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Chapter IX

Evaluating Designs for Web-Assisted Peer and Group Assessment

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Abstract

Activities, such as peer-group discussion and peer review, where students assist each other by commenting on and assessing each other's course work, are thought to be beneficial and effective in many aspects. Web-based technology has opened up new possibilities for peer- and group-assessment activities. Three main Web functions—e-resources, e-display, and e-communication—are discussed in this chapter in the context of six cases of teachers using peer and group assessment in a Hong Kong university. These cases use different levels of Web enhancement. Evaluation of the six cases involved student surveys, focus-group interviews, teacher surveys, analysis of forum postings, and counter site logs. The chapter provides an analysis of this evaluation data within the various designs of

these courses. The data collected generally confirm that Web-enabled peer-and group-assessment activities can produce positive results. The need for careful planning for these types of assessment activities is also clearly illustrated.

Peer and Group Assessments in Teaching

Traditionally, learning has been regarded as an individual process, especially under the influence of individualism in western countries (Webb & Palincsar, 1996). The model was that students would learn on their own in order to compete with their peers, and their achievements in tests or projects were also assessed on an individual basis. However, beginning in the 1950s, there have been an increasing number of studies demonstrating that group learning can be superior to individual-to-individual transfer of learning (Johnson & Johnson, 1989). Cooperative interactions were identified as bringing about good learning outcomes. A variety of peer-learning approaches appeared, and students were also assessed either on a group basis or an individual basis (Sharan & Hertz-Lazarowitz, 1980; Slavin, 1980, 1995).

Peer assessment involves using peers' comments in assessing the quality of assignments. Johnson and Johnson (2004) defined group assessment as "collecting information about the quality or quantity of a change in a group as a whole," while peer assessment "occurs when peers collect information about the quality or quantity of a change in a student" (p. 2). Thus, group-assessment activities involve students working in groups. Very often, group assessments look only at the group's performance as a whole and ignore the differential performance of the individuals in the group. A more complete model involves the performance of the group and its members being assessed not only by the teacher, but also by their peers in the same or in other groups. These activities involve both peer and group assessments.

Activities that involve peer assessment take many different forms, such as peer tutoring (Wagner, 1982), cooperative learning (Kagan, 1985, 1994), peer-group discussion (Hatano & Inagaki, 1991), and peer review in writing (Gere, 1987) in which students assist each other by commenting on and assessing each other's course work. Brown, Race, and Smith (1996) suggested that peer assessment helps students develop an awareness of the importance of structure, coherence, and layout in their work; peers can help one another by brainstorming the content and structure of essays. They can check for correct answers and may be able to identify exactly where errors have occurred.

Group-assessment activities also take many different forms. Group-based discussions (Webb & Farivar, 1999), assignments, projects, and debates are common enactments of group learning in classrooms. Group assessment is considered to be highly conducive to learning in a number of ways. Baumeister and Leary (1995) commented that the need to belong to and maintain human relationships is a fundamental benefit. Johnson, Johnson, and Smith (1998) remarked that "the research results consistently indicate that cooperative learning will promote higher achievement, more positive interpersonal relationships, and greater psychological health than will competitive or individualistic efforts" (p. A:32). There are also reports that group projects promote essential learning skills, including organization, negotiation, team work, cooperation, leadership, and problem-solving (Smith, Armstrong, & Tait, 2003).

As Table 1 suggests, peer assessment, group assessment, and peer-and-group assessment of activities can be considered as involving three major steps. There is a *preparing* stage in which students collect information and understand the activity to be done. Group assessment activities may have the preparation done in groups. The *working* stage is where students actually work out a solution, a report, or a piece of writing (alone or in groups). The *sharing* stage is when the worked solutions and writings are circulated for feedback. Additional sharing may occur when the first drafts are revised based on feedback and then resubmitted for further comments. Peer assessment sharing involves peer review at this stage. Group-assessment activities may receive feedback from the teacher. Group activities may also involve peer assessment when their fellow student groups or their fellow classmates are reviewing the group work individually.

Table 1. Stages of peer and group assessment activities

Stage	Assessment activity		
	Peer	Group	Peer and group
Preparing	Preparation and information gathering alone	Preparation and information gathering in groups	Preparation and information gathering in groups
Working	Working alone	Working in groups	Working in groups
Sharing	Presentation of work	Presentation of work	Presentation of work
	Feedback from peers	Teachers' feedback	Feedback from peers
	Refinement of work/enrichment of ideas	Refinement of work/enrichment of ideas	Refinement of work/enrichment of ideas

The Web in Teaching

University teachers are now more willing and able to use e-learning to assist their teaching because the advance of technology has made the development of educational Web sites more convenient. There are now online functions that are widely deemed to have a potential to enhance learning. The present study focuses on the following three functions: e-resources, e-display, and e-communication.

E-resources provide reading and learning materials to students. These materials are potentially more media-rich than traditional text-based materials (Hills, 2003). For example, common online materials in the sciences include animations and well-drawn graphics that can better explain difficult concepts because they assist students to visualize movements of molecules and genes in three dimensions. Online materials can also help students to extend their learning beyond the main requirements of the subject; examples are virtual laboratory video clips or a glossary of terms. Obviously also, the provision of well-organized links to other resources on the Web has a potential to support self-directed and exploratory learning.

The e-display function enables the Web to be a place for showing and exchanging students' work. File accessibility and revision is greatly improved compared with ordinary face-to-face exchange.

Lastly, the e-communication facility promotes student-student and teacher-student dialogues. Communication is considered by many to be essential to learning (e.g., Laurillard's, 2002, conversational model of learning). Using the Web for communication may have certain advantages over face-to-face discussion because it enables the keeping of better track records of the discussion and allows more time for reflective remarks. Communication between students and students, or between students and teachers, is achieved through the use of online discussion forums, chat rooms, and/or other online communication technologies (Kearsley, 2000).

One of the strengths of using the e-mode of handing out resources, displaying files and work, and engaging in communication is that students can access materials and messages an unlimited number of times, and at various times and places; this can increase the opportunities for learning.

When Pedagogy Meets Technology

The three Web functions can be used to facilitate peer and group assessment activities (Figure 1). E-resources can be used to provide materials for prepara-

Figure 1. Possible uses of the e-functions during activities
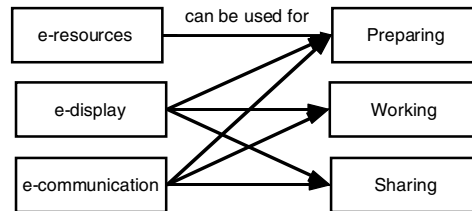
tion. The e-display functions may be used to exhibit students' assignments and ideas, or for critique and review. These drafts and ideas may also help other students' preparation or working process as well. Lastly, the e-communication function has the potential to help all the three stages: Students may use online discussion to search for ideas and information when getting ready for the task; they can discuss online when working on the task; and, as its most frequent use, students use e-communication when they share what they have already written in order to get suggestions for improvements. No one single e-learning design can employ all these possibilities and in Figure 1 we shall look at six different designs.

The Study

This chapter looks at how current Web technology can assist peer and group assessment in higher education by reporting the evaluation of six recent cases of Web-assisted peer or group assessment activities at a university in Hong Kong. These six cases have been chosen to be presented here not because they are all extremely successful. On the contrary, there is a range of effectiveness in these Web-enhanced peer and group assessment attempts. They are reported here because, taken together, they reveal useful patterns.

The Web development and evaluation of the six cases have been supported by the e^3Learning (e^3L) (i.e., enrich, extend, evaluate learning) project which has been designed to assist teachers to better exploit the possibilities of Web-assisted teaching. Full details of the design of this project are in James, McNaught, Csete, Hodgson, and Vogel (2003) and the project Web site http://e3learning.edc.polyu.edu.hk/. The e^3L project operates across three universities: the Hong Kong Polytechnic University, the City University of Hong Kong, and The Chinese University of Hong Kong.

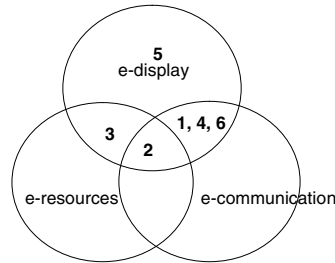*Figure 2. Web-assisted cases of peer and group assessment*

Table 2. Matching of e-functions and activities in the six cases

Web function	Assessment activity		
	Peer	**Group**	**Peer and Group**
	1. online journal 2. clinical cases	3. group case-based activity 4. online debate	5. group role-play 6. group multimedia project
e-resources	2	3	-
e-display	1, 2	3, 4	5, 6
e-communication	1, 2	(3), 4	6

Overview of the Six Cases

As shown in Figure 2, the cases incorporated different designs of using the three functions of the Web. Table 2 shows in more detail the peer assessment, group assessment, and peer-and-group-assessment activities in the six cases and the respective e-functions involved in each case.

The first two cases used the Web mainly to assist peer assessment. Activities carried out were reflective journal writing and discussion of clinical cases. Cases 3 and 4 used the Web for group-assessment activities: group case-based activity and online group debate. The last two cases used the Web to assist activities that have both the peer and group assessment components. The activities involved were group role-plays with peer criticism and Web-assisted group projects.

Five of the courses in these six cases were in the field of nursing. Case 5 involved a course on English-language teaching. All the courses were held in the Hong Kong Polytechnic University either in the 2002-2003 or 2003-2004 academic years.
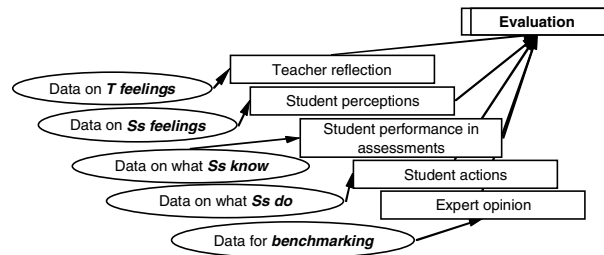
Figure 3. Evaluation data types

Table 3. Sources of evaluation data for the six cases

Data sources	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Teacher reflection on the experience of the course (data on how the teacher **feels**)	Course-end teacher survey	Postings teacher made on the website	Course-end teacher survey	Course-end teacher survey	Course-end teacher survey	Course-end teacher survey
Students' perceptions of their experience (data on how students **feel**)	2 student surveys, (mid-term and course-end); 2 focus-group meetings	Course-end student survey	Course-end student survey	Course-end student survey & focus-group interview	8 task-end student surveys, and 1 course-end student survey	Course-end student survey & focus-group interview
Student performance in assessments (data on what students **know**)	X	Forum posting content analysis	X	Forum posting content analysis	X	Forum postings content analysis
Student actions (data on what students **do**)	Site and forum logs	Site and forum logs	Site logs	Site and forum logs	X	Site and forum logs
Expert opinion e.g. evaluator, peer evaluator, external examiner, employers (data which has **'benchmarking'** validity)	X	X	X	X	X	X

Outline of the Evaluation Model Used

The overall approach of the evaluation is aligned with a constructivist approach rather than with an absolute measurement perspective (Reeves & Hedberg, 2003; Scriven, 1993). Thus, the data collected are not meant to be precise measurements of the learning enhancement. Instead, they are rich descriptions that aim at giving indications of the advantages and disadvantages of the learning intervention. Multiple sources of evaluation data were collected. As shown in Figure 3 and Table 3, five sources of data are used in e³L evaluations: teacher reflection, student perceptions, student performance, student actions, and expert opinions (Lam & McNaught, 2004).

Kennedy (2004) argues that we need to put an increasing emphasis on the cognitive processes of learners. While his work is with learner-content interactions in stand-alone computer environments, his "cognitive interaction model" is of interest in evaluating the possible benefits of online environments. He defines *cognitive interactivity* as being "a continuous, dynamic relationship between instructional events and students' cognitive processes that is mediated by their behavioural processes" (p. 58). In the evaluation studies, we have tried to distinguish between what students *do* and what students *know* in order to tease out some understanding of this relationship.

Table 3 shows that the evaluation strategies of the six cases are varied, depending on the pragmatics of the situation, such as the availability of the teacher and the class. Note that, in these six cases, no expert peer review was used, though it has been valuable in other e³L evaluations.
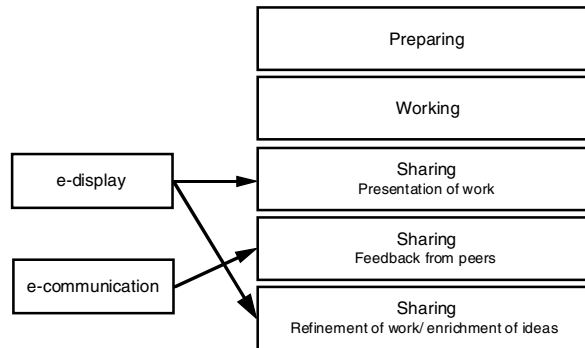
Case 1: Peer-Review of Reflective Journals (E-Display and E-Communication)

Introduction

The teacher of a nursing course put up a site using the WebCT platform. It was the first time that the teacher had tried to bring e-learning into her teaching. Some parts of the site contained resources including video clips, pictures, readings of various subject themes, and crossword puzzles. More interestingly, the teacher also planned a Web-assisted peer-review activity in which the students were asked to share and comment on each other's reflective journals posted online; this part of the site is the focus of this case. Although the experience was not very successful, the teacher was pleased with this as a first attempt.

Students were asked to submit to the site forum short commentaries (not more than 100 words each) after they had begun their clinical placement. The teacher required that the reflective journals include the following three aspects: (1) students' evaluation of the strengths and weaknesses in their conducting nursing assessment, planning nursing management, and communicating with clients; (2) what the students have gained from the experience; and (3) how the experience has affected their future learning. The teacher also required that students should constantly view their peers' commentaries and give feedback through the forum. Students were also encouraged to refine or provide more information to enrich their journal entries based on the feedback they received. Both the commentaries and the peer feedback on the commentaries were counted in the course grade.

Figure 4. Design of Case 1

As Figure 4 shows, the peer assessment was assisted by the e-display and e-communication functions of the WebCT forum.

The teacher believed in the benefits of peer learning. She designed this activity of peer-reviewed reflective journals in order for the students to be more engaged in, and give more thought to, their clinical placement experiences. She also hoped that the availability of their peers' stories of clinical experiences online would give students a higher motivation in the course and deepen their understanding of clinical nursing practice.

Evaluation Methodology

Two student online surveys (one at mid-term and one at course-end), and two focus-group meetings (one at mid-term and one at course-end) were conducted. A teacher survey was also conducted after the course was finished to collect opinions from the teacher's point of view. The response rates of the mid-term and course-end student online surveys were 88% (97 students out of the 110 completed the survey) and 51% (56 students out of 110 completed the survey) respectively.

Observed Activity on the Web

E-Display

The e-display function did not work as well as expected. Although the teacher encouraged the students to do the activity and a small amount of the course mark

was attributed to this online activity, only a total of 59 journal entries were recorded. This means that nearly half the students did not write and post their 100-word commentaries.

E-Communication

The online communication function was not very well utilized either. A total of 45 pieces of feedback were recorded on the forum, commenting on the journal entries posted there, but 25 of them were written by the teacher herself.

Results from Surveys and the Focus Group

A moderately positive feeling towards the online commentary was recorded in the two student surveys. For example, a mean of 3.54 (in a scale from 1 to 5, with 5 being strongly agree) was collected when the students were asked whether they liked this activity of writing about clinical practice on the Web site. The mean score was 3.29 when the students were asked whether they thought the activity had helped them learn. The mean was 3.46 when asked whether they agreed that they had learned from reading other students' commentaries. A major problem in the student survey data was that there was a high percentage of students who picked the "cannot decide" option (around 40% in each case), suggesting that many of the students either did not have strong interest in this activity or they might have not done the activity in the first place.

This lack of participation was further confirmed in the focus-group meetings. Students admitted that they found it difficult to find time to look at others' files of clinical experience since there had already been many things to deal with and there were too many postings on the site.

Some of the students blamed the unfriendliness of the WebCT forum for its unpopularity. The messages were arranged in chronological order rather than according to the topics. Students suggested that relevant messages with their replies should be arranged together like a message board. There was also a complaint about the forum's incompatibility with Chinese characters.

Students suggested breaking the class into smaller groups so that each student would need to read the journals within one group only. Students did not feel they knew their classmates well enough to engage in active, even heated, discussion online; they lacked the feeling of an online community. Some others said that the forum would be more interesting if the teacher posted answers to common problems onto the forum.

The teacher observed no significant learning improvement; she noted in the course-end teacher survey: "I see no obvious learning improvement; however,

I noticed that they are more eager to talk about their learning difficulties and share with me on their clinical experience related to subject material learning."

Case 2: Peer Discussion of Cases (E-Resources, E-Display, and E-Communication)

Introduction

The second case is a Web-enhanced peer assessment activity (online case-based discussion) implemented by a teacher of a one-semester course on nursing. The teacher has used the Web in teaching for four years, but it was his first attempt at this kind of activity. The results, however, have turned out to be quite promising.

The teacher provided two multimedia-enriched cases (with photos, simple animations, and sound effects) about a car and a fire accident respectively and asked the students to post their thoughts and remarks on these cases on the site forum. The car-accident case was further split into three stages: the first on the accident scene, the second in the hospital after a preliminary check-up, and the third in the hospital after radiographic scans had been taken. The second case was split into two stages: the accident scene and the hospital. The photos, sound effects, and real hospital reports and scans made the case contextually rich and realistic. There were questions to consider and decisions to be made in each of

Figure 5. Design of Case 2
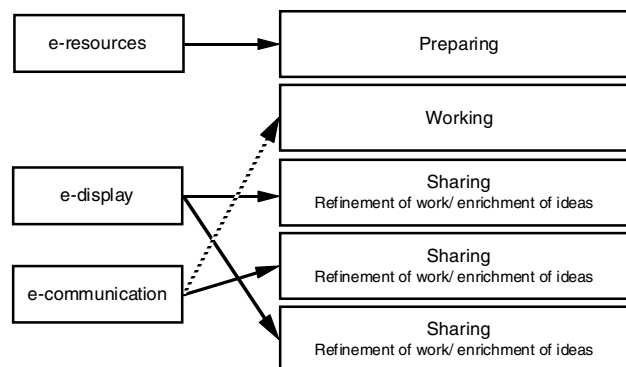
the stages of the cases. There were also links to other Web resources related to the cases. The students posted their suggested decisions and their justifications of their decisions onto the forum, while the peers commented on each other's solutions. The cases were also used as materials for face-to-face discussion in the tutorials.

The teacher motivated the students to participate in the online discussion by constantly monitoring the progress on the site and regularly added his timely comments to help build the atmosphere and the sense of community. Participation in the online discussion was counted as part of the course assessment. As Figure 5 shows, facilitation of this case-based activity was achieved by all the three Web functions we have identified.

The teacher believed that it is important for students to go through real cases in his course in order for students to practice decision-making, which is a key skill in the students' future nursing profession. The reason for the teacher's decision to introduce a peer-discussion component to his cases was that he believed the feedback and comments from the peers would enable students to better consider the different aspects of a case and be more engaged in the case.

Evaluation Methodology

The response rate of the course-end student online survey was 85% (76 students out of 89 completed the survey). In addition, five students gave their opinions in the focus-group meeting, and the teacher gave feedback on the Web site. Site log data and forum postings were also analyzed.

Observed Activity on the Web

E-Resources

Students mentioned in the focus-group meeting that the multimedia representation of the cases were "high-tech" and interesting to look at, and thus had attracted their attention. They regarded the cases as being realistic. They also remarked that cases with the possibility of showing animation and videos are most useful to show sequences of events and procedures.

The links to other Web resources were highly appreciated as well. Students noted that they quoted information from textbooks, journals, or Web sites more readily and that they considered searching for information on the Web convenient.

Figure 6. Distribution of students' frequency of posting
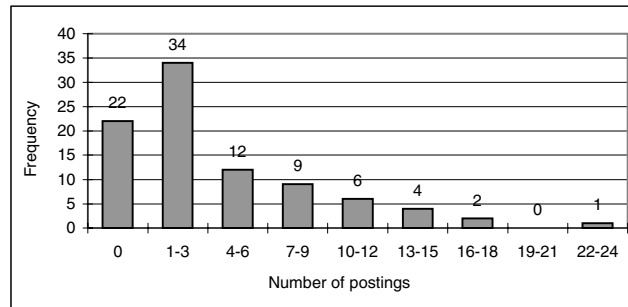
E-Display and E-Communication

The site forum (in which both the e-display and e-communication took place) attracted good participation. The forum logs revealed a satisfactory to high degree of use of the forum for discussion. The total number of postings recorded in the forum was 449. Of the postings, 79 were written by the teachers. On average, each student (in a class of 89) posted about 4.2 messages. Over 75% (67 out of 89) of the class participated in the online discussion. While most of them had posted one to three times throughout the course, five students participated actively in the forum, with postings ranging from 15 to 23 each (Figure 6).

Students reported that there were keen discussions on the site. Many of them would look at the postings more than once a week during the most active period of the forum. They admitted that they posted messages onto the forum because marks were allocated to the online participation. However, they thought that once they were accustomed to visiting the forum, they found accessing it and using it very useful. They also appreciated that the teacher often read their postings on the forum and wrote replies in the forum as well.

Students in general preferred to have online discussions before working on the papers, so they could pinpoint the most relevant information. Through the online discussion, they clarified misunderstandings and thus avoided interpretation errors when writing their essays. This was not expected and is shown as a dashed line in Figure 5.

Results from Surveys and the Focus Group

Generally speaking, the online case discussion activities were valued highly by the students. Most students (~70%) found completing the cases helpful and felt that they had learned from doing so.

With respect to the comparison between face-to-face discussions and the online forum, many students thought it was effective and efficient to use the Web for the discussion (~60% agree or strongly agree). With respect to the quality of criticism, over half of the students thought their peers could give a high-quality critique (~55% agree or strongly agree) and most of them thought the Web had enabled them to receive feedback (80% agree or strongly agree).

The majority of students agreed that they received good ideas or comments from their peers (~70% agree or strongly agree) and that the feedback was informative (~75% agree or strongly agree). Suggestions for improvement included providing more background information in the cases, lengthening the time of working on the cases, and removing the assessment scheme.

All students agreed that they had few opportunities to express their ideas in tutorial classes due to the limited class time (two hours) and the relatively large class size. The online discussion thus provided more opportunities for students

Table 4. Forum postings classification categories related to the SOLO taxonomy

SOLO Taxonomy (Biggs, 1999) categories	Explanation of SOLO categories	Postings classification categories	Type of posting
Prestructural	Misses the point	Non-substantive	• Social
Unistructural	Single point	Substantive	• Adding new points • Enhancement and clarification of points
Multistructural	Multiple unrelated points		
Relational	Logically related answer	Elaborated substantive	• Making clear contrary statements • Developing complex arguments • Referring to material with a new perspective • Using fresh and different reference material
Extended abstract	Unanticipated extension		

to discuss. All in all, the students affirmed the appropriateness of conducting the discussion in e-format.

Although the teacher did not notice any significant improvement in student-student and student-teacher interactions throughout the course, he believed that the Web activities improved students' understanding of the subject matter. In the Web site, he thought the discussion forum was the most effective component.

Analysis of Forum Postings

The students were able to give good comments to each other. On the forum, 23 randomly sampled threads with 102 postings were selected for further analysis. The 102 randomly selected postings (23% of the overall postings) were analyzed with reference to their nature and quality of content. Postings were classified as nonsubstantive (usually social; Although we do recognize the value of social interaction in community-building online, in this case another public forum was the social arena), substantive (i.e., related to the topic), and elaborated substantive. These classifications are related to the Structured Observation of Learning Outcomes (SOLO) classification (Biggs, 1999), as shown in Table 4. A summary of the data is shown in Table 5. The data indicate a good level of engagement in the forum; the percentage of elaborated substantive postings is high.

# Case 3: Group Case-Based Activity (E-Resources and E-Display)

Introduction

The third case is a Web-enhanced group activity in nursing. The teacher provided audio case clips, mainly to be listened to by the students online in their free time and then used as materials for discussions in tutorials.

Table 5. Summary of the analysis of the forum postings in Case 2

No. of postings analysed	102
% of postings analysed	23
% of non-substantive postings in sample	9
% of substantive postings in sample	30
% of elaborated substantive postings in sample	61

Figure 7. Design of Case 3
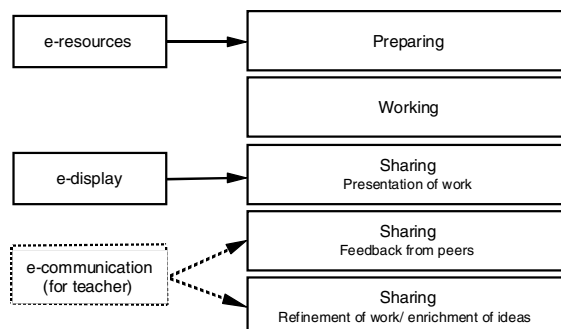
There was also a more elaborated case called the SARS (Severe Atypical Respiratory Syndrome) case (enriched with photos and audio). The students in groups handled this case. Each of the groups wrote a report describing how they would handle the SARS case. The teacher and peer students submitted these reports on the site for viewing. The teacher also posted in the same presentation area her feedback and grades on each of the group reports.

The main roles the Web played in this design of the case-based activity related to the e-resources and e-display functions (Figure 7). The e-resources function provided the students with realistic audio-recorded cases. The e-display function (using the presentation feature in WebCT) allowed the students to post their group reports onto the site for reviews. Discussion of the cases, and commenting on the group reports were not explicitly required to be done online. In fact, the teacher had allocated ample time for case discussions and feedback on reports in classes. Nevertheless, a forum was also set up on the course site to facilitate students who opted for additional e-communication online.

As in Case 2, the teacher in this case also believed in the benefits of using real cases in her course in order to train students' decision-making skills in applying theories and concepts to clinical situations. The teacher decided to use group work in this case-based teaching design because she believed students would "learn to learn" in groups through actively considering the feedback and comments from peers.

Evaluation Methodology

The evaluation data came from a course-end student online survey, a teacher survey, and the site-log information. The response rate of the course-end student

online survey was high—95% (145 students out of the 153 completing the survey).

Observed Activity on the Web

E-Resources

The students welcomed the resources of the cases. The site recorded heavy traffic during the course. Over 50% of the students who responded the survey said they visited the Web site a few times each week. The site logs recorded a high number of visits. Among the different pages of the Web site, the course schedule page was visited most (2,753 accesses) and audio cases page, including the SARS case, came second (919 accesses).

E-Display and E-Communication

The e-display function also seemed to function as expected. All 19 student groups posted their assignments on the forum, displaying their work to their peers for comments. The e-communication did not work well for student-student interactions. There was feedback from the teacher to each of the assignments, but no feedback from the students was recorded despite the fact that the teacher had encouraged the students to give peer feedback to each other.

Results from Surveys and the Focus Group

The students really enjoyed the Web-based cases. About 60% of the students found audio-enhanced cases helpful to their learning. Moreover, ~80% of the students had accessed and listened to the audio clips on the site, and over 50% of the students said the cases increased their interest in the course. Indeed, the main suggestion for improvement of the site was requesting more cases in video or audio formats.

The students also found the e-display function to be useful. Over 65% of the students responded with either "strongly agree" or "agree" to the survey statement "reading the work of the other groups was helpful to my learning" (mean score 3.69 out of 5). This suggests that, although the students did not make much use of the e-communication function, they took advantage of the e-display and benefited from reading their peers' work.

At the end of the evaluation, the teacher was so impressed by the students' positive reactions towards the e-resources that she indicated in the course-end teacher survey that her next plan was: "more learning resources can be uploaded to the website e.g. case studies and useful references & links."

Case 4. Group Online Debate (E-Display and E-Communication)

Introduction

The course in this fourth case was a nursing course for part-time students taking place over two months in the summer. It was the teacher's first attempt to use an online forum for a debate about controversial issues concerning nursing home care in Hong Kong. Each student group selected one discussion topic from four alternatives and could debate from either the proposing (i.e., affirmative) or the opposing side. The four debate topics were about home care and hospitalization and were as follows:

1. There is a need for change to meet the home-care needs of people in Hong Kong.
2. Increased home-care services can save health-care costs.
3. Home care is an alternative to hospitalization.
4. Home is always the best place for patients.

Figure 8. Design of Case 4
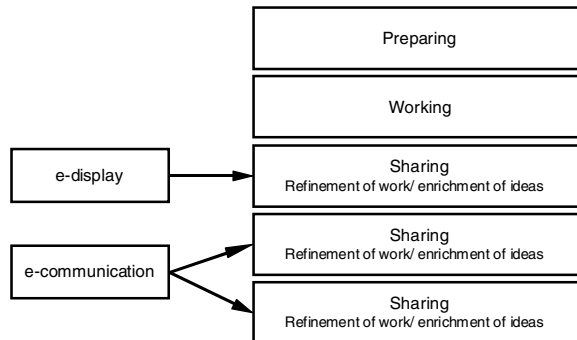
The proposing side was given one week to post their arguments to support the statement while the opposing side used the week following to post their arguments (as a group or on an individual basis). Then, the third week would go back to the first group again. At the end of the debate, each student had to submit his or her personal views on the topic in the form of a short essay. Marks were allocated according to the students' performance in the online debate and their individual course-end essays.

As Figure 8 shows, facilitation of this case-based activity was achieved by mainly employing the e-display and e-communication functions. The e-display functions used the site forum to host the student groups' arguments for or against the motion. The e-communication part (also using the forum) allowed the opponent groups to post their counterviews.

The teacher chose the format of an online debate to motivate the students to be more engaged in the subject, to be able to appreciate the complexity of the issues surrounding home care, and to be able to acquire some important learning skills such as analytic and argumentative skills. The teacher expected the assistance of the Web would lead to a smoother exchange of dialogue for her students who were mostly part-time students who had full-time work in the daytime.

Evaluation Methodology

Altogether five instruments were used to collect both the qualitative and quantitative data for this online debate attempt. An online course-end survey intending to elicit students' feelings about the online debate was conducted with a response rate of 50% (58 out of the 114 students). In the course-end focus-group meeting, 10 students enthusiastically expressed their ideas about various aspects of the online debate. A site log was installed to track students' use of the debate forum. A content analysis was also done on the debate postings. Lastly, the teacher's feedback was collected with a course-end survey.

Observed Activity on the Web

E-Display and E-Communication

The forum logs showed that the attention paid to the forum was intense. There were 212 postings on the forum: an average of 1.88 postings for each of the 114 students in the class. The total number of visits paid to the debate section of the forum over the period amounted to 11,663. On average, each student visited the forum 114 times, either browsing through the messages or posting their own

messages. On average, each student read 58 articles posted on the forum. For each topic, there was sufficient discussion—an average of 31 postings per topic—and the arguments were quite balanced with both sides of the debate well represented.

Results from Surveys and the Focus Group

Quantitative figures from the online survey showed students' liking of the online debate. Over 70% of students indicated their liking for online debate activity in the survey, and nearly 80% of students agreed that online debate added fun to the routine learning processes. This was echoed in the focus-group meeting with students appreciating the time flexibility and commenting that their critical and logical thinking had been strengthened. However, in the focus-group meeting, a strong minority of students condemned the online debate because it lacked immediate feedback, was time-consuming, and was more difficult being the opposing side of the debate.

In the survey, students agreed that they spent more time reading and finding additional information from other sources in order to complete the online debate task. Over 80% of students thought that they had engaged in real and meaningful arguments when they did the online debate. The positive appraisal might possibly be due to the self-recognized improvement in the argumentative skills but might also be due to the better preparatory work students had done.

Students supported the use of online debates over traditional ones, since (1) they could have a longer time to prepare, think more thoroughly, and thus absorb and assimilate the materials acquired more effectively; and (2) the greater credibility of debate sources enhanced academic soundness.

Students, by and large, agreed that they could analyze both pros and cons of an issue in a more systematic manner. Students stressed thinking beforehand as a learning benefit of the course. New angles of thinking were allowed in the discussion, with more new ideas being thrown out.

Improvements suggested by the students concerned streamlining the logistics, such as ways to improve grouping of students, more guidelines on debating and argumentative writing skills, introduction to the flow of the debate before it

Table 6. Summary of the analysis of the forum postings in Case 4

No. of postings analysed	123
% of postings analysed	100
% of non-substantive postings	2
% of substantive postings	44
% of elaborated substantive postings	54

begins, allowing the students to write longer pieces, and having longer time frames for the writing.

Analysis of Forum Postings

Using the SOLO taxonomy-based classification system described in Case 2, we found over 98% of the postings were substantive comments (presenting new points and clearly explaining positions), and many of the students were able to explain their comments in an elaborated way (e.g., able to quote external fresh information to support their points and linking arguments clearly). The first speakers usually posted the overview of the stance of the group, all of which were new points, and the second speakers of both sides adopted high quality replies in terms of essay articulation, content, and number of proper citations. The online discussions were shown in this sense to be quite genuine and meaningful. In addition, students demonstrated above-average analytical skills in this course assignment.

Case 5: Group Role-Play with Peer Criticism (E-Display)

Introduction

The fifth case involved role-play activities that had both peer- and group-assessment elements. The course was an English language for marketing course for a group of 12 business students. The teacher had been using role-plays to

Figure 9. Design of Case 5
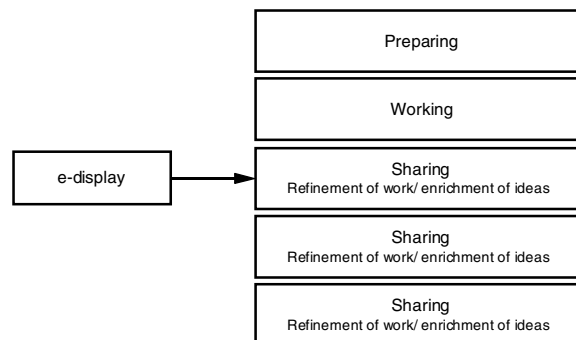
assist teaching for many years already but it was the first time that she had used the Web extensively for a series of role-play activities. Students were asked to roleplay two roles: (1) company with a new product or service, and (2) an Internet marketing company. They needed to complete eight tasks on the Web, including putting up home pages, writing e-mails, writing a press release, designing marketing research questionnaires, and finding Web resources. These activities were all done in groups.

The peer assessment part came from the constant peer feedback in the work the students created because, although each of the groups played two roles, they did not market their own product. Each group had to find another group of students whose product they would sell, and so they constantly monitored the other group's work to check whether their promotional materials were up to standard and suited their needs.

E-display was employed to facilitate the eight role-play activities. The function was mainly achieved by the forum of the site, in which the groups posted up their work as attachments for the teacher and their peers to see. The following diagram shows how the e-display functions helped the presentation of work and the housing of the final versions of the work. Peer comments on the e-tasks, however, were not collected on an online format but were mostly done in class or face-to-face outside class hours.

The teacher believed that the role-play activities would give students realistic practice in how to use the English language appropriately in marketing products. Also, by asking students to monitor each other's work, they would learn more about how to judge the quality of promotional materials and in turn would also produce materials that were of high quality as well. It was further hoped that the Web would facilitate the document exchange mechanism that was deemed critical in view of the complexity of the activity design and the relatively large number of e-tasks involved.

Evaluation Methodology

The evaluation strategies employed included eight end-of-task online student surveys, one course-end online student survey, one end-of-course focus-group meeting with the students, and one course-end teacher survey.

Observed Activity on the Web

E-Display

The students visited the course Web site very often; most of them did this a few times a week or more often. Of the 12 students, 8 claimed that they put up e-tasks onto the site quite often or very often, and 7 of the students reported that viewed the e-tasks of the other groups quite often or very often.

Results from Surveys and the Focus Group

Overall, the students' comments on the whole e-learning experience were positive. They generally thought the e-tasks as a whole helped them learn a great deal about using English for marketing (mean score 3.92 out of 5).

Nearly all of the e-tasks were considered to be quite difficult to do by the students. Some commented that they encountered difficulties in setting up home pages; some said they could not distinguish a press release from a promotional letter; some mentioned the difficulty in writing long questionnaires; some talked about the challenge of writing findings in a report; some had problems drawing graphics and making attractive poster designs. The e-tasks that required them to write e-mails and business letters seemed to be comparatively easier than the other e-tasks.

More uniform opinions were collected about the meaningfulness of the various e-tasks. All e-tasks were regarded as meaningful by most of the students surveyed. One interesting remark concerned with the setting up of a home page in E-task 1. The student remarked that at first he or she thought it was meaningless setting up a home page in an English course but later found that he or she had learned a lot by so doing.

Although the design of the e-tasks emphasized roleplay and peer help, the data collected did not show that students appreciated the feedback they got from their peers; rather, they preferred the feedback they obtained from the teacher. It was thought that more time might be explicitly allocated for student groups to critique each other either in class or online.

Figure 10. Design of Case 6
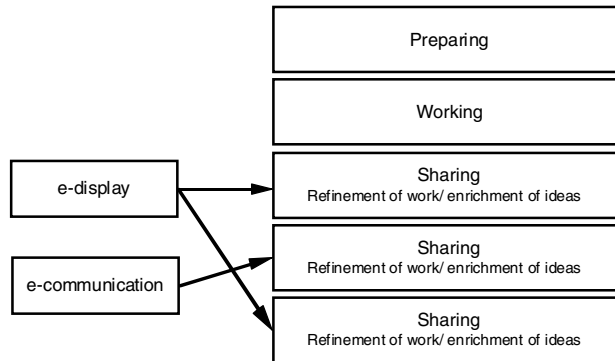
Case 6: Group Multimedia Projects with Peer Assessment (E-Display and E-Communication)

Introduction

The final case was also a combination of both group work and peer assessment. The teacher in this case asked her students to prepare multimedia projects in groups, which she called "Cybernet Shows," for a public health course. The finished projects were supposed to be deliverables that could be viewed online to promote any one of the issues covered in the course. The projects could take the form of a PowerPoint® show, a Web site, or a video strip. The site contained an assignment submission system through which the students posted their multimedia projects for teacher and peer revision. Furthermore, there was a discussion forum for the exchange of comments. Interaction mainly came from the teacher and the students' peer comments on each other's work in the forum.

The project activity took three stages: (1) Students were required to form groups of around 10 students and each group needed to produce and upload a draft Cybernet Show on the course site; (2) these shows were subjected to criticisms and comments from students of a preassigned group in the forum; and (3) students revised the drafts according to both the teacher's and their classmates' comments.

The Web facilitation of this case-based activity was achieved by the e-display and the e-communication functions. The e-display (putting the links to the materials onto the site forum) enabled the students to exhibit their multimedia projects for peer review. The e-communication function (i.e., forum) then enabled exchanges of opinions. Lastly, the e-display function played a role again as the teacher took the time to design an online exhibition page to repost the revised versions of the projects for the class to see at the end of the course (Figure 10).

The teacher aimed to improve creativity and the students' engagement with the subject through the group multimedia project. She expected that the assistance of the Web would facilitate the whole file exchange and idea exchange process, so necessary in this kind of activity design that involved cross-group interactions.

Evaluation Methodology

Data from both the teacher and the students were collected. A course-end student survey with a response rate of 38% (87 out of the 229 students responded) was conducted. Also, a focus-group meeting with eight students occurred. The postings on the forum were also collected and a forum-postings analysis was conducted to gauge how involved the students were in the forum. Average thread length, average postings per students, and the postings' content type (whether the messages contained substantive or nonsubstantive information) were analyzed. On the teacher side, a seven-item teacher survey was conducted. The teacher also made qualitative comparisons with students' work in previous years.

Observed Activity on the Web

E-Display and E-Communication

The site forum was active (the Cybernet-Show-related component was the largest share of the forum). The forum logs recorded 20,170 visits and 10,174

Table 7. Summary of the analysis of the forum postings in Case 6

No. of postings analysed	78
% of postings analysed	100
% of non-substantive postings	13
% of substantive postings	81
% of elaborated substantive postings	6

instances of an article being read. On average then, each of the 229 students paid 88 visits to the various places on the forum and each of them read 44 postings. The e-display function seemed to have operated very well.

The e-communication part, however, was not outstanding. The total number of postings in the Cybernet-Show section of the forum was 133. From this number, several postings need to be deducted—13 posts that were the links of the Cybernet Shows, 3 posts that were self-corrections of errors, and 39 posts that were teachers' comments—leaving 78 peer-review postings contributed by the 229 students in the class. The average thread length on the forum was 2.8, which meant that, on average, one or two replies were given to each leading post. Overall, online peer review was not actively carried out.

Results from Surveys and the Focus Group

Despite the fact that e-communication was not very active, the students still largely confirmed in both the survey and the focus-group meeting that the Cybernet Show on the whole was a good learning exercise. More than 80% of the respondents of the student survey showed positive responses to the statement: "Revising other group's presentation was a meaningful activity that helped my learning." However, participants in the focus-group meeting noted that the instructions for, and the layout of, the forum were quite confusing. Students were confused whether they should give feedback to individuals or to a group as a whole.

The forum-posting analysis generally shows that students were able to give constructive and useful comments to each other. There is still room for improvement, though, on the quality of the comments students give at this peer-revision stage. Although 81% of the postings were substantive comments (presenting new points and clearly explaining positions), few (6%) students were able to explain their comments in an elaborated way (e.g., able to quote fresh external information to support their points).

Students also generally found it helpful to learn to go through the second stage that required them to criticize each other's work. Sixty percent of the respondents agreed with the statement "After the cyber-show activity, I found that I was more willing to and am more able to give critical comments on the work of others." Nearly 80% of the respondents felt that they were now more willing to listen to and accept others' criticism, and they also felt they were able to learn from others' ideas.

As for the third stage of the activity (the modification of the Cybernet Shows based on the comments received), more than 80% of the respondents of the student survey agreed that it was useful to make amendments based on other

students' comments and criticisms. However, the focus-group meeting revealed that not many students did actually modify their shows. Students in the meeting said that they were not motivated to modify their project because the amendments were not marked. Also, there were practical problems in amending their projects. This discrepancy between student-survey data and focus-group opinions shows how important it is to triangulate evaluation data. The reality is that students will not do extra work (even if they acknowledge it could be beneficial), and so it is important for the course teacher to provide sufficient incentive to students.

In general, in both the focus group and the survey, students agreed that the multimedia-project work enhanced their creativity, trained them in a number of important skills (e.g., team-collaboration skills, computer skills, video-filming skills, and analytic skills), and helped them understand more about, and have more confidence in, really promoting public health care. The project also gave students a sense of satisfaction, especially when the deliverable product was finished. The project helped the students to integrate and articulate the course concepts and theories through the process of producing Cybernet Shows. The activity also helped them to associate personal values to the different public health issues. In this sense, the project has enabled students to move beyond application of course material in an academic way into a personalized expression of the material.
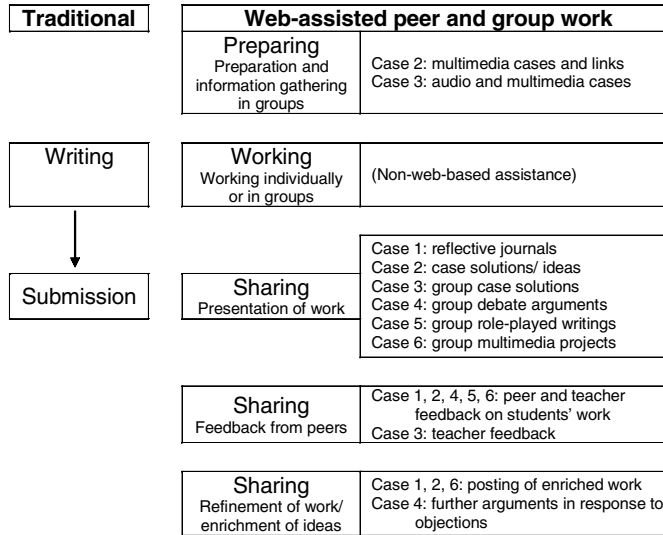
The teacher also reported that she saw more involvement from the students when the task was conducted online compared with the in-class presentations in the past. She also remarked that she saw great improvement on students' work too, perhaps as a result of the fact that the students got more feedback on their tasks when the tasks were online for their classmates' viewing. The teacher remarked that she enjoyed the addition of the Web component to her course and she observed that students got learning satisfaction, too. Apart from the student-student communication required by the Cybernet Show activity, the teacher also remarked that the forum had provided a better channel for teacher-student communication, an aspect she also valued very highly, although measures should be taken to foster a more active use the next time the activity is to run.

Discussion

Accommodating Complexity

The six cases reveal that peer- and group-assessment activities are relatively complex in design. Figure 11 shows that in these six cases more consideration

Figure 11. Complexity of peer and group assessment designs

Traditional	Web-assisted peer and group work	
	Preparing Preparation and information gathering in groups	Case 2: multimedia cases and links Case 3: audio and multimedia cases
Writing	**Working** Working individually or in groups	(Non-web-based assistance)
Submission	**Sharing** Presentation of work	Case 1: reflective journals Case 2: case solutions/ ideas Case 3: group case solutions Case 4: group debate arguments Case 5: group role-played writings Case 6: group multimedia projects
	Sharing Feedback from peers	Case 1, 2, 4, 5, 6: peer and teacher feedback on students' work Case 3: teacher feedback
	Sharing Refinement of work/ enrichment of ideas	Case 1, 2, 6: posting of enriched work Case 4: further arguments in response to objections

has been put into guiding students through the preparing, working, and sharing stages in peer- and group-assessment activities than occurs with the simple write-and-submit type of traditional assignments.

Figure 11 also shows how the six cases had different focuses in the various stages of the activities. For example, Cases 2 and 3 took care to assist students with the preparation stage of the activity by providing case materials and/or other readings on the Web. All the cases designed some form of work-sharing and work-reviewing mechanism. Cases 1, 2, 4 and 6 were even designed in such a way so that the students further reflected on their work and made revisions or enrichments based on the feedback received.

From these six cases, it becomes clear that the Web's strength lies in providing multimedia online materials (e-resources), providing a storage place for student-generated work and ideas, awaiting comments (e-display), and providing an archivable platform for ideas to flow between students in a time- and place-independent fashion (e-communication). This flexibility aids in solving the logistical problem of a complex activity design.

Students mentioned many times the flexibility and convenience of the assistance provided by the Web, and that they enjoyed the peer and group assessment: "I like the process of doing the cyber-show activity. It let us to discuss and co-operate with classmates. Since everyone has [their] own idea and opinions, I can learn and know different views they have on the issues;" "[I like] the interactive

way of learning from comments from classmates;" and "more videos like the scenario of SARS, can make the teaching more interesting."

However, not all is plain sailing. For example, in Case 1, students did not participate in online peer review actively as expected; and, in Case 6, nearly half of the students did not give online remarks to their peers' Cybernet Shows. The use of e-functions do not automatically lead to success. We will take a closer look at each of the three functions and try to identify some factors to success based on the experience of the six cases.

E-Resources

Students' and teachers' feedback towards the e-resources function tends to be, in general, very positive. Its use in the facilitation of peer and group assessment seems to be confirmed. In Table 8 is a summary of the strengths and weaknesses (if any) collected from the Cases 2 and 3 using e-resources. The wide acceptance of the e-resources function is not difficult to understand. Students usually do not object to teachers doing more work!

E-Display

The e-display function is not as popular as the e-resources. As can be seen from Table 9, both strengths and weaknesses were observed from the six cases concerning this function.

The strengths of this function are that in many cases the students actively view the displays and they agreed that viewing their peers' work is helpful to their learning. One main problem concerns the convenience of use. If uploading the

Table 8. Strengths and weaknesses of e-resources

	Strengths	Weaknesses
Case 2	• multimedia cases attract students' attention • animation and videos can show sequences of events and procedures clearly • searching information on the Web convenient – more frequent citations can be seen in students' work	• preparing cases is very time-consuming for teachers
Case 3	• students find audio-enhanced cases helpful • students want more • materials are viewed frequently	• preparing cases is very time-consuming for teachers

Table 9. Strengths and weaknesses of e-display

	Strengths	Weaknesses
Case 1		• participation not good • not easy to post and check messages in WebCT • can add too much to students' workload
Case 2	• achieved a good participation • students posted original ideas	
Case 3	• all students displayed assignments • students considered that reading the work of the other groups is helpful	
Case 4	• students posted their first statements as scheduled • intense attention given to reading postings	
Case 5	• all students posted their work for sharing successfully • students visited the work often	• encountered technical problems making web materials • encountered technical problems in posting materials online • did not generate much peer review
Case 6	• all students' posted work for peer review • revised students' work exhibited online • students viewed their peers' work	• encountered technical problems making web materials • encountered technical problems in posting materials online

materials for display can be made easier, more students will be willing to do this and do this more frequently.

Another major problem concerns workload. This e-component normally adds more work to students' course work rather than simplifying work for them. It is a key issue that teachers should foresee the additional workload brought about by the introduction of any extra online activities. In the case of e-display, there is a danger that students find more materials on display than they can handle. The more successful cases in our study used grouping to help students shortlist the materials and focus their attention.

Table 10. Strengths and weaknesses of e-communication

	Strengths	Weaknesses
Case 1	● teacher found students more eager to talk about their learning difficulties	● few critiques recorded ● not easy to post and check messages in WebCT ● too many journals to read ● lack of teacher's attention
Case 2	1. keen discussion 2. teacher responded and monitored the discussion 3. helped clarification of concepts and ideas 4. improved exam and assignment performance 5. students able to give quality feedback to their peers 6. students considered system effective 7. students considered system convenient	
Case 3		● no feedback from students, only from teacher
Case 4	○ most students preferred web-based debates to face-to-face ones ○ added fun to the routine class teaching ○ ideas on the forum well substantiated with evidence	(a) lacking immediate feedback (b) time-consuming for frequent checking of updates
Case 6	● students generally appreciated peer review	1. not a high quantity of online discussion on their peers' work 2. quality of feedback was not high. 3. instructions and layout of forum confusing

E-Communication

The e-communication function is found to be yet more difficult to use. As can be seen in Table 10, there are cases (2 and 4) where online discussions really worked and brought along benefits, while on the contrary, there are cases (1 and 3) where meaningful and active online discussion just did not happen and students did not enjoy the experience.

The main weaknesses relate to difficulty of use, scarce replies, and lack of immediate responses. The strategies used in the more successful cases to bring

about successful communications included the provision of clear guidelines specifying how, how often, what and when to interact online. Also, when teachers make it clear that e-communication is a required part of the course, then the forum is more likely to be populated. Populating the discussion forum is of utmost importance even if students are forced to do so, in order to get a sequence of discussions rolling. To a certain extent, this suggestion is in opposition to the belief that e-learning should be self-directed and e-communication should be self-motivated. However, judging from the experience reported here, this kind of genuine and active virtual learning space is not fostered easily, especially in places like Hong Kong where there is a limited tradition of e-learning.

The quality of the discussion will improve gradually, when (1) the students are more used to seeking help online; (2) an online learning community is built (Wenger, 1998); or (3) teachers demonstrate the usefulness of online discussion by leading one or a few meaningful discussions on the Web.

Progressive Development

Of course, the need to induct students into any new activity is well-known. Our experiences echo and reinforce those of other practitioners and researchers. Salmon's (2000) five-stage model of (1) access and motivation, (2) online socialization, (3) information exchange, (4) knowledge construction, and (5) ongoing development can be seen quite clearly in our cases. Case 1 had limited success because students did not feel comfortable with this online group; Stage 2 had not been reached. In several of the cases there was clear information exchange (Stage 3) but limited knowledge construction (Stage 4). In none of our cases is there evidence of students taking on independent ongoing development through their own initiatives (Stage 5).

The discussion of the e-communication function, in particular, highlights the importance of group dynamics and participation. This resembles the concept of group processing (Johnson & Johnson, 1989, 2004) which establishes that group members need assistance and guidance on collaborative skills before group work. In the same vein, it is observed here that online peer and group work needs support for the development of online group processing skills.

Both teachers and students are relative novices in the world of online learning. Even students who have spent considerable time online are not necessarily experienced in formal online learning situations. In our six cases, only the teacher in Case 2 was an experienced online teacher and even he was new to online peer review. Staff working in e-learning support need to constantly remember this and refrain from suggesting learning designs that are too ambitious for the teachers and students involved.

The experience of these six cases can now be fed back into future development work with teachers here in Hong Kong. There is no doubt that guidelines developed locally are more persuasive than totally foreign cases. The synergy we see here between our Hong Kong contexts and the reported experience of others elsewhere strengthens our guidelines and affirms our endeavors.

Acknowledgments

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