

Impact of online training materials in a first year undergraduate course

Peter Gibbings

University of Southern Queensland, Toowoomba, Australia
Peter.Gibbings@usq.edu.au

Abstract: Students studying university courses in the off-campus (distance education or external) mode may be at a disadvantage to on-campus students since they don't have the benefit of face-to-face instructions. Furthermore, they don't have the opportunity to participate in formative assessments that are often delivered informally in lectures. This may lead to feelings of remoteness and isolation leading to poorer learning, lower results in assessments, and may also contribute to drop out rates, particularly in first year courses. To overcome this inequity, the usual training materials presented for a first year course in 2005 were supplemented with PowerPoint lectures, enhanced with synchronous audio, and a series of quizzes to be used as formative assessments. The lectures and quizzes were presented online via a course web site and were designed to become an integral part of the learning experience. The effectiveness of these enhanced materials was evaluated by surveying the users. Outcomes of the survey indicate that the enhancements to materials facilitated improved students' learning, contributed positively to the learning experience, increased enjoyment of the course, and were a strong motivator. Off-campus students reported feeling less disenfranchised with the university and having a greater affinity with the lecturer, both of which should help increase first year retention rates. The information presented in this paper will be of benefit to others designing online teaching and learning activities.

Keywords: Breeze, quiz, online

Introduction and Background

Since beginning operations in 1967, the University of Southern Queensland (USQ) has developed an international reputation for offering high quality academic programmes. The university's principal campus is situated at Toowoomba, approximately 130 kilometres west of Brisbane, Australia. At USQ, students may elect to study in the on-campus (internal), off-campus (external), or online delivery modes. Approximately seventy-five percent of USQ students choose to study off-campus.

The Faculty of Engineering and Surveying (FoES) is one of five Faculties at the USQ. Students may study within different FoES disciplines: Agricultural, Civil and Environmental Engineering; Electrical, Electronic and Computer Engineering; Mechanical and Mechatronic Engineering; and Surveying and Land Information. Students may also be studying at Associate Degree (two year), Bachelor of Technology (three year), Bachelor degree (four year), or double degree (five year) levels.

The Surveying and Land Information discipline offers a single spatial science program with two majors: Surveying, and Geographic Information Systems (GIS). Students in this discipline study a number of courses that are common to both majors, with the remainder comprising professional courses specific to their major study area.

Case Study

One common first year course for the Surveying and Land Information Discipline, introduced in 2005, is 'Introduction to GPS (SVY1110)'. This course is also offered as an elective to students from other disciplines and faculties. In 2005, 26 students enrolled in the internal mode and 100 students enrolled in the external mode of the course. Only 12 of these students were not from the Surveying and Land Information discipline.

All external students enrolled in SVY1110 were supplied with a study package, which included an Introductory Book that contained course specifications and assignments, and a Study Book containing instructional materials. Internal students were expected to purchase the same materials. This information was supplemented with a dedicated web site published on a course management platform that included:

- general announcement messaging and electronic mail boxes,
- facilities for students to download teaching materials such as PowerPoint lectures, tutorials, and practical exercises,
- online quizzes and student surveys,
- online discussion utility to facilitate and manage text discussions (including functions such as topics, threads, and messages),
- synchronous chat facility,
- electronic assignment submission,
- access to past and sample examination papers,
- links to useful information on the internet, and
- ancillary services such as operating instructions, help, and support.

Courses at USQ normally use WebCT Vista ©™ platform for these functions. The communication facilities, in particular the discussion boards, allow students to 'learn collaboratively' (Dillenbourg, 1999, p. 7) and to 'socialise' (Ragan, 1999) in the subject field. It also provides the all-important contact between the examiner and students (Ragan, 1999), but the platform cannot completely replace the interaction that takes place during the traditional on-campus instruction.

As the external students do not have the benefit of face-to-face lectures, in 2005 some of the PowerPoint lectures that were used for internal lectures in SVY1110 were enhanced with animations and synchronous audio and offered on the web site. The audio is the voice of the course examiner (a photograph is also displayed) explaining concepts that are simultaneously being displayed on the PowerPoint slides and synchronised to match the slide animations. This presentation is therefore similar to what might be experienced in an on-campus lecture. The slides and audio operate automatically, but the student does have some control through the pause, replay, and navigation facilities. Macromedia Breeze plug-in for PowerPoint (Macromedia Inc. and Adobe, San Jose, CA) was used to produce these presentations. Figure 1 shows an example of a Breeze presentation with the speaker's photo in the top left hand corner, a list of slides beneath this for navigation, and the main slide display area on the right hand side.

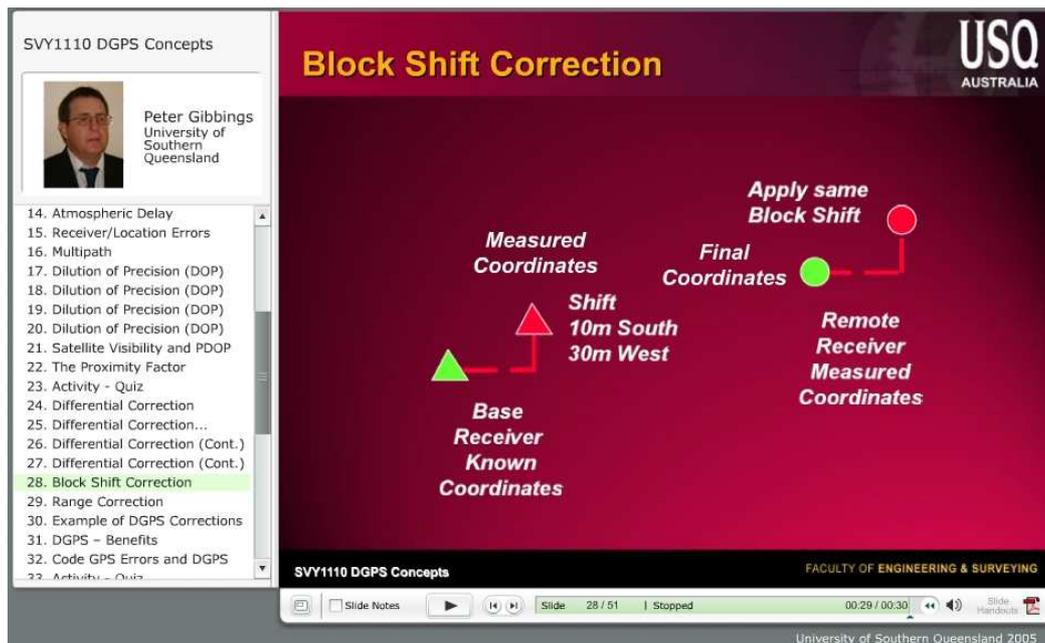


Figure 1: Example of breeze PowerPoint presentation screen

Students view the Breeze presentations through a web browser on their personal computers. Some potential problems that may be experienced when using slow modems are overcome by using video streaming technology. Although the presentations were introduced to SVY1110 mainly to assist external students, internal students also found them a helpful supplement to the traditional on-campus teaching and learning activities as either a second viewing or for those occasions when they could not attend the lecture.

It was believed that by introducing these enhanced presentations, external students would have learning processes improved; would feel less alienated; would consider the lecturer (examiner) was more approachable; and would feel a greater sense of belonging to the university. The presentations may consequently have the added advantage of helping to address the declining retention rates for first year students. It is recognised that the discussions area in the course web site may also be of assistance in this regard, though statistics show that students enrolled in SVY1110 in 2005 were more likely to use the Breeze presentations than the discussions area.

To complement these presentations, an online quiz was prepared for each module of study in the Study Book. These quizzes were formative assessments and comprised questions relating to the particular study module, and were intended to be used throughout the course as recommended by Reushle et al. (1999) to encourage students to reflect on their own learning needs and to provide a feeling of competence and personal control.

Several types of questions were used including multiple-choice, matching pairs, true/false, and short answer. Students were able to immediately check their graded quizzes against the correct answers and thereby learn from their mistakes, or reinforce that they had grasped the concepts. Since these assessments were linked to learning objectives and provided instructive feedback, they were designed to become an integral part of the students' learning process (Isaacs, n.d.). An example of a question depicted in Figure 2 shows feedback to the quiz question at the bottom of the screen.

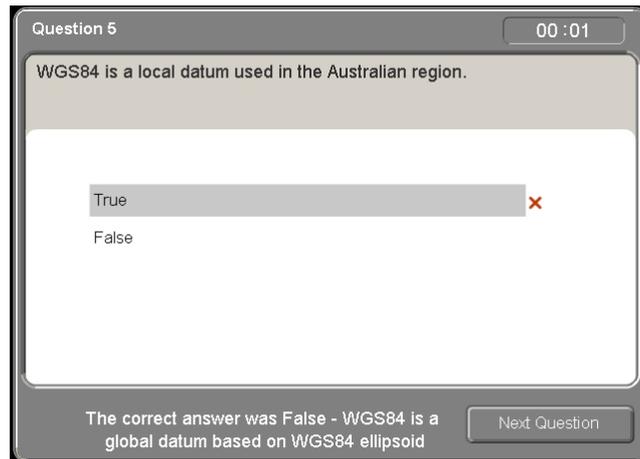


Figure 2: Example of an online quiz question

Advantages of the online quizzes were that students could do them at any time (since they were not part of the summative assessment for the course):

- they could be done more than once,
- they were designed to provide immediate feedback to the student on correct or incorrect answers, and
- summary statistics were provided at the end of the quiz so students could monitor their own progress.

Educational research (Ruhl, Hughes, & Schloss, 1987) suggests that short (10-20 minutes) information sessions, followed by engagement in short activities such as these online quizzes that reinforce the information presented, is a proven way to ensure effective delivery of educational materials. It has also been recognised that the receipt of feedback and the opportunity to reflect on this feedback, as provided with the quizzes, are important components of effective teaching and learning (Laurillard, 1993).

The apparent pedagogical and other advantages of the online quizzes and Breeze PowerPoint presentations used in SVY1110 need to be verified. The aim of this paper is to assess students' impressions of the effect these enhancements had on their learning and general experience in the course.

Method

Students enrolled in SVY1110 in 2005 were asked to complete a student survey in the form of an online questionnaire presented on the course web site immediately after the semester had finished and before the final examination in the course. Students' answers and comments were stored electronically and entered into a spreadsheet for analysis. All enrolled students were notified by e-mail of the existence of the questionnaire and encouraged to participate in the survey. An announcement, alerting students to the questionnaire and encouraging participation, was also placed on the web site so that it would automatically appear on screen to everyone who entered the site.

The first part of the questionnaire involved an assurance that all information was anonymous and that students' responses would not be linked to individual details. Attitudes and perceptions with respect to the Breeze presentations and online quizzes were measured by seeking responses to various suggestions in the questionnaire. Responses were selected from

a five point Likert scale (Matell & Jacoby, 1971) ranging from 'strongly agree' to 'strongly disagree'.

In 2005, 35 responses were received, which represented approximately 28 percent of the students enrolled in the course. Of these, 10 were internal and 25 were external students. Not all respondents answered all questions so there is some disparity in the total number of respondents to different questions. Although a request to complete the questionnaire was sent to all students, it is recognised that the results may not necessarily represent the general consensus of the entire student population in this course. This is because the results may be biased due to the fact that those who responded to the questionnaire may also be those most likely to be using the web site and online materials. These students may have a predisposition to using online materials, and may therefore be more likely to use the Breeze PowerPoint presentations and online quizzes, and may have a preference to this style of learning. Nevertheless, the results are considered valid for the purpose intended and will provide some useful insights into the value of the Breeze presentations and online quizzes.

Results and Discussion

It is not appropriate or relevant to provide full details of questions and responses in this paper. Instead, student responses to selected questions are presented and analysed to draw conclusions on the usefulness of the materials under review.

Breeze Enhanced PowerPoint

As expected, most respondents preferred the online Breeze presentations to normal print materials. Figure 3 summarises responses to the suggestion: *The Breeze (animated with voice) lectures communicated information more clearly than print materials.*

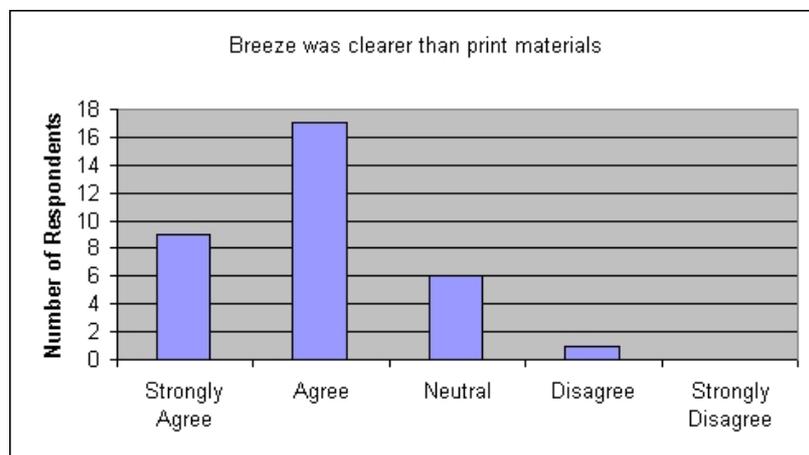


Figure 3: Breeze preferred to print materials

In general, the publication of PowerPoint lectures (even without audio) on the web site was well received. Responses in Figure 4 refer to the suggestion: *The PowerPoint presentations of lectures on the course web site communicated information clearly.* Eighty-two percent of students agreed or strongly agreed with this proposition.

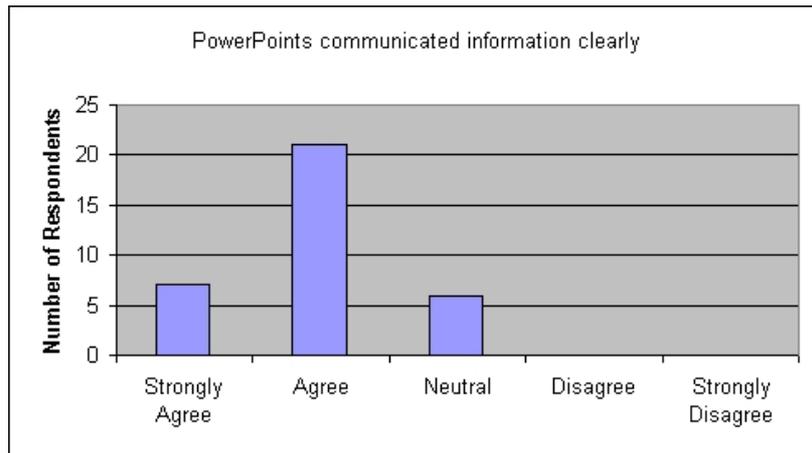


Figure 4: PowerPoint presentations communicated information clearly

The addition of synchronous animation and voice to poor quality PowerPoint presentations may well be a useless exercise. Therefore, the results shown in Figure 4 are important because they show that the presentations are of good quality before any enhancement. The addition of synchronous animations and audio was preferred to the normal PowerPoint lectures. Figure 5 summarise responses to the suggestion: *The Breeze (animated with voice) lectures communicated information more clearly than the normal PowerPoint without voice.*

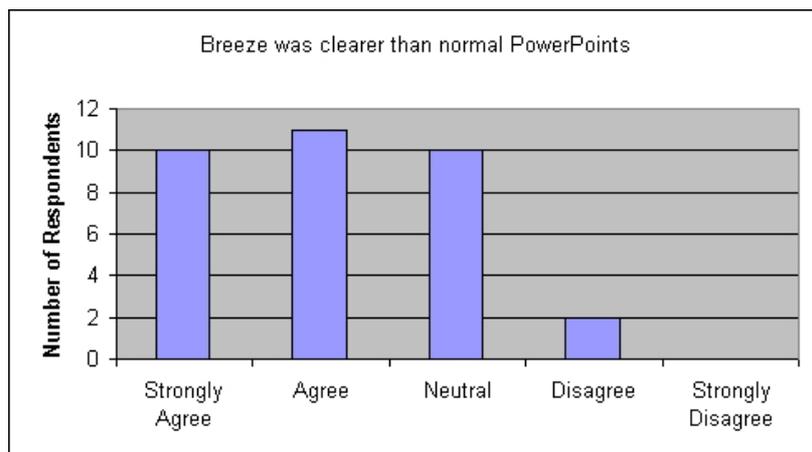


Figure 5: PowerPoint better with synchronous animations and audio

An obvious reason why students would prefer the Breeze presentations is that they helped them understand the materials being presented, particularly complex concepts that may benefit from a detailed verbal and graphical explanation rather than trying to learn the concepts from print materials. This assumption was tested by asking students to respond to the assertion: *The Breeze animations and voice aided my understanding of difficult concepts in this course.* Results are shown in Figure 6.

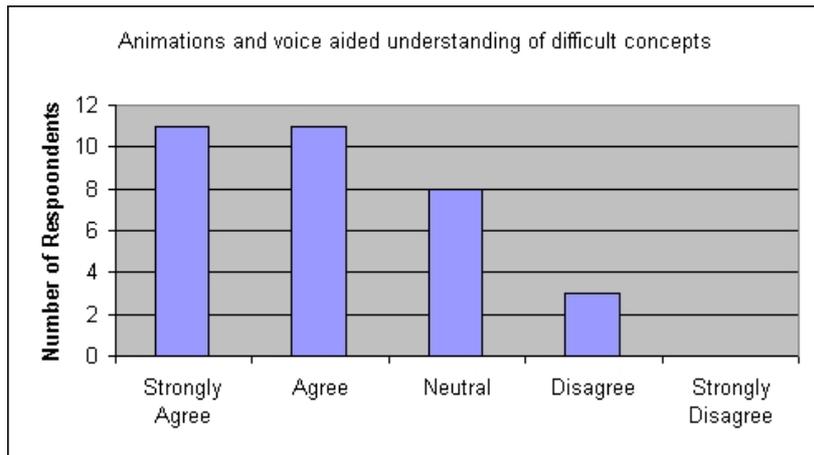


Figure 6: Breeze aided understanding of difficult concepts

Introducing these presentations enhanced students overall experience in the course, possibly because they felt less alienated, and more able to relate to the lecturer since they could now see his picture and hear his voice. This view is supported by responses to the suggestions: *My overall learning experience in this course was enhanced by the Breeze presentations*, presented in Figure 7; *My learning experience in this course was made more enjoyable by the Breeze presentations*, presented in Figure 8; and *I felt a greater affinity with the lecturer and did not feel so isolated in this course compared to others that do not have Breeze presentations*, presented in Figure 9.

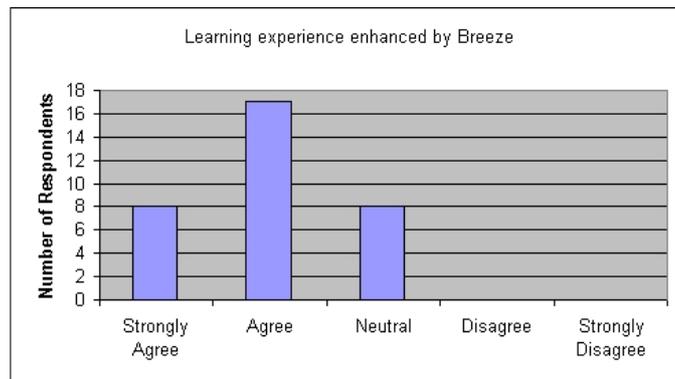


Figure 7: Breeze enhanced overall experience in the course

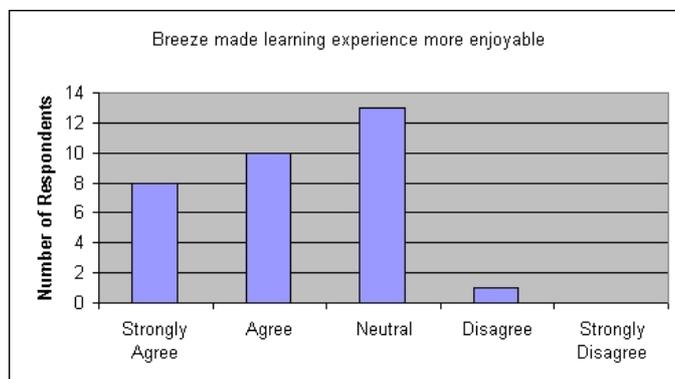


Figure 8: Breeze increased overall enjoyment of the course

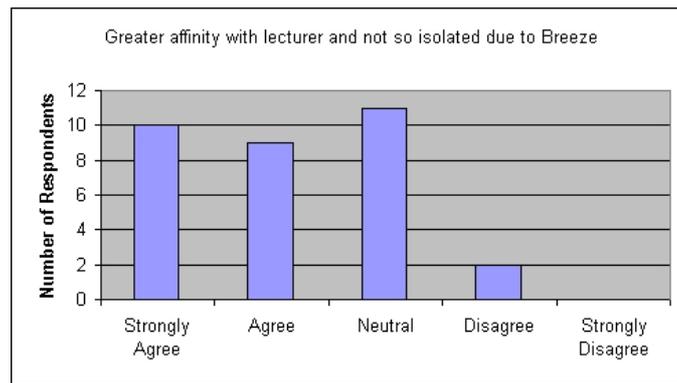


Figure 9: Breeze increased affinity with lecturer and decreased isolation

It is expected that this increased enjoyment of the learning experience may help convince students that they can successfully learn in the external mode, and thereby help increase the first year retention rate. Feeling less isolated should also contribute to the students' engagement within the greater university community and increase their sense of belonging. Because students felt a greater affinity with the lecturer, they should consider the lecturer more approachable if they have any problems in the course.

Students were also asked to provide comments on the overall impression of the Breeze presentations. Responses include:

- *Added a human touch to the learning experience*
- *They gave an added dimension to the presentations which helped being an external student.*
- *An excellent tool to complement the other printed course material. I gained a better understanding of concepts from both the visual and audio content, and then referring to the printouts/study book.*
- *Helped to clearly explain what was not fully understood in the text. Would be great to have these for more subjects. Especially when studying externally.*
- *The presentations are excellent because topics are talked about with the use of diagrams, and you can stop and start the presentation whenever you need to. When reading the information straight from the book, you can sometimes get lost in the terminology and then have to read it over again. Trying to read and make sense of it yourself takes a lot longer than someone explaining it clearly in a presentation.*
- *Hearing the words from the lecturer is great! Helps with concentration and gives you a better understanding, wish every course had it!*

From these comments it can be concluded that the Breeze PowerPoint presentations have significantly compensated external students for the lack of face-to-face lectures.

Online Quizzes

Students expressed the opinion that the online quizzes were of great benefit to their learning, and that they much preferred the online presentation of the formative assessment to print versions offered in similar courses. Responses to the suggestion: *The online self assessment quizzes helped my understanding of each module*, are shown in Figure 10; and *The quizzes are more effective online than if they were presented in the study book*, in Figure 11.

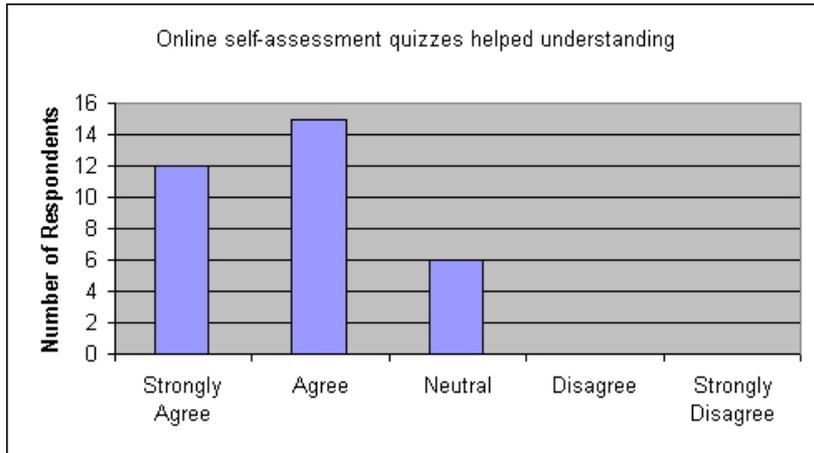


Figure 10: Quizzes helped understanding

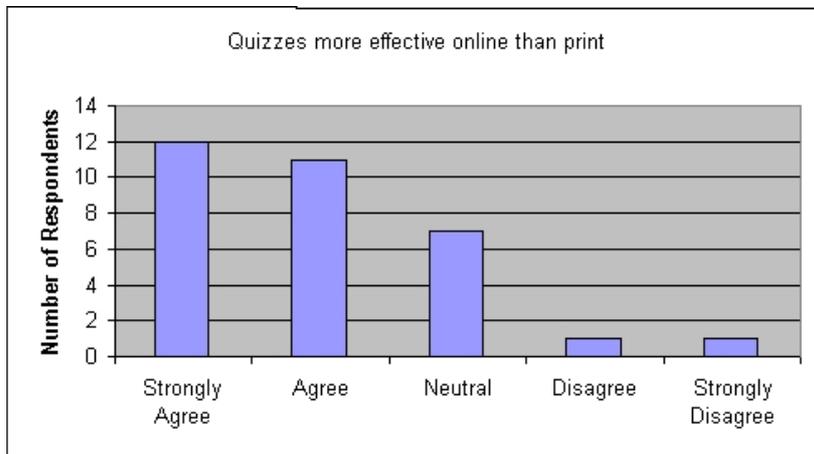


Figure 11: Online quizzes more effective than print

Again, these results must be treated with care since, as explained previously, these students may already have a predisposition to online learning. From a student perspective, perhaps unfortunately, one of the main focuses is on passing the assessment items rather than on what they learn. Responses to the proposition: *The quizzes helped me study for the final exam*, presented in Figure 12, indicate that the quizzes were of great benefit in preparing for the final summative assessment.

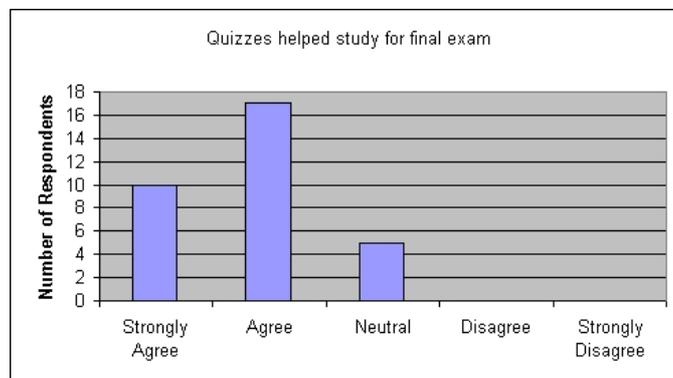


Figure 12: Online quizzes helpful for exam study

Figure 2 provided one simple example of how feedback is provided to students during the assessments. The ability to try a question and receive immediate feedback on an incorrect answer allows the student to learn from their mistakes as well as providing a useful gauge of their current knowledge level. Anecdotal evidence from informal discussions with students indicate that the ability to carry out the formative assessment, get immediate feedback, take necessary remedial action, and redo the assessment at a later time, were important aspects of the quizzes. This feedback or ‘*trial and error*’ is considered by Savin-Baden (2004) and Acar (2004) to be an important part of learning. This is supported by responses (Figure 13) to the assertion: *The summary statistics at the end of each quiz were helpful for me to gauge my understanding of the materials.*

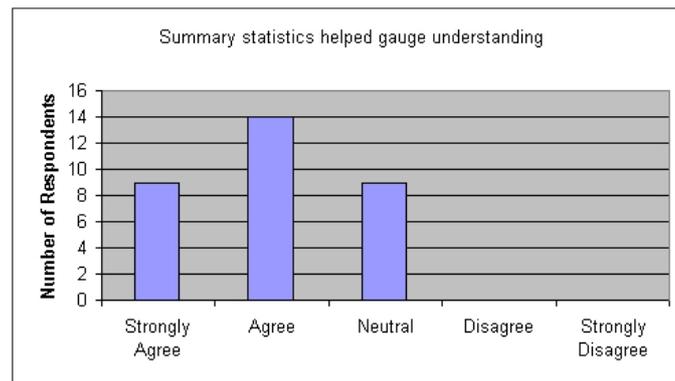


Figure 13: Summary statistics helped gauge understanding

Comments were sought from students on their overall impression of the online quizzes. The following responses indicate that the quizzes became an integral part of the learning process:

- *Quizzes were useful to keep me focused on some of the learning outcomes. A useful tool requires interaction rather than the potential to read passively and not really take it in.*
- *I thought these quizzes were good at ‘filling in the gaps’.*

It is well accepted that adult learners prefer to take some control of what and how they learn. Some form of learner independence is particularly important to external students and appropriate mechanisms to facilitate this should be a key consideration for designers of teaching and learning activities for these students (Reushle et al., 1999). If this happens they will be more likely to become ‘engaged’ in the teaching and learning activities they perform (Heimbecker, 2005) and outcomes will be improved as a result (Knowles, Holton, & Swanson, 1998). Evidence of this engagement, and the use of the summary statistics by students to monitor their own progress in the course, is demonstrated by the following comments:

- *They gave me a quick and succinct summary of my current course knowledge. More questions would have been ideal.*
- *I used these quizzes at the beginning of the term and also the end. It was a great way to check how my general knowledge of the topic areas is going.*
- *They were good to gauge where you were at for a subject and sometimes with some questions they helped answer any doubts.*
- *The quizzes are an excellent tool to help test your knowledge of each module.*

Since the quizzes were linked to course and module learning objectives, they provided a measure of the achievement of learning goals. This was valuable information for external students to monitor their progress and, if necessary, adjust their learning strategies. Students

appreciated the immediate feedback and the ability to reflect, undertake extra learning, and then go back and try the formative assessment again in a manner similar to Biggs' 'retrospective quality assurance' (Biggs, 2002):

- *The instant feedback on the areas where you are strong or weak helps to define where to concentrate more study time & effort.*
- *Good as they provide a chance to test knowledge and give the answer straight away.*
- *It is a quick and easy way to test yourself and be given feedback immediately.*

Student motivation can be a critical ingredient to successful learning (Knowles, Holton, & Swanson, 1998). At USQ most students studying in the external mode do so because they are already employed in some capacity in industry, and external mode allows them to study and work at the same time. This obviously places great demand on their time so motivation and inspiration for these students can be difficult at times. Accordingly, the most important comment of all from the student survey may be: *They provide good motivation.*

Conclusion

This paper reported students' opinion of the effect Breeze-enhanced PowerPoint presentations and online quizzes had on their learning experience and general impressions of a first year university course. It was found that the enhanced materials made a positive contribution to their learning experience and anecdotal evidence suggests this has led to improved students' learning. Most importantly, the material enhancements were well worth the resources invested since they were reported to be a strong student motivator, led to a better learning experience and improved student participation. Off-campus students reported feeling less disenfranchised with the university and having a greater affinity with lecturer, both of which should help increase first year retention rates.

References

- Acar, B. S. (2004). Analysis of an assessment method for problem-based learning. *European Journal of Engineering Education*, 29(2), 231-240.
- Biggs, J. (2002). *The Reflective Institution: Assuring and enhancing the quality of teaching and learning*. Hong Kong: Learning Teaching Support Network Generic Centre.
- Dillenbourg, P. (Ed.). (1999). *Collaborative Learning: Cognitive and Computational Approaches*. New York: Pergamon.
- Heimbecker, B. (2005). Changing ourselves: A gaze in the mirror. Retrieved 1 November, 2005, from <http://www.lupinworks.com/ar/changing/bh.html>
- Isaacs, J. (n.d.). *Assessment for Learning*. Brisbane: University of Queensland (Teaching & Educational Development Institute).
- Knowles, M. S., Holton, E. F., & Swanson, R. A. (1998). *The Adult Learner* (5th ed.). Houston, Texas: Gulf Publishing Company.
- Laurillard, D. (1993). *Rethinking University Teaching: A Framework for the Effective use of Educational Technology*. London and New York.: Routledge.
- Matell, M., S., & Jacoby, J. (1971). Is There an Optimal Number of Alternative for Likert Scale Items? Study I: Reliability and Validity. *Educational and Psychological Measurement*, 31(3), 657-674.
- Ragan, L. C. (1999). Good teaching is good teaching: An emerging set of guiding principles and practices for the design and development of distance education. *CAUSE/EFFECT*, 22(1).
- Reushle, S., Dorman, M., Evans, P., Kirkwood, J., McDonald, J., & Worden, J. (1999, 5-8 December). *Critical elements: Designing for online teaching*. Paper presented at the ASCILITE99 Responding to Diversity: 16th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education, Brisbane, Queensland: QUT.
- Ruhl, K. L., Hughes, C. A., & Schloss, P. J. (1987). Using the pause procedure to enhance lecture recall. *Teacher Education and Special Education*, 10, 14-18.
- Savin-Baden, M. (2004). Understanding the impact of assessment on students in problem-based learning. *Innovations in Education and Teaching International*, 41(2).