2006

Impact on Student Learning From Traditional Continuous Assessment and an E-Assessment Proposal

Seibu Mary Jacob
Swinburne University of Technology Sarawak, Malaysia, sjacob@swinburne.edu.my

Biju Issac
Swinburne University of Technology Sarawak, Malaysia, bissac@swinburne.edu.my

Yakub Sebastian
Swinburne University of Technology Sarawak, Malaysia, ysebastian_swin@yahoo.com

Follow this and additional works at: http://aisel.aisnet.org/pacis2006

Impact on Student Learning From Traditional Continuous Assessment and an E-Assessment Proposal

Seibu Mary Jacob, Biju Issac
Swinburne University of Technology Sarawak, Malaysia
sjacob@swinburne.edu.my
bissac@swinburne.edu.my

Yakub Sebastian (Student)
Swinburne University of Technology
Sarawak, Malaysia.
ysebastian_swin@yahoo.com

Abstract

Is learning for assessment an inevitable outcome of assessment for learning? We plan to investigate on this – by showing the effects of traditional continuous assessment modes we have implemented, and inviting student opinions on an e-assessment proposal which was virtually tested in a university setup. Student's perceptions are checked in the case of traditional continuous assessment techniques vs. non continuous assessments and the effect tallied with the coursework marks obtained for two groups of students. Also classroom assessment vs. e-assessment options were posed to students who were exposed to the proposed e-assessment option and comments invited. In each case, the reasoning behind the choice of assessment and associated learning strategies are probed into. The e-assessment is proposed to implement continuous assessment especially for large classes and also as a medium to invoke a positive learning approach through the feedback mechanism available on the e-assessment tool. A simple algorithm is also proposed for essay e-assessment scoring.

Keywords: Continuous assessment, E-assessment, Learning approach, Student Learning

1. Introduction

There is seen a constant tug of war between assessment for learning and learning for assessment. There has been growing interest in raising the standard of assessment with the learner and learning in mind. The potential of formative assessment to encourage deeper engagement with learning and to enhance autonomy and motivation has been glorified. An extensive review of the literature by Black and Williams reveals that formative assessment is a progressive force in learning. Following this, the Assessment Reform Group proposes that the technical terms 'formative' and 'diagnostic' assessment should be replaced with 'assessment for learning' (Assessment Reform Group 2001). Studies (Torrance & Pryor 1998; Ecclestone & Swann 1998; Ecclestone & Hall 2002; Bloomer 1997; Grenfell& James 1998; Hodkinson et al. 1996; Reay & William 1999; Pollard & Filer 1999; Ball et al 2000) suggest that different assessment systems have an important impact on learning identities and dispositions in students in an increasingly long life of formal learning. The present review intends to explore Entwistle's (1991)

finding that the student's perception of the learning environment determines how he learns and not necessarily the educational context in itself. If full understanding of student learning is the purpose of our educational research and practices, then the reality of student experiences can't be neglected. As educators have observed, student learning is related to evaluation practices. The intention that we have is to present a review of student's perceptions about assessment in line with their learning strategies, which we believe will make a marked contribution to our current understanding in the field.

Hornby (2003) details on the fourfold purpose of assessment: formative, to provide support for future learning; summative, to provide information about performance at the end of a course; certification, selecting by means of qualification; evaluative, a means by which stakeholders can judge the effectiveness of the system as a whole. But isn't this list omitting another powerful role that assessment can have, on effecting what students learn and especially how they learn? Gibbs (1999) has hence suggested that if students see assessment as the curriculum, effective teaching needs to use this knowledge, in order to use the power of assessment strategically to help students learn. Biggs (2002) echoes the same fact when he says that students learn what they think will be assessed rather than what is in the curriculum.

2. Assessment and Student Approaches to Learning – Historical Review

As educators, actively involved in evaluation practices, we would argue that student's learning is very well influenced by assessment. The student's notion about learning and studying determines the manner in which he tackles evaluation tasks. Conversely, the learner's experience of evaluation and assessment determines the way in which he approaches learning (K.Struvyen et al 2005).Assessment can thus be looked upon logically and empirically as one of the defining features of students' approaches to learning. (Entwistle & Entwistle 1991; Marton et al 1997; Ramsden 1997).

Three approaches to learning are identified in the context of student perceptions of learning.
Surface approach, which is an intention to complete the learning task with little personal engagement, seeing the work as a forced external imposition. This is often associated with routine and unreflective memorization and procedural problem solving, with restricted conceptual understanding being an inevitable outcome (Entwistle & Ramsden 1983; Trigwell & Prosser 1991; Entwistle et al. 2001).In contrast, deep approaches to learning, originate from an intention to understand, to active conceptual analysis and if, carried out thoroughly, generally result in a deep level of understanding. This approach results in high quality learning outcomes (Entwistle & Ramsden 1983; Trigwell & Prosser 1991). Strategic or achieving approach to learning, where the student's intention was to achieve the highest possible grades by using well organized and conscientious study methods and effective time management (Entwistle & Ramsden 1983; Entwistle et al 2001).The interesting fact here is that student approach to learning is quite dynamic, rather than statically restricted to one of the above. These changes in approaches are not easily and usually noticeable, rather subtle changes. This is because the learner modifies his approaches based on the actual context and tasks he is experiencing. The Swedish Research Group of Marton and Saljo (Marton and Saljo, 1997) is in the forefront of

research on the relation between approaches to learning and assessment. They conducted a series of studies in which they tried to influence the students towards a deep approach to learning by indicating how to go about with learning. The studies revealed that the students' perceived assessment requirements have a strong relation with the approach to learning a student adopts when tackling an academic task (Saljo 1975; Marton and Saljo 1997). Students often explained surface approaches or negative attitudes in terms of their experiences of excessive workloads or inappropriate forms of assessment. Yet varying the assessment questions may not be fully enough to evoke deep approaches to learning (Ramsden 1997).A notable conclusion from the studies is that it seems easy as well as difficult, in different senses, to influence the approach students adopt when learning (Marton 1976; Saljo 1975).

3. Students' Perceptions on Assessment Techniques

We attempted a case study in a university setup to look into the students' perceptions on assessment techniques and the reasoning behind the same. The objective was to look at why students learn in the way they do in terms of the possible influence of particular evaluation methods on students' approaches to learning. The relevant questions were: What do students think about continuous vs. non continuous assessments, traditional classroom vs. e-assessments? How do they experience these assessment modes? Why do they favour some? A total of 153 students from four subjects in Engineering and Business degree streams participated in the study from a university. A questionnaire containing closed and open questions was the instrument distributed to the participants.

3.1 Continuous vs. Non-Continuous assessments

Continuous assessment was preferred over a single assessment by a 78% majority. Easiness to study for small topics and hence being able to score good marks easily were the popular reasons for the preference, as shown in figures 1 and 2, rather than the fact that it would result in the mastery of the topics.
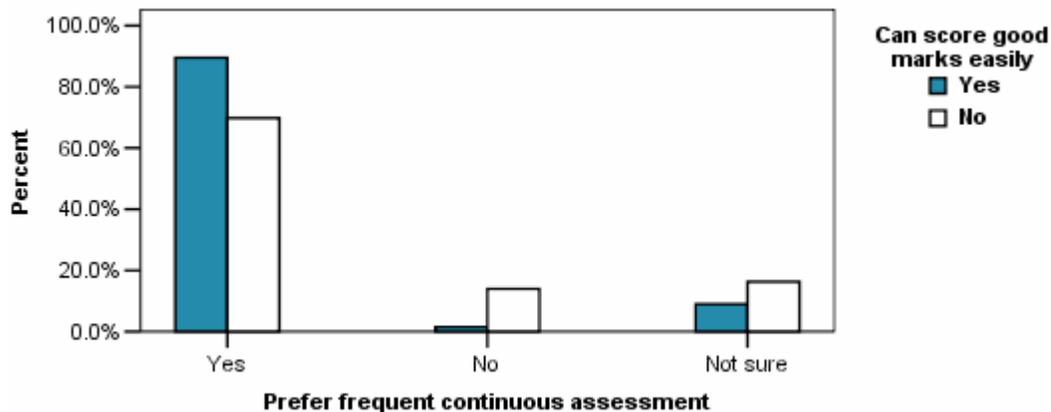

Figure 1: This shows the student preference for continuous assessment on the basis of scoring good marks.
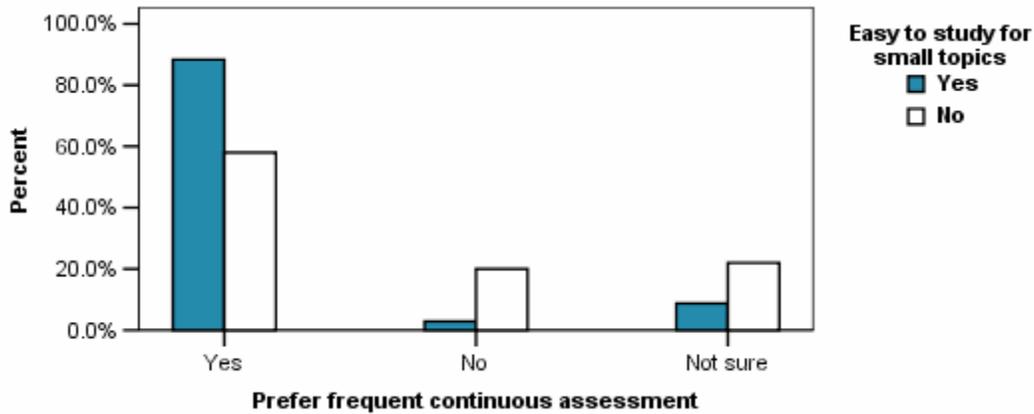
Figure 2: This shows the student preference for continuous assessment on the basis of easiness to study for small topics.

For subject 1, the comments from students in favour include: The course work marks can be better because of the weightage given to each of the continuous assessments. This helps to build a stronger foundation as one move from one topic to the other. It would force one to learn throughout the semester. The comments against continuous assessments include: Too many assessments robs one's time to learn other subjects. Frequent assessments keep you on the revision mode all the time, no relaxation. For subject 2, the comments from students in favour include: Gives one more chances to score over the semester, so less worries. The comments against continuous assessments include: Even a single assessment is fine as long as the lecturer provides with proper feedback. For subjects 3 & 4, the comments from students in favour include: It forces one to learn topics properly before going to the next topic. Each topic is given emphasis through the continuous mode of testing. This assessment technique is good for a person who has poor memory to recollect so many topics. The students in this group didn't comment much negatively. Regarding the learning facilitation, students voiced that Continuous assessment helps to check on learning and that learning happens in steps, not just for the final exams. Does this point to the learning strategy adopted by the students? They seem to need a check on their learning through tests, which they prefer in small units. But the reasoning behind this, as we saw earlier, was not to master the topic as such, but just to make sure that their scoring was helped. Among the open comments received in favouring a series of continuous assessments over a single assessment were: It gives one more chances to improve one's coursework score. The course work grades of category 1 and category 2 subjects are analyzed. The grades fall into three categories-A (Low Achievers scoring less than 50%), B (Medium Achievers scoring between 50 and < 75%), C (High Achievers scoring more than75%).
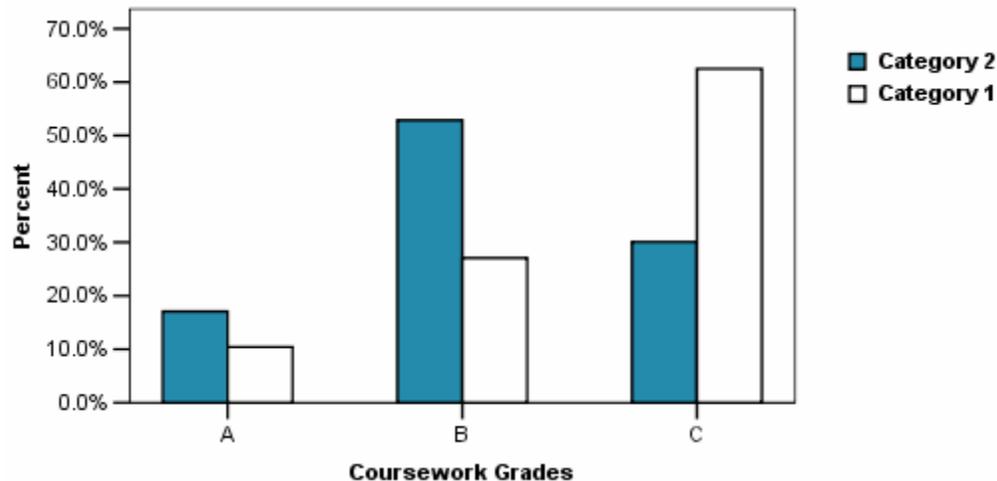
Figure 3: This shows the distribution of grades among the Category 1 & Category 2 students. Category 1 students show a majority of High Achievers.

The graph in figure 3 shows a clear distinction between Category 1 and 2. Category 1 which follows a series of continuous assessments produces an enviable majority of High Achievers. Category 2 students seem to be a high chunk of Medium Achievers. Also a comparative higher number of low achievers fall under Category 2. Category 1 grades clearly show a negatively skewed distribution while Category 2 grades are fairly normally distributed. Is the power and influence of coursework evident here? In continuous assessments as assignments, students are supposed to search for and synthesize information on the basis of its relevance to the given assignment. They are then required to structure the information in order to present a reasonable response to the question. It is reasonable to assume that students will learn through doing such tasks, provided it is structured in a way to encourage a deep approach to learning. We are conveying the wrong message if students perceive assignments in the course work as artificial hurdles to cross over in their quest for a degree. Such perceptions of students encourage a strategic approach to their studies, and let them resort to plagiarism, cheating and using 'Rules of the Game' or ROGs (Norton et al 2001). ROGs are an indication that students perceive a hidden curriculum where tutors say they want certain things in the assessment task.

3.2 Class room vs. E-assessments and E-assessment Proposal
The term 'e-assessment' is used with reference to a system of e-assessment which was tested in the university through the Black Board Learning System (BBLS). The Blackboard Learning System is a comprehensive and flexible e-Learning software platform that delivers a complete course management system with a customizable institution-wide portal with online communities. E-assessment is a proposal we intend to suggest to facilitate continuous assessment, especially in the context of large classes where manual intervention by the lecturer becomes tedious. These would be on-screen assessments where the learner completes the e-assessment task at a computer. This particular system is widely used in the particular university with regard to uploading learning materials, options of Discussion forums, online tests etc. There are various

options for the creation of online tests-multiple choice, fill up the blanks, open ended questions etc. The proposal is to implement a series of continuous assessments through the Black Board Learning System alongside the usual classroom test (which can also contribute to the internal marks for the subject). The time for the test can be preset such that students can't have access to it after the set time. The test scores are viewed immediately along with the detailed feedbacks. E-learning submission procedures can be also be used, like the option of digital drop box in BB to evaluate assignments. To show the extensive usage of the BB system in the university, the bar chart below in figure 4 shows one semester's (14 weeks) daily usage statistics of the Online Black Board Learning System for one of the subjects considered in the survey. There are about 90 students enrolled for the subject. Figure 4 shows that online learning is quite popular with students.
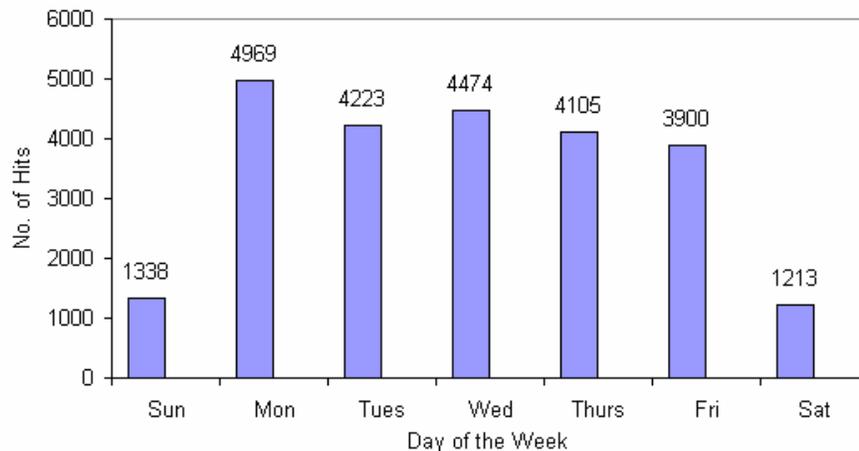

Figure 4: This shows one semester (14 Weeks)'s daily usage (hits) statistics of the Online Black Board Learning System in the University for one of the subjects of the study.

Amelung, Piotrowski and Rosner (2006) stated the underlying belief behind their e-assessment proposal for computer science education. Referring to the freedom of teaching, they believe that teachers should be "liberated from avoidable administrative work, so that they are free to concentrate on teaching and tutoring." Implementing e-assessment technology is the proposed way to achieve this form of liberation. They also pointed to the benefit of immediate feedback given by the online multiple choice tests. In addition to that, teachers can access statistical report, providing an overview of performance of all students in the tests. We also suggest the advantage of electronic multiple-choice tests which offers lower costs of deployment and provides greater flexibility of timing and location. This is particularly important with respect to continuous assessment where assessments will be carried out frequently.

A Java online test that was created is taken as a sample to demonstrate the feasibility of e-assessment. This test consisting of 6 multiple choice type and 4 true false type questions were introduced to the students. Once the Java online test link is clicked, the screen in figure 5 below appears. The online assessment can be created using the options as shown in the test canvas in figure 5. There are many types of questions to choose from like – Multiple Choice, True/False, Multiple Answer, Ordering, Matching, Fill in the blank. These questions can be given scores. As we key in the question, we can add details

for correct answer and feedback. Feedbacks can be set for correct answer and incorrect answer. Once the Multiple Choice is chosen from the options shown in figure 5, we get a screen to input the question and answer details. Consider the format of a typical question with feedback details. The details given under correct feedback will appear when the correct answer is chosen and that under incorrect feedback would appear when the wrong answer is chosen. The lecturer has all the freedom to customize the answer and the feedback details in accordance with the level of students he is teaching. As an example, for a weak class he can add more details into the feedback section that could help in the student learning. But a general rule of thumb, it's always good to give detailed explanations in feedback sections. As the students decide to take the test, a screen appears for them to preview the assessment and to select the right answer. The test can be set to single or multiple attempts. Completion can also be forced with options of time limit etc. so that the student needs to finish the test within a stipulated period of time.
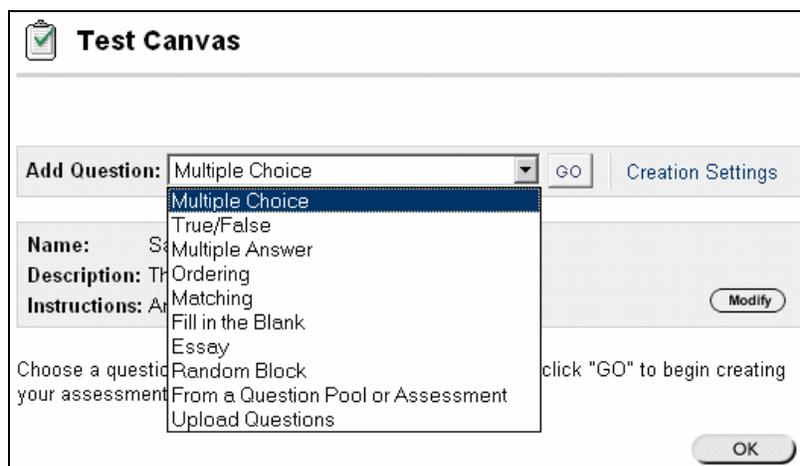

Figure 5: The Test Canvas gives the option to create test as Multiple Choice, True/False, Multiple Answer, Ordering, Matching, Fill in the blank which can be given scores. Essay type Tests can be created without scores.

Once the online test is done, the review is presented to the student as follows in figure 6. This is the most important part. Here they can see their scores for each question and a detailed feedback. One of the main problems in student learning is the delay with which the student is able to get access to the right answer for a question. Or in other words, in traditional assessments or tests, there is always a delay in getting the right answers back to the students after the assessment is done. This is because the lecturer has to take all the answer scripts and manually mark them, which obviously takes time. But the fact of the matter is, this 'feedback delay' slows down the learning process in the student. So what if we have a technology that helps to disperse immediate and detailed feedback to the students, once the assessment is done? That is rightly provided by Black Board Learning System and the proposal we make here, illustrates that.

Figure 6: Review Assessment Screen. This shows the final score and the detailed and immediate feedback on the answers, explaining it to the students. The detailed feedback for the first question is shown.

As explained before feedbacks or comments can be appended along with the closed ended questions, to help student understand his position of learning and to lead him to the answer sequentially as well as to challenge him further to the next stage of reading/understanding. This option would facilitate immediate feedback as they choose answers for the closed ended questions. The students involved in the survey were exposed to this mode of tests. From the survey responses, 80% of the students chose e-assessment through the BB as their choice of assessment over the conventional classroom assessment. But there were comments like the possibility of computer crashdowns, power failure regarding the negative side of e-assessment. And 87% among the above supportive majority has given immediate feedback as the reason for their choice, as shown in figure 7. See figure 8 for the rating of feedback availability on Blackboard.
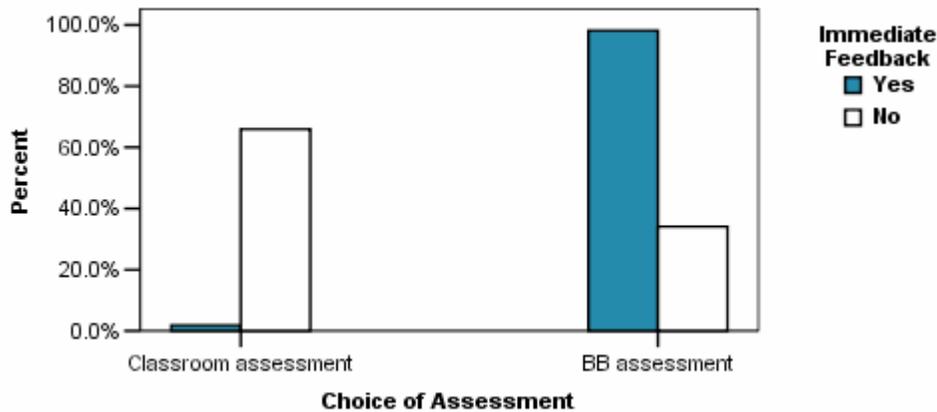
Figure 7: This shows the percentage distribution of students who have chosen immediate feedback as the major reason for choice of e-assessment compared to classroom assessment.

The other reasons for the choice of e-assessment were the absence of the rigid classroom setting, easiness to use and flexibility in attempting the test. Among the students in favour of e-assessment through the BB, the responses were 50-50 towards whether feedback helps in focusing on the learning objectives. This points to a lack of clarity among the students about learning objectives and the role that feedback can play here. But a very heavy number voiced out that the feedback option is helpful to measure their strengths and weaknesses. The relevant open comments in favour of e-assessment were: The method promotes self initiative and motivation. Immediate feedback after each question helps in immediate clarification.
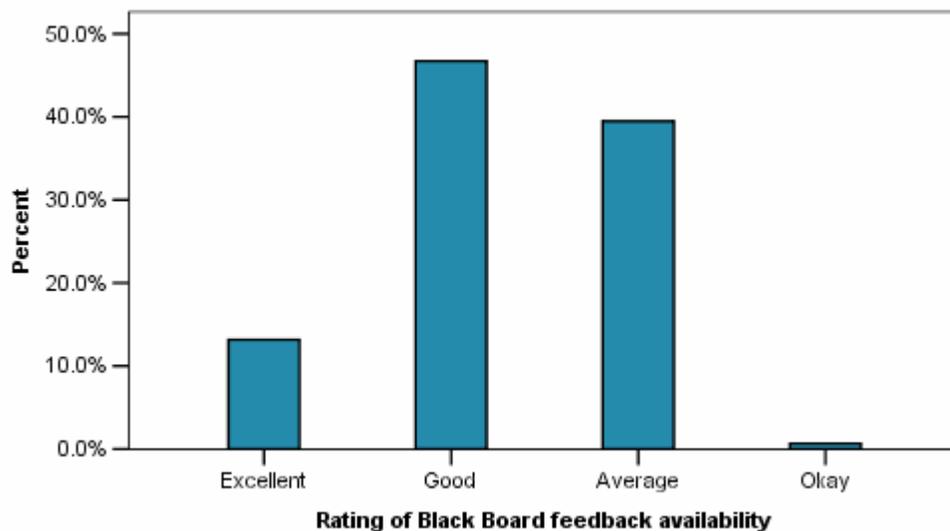

Figure 8: Chart showing the Rating of Blackboard feedback that was rated above average by 60% of students.

The creation of the tests would involve considerable time to be devoted from the lecturer's side especially at the initial stages. But once you have a pool of questions to rotate, there are options to shuffle the order of questions and create different tests. But this is the only way to accomplish continuous assessments with proper question feedback, in the context of large classes especially with time constraints. However it's important to understand that not necessarily do these efforts lead them to the intended deep level learning. As Sambell et al (1997) put it, several students claimed that they simply did not have the time to invest in this level of learning and some freely admitted they did not have the personal motivation. Thus there could be a gap between their perceptions of the type of learning being demanded and their own actions.

3.2.1 General E-assessment Advantages
- Though implementation of continuous e-assessment cannot replace the traditional classroom continuous assessment, it can effectively complement the latter. In e-assessment, especially in open-book environment, students are given immediate

access to huge amount of information on the Internet. This would be in contrast to paper-based, classroom-restricted open-book assessment where no immediate access to resources (Internet) is possible.

- It shows the scores to the students immediately for the Multiple choice type questions, so that proper evaluation/judgment on a student's standing in terms of subject knowledge is made clear. A keen student can make use of the immediate results for his own further progress.

- E-assessment can offer the benefit of personalized learning agenda (Andrew 2005). That is, it allows students to attempt tests whenever they are ready, arguably leading to better assessment results.

- It gives immediate feedback to the students so that the learning process happens without any further delay compared to the traditional class room based approach. The grading for multiple choice questions is immediate and the student has access to his scoring sheet immediately as he attempts the test.

- The options to create detailed feedbacks in e-assessment setup help the student to get to the root of his mistake, with sufficient explanation. The response regarding the necessity of feedback shows the students could be encouraged to a deep learning if the feedbacks could typically lead them to more reading or research in the area. The disadvantage with the closed questions here, can be that when the answer is correct (if accidentally), then the student is fooled into a lethargy concerning further reading. This would end up with a surface approach to learning or even the common strategic approach that was mentioned earlier. Here perhaps a model can be experimented with where a correct answer is not only followed by in-depth feedback, but also an invitation to attempt another related, more in-depth question. In this way, student's learning scope will go even further. So the platform that can be used to initiate a deep approach is the wise and discreet usage of the feed back option by the lecturer. Whether the answers are correct or wrong, the feedback could include a good summary of the facts supporting the answer and then inspire the student to do some more reading on the same. It is in this context that we are proposing a series of e-assessments as an alternative to the traditional continuous assessments. The effectiveness in learning would depend on how the feedbacks to the questions are set and how the students respond to the detailed feedbacks

- It makes the learning aspect quite attractive to the students as they have to take the assessment online, especially with the popularity of computers with students. The students are free from the rigid classroom atmosphere. If taken in the right perspective, a tension free atmosphere can be ideal for assessment.

- Once the questions and feedbacks are setup initially (through elaborate and hard work), marking is done automatically by the e-learning system and the lecturer has no problems even with a very large class to get the results out immediately after the exam. Efficiency in grading and timely results keeps students also motivated to move on.

- It produces more motivation for study and learning for students as is shown from the survey results of Amelung et al (2006) for computer science education.

- Because teachers can easily review and compare student's work, we also argue that students can be discouraged from committing plagiarism. Even plagiarism detection software can be used to check the submitted electronic file or text for similarities. Reducing plagiarism will improve students' learning effectiveness. A partial sample output from a plagiarism detection software is shown below in table 1. The 16 groups of students had submitted Java program assignments through Blackboard electronic

submission facility. High percentages such as 90.1% and 78.9% for Grp 12 and Grp 1 respectively (in comparison with Grp 16 and Grp 5) indicate plagiarism and they were detected. This shows one of the advantages of electronic submission over paper based submission, especially for programming subjects.

Table 1: Partial output from a Plagiarism Detection Software

Grp 12	→	Grp 16 (90.1 %)	Grp 15 (50.3 %)	Grp 2 (46.7 %)	Grp 14 (39.9 %)	Grp 10 (36.5 %)	Grp 3 (34.3 %)	Grp 6 (34.1 %)	
Grp 1	→	Grp 5 (78.9 %)	Grp 11 (40.8 %)						
Grp 11	→	Grp 8 (52.7 %)	Grp 14 (35.1 %)	Grp 5 (33.7 %)					
Grp 2	→	Grp 15 (49.3 %)	Grp 10 (46.8 %)	Grp 16 (46.1 %)	Grp 14 (44.0 %)	Grp 6 (37.6 %)	Grp 4 (34.7 %)	Grp 7 (33.8 %)	Grp 13 (33.3 %)
Grp 15	→	Grp 16 (48.9 %)	Grp 14 (38.1 %)	Grp 10 (37.2 %)	Grp 7 (33.7 %)				

3.2.2 Further Challenges posed by E-assessment

We were commenting on the multiple choice format assessments while commenting on the immediate result and feedback availability. Amelung et al (2006) has suggested programs which tackles the issue of essay-type tests and assignments. This program module allows the creation, submission and grading of students' assignments. Students could also view the progress of the work they have submitted. For assignments which must go through various stages e.g. submission, approval, etc, this feature proves to be useful, especially for large classes and distant learning. Teachers can view the summary of grades for each student's submissions, giving them feedback on the student's overall performance. Another efficient automated essay scoring has been proposed by Attali et al (2006) which is a single scoring model, with transparent modeling procedures, and based entirely on expert judgment.

In Black Board learning system, the students can be tested for descriptive essays, in that they can type in the essay, but the evaluation of the essay has to be manually done by reading through each essay. This can be cumbersome, if the number of students in the class is high. Let's consider a web-based interface to input the essay related keywords, sub-keywords, scores and weights associated with keywords and sub-keywords. Weights are considered along with scores, so as to have more flexibility when using related words or words with same scores. This helps to calculate the scores, when emphasis needs to be given to some specific words in a family of related words even though their scores are the

same. We assume the use of a lexical analyzer which allows keyword or sub-keyword comparison to different forms of a word (like present, past or future tense and other related word forms etc). We want to propose a simple essay e-assessment process as shown in Figure 9, especially when the student number in the class is high.

1.   Input main keywords (k_i) for student's essay and assign weights (w_{ki}) and scores (s_{ki})   to these keywords. The assigning of weights and scores are crucial in getting a right   score.

2.   Assign sub-keywords (s_{ki}) to each of these keywords and assign weights (w_{ski}) and   scores (s_{ski}) to these sub-keywords. The assigning of weights and scores are crucial in   getting a right score.

3. $s_{ki} = \sum (w_{ski} \times s_{ski})$ *for i = 1 to n* (where n is the number of sub-keywords).

Total score = $\sum (w_{ki} \times s_{ki})$ *for i = 1 to m* (where m is the number of keywords).

4.   Test the scores on sample essay answers (for the question given to students) and fine   tune the scores and weights as needed.

5.   The essay e-assessment can be made ready once the evaluator gets a satisfactory score   with his sample essay training.
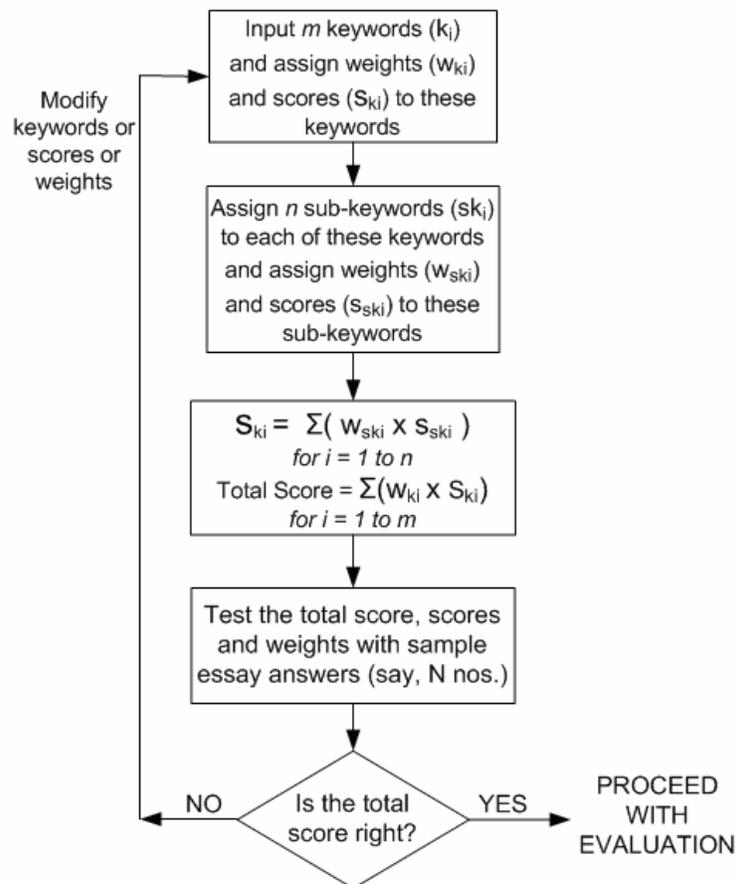

Figure 9: Flow Chart showing essay e-assessment proposal

The development of meta cognitive skills gain increasing attention and take upon the position of educational goals, as the world moves towards knowledge based society. Examples of meta cognition highlighted by Ridgway et al (2001) are given under four headings as: knowing how to use knowledge; analyzing and improving cognitive processes; supporting reflection and critical skills; assessing competence with different thinking skills. These skills can be given importance as essay type or descriptive questions are schemed for marking through e-assessment.

4. Conclusion

The reviewed studies and the particular survey done revealed that students' perceptions of assessment and their approaches to learning have some patterns of influence, but the web of influence can't be emphatically shown. A surface approach to learning is easily induced, but promoting a deep approach seems to be more problematic (Marton & Saljo, 1997).The intention of this paper has not been to claim inevitable evidence for the patterns of learning and assessment connections. But this is an honest appraisal of how teachers struggle with supporting the desired type of learning through the medium of assessment. Students, on a general note, tend to be strategic learners and try to predict the teacher's requirements, to produce good grades. These strategic learners can easily alter between the deep approach and the surface approach, depending on their perceived evaluation requirements. Former experiences, the context and the assessment mode make the student's approach to learning a very individual approach and not easily predictable. But the fact remains undebatable that patterns, tendencies, and relations between the different assessment methods and student learning provide useful insights for student educators. The proposal made with regard to implementation of continuous assessment as a series of e-assessments is not intended to fully replace the traditional classroom assessment. But it can effectively complement the latter especially in the context of large classes.

Assessment should reinforce good curriculum practice. We are living in times where students use powerful and appropriate tools to support learning and solve problems in class, but are then denied access to these tools when their 'knowledge' is assessed. ICT can support desired educational goals hard to achieve via conventional teaching methods. 'ICT can support the development of higher-order thinking skills such as critiquing, reflection on cognitive processes, and 'learning to learn', and can facilitate group work, and engagement with extended projects; ICT competence is itself a (moving) target for assessment.' (Ridgway et al 2004). As new technologies come in, it is important that educators ask themselves these questions: what can be taught, given new pedagogic tools; and how assessment systems can be designed which put pressure on educational systems to help students achieve these new goals. Else, e-assessment could result in the risk that it will be designed on the basis of convenience, with disastrous consequences for educational practice (Ridgway et al 2004). The developments in e-assessment will impact teaching and learning programmes as well as the way in which these programmes are run. As the method becomes more widespread, students will need to become comfortable and confident with the challenges it presents and the issues that it raises for classroom practice.

5. References

Amelung, M, Piotrowski, M & Rosner, D, *EduComponents: Experiences in E-Assessment in Computer Science Education*, 2006. Retrieved April 2006 from: http://wwwai.cs.uni- magdeburg.de/forschung/projekte/educomponents

Andrew A., "E-Assessment. What will it mean for teachers and students?", Teaching Business and Economics, Proquest Education Journals, 9(3), 2005, pp. 26.

Assessment Reform Group, "Assessment for Learning: Ten principles", London, Institute of Education, 2001.

Attali, Y., Burstein J., "Automated Test Scoring With e-rater v.2." Journal of Technology, Learning and Assessment, 4(3), 2006. Available from http://www.jtla.org

Ball, S., Maguire, M., & Macrae, S. *Choice, Pathways and Transitions Post-16: New youth, new economics in the global city,* London, Routledge Falmer, 2000.

Biggs, J. "Aligning the curriculum to promote good learning", November 2002 available at www.ltsn.ac.uk

Black Board Learning System (BBLS), Website: http://blackboard.swinburne.edu.my/webapps/login/

Bloomer, M. *Curriculum Making in Post-16 Education: the social conditions of studentship*, London, Routledge, 1997.

Ecclestone, K. and Hall, E. *Improving Formative Assessment in Post-16 Education,*
Report to the learning and skills development agency, 2002.

Ecclestone, K. and Swann, J., "Litigation and Learning: tensions in improving university lecturers' assessment practice," Assessment in Education, 6, 1999, pp. 377-389.

Entwistle, N. J., "Approaches to learning and perceptions of the learning environment. Introduction to the special issue," *Higher Education*, 22, 1991, pp. 201-204

Entwistle, N. J and Entwistle, A., Contrasting forms of understanding for degree examinations: The student experience and its implications, *Higher Education*, 22, 1997, pp. 205-227.

Entwistle, N. J and Ramsden, P, *Understanding Student learning,* London: Croom Helm 1983.

Entwistle, N. J. (eds) The experience of learning. Implications for teaching and studying in higher education, Edinburgh, Scottish Academic Press, 198-217.

Gibbs, G. "Using assessment strategically to change the way students learn," in: Brown,
S. Glasner, A. (eds.), Assessment Matters in Higher Education, Buckingham, SRHE & Open University Press

Grenfell, M. and James, D. with Hodkinson, P., Reay, D. and Robbins, D. *Bourdieu and Education: acts of practical theory*, London, Falmer Press, 1998.

Hodkinson, P., Sparkes, A.C., Hodkinson, H. *Triumphs and Tears: young people, markets and the transition from school to work*, London, David Fulton, 1996.

Hornby, W. "Assessing using grade-related criteria: a single currency for universities?", *Assessment & Evaluation in Higher Education*,28(4), 2003,435-454.

Lin Norton, "Using assessment criteria as learning criteria: a case study in psychology," *Assessment & Evaluation in Higher Education* (Vol. 29, No.6), December 2004, pp. 687-702.

Marton, F. & Saljo R. Approaches to learning, in: Marton F., Hounsel D. & Entwistle (Eds). The experience of learning. Implications for teaching and studying in higher education, 1997.

Pollard, A. and Filer, A. *The Social World of Pupil Career; Strategic biographies through primary school*, London Cassell, 1999.

Ramsden, P. The context of learning in academic departments, in Marton F., Hounsel D and   Reay, D. and William, D., "'I'll be a nothing': Structure, agency and the construction of   identity through assessment," *British Educational Research Journal,* 25, 1999, pp. 343-   354.

Ridgway, J. and Mccusker S., Pead D., Report 10-Literature review of e-assessment, 2004. Retrieved April 2006 from: http://www.futurelab.org.uk/research/reviews/10_01.htm

Ridgway, J, Swan, M and Burkhardt, H., Assessing mathematical thinking via FLAG, in: D Holton and M Niss (Eds).Teaching and Learning Mathematics at University Level - An ICMI Study. Dordrecht: Kluwer Academic Publishers, 2001, pp. 423-430. Website: www.wcer.wisc.edu/nise/cl1.

Sambell, K., McDowell, L. and Brown, S. "'But is it fair?' – An exploratory study of student perceptions of the consequential validity of assessment," *Studies in Educational Evaluation*, 1997, 23(4), pp. 349-371.

Struyven, K., Dochy P. and Steven Janssens, "Students' perceptions about evaluation and assessment in higher education: a review," *Assessment & Evaluation in Higher Education* (Vol. 30, No.4), August 2005, pp.325-341.

Trigwell, K. and Prosser, M., "Improving the quality of student learning: the influence of learning context and student approaches to learning on learning outcomes," *Higher Education*, 22, 1991, pp. 251-266.