3).

### *Suggestions for improvement*

Clearly from the challenges experienced by learners there is room for improvement and the students did make good suggestions which should be considered for example working in the smaller groups when building the concept maps, letting students sum up at the end of the evening and explaining more clearly what is expected:

Maybe if we could in our groups or in pairs map out the concept map and then bring all the ideas together, instead of working on one concept map as a whole group, then it would be interesting to find out how each pair mapped the concept map (Personal Communication, Interviewee 4).

A way to conclude either the students (just one) or a lecturer can sum up the major content or concepts of the night so as to guide students (Student Reflective Journal 2).

Not always clear what the lecturer wants ... . Explanations and expectations should be clearer (Student Reflective Journal 1).

Some of the concepts are just too difficult to interpret and understand. The lecturer should take note of this and have a discussion on this (Student Reflective Journal 1).

## **CONCLUSION**

This lady is obsessed with group work (Student Reflective Journal 2).

I had to smile at the statement made by the student. Perhaps I have experimented too much. However, the aim was to see to what extent cooperative learning could be used. The aim was to push the envelope and to challenge the students in a different way. Research indicates (Slavin 1991; Lindauer 1997; Johnson et al. 2000; Killen 2000; Marr 1997; Bitzer 2004) that cooperative learning does improve academic achievement so experimenting in this manner seemed like a win-win situation. Furthermore comments like ‘I don’t know if this lady is a teacher but I find her approach untraditional’ (Student Reflective Journal 2) made the process worth it as I did want to be untraditional. Overall the experience was positive as students indicated that ‘the whole lesson (sic) was exciting’ (Personal Communication, Interviewee 4) and ‘... we have come to a point where we have gelled together. So participation is not a problem’ (Personal Communication, Interviewee 3).

Clearly the students were also able to reflect on their learning and the process within the class ‘group work and activities expect more of the learner than just sitting and listening to a lecturer. It also expects more of the lecturer because she must be creative and keep the action going’ (Student Reflective Journal 1), ‘appears to be easy but taxing’ (Student Reflective Journal 3) and ‘you are more into it, it is not as if someone is talking in front and you fall asleep’ (Personal Communication, Interviewee 2). Perhaps in closing, I think that this quotation encapsulates what I

aimed to do 'I think this way of "teaching" is much better than the conventional lecture where the lecturer does all the talking' (Student Reflective Journal 1).

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