

This issue of CDTL Brief presents the last instalment of a two-part discussion on the issues surrounding IT-supported Learning Strategies.

The Value of Online Student Peer Review, Evaluation and Feedback in Higher Education

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Since the inception of the World Wide Web and its rapid adoption by the public, business, government and education, research into its use has been constantly outpaced by its exponential growth. Just as architects and innovators of earlier technologies learnt of why and how new technologies worked through trial and further improvements, 'cyberphiles' are discovering the possibilities and inadequacies of Information and Communication Technology as new features emerge. Regardless of the unfolding technical wizardry, while some believe that the underlying principles of learning and cognition do not change with the medium of delivery (Wilson & Lowry, 2000), others argue that in some cases developments in technology have brought new perspectives on how humans learn (Papert, 1980) and new possibilities of expressing cognition such as through simulation and model building (Jonassen, 1995).

To date, much of the teaching and learning through information technology has focused on scripting presentations and providing pre-programming responses to limited user input. However, this 'Online Tutorial' design approach has never been very effective at supporting activities for critical thinking. Addressing these levels of cognitive processing demands a nuance in identifying user input and a level of sophistication in creating meaningful feedback that is best exemplified through human communication, or even computer-mediated human communication. Computer-mediated communication (CMC) has great potential in promoting the relationships necessary to support and expand one's knowledge and the challenge is to design CMC-enhanced learning activities that support strategies aimed at eliciting reflection, critical thinking and debate.

One approach is to involve students in the revision, evaluation and feedback process of correcting online assignments, i.e. online peer assessment. However, some have criticised the use of non-traditional assessment methods such as peer assessment for being: (a) less rigorous than traditional forms of assessment; (b) too demanding, putting unreasonable pressure on some students; (c) not reliable since people other than the lecturers are involved in it; and (d) not necessarily fair due to student biases.

In response, proponents like Bostock (2000) believe that "Student assessment of other students' work, both formative and summative, has many potential benefits to learning for the assessor and the assessee". He points out that peer assessment encourages student autonomy and higher order thinking skills, and although he is aware of the weaknesses of peer assessment, he trusts they can be avoided with anonymity, multiple assessors, and tutor moderation. Furthermore, Bostock points to internet technology and its potential to assist in the management of large numbers of students.

One example of an online peer review and assessment system is the Criterion Peer Review™ (CPR) program developed at UCLA, USA, by Orville L. Chapman and Michael A. Fiore. This program, first introduced in 1999, incorporates an integrated set of 'digital tools' that manage the review process, analyse student input and prepare reports for both instructor and student (Chapman, 2001). CPR assignments engage students in correcting short essays on a specific topic. After electronically submitting their respective essays, students then read and assign a score to three 'calibration' essays: one calibration essay is an exemplar written by an expert; the other two are

documents containing misconceptions, omissions, and errors. To clarify students' understanding of the issues and to correct any misconceptions that they might have, CPR provides extensive feedback in the assessment of the calibrations.

After the calibration exercise, CPR assesses each student's performance, and if the performance is inadequate, the student receives further instruction. Students must repeat the calibration satisfactorily before being allowed to continue. From these practice exercises, students achieve competency as reviewers before being assigned to read and score three anonymous peer essays, as well as their own. Finally, the program generates a report, showing the reviewer's comments and scores.

Another example of an online peer review and assessment system is OASYS. Developed at the University of Warwick, UK, by A. Bhalerao and A. Ward (2001), OASYS not only marks multiple-choice questions (MCQs) automatically, but also subsequently controls the anonymous distribution of free response answers amongst learners for peer assessment. A hybrid system combining MCQ testing with free response questions, OASYS was designed to address the inadequacies of current computer-assisted assessment systems that limit the testing format to MCQ because marking for free response answers cannot be easily automated.

Bhalerao and Ward explain that their Computer Science classes are "...increasingly using supervised practical programming sessions rather than seminars to reinforce problem solving". As such, with 240 first year undergraduate students, approximately 1000 scripts need to be marked and commented on before the next lab session that is usually in a week's time. Of course some of the questions seldom have unique answers, and providing timely feedback is critical.

Believing that without the human element in the assessment processes, the quality and validity of the assessment is reduced, Bhalerao and Ward proposed a "...system which exploits the efficiency of electronic document handling whilst achieving the quality of feedback that can only be given by humans". Using anonymous electronic distribution, each script is marked multiple times, increasing the validity of the marks. A monitoring feature allows tutors to view the

variability of the marks given to each script and if the variance is high, indicating disagreement between the assessors, the script is highlighted for moderation by the tutor.

So what is the value of online student peer review, evaluation and feedback? Is learning how to assess someone else's work a practical skill for future engineers, doctors, lawyers and so forth? Considering that higher education institutions ultimately favour the implementation of learning activities that challenge learners to provide evidence of analysis, synthesis and evaluation skills necessary for effective critical thinking, and that these activities involve the sharing and communicating of the learners' perspectives, it is therefore imperative that learners engaged in these activities receive timely formative feedback. It is important that students corroborate or dispute their constructed knowledge before misconceptions take root. However, with the high student-to-teacher ratios in many tertiary education environments of today, how well can this be done? Online student peer review, evaluation, feedback, critique and debate need to be examined more closely in order to establish rules and guidelines to maximise their potential.

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ICT-supported Learning Strategies and Learner-centred Instruction

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This paper aims to provide a brief overview of how two unrelated developments, the ever-evolving technological advancements and a paradigm shift in education, have

combined together to form a new approach to learning (i.e. from instructor-led to learner-centred instruction) and highlight areas of synergy between the two developments

in transforming education via the deployment of ICT (information & communication technologies).

Impact of technological developments on education

The emergence of both ICT and technological tools of multiple capabilities have increased the possibilities of using technology as a powerful medium of delivery, instruction and communication (Lim, 2000c, 2001). The convergence of technologies offers not only easy access to vast online teaching and learning resources, flexible life-long learning and educational opportunities, but also new ways of interaction and communication as well as building online learning communities.

Traditionally, courseware has been built in huge structures with intertwining content, making it difficult to isolate sections of the content for searching and re-purposing. With technical innovations in developing reusable learning objects, courseware content can now be separated into database-driven objects and centrally stored, searched, retrieved and re-assembled according to the learners' needs and requirements (Barrit & Lewis, 2001; Mow, 2002). This trend of learning object development is well suited for supporting learner-centred instruction.

Paradigm shift from instructor-led to learner-centred instruction

To meet demanding workplace requirements, learners must firmly grasp the fundamentals of their discipline and develop a range of skills that is highly valued by employers. These skills include teamwork, construction of new knowledge, multidisciplinary problem solving, communication, life-long learning, self-assessment, change-management, and a familiarity with technological developments.

However, traditional modes of didactic instruction, which treat students as passive learners and the instructor as the sole provider of information, are no longer adequate in providing learners with the necessary skills. For effective instruction and learning, learners must be actively involved in and be more responsible for their own learning (Lim, 2000a, 2001; Felder, 2000; Lim, *et al.*, 1999). This poses a compelling shift of roles for instructors and learners: instructors now function as facilitators/resource persons and learners are self-directed and autonomous, independently managing and monitoring their own learning (Abdullah, 2001; Clifford, 1999).

Learner-centred instruction focuses on learning rather than on teaching, paralleling learner-centred psychological principles that emphasise the active and reflective nature of learning and learners (American Psychological Association, 1997). Learner-centred instruction moves from teaching learners to facilitating learners to learn.

Deployment of ICT-supported learning strategies in learner-centred instruction

Today, educators face two major challenges: (a) they must manage the paradigm shifts of roles and practices in learner-

centred instruction; (b) they must learn and adopt appropriate online learning technologies in their teaching practice to help them achieve their educational goals. Consequently, some ways in which online learning technologies are capable of supporting a learner-centred learning environment are outlined below.

The proliferation of web-based technologies has enabled the quick production of online lectures and other learning resources. Besides being a delivery medium for easy access and download of materials, online technologies are also capable of providing varied, meaningful learning experiences through the careful planning, designing and structuring of learning tasks, activities and support.

1. Online learning activities

Online learning activities are tasks and problems used to engage learners (Oliver, 2001) by providing opportunities for learners to actively construct their own understanding of content (Laurillard, 1993). Learners assume much responsibility for their own learning: they are able to determine where, when, how fast and what they learn and in what sequence. In this 'unstructured' learner-centred learning environment, learners set their learning goals, create their learning paths by selecting and assembling learning objects, as well as monitor their own progress. Online learning activities that are capable of supporting learner-centred instruction include:

- By incorporating concepts, problem statements, reference sections and a variety of tools, online technologies are capable of supporting and enhancing problem-based learning processes (Lim, 2002, 2000b).
- Participation in online debates requires learners to assume an active role so that they are able to reflect on their own perspectives and those of others.
- Project work to be completed online by teams promotes active participation within a learning community.
- Apart from being able to disseminate information to learners, online technologies can help in research. For instance, instructors may refer to useful online learning resources, pose provoking/thoughtful questions through email/discussion boards, and provide opportunities for the construction of knowledge, self-reflection and self-assessment.

2. Online communication and interaction

Online communication provides excellent opportunities for learners to exchange, share and brainstorm ideas, discuss issues as well as engage in problem solving and critical thinking, independent of time, distance and location. Consistent interaction, via online communication between instructor and learners and among learners over learning issues, is cited as the most essential component of any successful web-based course (Lim, 1998). ICT makes possible two modes of online communication and interaction:

- Asynchronous or delayed-time communication (e.g. email, listserv, newsgroups and discussion boards) is basically text-based and can be conducted anytime, anywhere. Such flexibility enables reflection and critical thought before any posting is made.
- Synchronous or real-time communication takes place via chat rooms, electronic whiteboards, audio conferencing, video conferencing, file and application sharing, and live e-learning/virtual classrooms. With improved network bandwidth and more capable conferencing tools, real-time communication is gaining popularity in complementing asynchronous interaction.

Both modes of communication are well suited for learner-centred instruction in promoting knowledge construction and creating online communities for collaborative learning (Coomey & Stephenson, 2001; Oliver, 2001; Lim, 2001, 1999). Instructors can capitalise on the capabilities of online technologies to design group-learning activities (e.g. peer assessment, collaboration and interaction) and promote self-directed learning. However, a wealth of literature indicates that for any type of online interaction to be successful, it must be carefully structured into the course as learners will not automatically participate in group discussions, debate, or answer the questions posed online (Coomey & Stephenson, 2001; Oliver, 2001; Lim, *et al.*, 1999; Lim, 1998; Laurillard, 1993).

3. Online learning support

Online learning support is an integral part of the online learning process in guiding learners and providing feedback (Coomey & Stephenson, 2001; Oliver, 2001). In learner-centred instruction, learners direct and control various aspects of their learning (e.g. learning outcomes, choice of group members), with instructors in the background providing advice and general guidelines on resources and procedures. Various means of online learning support include:

- Learning guides (e.g. generic ones on study and research skills or specific guides on how to complete a particular online course).
- Online mentors and buddies who facilitate, coach or guide learners through the course.
- Online personal learning portfolios (e.g. learners' journals, personal learning logs) to promote self-reflection (a critical component of learner-centred instruction).
- Online public learning portfolios to encourage peer review and feedback on each other's work.

Conclusion

The current shift from an instructor-led to a learner-centred learning environment can be well supported by the concomitant development and proliferation of online technologies and tools. The effective deployment of ICT-supported learning strategies calls for good practices in

designing and structuring learning tasks and activities that promote active involvement of learners, and also provide support and feedback for self-directed learning. If the use of technology is to be maximised, the dominance of the instructor-led approach to instruction must be challenged.

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A Study Investigating the Impact of Web-enhanced Learning on Student Motivation

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Background

In the last decade or so, educationists have used Information Technology (IT) in the classroom to help motivate students to learn, and are aware that with IT, education will change dramatically (Kearsley, 2000). This paper outlines a research study I undertook to investigate the extent to which a combination of face-to-face teaching and online learning motivated a group of second year students at Temasek Design School (Temasek Polytechnic) to learn Language and Communication (L&C). 22 second year students from the Apparel Design and Merchandising (AD&M) Course at Temasek Polytechnic's Design School were chosen for this study.

The L&C programme, which combined face-to-face teaching with online learning (also known as web-enhanced learning), lasted from July 2001 to February 2002. The online programme was developed using the software, Blackboard. Lessons were organised such that about half the lesson time was spent in class and the other half in the computer laboratory where students could do the online assignments.

The classroom sessions were devoted to going through the course notes and addressing any problems that arose during the online classroom. For the online component, I directed students to interesting and informative websites that they could visit to get more information about the topics dealt in class. I also posted extra notes on creative and critical thinking tools that I felt would help them to do their L&C projects. Mini online exercises that would give students the opportunity to apply these tools were also set; on average, students were given one online exercise every other week. In addition, students were encouraged to participate in discussion forums that were set up to

facilitate a spontaneous exchange of ideas amongst students.

Data for the research study was gathered through online focus group discussions. The data gathering took place from 2 January 2002 to 30 April 2002.

Key research findings

A number of significant findings emerged from the study. 100% of the students found online learning as a fresh, interesting and enjoyable mode of learning. Students regarded certain features of Blackboard to be particularly appealing, such as the discussion forums, which allowed them to share their views about topics related to L&C with their classmates.

The greatest draw of online learning is the flexibility it allows (Jolliffe, Ritter & Steven, 2001). The research subjects also cited this as an advantage, stating that what had attracted them to the online learning mode was the flexibility and convenience it afforded: with Blackboard, most students found that they could learn L&C anytime, anywhere. One student reflected thus:

“Previously, a fixed time was allocated to us to discuss the given topics and do the set assignments...which I feel was very unconstructive because mornings are not the best time for me to think. Rather, I am the kind who works and thinks better at night. Therefore, the time given to us during L&C served very little purpose, as I feel forced to do L&C assignments. Blackboard allows me to answer questions at times that I feel most at ease, which also means that I will spend more time on this subject.”

There was further evidence to show that the majority of the students surveyed were more motivated to learn L&C after the introduction of web-enhanced learning. Of the 22 students surveyed, only two stated that there was no difference to the time they spent on L&C before and after the introduction of web-enhanced learning. The rest mentioned that they had spent more time doing the L&C assignments after they started the online learning via the Blackboard. Most of the students seemed to have spent more time participating in the discussion forums, as they wanted to find out what their classmates had to say about the different forum topics and to contribute their views at the same time.

What was gratifying to know was that students did not merely participate in the forums because it was fun to do so, but actually thought through their ideas and read what others had to say before responding online. They became more critical and reflective. As one student said,

“I do spend more time giving my opinions to the questions posted. If you were to give them to me during lessons, I might just do them in a hurry and hand them up. But with online learning, I do give more thought in writing my views.”

What was surprising was that some of the students continued to contribute to the discussion forums even though the L&C subject had completed its run for the academic year and students had gone off for their internship programme. Many took the opportunity to share and give moral support to their peers who were not enjoying their internships or who were having a difficult time.

The sample group of students also felt that since the introduction of web-enhanced learning in L&C, there had been greater participation among the group. They noted that even the quiet ones who rarely spoke up in the classroom were willing to express their views through the online forums. As noted by Palloff & Pratt (2001), such students feel liberated in the ‘faceless’ online classroom and are more inclined to participate. One of the quieter students in class admitted: “Through Blackboard, I can convey my thoughts more freely and the immediate effect of being condemned is lowered.” She also felt that the online forums enabled her to clarify her views if they had been misunderstood and that she need not be overwhelmed by criticisms of her views. This might have been a problem in the traditional classroom context.

Finally, since the introduction of Blackboard, students seemed to have also taken a more active interest in L&C. Some students indicated that they had started reading more and referred more frequently to the L&C lecture notes.

Despite all these positive views students had about online learning, many were quick to point out that they would not want this subject to go totally online. Students felt that this might lead to the loss of the lecturer’s personal touch.

Conclusion

With the positive feedback from the students who participated in this research study, there is a possibility of opening this form of web-enhanced learning to more students who might stand to benefit from this mode of learning.

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