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EXPANDING THE TRADITIONAL CLASSROOM THROUGH COMPUTER TECHNOLOGY: COLLABORATIVE LEARNING IN GRADUATE SOCIAL SCIENCE COURSES

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Abstract. This paper discusses the use of computer technology in expanding the traditional college classroom. The discussion is guided around several issues concerning teaching and learning techniques in higher education institutions. Questions raised in the discussion are: (i) why are new teaching techniques needed in teaching and learning among graduate students of higher institutions? (ii) are the traditional teaching techniques in sufficient to ensure academic understanding among graduate students? (iii) which teaching techniques do accommodate students' curiosity in acquiring borderless knowledge? and (iv) what are the challenges facing lecturers in structuring course curriculum using the new techniques? The paper also discusses the JIGSAW method as a strategy that could be used in collaborative learning via computer technology.

Key words: Collaborative, computer mediated communication, electronic classroom, interpersonal skill, JIGSAW II

Abstrak. Kertas kerja ini membincangkan penggunaan teknologi komputer untuk memperluaskan corak pengajaran dan pembelajaran bilik darjah tradisional. Perbincangan akan berpandukan beberapa isu mengenai teknik yang digunakan di institusi pengajian tinggi. Persoalan-persoalan yang dibangkitkan ialah (i) mengapakah teknik baru diperlukan untuk pengajaran dan pembelajaran pelajar-pelajar siswazah di institusi pengajian tinggi? (ii) apakah teknik semasa tidak mampu memberi pemahaman yang mantap di kalangan pelajar siswazah? (iii) teknik pengajaran manakah yang dapat memenuhi keperluan inkuiri minda pelajar siswazah untuk menggarap ilmu tanpa sempadan? dan (iii) apakah cabaran-cabaran yang dihadapi oleh pensyarah-pensyarah dalam penstrukturan semula kursus menggunakan teknik baru? Kertas kerja ini juga akan membincangkan kaedah JIGSAW sebagai strategi yang boleh digunakan dalam pembelajaran kolaboratif melalui teknologi komputer.

Kata kunci: Kolaboratif, komunikasi berperantarakan komputer, kelas elektronik, kemahiran interpersonal, JIGSAW II

1.0 INTRODUCTION

Effective teaching and learning brings out the satisfaction among students and teachers alike. Regardless of whether one is a school teacher or a college instructor the satisfaction derived from the teaching process is only felt when the method or teaching strategies used is able to commensurate between hard work from the teaching process and academic success achieved by students. As such, teaching strategies adopted by

teachers or instructors can help trigger rippling effect of academic success among students.

Teachers, particularly those who are involved in the academic world of higher institutions, are always challenged by students' ability (or inability) to comprehend complex concepts from different rubrics of knowledge. Much worse, many instructors do not undergo formal teaching program, thereby, making them short of teaching strategies to make teaching and learning at higher institutions more commendable.

Hooks (1994) suggests that the learning process comes easiest to instructors/lecturers who teach in a manner that respects and cares for the soul of the students. She also emphasized the importance of providing necessary conditions where learning can most deeply and intimately begin. Hooks' (1994) suggestion can materialize, if instructors are willing to experiment with new and innovative teaching techniques and to extend their horizon to new approaches of teaching and learning. Rigidity in teaching concepts can only lead to failure on the part of the lecturers as well as students.

This paper will try to address a few issues concerning teaching and learning techniques in higher education institutions such as why are new teaching techniques needed in teaching and learning graduate students of higher institution?, are not the traditional teaching techniques (for example: lecturing, face-to-face discussion and tutorial) sufficient enough to ensure academic understanding among graduate students?, which teaching techniques do accommodate students' curiosity in acquiring borderless knowledge?, and what are the challenges facing lecturers in structuring course curriculum using new techniques?

In the discussion, this paper will try to emulate the logic of using collaborative learning, a teaching technique commonly used among schoolteachers, in the graduate classroom. Needless to say, the collaboration process will be discussed within the context of computer technology.

2.0 WHY THE NEED FOR NEW TEACHING TECHNIQUES?

The era of globalization spurs information overload, since information can be downloaded from different sources regardless of geographical location. However, the propensity of benefiting from the vast knowledge of information is limited when students are involved only in the traditional method of learning vis-à-vis learning using computer technology that promotes academic satisfaction among students of the new generation.

Traditional teaching methods such as the talk and chalk technique, and classroom lecture, might only allow limited amount of information to flow from lecturers to students depending on the amount of knowledge acquired by lecturers. In a sense, teaching and learning only flows in a linear fashion (Grasha, 1997). The more knowledge the lecturer acquires, the more information will be disseminated to the students. However, the human mind (in this case the lecturers) can only store a certain amount of information and this limitation can be very frustrating to students who

constantly seek new information to meet their level of curiosity. Inevitably, lecturers need to adjust their teaching technique that involves the transfer of pedagogy from the traditional approach to electronic (entirely online) or computer assisted (courses supported in any way by computer technology) approach. This might be the answer to new techniques of teaching and learning in the era of globalization.

However, the paradigm shift in the pedagogical context requires complex adjustments and substantial rethinking of the ways in which classroom time is spent. Time for a traditional classroom is limited to the allotted time given for a particular course. Interaction between learners and knowledge disseminators runs only during that limited time and not beyond. However, for electronic classroom or computer-assisted classroom, the interaction expands beyond time and geographical boundaries. Postgraduate students need more time to discuss in-depth issues pertinent to their area of interest, particularly when they are involved in research. This is only achievable when the students have vast knowledge on the subject matter. Concomitantly, time is the factor that determines the amount of knowledge that these students can accumulate. The more time they have to interact and discuss with others on-line using computer mediated communication, the more knowledge they will gain.

Computer mediated communication supports synchronous and asynchronous communication. Synchronous communication reflects communication between two or more people that are connected to each other via their computers, and communicating at the same time with each other. On the other hand, asynchronous communication reflects a communication where only one person can communicate at a time (*e.g.* telephone answering machine and e-mail) in different combinations such as when one person is working alone accessing information, or when one person is communicating with many others, and when many people are communicating with many other people at different times (Jonassen 1996; Rosseni *et al.*, 2001).

The traditional classroom also provides limited space for learning, *i.e.* within the classroom. Students can only interact with their course-mates and the lecturer who teaches them. This space can only be expanded if the students themselves take the initiative to interact with people outside the learning boundary. However, computer-assisted classroom naturally provides the extra space for students to interact with individuals outside the classroom (within and outside the campus) via chat room, e-mail, on-line conferencing, video conferencing, and other computer mediated communication methods. This promotes diversity in knowledge gain and inevitably, will deepen their understanding on the subject matter. This again helps in their self-reflection process.

3.0 WHY COLLABORATIVE LEARNING THROUGH ELECTRONIC CLASSROOMS (INTERNET)?

The expression “electronic classroom” is sometimes applied to distance education classes that use computers. This paper will refer to a graduate class on ‘Research

Methodology' equipped with internet-ready networked computers. The course should have collaborative learning, not individualised learning, as the goal.

The 'Research Method' curriculum involves both understanding of quantitative as well as qualitative research designs. As such students need to find examples of every research possible to understand the designs. Students will take longer time to accumulate and digest all the information. However, this problem can be overcome collaboratively, which allows interaction between individuals. Each student can exchange information on research design with others using computer mediated communication, thereby shortening the time needed to accumulate the different examples. Therefore, the collaborative approach to teaching and learning supported by electronic classroom can support a variety of topics and areas within a short period of time (Koschmann 1992).

4.0 WHAT IS COLLABORATIVE LEARNING?

Collaborative learning is based on the idea that learning is a naturally occurring social act in which the participants talk among themselves (Gerlach 1994). Smith and MacGregor (1992:9) suggest that the idea of collaborative learning is based on several premises. First, that learning is an active and constructive process in which students integrate new materials with prior knowledge to create new ideas and new meanings. Second, that learning depends on rich contexts that ask students to collaborate with peers to identify and solve problems by engaging in higher-order reasoning and problem solving skills. Third, that learners are diverse and have different background and experiences. Fourth, that learning is a social act in which students talk to learn. This social interaction often improves the participants' understanding of the topic under consideration. Fifth, that learning has effective and subjective dimensions. Collaborative activities are both socially and emotionally demanding and most often require students not only to articulate their own points of view but also to listen to the views of others. These premises exude the idea of creative learning. Students work with others to create knowledge and meaning and do not have to rely solely on lecturers or textbooks.

Collaborative learning promotes several skills that enhance intellectual as well as personal and social development. Miller, Trimbur and Wilkes (1994) suggest a taxonomy of collaborative skills that is necessary to facilitate collaboration in college classrooms. The skills include: (a) Interpersonal skills, (b) Group building management, (c) Inquiry skills, (d) Conflict Management, and (d) Presentation. The first skill, interpersonal skill is needed because students as social beings learn through interaction with friends and family and in social situations. These interpersonal skills include getting to know someone's name, being a good listener, providing positive feedback, responding to people's ideas without making personal criticism, and using effective communication.

The second skill, group building/management involves students managing a variety of learning task, such as negotiating differences in perspective and arriving at consensus. Students must follow a specific agenda, keep to given tasks, meet deadlines, show empathy with the needs and problems of other group members and discuss feelings about the group and the process.

Students need the third skill, the inquiry skill, to explore additional information, to analyze, synthesize and evaluate information and findings and draw conclusions. These skills are pertinent to seeking information from a variety of sources. The skill will also enable students to evaluate information and the sources. Miller, Trimbur and Wilkes (1994) suggest that the inquiry skill is not unique in collaborative classroom but is essential to the success of collaborative activities.

The dynamics of group work will trigger conflict among group members. As such, each group member will have to acquire effective conflict management. This is the fourth skill needed for collaborative learning in college classroom. Conflict arises due to several factors: incompatibility among group members, opposing needs, drives, wishes, external or internal demands. Conflict in group work can also arise from personal issues such as some members not completing the task given, or disagreement over intellectual interpretation of some themes being discussed in the group. Conflict cannot be evaded but need to be resolved by group members productively.

The last skill needed is presentation skill. This skill comprises the ability to organize, synthesize and summarize information so that others can understand. Effective presentations require group members to relay information accurately in an electronic environment. However, in a face-to-face setup, effective presentations also require group members to speak in front of the group confidently.

Creating the right presentation materials is also essential in order for the larger audience to draw a conclusion from the information. Basic writing as well as speaking skill is important at this level for a face-to-face presentation. However, in an electronic presentation via the computer mediated communication, basic writing skill is particularly important.

There is a lot of flexibility in collaborative learning. It enables the lecturers as well as students to optimize their full potential in interacting with others. The strategy also enhances critical thinking at a much higher level where students are able to synthesize, and evaluate the accuracy of information and understand how the information have an impact on their learning process. Concomitantly, students will also develop group management and conflict resolution skills. These necessary skills are illustrated in Table 1.

5.0 COLLABORATIVE LEARNING IN COLLEGE CLASSROOM

Understanding what collaborative learning is will help lecturers modulate their teaching activities. However, understanding the concepts alone is insufficient to run a successful

Table 1 Taxonomy of collaborative skills

Skills Category	Collaborative Skills
Interpersonal Skill	Congenial, friendly, make clear statement, listening skills, positive communication (no name calling, put-downs) and eye contact.
Group Building/Management	Organize work, keep group on task, run a meeting, participate in group self analysis, show empathy
Inquiry Skill	Clarification, critique, probe assumptions and evidence, probe implication and consequences, elicit view points and perspectives
Conflict	Prevention, resolution and mediation
Presentation	Summarize, synthesize, speaking in front of a group, creating presentation materials, report writing.

Source: Miller, Trimber and Wilkes (1994)

course. What lecturers should be concerned about is, what is the most appropriate way of handling collaborative learning among college students. Various modes or activities represent collaborative learning. Such activities include STAD (Students Team Achievement Divisions), JIGSAW II, and TGT. These activities are more commonly used in the school classroom and they involve class-based orientation.

Nonetheless, the writers feel that such activities, with some addition or modification, are still applicable to college classroom. Conceptually, the writers will adopt the JIGSAW II approach to collaborative learning. However, the collaborative boundary goes beyond the walls of the classroom and globalizes by the use of internet and intranet. This is in-line with the idea of e-village, and e-knowledge where learning is a global activity and everybody learns from somebody regardless of their geographical locations.

6.0 WHAT IS THE BEST COLLABORATIVE TECHNIQUE TO BE USED IN A GRADUATE CLASS?

The writer would like to suggest the JIGSAW II approach when using collaborative technique in graduate classroom. However, the feasibility of using the approach lies in both lecturers and students plus the information sources available. JIGSAW II approach consists of a number of small groups with 4 to 5 students. The group will work together as a team to achieve the common goal or to solve a common problem. This approach can be carried out in many ways. However, for the benefit of this discussion, the writer will suggest two most probable ways to handle the approach. The first method, is what we call the intra-classroom collaborative interaction and the second method is the inter-classroom collaborative interaction.

7.0 INTRA-CLASSROOM COLLABORATIVE INTERACTION

This method is easily done by the lecturer and students from their own classroom. Students will be divided into small groups (G1, G2, G3 and G4). The lecturer will have to prepare information seeking exercise ahead of time. Assuming that each group has 4 members (M1, M2, M3 and M4), therefore, the students will be identified according to group and membership in the group. Table 2 shows the distribution of group members within their respective groups.

Table 2 Distribution of group members

	G1	G2	G3	G4	
M1	G1M1	G2M1	G3M1	G4M1	Expert 1
M2	G1M2	G2M2	G3M2	G4M2	Expert 2
M3	G1M3	G2M3	G3M3	G4M3	Expert 3
M4	G1M4	G2M4	G3M4	G4M4	Expert 4
	OG1	OG2	OG3	OG4	

OG – Original Group

At the beginning of the collaborative process, students will be grouped in their respective grouping. At this stage, the lecturer will help students form a cohesive group. This is pertinent to the group success, particularly when sharing the information gathered from other groups. Cohesiveness among group members can be developed through the following exercise:

(i) Develop ground rules to establish some guidelines on how the group should function.
(ii) Train the students with relevant skills (communication skills, leadership skills, listening skills, presentation skills, and social skills).
(iii) Appoint a group leader and identity task for each group member.
(iv) Develop group motto and objectives.

When cohesiveness among group members develop, the lecturer will assign a task to each group member (M1, M2, M3 and M4) according to the topic to be discussed (for example, different type of sampling process). Every member from each group will be given the same task (*see* Table 3). Concurrently, the expert group will be formed.

Table 3 Distribution of task among group members

Expert 1	G1M1, G2M1, G3M1, G4M1	Stratified sampling
Expert 2	G1M2, G2M2, G3M2, G4M2	Systematic sampling
Expert 3	G1M3, G2M3, G3M3, G4M3	Cluster/Block sampling
Expert 4	G1M4, G2M4, G3M4, G4M4	Snowballing sampling

8.0 TIME FRAME OF INFORMATION SEEKING ACTIVITIES

Each group member will be asked to find information regarding the topic given. The students are encouraged to find information through the internet, books, journals, thesis and research reports. The information collection process should be exhaustive. Expert group members will interact accordingly in a collaborative manner. Members should practice person-to-person interaction skill. Among the qualities of interpersonal skill are sharing and seeking information, displaying creative and critical thinking and having an open mind as well as empathy towards any serious discussion at hand.

To further expand the collaboration process, an electronic discussion group (e-group) may be used to send files on information regarding each topic. The instructor or an appointed moderator will subsequently create and moderate an electronic discussion group. Using a free web discussion facility such as the Yahoo Groups, this can easily be done. First, the moderator has to create four folders to house information or files on the four sampling techniques (Figure 1). These folders are created in the file section of the e-group. All members may contribute, read or download information on any of the folders according to respective topics. After reviewing the information, members can all sit on a virtual roundtable in the message section to discuss, debate, critic and give ideas on all four topics. Finally they should come up with a well-developed, creative and critical conclusion for each topic to be presented in a face-to-face seminar. At this stage expert group members will interact accordingly in a collaborative manner.

Having the interpersonal skills as the meaning suggests, is an ability to interact, understand, accept, and respond appropriately to people (Morris, 1999). This skill is just the right skill, especially in creating rich interaction among students and educators. On the contrary, collaborative teaching and learning is a process that involves outside parties to participate directly or even indirectly with university (and graduate students) in developing, distributing and sharing knowledge and information. These outside parties include the government and non-government bodies, public and private institutions of higher learning. Therefore, these graduate students have the opportunity to accumulate vast amount of knowledge from various resources. However, the accumulation of knowledge is easier done if it is via the internet.

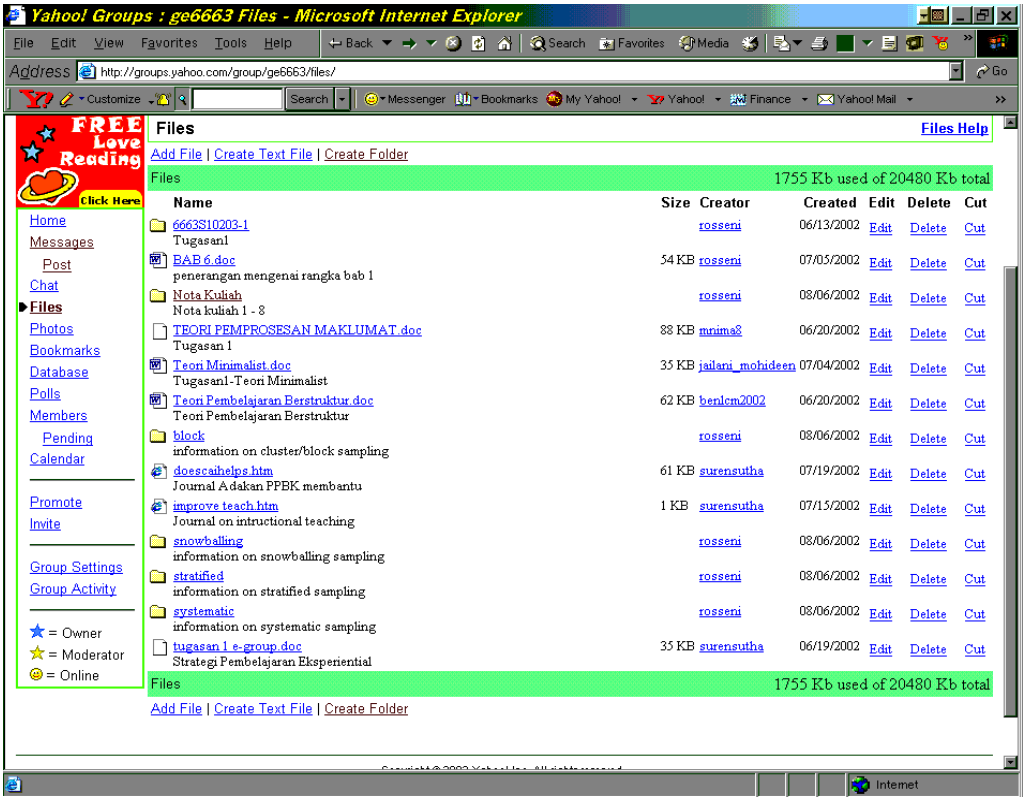

Figure 1 Folders created in an e-group to store information on various topics

According to Forsythn (1996), the internet has the ability to provide access to information for everyone. He also suggested that the internet can offer possibilities to support alternative learning settings, and this is considered crucial for gradate students because they are supposed to be well read and knowledgeable on their subject matter. The question is why do we focus on the internet as the collaborative partner?

Graduate studies are demanding in terms of accumulation and sharing of knowledge from experts. These so called experts are placed in various countries and regions. Therefore, it is impossible for the graduate students to have a face-to-face contact with these experts. Immediate accumulation and sharing of knowledge can be done through the internet using various modes. Inevitably, global education system can be developed. This is cost and time effective in terms of knowledge accumulation.

Within the collaborative teaching and learning activity, the use of the internet is very useful when the students are given tasks to accomplish for a given time period. The students can use the internet to find information related to the task given. This can be done interactively. As such, the interpersonal skill will be required for them to make contact with the information provider. This is very important since the graduate students are seeking information from an authority that they have not met. Furthermore, these

experts might be working with different time zones and work settings. Without the interpersonal skill, information gathering can be difficult.

Table 4 shows interpersonal skills required during the collaborative process and the internet tools that can help them acquire the information.

Table 4 Interpersonal skills vs internet tools

Interpersonal Skills	Internet Tools	Example of Tasks
Socializing and interacting to others in a highly verbal way	1. Chat rooms 2. E-mail 3. Web Forum	Research design in different field of study (e.g. Medicine, business, education etc.)
Sharing and seeking information	1. Web pages 2. E-mail 3. Web Forums 4. Chat rooms	Global graduate classroom (e.g. developing instrument for mental status, work quality, EQ of individuals from different locality etc.)
Displaying creative and critical thinking	1. Web pages 2. Web forum	Electronic Publishing (to develop a web page reporting research projects)
Having an open mind as well as good sense of empathy towards any serious discussion at hand	1. E-mail 2. Web Forum	Tele-fieldtri ps (visiting interesting research center, grants foundation, and visual expedition)

9.0 ASSESSING EFFECTIVENESS OF COLLABORATIVE CLASSROOM

Collaborative teaching and learning strategies require constant assessment to ~~gauged~~ gauge its effectiveness. The two types of assessment are: assessment during process, and assessment of the end product. The first assessment can be conducted using periodic collection of work such as drafts, journals, reflections, and progress reports. These can help lecturers determine students' current status in their research project. Cramer (1994) suggested that some of the materials used in assessment will not require direct feedback from lecturers but can be checked as a progress report. Cramer also suggested that the value of the assessment lies in the process of the work itself. Lecturers may also consider to have some kind of formative commentary, oral or written, before the project is completed for formal grading. Progress data can help inform the lecturers where the students are going with their research project. According to Cramer (1994) such data is fluid or dynamic showing both the direction and the magnitude of change within the students.

The second assessment focuses on students' accomplishments and mastery in the course project. Students can be graded individually or in groups. Cramer (1994)

suggested that when the combination of grading is used, the assessment would be interwoven with the course materials. Inevitably, the assessment becomes more accurate.

The goal of assessment in collaborative graduate classroom is to attend to differences between passive and active learners. Therefore, lecturers and students must be knowledgeable with the assessment process. Students become more engaging in the learning process when they are actively involved in the assessment process.

10.0 COMPUTERS AND COLLABORATION IN THE RESEARCH METHOD CLASS

The following are possible steps to be taken in developing collaborative classroom with computer technology inclusion:

(i) Students work in small groups and confer about a project that they can develop together based on one research design.
(ii) To save time, students will be asked to share their ideas in an electronic discussion group. The lecturer or the group leader will make an initial posting for their pre-appointed topic and all the other group members are asked to contribute their ideas about the topic.
(iii) The students will also be asked to read a hypertext research book and build a class reading by annotating and then passing it to others via the discussion group. Students will be asked to use a special font to highlight their contributions.
(iv) Students will compare the annotated reading materials with the original to understand the research design.
(v) The lecturer will then ask the students to share knowledge on research design in real time and to discuss in-depth about each design method.
(vi) These discussions can be archived for others to read and comment asynchronously.

11.0 CHALLENGES ON USING COLLABORATIVE ELECTRONIC CLASSROOM

Many challenges inflict both lecturer and students throughout the learning process. Some possible challenges include understanding how to manipulate the files. The use of campus bulletin board also pose a possible challenge because the board is a public forum where the public can observe all interactions. Therefore it is difficult to control and confidentiality of information is decreased. This might dishearten the students. The use of software can also pose a possible challenge because students need to understand the tool being used properly. Ineffectiveness can occur when computer tools are wrongly used. Discomfort among students can also arise because comments that are placed in the discussion can be read by others. The peer critiques can be

misunderstood and can lead to negative interaction (people stop interacting and changing ideas).

12.0 DISCUSSION AND CONCLUSION

Collaborative teaching and learning transpired in the school classroom. However, it is possible to extend it to the graduate classroom, in particular for a research methodology course. The possibility of using different collaborative partners aside from peer course mates, provide a different avenue in information seeking activities. One of the most prominent partners in this process is the internet. However, the internet per se is not interactive, thereby, reducing the possibility of developing interpersonal and social skills that are important in collaborative teaching and learning.

Lecturers who intend to use or try using the internet as a collaborative partner will have to consider the most effective tools to optimize the use of the internet while not neglecting the interpersonal and social skills. Tools such as chat rooms, e-mail, and web forum are useful in helping students interact actively with their source of information and at the same time giving them the opportunity to develop and master their interpersonal and social skills.

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