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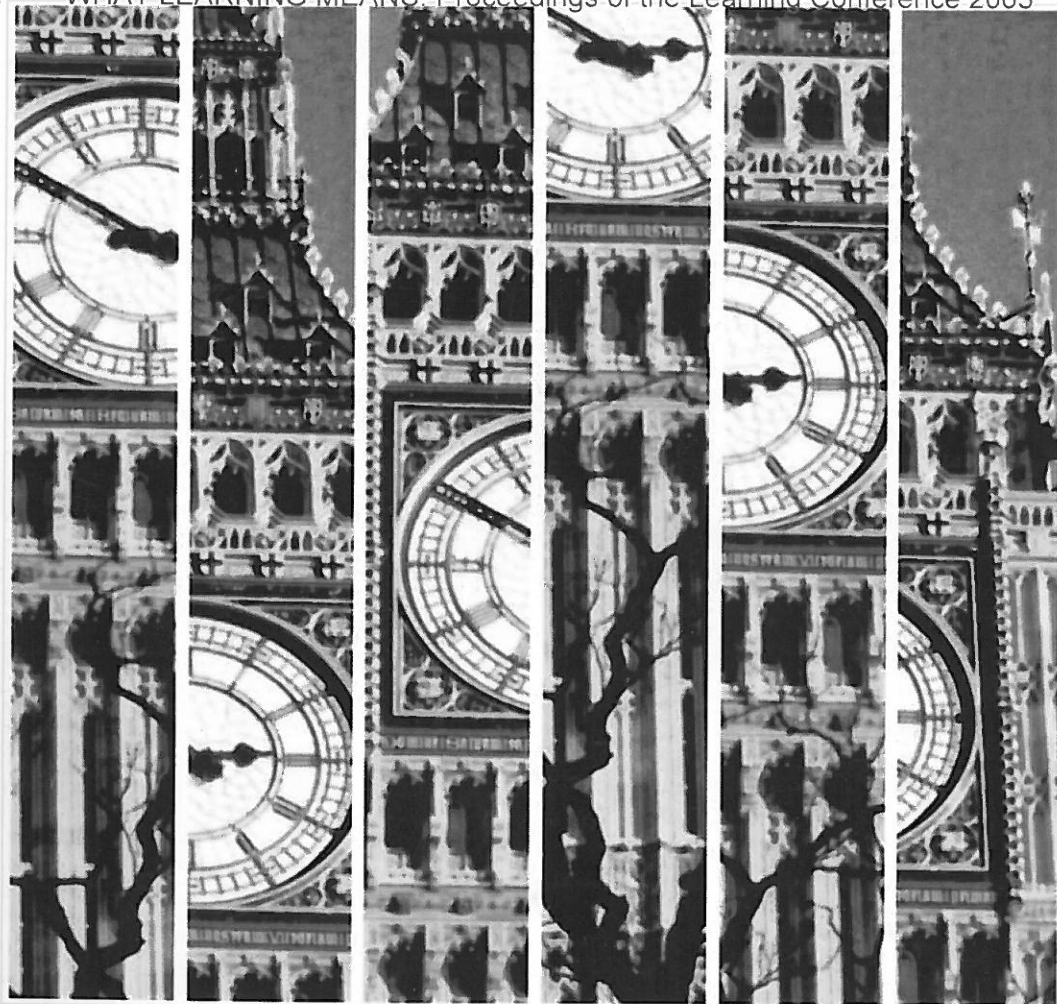
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Peer Tutoring as a Student-Centred Learning Strategy for a Health Care Programme

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Introduction

In the past, health care educators have put the main focus on the academic outcome of students, but according to Gordon (2003), it is the trend now to also place an emphasis on students' personal and professional development (PPD). Although traditional teaching can support the development of academic attributes, some have queried its effectiveness (Patel et al., 1997; McKeachie, 1990). For personal and professional development the ordinary classroom climate is not the best arena for support. The use of different pedagogies within programme curricula have been sought to provide the solution with the majority encompassing the same theme, i.e., student-centred learning rather than teacher based learning (Spencer and Jordan, 1999; McKeachie, 1990).

Peer tutoring is one strategy that will support student independence, and provide opportunities for assuming responsibility in learning, but as with any initiative it must be properly implemented and it is also unwise to consider it as a panacea. Different formats of student tutoring should be actively designed, structured, contracted and operated to maximize the likelihood that the stated objectives will be achieved (Topping and Hill, 1995). This study reviewed the implementation of a peer tutoring programme into profession-related subjects of an undergraduate radiography programme. Since, it is not a one-step process to integrate a new learning strategy, thorough review and reflection on the aims and objectives, design and operation, together with insight from a previous pilot study have contributed to the outcomes reported here. The aim was to encourage deep learning, the development of wider skills for students such as tutoring abilities, and to provide the opportunity to enhance the inter-relationships between faculty members, tutors and tutees as a means of improving the learning environment. Within this scheme, tutors and tutees were required to spend a portion of their required self-study hours in practical and tutorial sessions preliminary to the tutees' timetabled classes. For tutors, the aim was to encourage a deeper understanding of previous learning and the development of tutoring skills important for the workplace, while it aimed to provide tutees with additional opportunities to develop skills and understanding in a non-threatening learning environment as part of their knowledge and skills development.

In this study, the peer tutoring scheme differs from most reported studies that have enlisted tutor volunteers for peer tutoring, in that the implementation was written into the programme requirements for both groups of students, as a part of their self-study hours. It was recognised, however, that the tutoring group should be given some flexibility so they were given the option of completing additional assignment work if they did not want to take part. Other relatively new settings of peer tutoring in this study were, for example, a reflective diary as a part of the

assessment scheme for the related subject of tutors, applied learning format in tutoring, presence of a facilitator, and provision of an electronic peer tutoring resource centre (Sobral, 2002; Goodfellow and Schofield, 2001; Iwasiw and Goldenberg, 1993). Nevertheless, some of the more generic components of a peer tutoring programme such as a pre-tutor training workshop, provision of teaching materials and incentives also ran parallel to these (Hooper and Walker, 2002; Zant and Bailey, 2002; Smith, 1997). The study uses an action research approach to tailor the format of the peer tutoring scheme as a student-centred learning strategy.

Aim

To implement a peer tutoring scheme into the profession-related subjects of an undergraduate radiography programme to encourage deep learning for tutors and tutees, and encourage development of wider skills including management and leadership in learning situations for tutors.

Objectives

The objectives of peer tutoring are to:

1. Provide tutees with additional opportunities to develop their understanding and skills in profession-based subjects
2. Encourage a deeper understanding of profession-based subjects for tutors
3. Support the development of management and leadership skills in tutors, such that they understand the requirements of managing a learning situation
4. Support student-centred learning for tutors and tutees
5. Develop an equality in the tutee-tutor-staff relationship in managing learning situations

Research Design

An action research approach has been used and this paper reports on the first cycle of reflection, planning, action and observation. Data has been gathered using repeat application of questionnaires to tutors and tutees, interviews with tutors, tutees and teaching staff, and reflective reports from tutors.

Sample selection

Altogether seventy people (thirty-three peer tutees, thirty-two peer tutors and five faculty members) were involved in the peer tutoring scheme for a year one professional subject. Before the implementation of the peer tutoring scheme, two similar questionnaires were distributed, one to peer tutees and one to tutors to elicit their expectation on peer tutoring at individual and departmental levels. The response rate among tutees and tutors was 84.85% and 96.88% respectively.

At the completion of this first phase, a post-peer scheme questionnaire survey was conducted for both the tutee and tutor group. This aimed to collect information on the level of fulfilment of both tutee and tutor expectations. From the second survey, thirty-one out of thirty-three (93.94%) and thirty-two out of thirty-two (100%) questionnaires were collected from tutees and tutors respectively. Alongside the post-test, tutors were also required to present a reflective diary at the

completion of the tutoring period as part of the assessment scheme for their related subject. The aim of the reflective diary was to encourage a conscious review of personal development in terms of insights into subject content of peer tutoring classes, ability to manage learning situations, and personal gain from the experience.

Rather than a questionnaire survey, semi-structured interviews were conducted with the three core faculty members involved in different areas of the implementation, to gain their perspective on the mentioned aspects.

Data collection

The establishment of questionnaires and interview questions applied on this study were mainly based on those used in last year's pilot study conducted with volunteers on peer tutoring in the same profession-related subject. The guidelines set for the reflective diary encompass personal development in terms of insights into subject content of peer tutoring classes, ability to manage learning situations, and personal gain from the experience.

The questionnaire survey contained both closed questions, using a five-point scale, and open-ended questions. Interviews, which were conducted in Cantonese, were recorded by means of video camcorder and note-taking. The translated transcripts in English were given to the interviewees to review for accuracy, and changes made accordingly in terms of alterations and addition to the text. All subjects had the opportunity to withdraw from the study at any stage.

Data Analysis

Mean, standard deviation and two tailed t-test were used in analysis of the questionnaires (Sobral, 1989) and content analysis was used for the analysis of open-ended questions (with quasi-statistics as an accounting system for validity), tutor reflective diary and interviews (Polit and Hungler, 1987).

Results

From the questionnaire surveys, findings (Table 1 and 2) indicate that the study aims and objectives were met and especially for the tutee group. A positive statistical difference was noted in most of the questions for tutees encompassing additional opportunities to develop skills and understanding in a non-threatening learning environment as part of knowledge and skill development. There was not the same statistically significant positive change from the results of the tutors' questionnaires, though an overall positive increase was noted.

Tutees

Table 1
Tutees' View on Peer Tutoring Scheme (Before and after Implementation)

Questions	Pre-implementation (n=28)		Post-implementation (n=31)	
	Mean	SD	Mean	SD
Taking part in this exercise as a peer tutee will / has:				
1. Help me to understand the subject Radio-diagnostic Studies I (RDS I) ¹	3.96	.881	4.39	.558
2. Be useful to help me develop professional knowledge and skills	3.82	.772	4.23	.560
3. Be a useful way to help me develop my radiographic skills ¹	3.89	.786	4.23	.497
4. Be a useful way to help me understand image interpretation ²	3.75	.887	4.29	.643
5. Help me to develop an understanding of professional issues in radiography	3.61	.832	3.90	.746
6. Make it easier for me to ask questions when I do not understand	4.07	.979	4.32	.791
7. Mean I will feel less uncomfortable if I make mistakes ¹	3.50	1.000	3.97	.912
8. Help me to develop skills for continuing self-learning	3.36	.989	3.68	.748
9. Enhance my interest towards the professional knowledge ¹	3.38	.983	3.87	.922
The peer tutoring programme:				
10. Can improve the educational environment of the programme ¹	3.50	.962	3.90	.746
11. To work well will need tutees to be well supported by the faculty	3.57	.836	3.61	.844
12. Will help to develop a connection between tutees and tutors	3.89	.786	4.06	.680
13. Will help to develop a connection between tutees and faculty members	3.39	.737	3.61	.919
14. Will need to have arrangements in place that work well for the tutors and tutees ¹	3.64	.780	4.00	.516

Tutees ranked their answers from 1 to 5, with 1 being strongly disagree and 5 being strongly agree

¹ $p < 0.05$

² $p < 0.01$

Content analyses of the open-ended questions revealed that eighteen out of the eighteen (100%) tutees who completed this part of the questionnaire (58.1% of total respondents), gained from the scheme in terms of professional knowledge and skills. Only five out of twenty-eight (17.9%) respondents mentioned this aspect before the intervention. When asked about the most successful aspects of the scheme, sixteen tutees raised issues which support results from the close-ended questions including knowledge in "image interpretation / radio-diagnostic studies" (37.5%), "relaxed / good atmosphere" (18.8%), "motivation-asking question / self-study" (12.5%), "more time to practice" (12.5%) and "development of useful skills" (18.8%). To the question asking if a connection had developed between tutors and tutees of the seventeen (54.8%) responses, 41.2% indicated a closer relationship, 41.2% a better relationship and 17.6% a friendship had developed.

Thirteen tutees answered the open question asking for opinions on the least successful aspects. Responses encompassed two aspects, time arrangement "not suitable / insufficient" (69.2%) and tutors "providing unclear concepts or unable to answer questions" (30.8%). Nine tutees suggested ways to improve the scheme which included adjustment of tutor to tutee ratio (66.7%), and the provision of a human skeleton for demonstration (33.3%).

Tutors

Most questions in the tutor questionnaire showed a statistically insignificant result but with an overall positive mean change from pre- to post-implementation. These results are supported by the open-ended question results and reflective diary findings. The positive results support the aims and objectives laid down in the study.

When asked about the most successful aspects of the scheme, thirteen responses were received and were categorised into two themes, improved communication skills (38.4% / five tutors) and benefit from revision of skills (61.6% / eight tutors). A question asking what they had gained from taking part in peer tutoring indicated improved communication skill (22.5% of forty responses), revision of knowledge (22.5%), improved interpersonal skills (20%), knowledge enhancement (12.5%), gain in confidence (12.5%), improved presentation skills (5%) and enhanced analytical / critical thinking (5%). This is in contrast to the pre-intervention questionnaire where only twenty-four entries were recorded and they anticipated improved communication skill (25.8%), general skills (9.7%), tutoring skill (6.5%) and professional knowledge (6.5%). This provides some indication of the cognitive change experienced by tutors from the peer tutoring exercise. The acknowledged changes should support the development of deeper learning and leading to skills required to become life-long learners. Tutoring skills were not noted in the post-implementation questionnaire, however, the tutor reflective diaries indicated a realization of the workplace attributes that had developed and will be further elaborated in the discussion.

The tutors' response to the connection established between tutors and tutees correlated with tutees. Eight out of twelve (66.7% / 25% total group) tutors thought they had developed a friendlier relationship with tutees and one third of this group mentioned relationship improvement. The objective regarding the development of equality in the tutee-tutor-staff relationship in managing learning situations was not

strongly indicated by the findings from closed-ended and open-ended questions, but the tutor reflective diary supports this.

Although tutors raised issues in the questions relating to the shortcomings of the programme, and these were similar to the tutee questionnaire findings, entries were relatively few (34.4%) which is considered as a further reinforcement of this intervention. Two themes were identified from eleven responses as the least successful aspects of the scheme and they were class duration (72.7%) and order (27.3%). Six out of eleven (54.5% / 18.8% of total) tutors would want amendments to the timing of the classes and, would want the number of class activities reduced (45.5%).

Table 2
Tutors' View on Peer Tutoring Scheme (Before and after Implementation)

Questions	Pre-implementation (n=31)		Post-implementation (n=32)	
	Mean	SD	Mean	SD
Taking part in this exercise as a peer tutor will / has				
1. Help me to better understand the subject Radio-diagnostic Studies I (RDS I)	4.06	.629	3.97	.400
2. Be a useful revision/consolidation exercise of RDS I	3.97	.657	4.09	.466
3. Be a useful way to further develop my radiographic skills	3.61	.667	3.72	.729
4. Be a useful way to increase my understanding of image interpretation	3.65	.661	3.91	.588
5. Help me to feel more confident of my understanding of professional issues in radiography	3.77	.762	3.84	.628
6. Help me feel more confident in my ability to communicate my understanding of professional issues	3.77	.717	3.84	.677
7. Feel good because of helping others to understand what they need to learn ³	3.52	.677	3.91	.689
8. Mean I can develop tutoring skills that will be useful in my professional life	3.65	.755	3.69	.738
9. Improve my general communication skills	3.61	.803	3.78	.659
10. Improve my interpersonal skills	3.61	.667	3.69	.693
11. Provide a way of learning from interaction with the tutees	3.65	.551	3.81	.592
The peer tutoring programme:				
12. Can improve the educational environment of the programme	3.45	.675	3.69	.693

³ $p < 0.05$

13. To work well will need tutors to be well supported by the faculty	3.52	.769	3.41	.911
14. Can provide a collaborative relationship between tutors and faculty members	3.68	.541	3.44	.619
15. Will need to have arrangements in place that work well for the tutors and tutees	3.87	.562	3.72	.523

† tutors ranked their answers from 1 to 5, with 1 being strongly disagree and 5 being strongly agree

Faculty Members

From the faculty member interviews, issues raised were mainly on the positive side and correlated with the findings from both student groups. The overall feedback can be summarised in the following two quotes:

Through joining the scheme, peer tutors could review and deepen their understanding on the subject matter; whereas tutees, by building up good relationship with their peers, could study in a relaxed environment ... As the tutees acquired the basic concept of the subject matter in the pre-practical and pre-tutorial sessions, faculty members do not need to spend a lot of tutorial and practical time to explain the basic concept. Therefore, faculty member could spend more time on teaching more sophisticated theories and even sharing their clinical experience with the tutees which is nearly impossible in the conventional teaching method. (Faculty member A)

Since both the peer tutors and tutees gained benefit from the peer tutoring scheme ... I support the implementations of different learning approaches, such as peer tutoring ... (Faculty member B)

Negative comments were also noted in the two quotes below:

... most meeting times between peer tutors and tutees were held after 5:30 pm or even later. Such a late meeting time hinders the learning of the tutees as they are already tired after a long school day. (Faculty member A)

The current departmental policy on Central Time Tabling poses a serious threat to the scheduling of times for tutorial lessons. Because of the tight schedule of the formal lectures, tutorial lessons were inevitably scheduled at either late evening on weekdays or on Saturday morning. This does not only deteriorate the teaching performance of the tutors but also lessens the learning enthusiasm of the tutees. (Faculty member B)

Discussion

Importance of Peer Tutoring Design

Most studies conducted on the implementation of peer tutoring, a review of the literature reveals, highlight the benefits and some disadvantages. Most frequently, the benefits addressed were associated with the academic improvement of tutors and tutees in formal academic progress (Bergen and Han-fu, 2002; Yeager, 1981; Trevino and Eiland, 1980). The art of student-centred learning, however, is to empower the students as learners. Through the use of student-centred learning

strategies, they are encouraged to learn how to learn (Spencer and Jordan, 1999). It is inappropriate to expect peer tutoring to act in isolation as a panacea for student academic improvement, instead, different dimension should be used and peer tutoring is one available tool.

According to Topping and Hill (1995), peer teaching will succeed once it is structured, operated and quality controlled along with having specific clear, realistic, achievable and measurable objectives. The design, implementation and evaluation form the soul of the scheme. From the previous year's pilot study experience, simply following so-called good practice from other studies on peer tutoring such as recruitment of volunteers as tutors, and tutors not being graded (Sobral, 2002; Goodfellow and Schofield, 2001; Rizzolo, 1982), made it difficult to meet the goals although positive results were observed. The problems arose because peer tutoring as a student-centred learning strategy assumes students to take on greater responsibility for learning compared to conventional teaching methods. However, it is an assumption to predict students are willing and competent to fulfil the task and this may pose a threat to the programme objectives. This reinforces the importance to facilitate and have measures in place to assure the objectives will be achieved.

Tutor Compulsory Participation

Most often peer tutoring is conducted on a voluntary basis with the selection of "capable" students as the tutors (Sobral, 2002; Goodfellow and Schofield, 2001; Rizzolo, 1982). This concept is based more or less on the belief of self-motivation to help the incapable or, in case of paid tutoring, monetary reward (Zant and Bailey, 2002; Walker-Bartnick et al., 1984). Our pilot study indicated that even if tutors were volunteers, they lost interest with time when arrangements in place did not work as expected for the tutors and tutees. After reflecting on the outcomes of the pilot study, a decision was taken to write the scheme into the programme requirement for all students with plans to amend problems found in the pilot study. However, students in the tutoring group were given the option of completing additional assignment work if they did not want to take part as tutors. The requirement to participate in peer tutoring may seem to violate the general principles of this strategy, as a humanistic approach providing students increased autonomy (Pedley and Arber, 1997), however, student-centred learning strategies such as problem-based learning and portfolio assessment, are not a matter of choice for students to follow (Pang et al., 2002; Gallagher, 2001; Lettus et al., 2001). Also, if peer tutoring is good for student learning, it should be promoted to every student and the aims for this study were considered part of the overall development promoted by the programme. One tutor mentioned in her reflective diary:

During the period of peer tutoring scheme, at the earliest stage, I thought that this was just a burden and felt that this scheme was a little bit imperious as everyone was forced to be a peer tutor, otherwise, placement period will be added. As the consequence of this, my impression on peer tutoring scheme was not good. Nevertheless, after I attended the first class of peer tutoring, I found that some of the year 1 students really want to learn skills, techniques and knowledge from me. I started to be affected and thought I had the responsibility to give them a precise knowledge and concise skill. Being a student is not just to input the knowledge,

output is more important on the learning process. During these days, I discovered inter-learning is the most effective way to help me progress. (Tutor A)

The fact of allowing students from the tutor group who wished to complete additional assignment work rather than take part in peer tutoring, would seem to go against our aim of implementing peer tutoring as stated above. This option was given because it is not usual to include peer tutoring as a required activity, and some alternative was considered suitable. It has eventuated that no tutors took the option and the overall gain for tutors from peer tutoring encourages us to review the necessity of retaining it.

Applied Learning in Peer Tutoring

Within the peer tutoring programme, an applied learning approach was developed for practical classes. It required the tutees to use given cases with patient data such as age, gender, and history, as well as the examination requested, and tutees were guided by tutors to undertake appropriate examinations in a role play situation. Since Radiography as an allied health care profession requires application of learning, students should be able to integrate theory and practice and use theoretical knowledge to solve clinical problems (Pang et al., 2002). In the pilot study, tutees were only asked to perform several radiographic projections in the practical classes rather than the implementation of the more applied learning approach used for this first cycle. Nevertheless, learning takes place most effectively when students learn in the domain in which knowledge is to be applied (Boud and Feletti, 1997). It would seem unrealistic to expect the students (in this case tutees) to bridge the theory practice gap in the foundation year. In the peer tutoring situation, through the influence and guidance of tutors, it was possible to achieve this which is reinforced by the positive findings noted in this study. This might be because learning cases were carefully designed and measures were taken to ensure the activity would be aligned with the practical skills required from beginning students in the workplace situation. Also, the situations were similar to those met by tutors in their recent clinical placements and the level of cases was set according to the tutors' experience. Another aspect was the use of a facilitator to support tutors in guiding the tutees if any problem emerged. These factors meant tutees could gain an insight into the need to develop professional attributes. This could support them to prepare for future clinical placement and workplace experience, which will be followed up in subsequent rounds of the study.

Reflective Journal Assessment

Solomon and Crowe (2001) reported the use of reflective journal writing to outline the students' experience as a peer tutor, in this study the reflective diary was used as a graded assessment. Reflective journal assessment is not new in the health education domain (Kember et al., 1999) but it was a novel idea to incorporate it into a peer tutoring programme. In the general setting of peer tutoring, tutors would not be assessed or graded due to their voluntary participation and the likelihood of threatening their teaching performance (Sobral, 2002; Goodfellow and Schofield, 2001; Rizzolo, 1982). The reflective diary assessment was placed in the scheme to encourage tutors to reflect on their experience and to encourage them to become

more aware of what they had gained from the experience. Since this year's peer tutoring scheme was written into the programme requirements for all students, it was considered important to ensure the exercise was seen as part of the students' development and progress. Tutors were encouraged to write regularly to ensure their thoughts and reflections during the programme were not lost. A review of the reflective diaries and other data indicates students do not have negative comments on this measure and evidence of development could be categorised into three themes, namely: personal growth / confidence building; development of tutoring skills and provision of learning support; and reinforcement of learning.

Personal Growth / Confidence Building

In many of the reflective diaries, students addressed their negative perception and concern before the intervention. However, their ongoing reflection identified a number of areas of personal growth and confidence building from the scheme such as confidence and motivation development, acquisition of tutoring skills and, most importantly, they valued peer tutoring as a way to facilitate the learning environment for both tutors and tutees. In the majority, they considered peer tutoring as valuable because it provided a rewarding experience, for example, self-recognition of responsibility establishment and a sense of achievement, important for future professionals. Since it is difficult to change a person's values, this, in turn, reinforces the attainment of the study objectives.

This peer tutoring scheme really provides a very unforgettable and valuable experience for my university life ... Before the scheme, I was afraid of my capability in the tutor role ... But in fact, after attention of two workshops provided by the faculty and about 11-weeks participation of the scheme, all worries and problems have gone. This is mainly due to the growth of self-confidence and the improvement of the teaching skills. Moreover, more motivation gained from this scheme can help me in dealing with any challenges of my future career, i.e. being a clinic mentor. (Tutor B)

... Before I became a tutor, I thought that being a tutor was a simple task helping students understand a subject that I was familiar with. However, my experience over these months has expanded my perception towards the duties and responsibilities of a tutor ... Conversations between student tutors and tutees helped in creating an environment of open exchange and practical tuition. Tutees busy in dropping down their notes using short phrases, Chinese, abbreviations, drawings ... I was very much impressed by their masterpieces ... Tutors thus act as an assistant in supplementing what they missed. Sharing experience and training can also arouse their attentiveness. All these methods have been proven to be effective based on my past experience. It's an opportunity to help people to get the most out of their classes so that they can feel more comfortable with their studies. I feel as though I am a friendly person who is easy to talk to; therefore, that quality may help students feel comfortable. If tutoring is successful, both individuals benefit. (Tutor C)

Development of Tutoring Skills and Provision of Learning Support

As noted in the following quote, tutors were able to develop their tutoring skills. There was a consideration that within one semester to what degree could teaching skills could be developed and become deep-rooted. The tutors not only encouraged the development of knowledge and skills, but also managed all needs of the tutees,

including encouraging weaker students, and supported their learning. The following reflection shows that one tutor understood the role of the student-centred learning approach and their responsibility in managing it. Eventually this experience enlightened the tutors to understand the requirements of managing their own learning situation, and the need to establish a collaborative relationship with faculty members in other subject areas.

Sometimes answers do not come easily. Even after working out the problems and consulting with other tutors. We worked out a plan for finding out the solution by requesting both of us to find information and compare our findings during the next session, so that we can help other students who may encounter the same problem. Sessions usually overran but questions did not stop due to the time constrain. They said they would not have stayed so long if we had not. I guess sometimes being a tutor means simply to listen and “be there” for a student. For many students, a company who express his/her understanding in their difficulties is all the help they need. Tutoring and friendship go hand-in-hand. I felt empowered and responsible for the learning of my friends. I get to see them make some accomplishment on film evaluation through their own efforts. But, not every client wants to put forth the effort that it takes in order to succeed. Sometimes, passive tutees do hinder the progress. A positive reinforcement helps students become more confident in their own abilities. Overlook some of the small mistakes, especially when they are beginning to experience a feeling of success. A “yes...but” statement usually sounds pleasant since direct negative criticism is humiliating. Makes them to take the leading role, asks them to present what they know. (Tutor C)

Reinforcement of Learning

Student learning often involves “book learning” which is considered a non-reflective thoughtful action. It is, however, not enough for successful professionals who require frequent reflection on their practice (Kember et al., 1999). In this study, peer tutoring was able to facilitate the tutor reflection process. When they considered their previous acquired knowledge, they identified additional understanding they could bring to the learning situation. The quote from a tutor (Tutor D) below also highlights the importance of having arrangements in place that work well for the tutors and tutees which would include the presence of the facilitator. The questionnaire results (Q.15, Table 2) shows a decline in this aspect but this probably relates more to the difficulty in time scheduling.

As a tutor, I feel that it is a good chance for me to consolidate my knowledge of the year 1 RDS I course. I think it is good for the teaching assistant (X) to ask us questions in order to ensure and revise our knowledge. It is good because something we may have forgotten or something we found difficult and left behind during Year 1 can be revised and made clear, so that we can help the tutees to understand the knowledge better. (Tutor D)

Putting what you have learnt into real practice is the best way to acquire further knowledge. By tutoring, I would be able to expand my knowledge and increase my value in radiography. With each tutoring session, I have learned more from my clients than they have learned from me. (Tutor C)

Tutor Performance

Another issue was triggered by the inclusion of an assessment component. When reviewing the reflective diaries, quality reflective writing was presented by a wide range of the tutor group and not just those considered as “good” students according to other assessment measures. Evidence of self-realisation, reflection and positive value change was found across the tutor group. Students with lower average grade scores from other assessment components showed they had progressed similarly to students with higher grade averages (Bergen and Han-fu, 2002; Goodfellow and Schofield, 2001; Fantuzzo et al., 1989). This makes a case for not only including so called “good” students into peer tutoring schemes. Once we provided enough support such as a peer tutor training workshop and the presence of a facilitator, the overall group was well supported. From the quotes above, a deeper understanding of profession-based subjects from tutors was noted. Further, another of the objectives, the development of tutee understanding in a profession-based subject, was achieved.

Presence of Facilitator

The presence of a facilitator has been an important factor in the success of this first round of implementation, and though the support of teachers has been raised in some studies the presence of a facilitator in the classroom is less common (Solomon and Crowe, 2001). For academic staff the need to supervise peer tutoring sessions raises the concern of additional workload and therefore its sustainability. In the preceding pilot study, both tutors and tutees raised concerns about discipline relating to the peer tutoring session. Concerns ranged from disruptive influences within the sessions and erratic attendance of both tutors and tutees. This faculty is fortunate in having a regulation that requires research and project personnel to provide six hours each week to departmental duties, and use of this was made with a project assistant who had monitored the previous pilot study and who was also invited to join this study. The facilitator was asked to act as a liaison person between the three groups and to oversee the peer tutoring groups, with more than one group scheduled to meet at a time. The facilitator also arranged and managed the training workshops, providing the liaison between the Educational Development Centre, academic staff and students. During the course of the implementation the facilitator also suggested that support for students and between staff and students could be enhanced with the addition of an electronic resource centre, and took on the responsibility of setting that up.

Reflection on this provision of a facilitator, however, indicates the need for caution, and the need to ensure that the role and responsibilities of the various parties, especially faculty members and the facilitator, need to be clearly defined. There is a tendency for faculty to leave responsibilities to the facilitator and therefore making the facilitator’s task more complex and certainly time consuming. The provision of a facilitator in peer tutoring is a novel idea and was appreciated by faculty as is made clear in the following excerpts from feedback interviews.

I would need financial support to hire project assistant(s) to help out with the administrative work, such as arrangement, implementation and coordination with students. (Faculty Member A)

I feel that the support given to me is adequate as the project assistant helps to post my teaching materials to the WebCT and make contacts with peer tutors ... At present, the project assistant makes contacts and discusses with peer tutors the teaching materials provided by the faculty members ... (Faculty Member B)

The facilitator's reflection on taking up the post is also noted:

This is my first time to take up responsibility in a research study as a facilitator. I found I learnt and gained more from shouldering this task than as a teaching assistant (tutor). I was glad to take up the responsibility because I believed my last's year peer tutoring monitoring experience could make a contribution to the programme and I did. Appreciation and acknowledgement from faculty and students makes me feel proud of being a facilitator. It will be good for me if I can be the facilitator again in the next round of peer tutoring implementation. (Faculty Member C)

The facilitator not only provided administrative support, and by being present, a moderating influence, but also was available if students had problems they wished to discuss further. In this context it is important that the facilitator is able to provide that type of support, rather than taking over and making sessions teacher-led which is supported by the following quotes.

... X also will ask us some questions before the pre-tutorials are started, he will clarify our unclear concepts in anatomy and pathology like the location of fat pad in the elbow and some causes of arthritis. (Tutor E)

X usually has a brief revision with us before each class; really appreciate that I can have a deeper understanding of Radio-diagnostic Studies, such as the purpose in taking the projection and clinical practice. It is no doubt that he strengthens my concept. (Tutor F)

... the presence of the scheme leader (i.e. X) can monitor the pre-lab and pre-tutorial classes and give help whenever necessary. Also, the tutors and tutees must attend the classes (because class attendance is recorded, which was not available last year). This gives motivation for both the tutors and tutees to attend the classes, and concentrate on the discussion. (Tutor G)

Electronic Peer Tutoring Resource Centre

Setting up the electronic peer tutoring resource centre helped the scheme run efficiently. Few studies have reported on the use of the electronic peer tutoring resource centre or a tutor and tutee handbook. Shanks et al. (2000) and Smith (1997) mention the application of computer technology in facilitation of peer tutoring but suggest it is unnecessary to provide such a resource to the tutees and tutors because their own notes can spontaneously act as the peer tutoring handbook. Nevertheless, in this context, peer tutoring is part of the subject development, in the more profession specific context, the use of medical images are an integral teaching tool. Peer tutoring is similar to formal teaching situations in that teaching materials should be used to aid the learning of students.

The pilot study showed that a difficult aspect was the provision and delivery of suitable hard-copy images to tutors and misunderstanding arose over this issue. More than one group was active at the same time, requiring images to be copied, images were mislaid, and some not returned on time before the formal teacher-led

classes. This arrangement also meant that tutors did not often have images long enough in advance to prepare appropriately. Tutees also could not prepare well for the class as they only received the peer tutoring worksheets during the session. These problems diminished the quality of peer tutoring in the pilot study.

The setting up of an electronic peer tutoring resource centre provided suitable support for the cycle reported here. Through the use of internet technology, tutors and tutees had ready access to required material for the class, including images. Although Shanks et al. (2000) reported the use of Web-based technology in setting up a peer tutoring website, it emphasised the provision of information. If the provision is purely for information transmission as Shanks et al. (2000) suggest, comments on the need for it are probably valid. In this study, the homepage contains not only information for peer tutors and tutees such as notices, practical cases and digitised radiographic images, but also a glossary of terms for radiography, an interactive radiographic anatomy learning resource and discussion forums. The last two items support tutors in revising their professional knowledge parallel to the tutee learning process. The concerns raised from the pilot study were successfully resolved and the addition of a discussion forum has further enhanced the students' relationship development although further refinements should be made as noted in the quote below.

A short test can be given to them through the WebCT, each one must do this test after each tutorial class, in order to check how concentrated they were and how much they learned from this peer tutoring scheme. Although it may cause some additional workload for year one students, the test results will not be taken into account, and so will not cause so much of a demand. (Tutor B)

The use of the peer tutoring resource centre was developed during the semester as a response to a suggestion during this cycle. Consequently, feedback on this specific aspect is not specific and the usefulness of this resource will be more clearly monitored in the next cycle.

Relationship Development

Relationship development between tutees, tutors and faculty members within peer tutoring is usually not considered in peer teaching studies but its significance in supporting the enhancement of the learning environment is important. It is also noted that peer tutoring as a student-centred learning pedagogy should obey the principles of adult learning to support its success. In this study, evidence of a connection being established was found in the tutee and tutor questionnaire survey and supported in the qualitative data from reflective diaries and faculty interviews, for example:

During these days, we learned together with the tutees. Not just the relationship of teacher and student we get, but the friendship. This may be due to the similar age or we all are still students. Tutors will know what the tutees are concerned and what problems they may face since tutors have done what they are doing now. (Tutor A)

The relationship between peer tutors, tutees and faculty members is more like a triangle with each party being giving to and gaining from the rest of the other two parties. There are interactions between each party and they could not be separated from each other. (Faculty Member A)

I agree with [faculty member A]'s triangular relationship between the parties of this scheme. All the parties are informally cooperating with each other. (Faculty Member C)

According to Gillespie (2002), the establishment of this form of relationship will increase the learning motivation of students since they experience a sense of caring, knowing, trusting, respecting and mutuality in the relationship. Enhancing the learning environment can support positive learning outcomes and this correlates with the characteristic of adult learning in which motivation of learning is based on mutual trust and respect (Knowles, 1990).

Conclusion

In the study, novel ideas were incorporated into the peer tutoring scheme to further develop its potential as a student-centred learning strategy. These include the formalization of peer tutoring into the curriculum, an applied learning approach to tutoring sessions, reflective diary assessment, the presence of a facilitator and the implementation of an electronic peer tutoring resource centre. These provided another dimension to peer tutoring and were primarily aimed at supporting the learning development of tutees and tutors. Topping and Hill (1995) suggest that student tutoring should be specific, clear, realistic, and achievable using measurable objectives and be structured, operated, and quality controlled to increase the probability that the stated objectives will be achieved. The strongly positive result from the tutees, tutors and faculty members on this study reinforces this notion. Peer tutoring and the incorporation of related student-centred learning strategies can enhance the benefits brought to tutees, tutors and faculty members, and maximise the likelihood of success (Hewitt-Taylor and Gould, 2002).

The findings suggest the stated objectives have been largely achieved. Tutees have clearly been provided with additional opportunities to develop their understanding and skill, and tutors encouraged to develop a deeper understanding of the profession-based subject. In the spirit of providing a more holistic development for students, the scheme has provided the opportunity for tutors to develop management and leadership skills which can be extended to workplace learning situations, and the enhancement of the tutee-tutor-staff relationship in managing learning situations.

Further study on the transfer of management and tutoring skills to the workplace, and in enhancing the student-centred learning approach will be conducted in phase two based on the present outcomes. The peer tutoring electronic resource centre will be further developed, including the development of tutee and tutor workbooks, and its usefulness monitored in the next cycle. The study aims to extend the scheme so that all students will have two experiences of being tutored, followed by two of acting as tutors. Further cycles of action research will follow these through so refinements and adjustments can be made.

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