

# Just in time teaching revisited: Using e-assessment and rapid e- learning to empower face to face teaching



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Today's educational technologies allow an educator to more readily develop quality digital teaching and learning materials. By also integrating regular formative e-assessment into these learning objects, using a new generation of assessment technologies, lecturers can obtain a better understanding of the needs and knowledge students bring to the classroom, and can adjust their lecture plans accordingly 'just in time'.

Keywords: formative assessment, just in time teaching, rapid elearning

## Just in time teaching and formative assessment

The 'Just in Time Teaching' (JiT) approach to higher education was first put forward a decade ago (Gavrin & Novak 1997, Novak et al. 1998, Novak et al. 1999), offering as its principal innovation the implementation of a web-based weekly formative assessment strategy, designed to provide the lecturer with an advance indication of students' readiness for an upcoming face-to-face session.

Prior to each of these sessions, students were distributed a small set of questions intended to lead them into the topic under discussion and to assess their preparedness to deal with it. (See for example *JiT URLs* 2004 and *Example JiT WarmUp Exercises* 2007). Students were required to submit electronically their responses to these questions some 12 to 24 hours before the face-to-face session. The idea was that these responses would enable the lecturer to see where the students in the class were situated with respect to the topic under discussion, and to make corresponding adjustments to the forthcoming class. The face-to-face session would then be sensitive to both the needs and strengths of the students, rather than being a set piece designed by the lecturer; hence the 'Just in Time' title of the approach.

## Interactive lecturing

Novak et al also strongly advocated an 'interactive lecture' approach for the face-to-face sessions. 'Interactive' in this context meant two main things. Firstly, there should be a proper integration of the results of the student pre-class activity into the face-to-face discussion; consideration of that pre-class work should not just be bolted on to the session as a preamble or postscript but should play an explicit and pivotal role in the discussion (Novak et al. 1999, pp61-64). Secondly, the lecture should include periods designated for collaborative group learning, where small groups of two to four students worked together to solve problems, aided by the instructor as required.

## Adoption and evaluation

JiT has not received widespread take up in the tertiary sector, nor has it yet been subject to extensive scholarly evaluation. There are reportedly just a few hundred academics globally delivering JiT programs (*JiT Adopters* 2004) and only a few peer-reviewed studies of it have appeared in the literature (eg. Caprariis, Barman & Magee 2001; Marrs, Blake & Gavrin 2003). While most of these studies provide generally favourable evaluations of the approach, albeit with caveats about the set up time that a JiT implementation might require (Cashman & Eschenbach 2003), their conclusions are perhaps not yet underpinned by appropriately rigorous methodologies (Linneman & Plake 2006).

## Transformative potential

The JiTT framework appears to have major transformative potential in respect of face-to-face delivery in higher education, providing for a more collaborative and interactive approach to face-to-face teaching. It is situated clearly within a constructivist framework, for example, in respect of its emphasis on formative assessment as an integral part of the learning process (Holt and Willard-Holt, 2000), and the importance it places on the instructor-student dialogue associated with this assessment (Brooks & Brooks 1993). More generally it would appear to be a strategy worth trialing in the quest for approaches to higher education teaching and learning that are more student-centred and that more effectively blend face-to-face and asynchronous online activity. We believe therefore that the approach is worthwhile pursuing, to the point where proper evaluations are able to be made.

## Technological developments

There are two crucial technological issues for the facilitator adopting a JiTT approach: a capacity to readily and flexibly generate teaching and learning material, and an ability to conduct reliable and readily interpretable online assessments.

The SCORM (Sharable Content Object Reference Model) compliance of LMS's (Learning Management Systems) and other e-assessment tools, such as found in applications like *Articulate* and *Raptivity*, have made just-in-time assessment more viable. SCORM provides for answers to quizzes and other feedback from the learner to be manipulated by LMSs and reported back to the lecturer in easy-to-read summary and graphic form. This allows for the teacher to quickly manage the feedback from larger numbers of students. We now have the technology to "farm" quality feedback from a learner and to transmit it back to the teacher just in time to allow the results to be integrated into face-to-face teaching.

Rapid elearning is particularly popular in the corporate sector as it enables subject matter experts (SMEs) to create and deliver elearning content quickly and inexpensively. Tools such as *Articulate Presenter* and *Adobe Captivate* enable subject matter experts to generate learning objects quickly from standard *Powerpoint* files on their desktop. It allows for audio and/or video narrated content to be packaged with well designed interactive and feedback mechanisms, such as *Flash* interactions and quizzes. All this can be delivered smoothly on the web using *Flash*. This provides us with a powerful means for shifting of content broadcasting out of the face-to-face teaching session, and a quick and efficient way of creating, delivering and managing material.

## The law experiment

Recently at the University of Adelaide the Centre for Learning and Professional Development worked with the Faculty of Law to trial a JiTT approach to a lecture. This involved the repackaging of a portion of the standard lecture in the form of a rapid elearning presentation, packaged up with a Flash delivery tool from a narrated Powerpoint source file. The learning design was for only 8-10 minutes duration of "lecture" or broadcast before a multiple-choice quiz was to be taken. The quizzes were managed through the university LMS, an implementation of *Blackboard*, and the responses returned to the lecturer in the form of tabulated figures.

343 students were involved and an evaluation was carried out. 77 students completed a survey and 66% either agreed or strongly agreed that:

- The preparatory lecture material was stimulating
- It was useful to hear what others students thought about the issues
- Viewing content prior to attending the lecture improved my engagement with issues discussed
- They would like to attend similar style lectures in the future.

There were numerous positive statements such as "The online lecture was really cool, and during the lecture, on Tuesday, it actually felt like we were putting into practice what we had learnt. Also it was cool how you had overheads with the survey results so that we could see other students' perspectives. I have to say that this was the best lecture I have been to so far".

The lecturer commented that the process had highlighted a significant misconception 30% of the students misunderstood a point of law that was crucial to the development of the topic under discussion, and that she was able to adjust her teaching plan in order to address it. The lecturer also said that obtaining the

information from the assessment energized her presentation and that although it seemed to be a lot of work she thought it was worth it. She commented that she believed preparation would get easier as she developed greater familiarity with the method.

## Conclusion

The Just in Time Teaching framework appears to have transformative potential in respect of face-to-face delivery in higher education, providing for a more effective use of the web for distribution of broadcast content, and a more collaborative and interactive approach to face-to-face activity, better informed by an understanding of students' readiness to tackle the topic under discussion. Technological advances make implementation of JiTT more viable than when the approach was first developed almost a decade ago, and should provide a clearer platform for the much needed scholarly evaluation of the effectiveness of the framework in respect of improving learning outcomes.

## Bibliography

- Brooks, Jacqueline Grennon & Brooks, Martin G. (1993). *In Search of Understanding: The Case for Constructivist Classrooms*. Association for Supervision and Curriculum Development: Alexandria, VA.
- Cashman, Eileen M. & Eschenbach, Elizabeth A. (2003). Using On-Line Quizzes Outside the Classroom to Increase Student Engagement Inside the Classroom, *American Society for Engineering Education, Conference Proceedings, Pacific Southwest Section*.
- de Caprariis, Pascal, Barman, Charles & Magee, Paula (2001). Monitoring the Benefits of Active Learning Exercises in Introductory Survey Courses: An Attempt to Improve the Education of Prospective Public School Teachers. *Journal of Scholarship of Teaching and Learning*, 1(2), 13-23
- Example JiTT WarmUp Exercises (2007).  
<http://serc.carleton.edu/introgeo/justintime/examples.htm> [viewed 30 August 2007]
- Gavrin, A. & Novak G. (1997). Web Enhanced Physics with Just-in-Time Instruction. In *Case Studies in Information Technology*, National Research Council: Washington, D.C.
- Holt, D. G. & Willard-Holt, C. (2000). Lets get real – students solving authentic corporate problems. *Phi Delta Kappan* 82(3).
- JiTT Adopters (2004). <http://134.68.135.1/jitt/adopters.html> [viewed 30 August 2007]
- JiTT URLs (2004). <http://134.68.135.1/jitt/jitturls.html> [viewed 30 August 2007]
- Linneman, S. & Plake, T. (2006). Searching for the Difference: A Controlled Test of Just-in-Time Teaching for Large-Enrollment Introductory Geology Courses. *Journal of Geoscience Education* 54(1).
- Marrs, K. A. , Blake R. E. & Gavrin, D. (2003). Web-Based Warm Up Exercises in Just-in-Time Teaching. *Journal of College Science Teaching* 33(1).
- Novak, G. M., Patterson, E. T., Gavrin, A. & Enger, R. C. (1998). Just-in-Time Teaching: Active Learner Pedagogy with WWW. In J. Gil-Mendieta & M. H. Hanza (Eds), *Proceedings of the IASTED International Conference on Computers and Advanced Technology in Education (CATE '98). Cancun, Mexico*. IASTED/ACTA Press: Anaheim, Calgary, Zurich.
- Novak, Gregor M., Patterson, Evelyn T, Gavrin, Andrew D. & Christian, Wolfgang (1999). *Just-In-Time Teaching: Blending Active Learning with Web Technology*. New Jersey: Prentice Hall.

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