How can Blackboard assist in Assessment and Facilitation of Knowledge Exchange?

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Abstract ¾ *In the age of Internet, students become acquainted with World Wide Web as an alternative information resource and method of displaying information, opposed to hardcopies of data. This paper examines the use of such an e-learning tool as an alternative approach to traditional support materials and assessment. The e-learning tool used in question is Blackboard. Blackboard is an electronic medium that enables academics to provide a fully and integrated electronic resource locally and remotely for students studying the course. Blackboard can be more than a tool for posting lecture notes and posting announcements. Blackboard has the potential to become an integrated component of a module both in terms of; disseminating and facilitating the learning of course material and theory, an alternative and novel method of assessment. In addition the tool provides the means for the academic to monitor the student learning outside the classroom. This paper presents the results of applying such an e-learning tool over a three academic cohorts to support learning, teaching and assessment of a network programming module. The results include the analysis of the summative results (pass rates) of the assessments and the students' formative reflection and review of the module and Blackboard. The paper will finally conclude with the academics reflections of Blackboard and how Blackboard can form a pivotal role in a module in terms of learning, outcomes and analysis of academic performance of the students.*

Index Terms ¾ *alternative assessment, e-learning, learning attainment*

INTRODUCTION

Programming courses are often dry by nature, even when the students a have keen interest in the subject matter, for example Internet and Intranet programming. The traditional approach of chalk and talk offers limited learning experience, [1] and therefore restricts the student to one or two quadrants of Kolb's experimental learning cycle,[2], promoting passive learning, provides little opportunity to interact actively learn via reflective practise or experimentation. In my experience of learning and teaching to computer programming, there is need to reflect upon the theory and conceptualise a solution to a problem in programming terms, active experimentation of implementing the program, achieving concrete experience through testing the program, and finally reflecting again on the final product evaluating if it meets its purpose, i.e. solves the problem. However the traditional lecture is intended to convey the theoretical and factual contents of a course, [3], and provide the signposting for further studies in order to gain a greater understanding, depth and application of a subject, [4]. Therefore lectures have traditionally been supported by laboratories, that is to provide active and concrete experience of a subject. Laboratories can be designed to encourage students to enquire around a subject to investigate and evaluate a laboratory experiment.[3] However in the UK, Higher Education Council Fund payments have been reduced on computer and engineering based courses and consequently institutions have reduced student contact time to compensate. Therefore, alternative methods of supporting, promoting independent and depth of learning are being sought as alternatives to traditional student contact methods of teaching.

Despite the limitations of the traditional approach it is quantifiable in terms of measuring quality of delivery and receivership. Also, many students still believe or perceive that the academic is the fountain of all knowledge, and are reluctant to seek information from other sources. This is as students only see assessment as signposts to further learning, [5] as opposed to lectures. Therefore any innovation in the student learning process needs to be quality quantifiable and incorporate an assessment element, as assessment is the primary factor in motivating student learning.[6] In addition ideally the assessment strategy should facilitate the students to seek a greater understanding or meaning (depth) in a subject, opposed to encouraging strategic learning, that is learn what is required to achieve a high grade.[7] Also, any assessment process should not overburden the academic in terms of marking, as academic's work pressures are already demanding and increasing, and in some cases have been identified as critical, [8].

Student supplementary teaching is one solution to the problem. This process helps promote higher level of learning, [9] and can provides a framework to underpin the student's learning, [10]. A student teaching model of instructing all the students in an engineering class to prepare material for each week's topic and selecting one student each week to present the material in theory resulted in the students in achieving greater depth of understanding of the subject, [11]. However this model is unsuitable for today's large volume degree courses, in terms of workload, timescales and marking, [12] and course-work intensive degree courses, as over assessment of students inhibits learning. [1]. More successful

experiences in supplementary teaching in terms of learning have been achieved by encouraging the students to present their solution to a problem each week, [13]. Another successful alternative approach allows the students to design and teach a course, this approach was successful in reducing academic workloads and encouraged the students to be independent learners.[14] This methodology has been updated to provide a framework, that fulfils Quality Assurance Audit (QAA) and University policies.[15] The purpose of any supplementary teaching exercise is to provide a framework for the academic to become a facilitator opposed to teacher, and through their new role provide guidance, encouragement prior to the class, summative and formative feedback during/immediately after the session.

E-learning is another mechanism being developed and promoted by a number of Universities as a means to improve student-learning experiences, [16], and provides the opportunity to liberate academic staff to pursue other scholarly activities. The key is the employment of e-learning to provide the students with greater opportunities to learn outside the classroom without adding to the academic's work pressures, [8]. On-line discussion forums on Blackboards have been found to be effective in providing a communal knowledge database for all enrolled students. The online support extended and expanded the student learning experience, however this was not quantified in terms of learning outcomes of the course.[17] Students who actively participate in virtual classroom environment, i.e. Blackboard, have strong sense of community and therefore cognitive learning.[18] On-line collaborative assessment approach is successful in promoting reflective practise and deeper sense of learning as the process involves an individual on-line submission of course-work to a group and each group member reviews the submission and evoke a discussion, blackboard assisting the facilitation of learning.[19] This process illustrates the benefits of group-based learning, as the exercise promoted group social interaction and learning, as humans learn more naturally in a social environment.[20] Therefore ideally any e-learning tool should promote the sense of e-community, any e-assessment should be group-based and should encourage the students to read/reflect on one and others' contributions promoting facilitation of learning. Blackboard is example of such a tool that provides a learning shell which the academic can tailor to each individual course requirements i.e. provide on-line forums, on-line posting of course documents and supplementary material, announcements, emails to individual students or the class, e-tests; multi-choice and matching which can be marked automatically by Blackboard. In addition the academic can access course statistics, i.e. the frequency of access by the students and which students accessing and what information is being accessed on Blackboard. Importantly Blackboard can be used to encourage independent learning through on-line assessments, posting alternative resources for learning, and therefore a tool that supports academic in the role of facilitator opposed to teacher.

This paper presents the results of adopting both these approaches (supplementary teaching and e-learning) over three academic cohorts to support learning, teaching and assessment of a network programming module. The results will illustrate the analysis of the e-phase test results with the aim of evaluating the student learning from alternative methods of learning, teaching and assessment. All the course assessments were designed to measure the fulfilment of all or partial learning outcomes of the course.

ORIGINAL STRATEGY

The original strategy adopted to deliver the course in 2002/2003 was that of student supplementary teaching where-by students delivered in groups the entire contents of the course in conjunction with the students initially outlining the structural contents of the course, with the aim to define topics that best fulfilled the learning outcomes of the course. This approach has been shown that if introduced in the right context, to the courses aims, learning outcomes, and interlaced as a collective problem solving exercise, it can provide a more relaxed framework for the students to reflect upon their level of understanding of a course's contents, learning outcomes and satisfy a Universities' QAA.[15] In particular, students who participate in supplementary learning in conjunction with peer assessment achieve a greater multi and dimensional level of learning, as shown in Figure 1.[21]
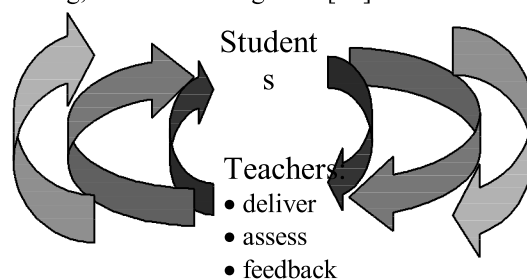

FIGURE. 1
COMPLEX CYCLICAL MODEL

The course delivered was further supported with computing laboratories and e-learning facilities (blackboard). Both these facilities provided the opportunity, for the academic to resolve any issues arising from the supplementary teaching

assessment. Also e-learning facility encouraged the academic to act as facilitator in the student learning process as opposed to key deliverer.   However the e-learning facilities also provided the opportunity for:

- groups of students preparing lectures to communicate more effectively through
  - group discussion board
  - file exchange area
  - email facility
- the students to continue the question and answer sessions initiated in the lectures on-line
- the students/academic to have on-line discussions on topics in relation to the module
- the lecturing students to define their sources of references
- the academic to provide summary of information for each topic after each lecture

ORIGINAL RESULTS IN PRACTISE

The students willingly adopted the supplementary teaching framework and continued with the quest for the solution to a problem for the whole semester. On the whole the student supplementary teaching practice was a positive experience for students and academic.   Each lecture concluded with a lively question and answer session that has provided an opportunity to clarify points in the presentation and summarising the lecture contents. If time was short these sessions continued on-line using the e-learning facilities. The course discussion forum was actively used by the majority of the cohort of students, class size of 73.   However one disconcerting feature was that once a group of students had presented their chosen topic to the class they typically ceased attending lectures and therefore failed to support their fellow peers presentations.   Reasons cited by students for lack of attendance, increasing assessment workloads as the semester progressed and the fact they had identified alternative sources on the lecture topics, i.e. the e-learning facilities as contained in electronic copies of lecture handouts, academic summaries of the lectures/topic and on-line question and answer sessions.

In addition to group supplementary teaching assessment the students were individually required to complete an e-phase test. The purpose of the e-assessment was to ascertain the student's level of learning and knowledge retention of every topic taught in the course.   The phase test was configured on Blackboard. The test question pool consisted of 50 e-multiple choice, each question consisted of 4 possible answers.   The phase test was designed to ensure typically 1 in every 5 questions in the 50 question pool was on a topic covered in the course.   Each student was randomly presented with 25 multiply choice questions out the pool of questions. This was to ensure that no two students had the same set of 25 questions.   Each phase test was automatically marked by Blackboard, in addition the e-learning tool provides easy and ready access to the phase test results for each individual and the overall phase test statistics. Therefore further analysis of an individual and overall class phase test results is permissible through the ready availability of the electronically stored raw data.

The class average mark for the phase test was 61% and standard deviation of 12, for class size of 73.   The phase test results were further analysed to establish the actual level learning of the students in relation to their chosen supplementary teaching topic. The class average mark was 67% and standard deviation of 37 for questions relevant to each student's supplementary teaching topic.   Note that the high standard deviation can be attributed to the fact that on average only 2 questions were relevant to a student's supplementary teaching topic, therefore insufficient number of questions were provided to provide a clearer standard deviation.   Also analysis of the phase test results illustrate a class median of 61% and standard deviation of 13 for questions not relevant to student's supplementary teaching topic.   These results highlight the fact that that the students achieved a deeper level of learning in the contents of the course, and supplementary teaching provides the opportunity for a greater level of learning. However, it should be noted that multi-choice questions do produce higher success rate than any other examination formats, as students find it easier to recognise a complex answer than construct one.22   Also, it should be noted that previous research has indicated that a quarter of questions are guessed correctly, therefore multi-choice examination may not be measuring a student's level of understanding of a subject.23   Nonetheless, multi-choice examinations have been proven to be ideal for assessing a student's factual knowledge of a subject.22

ORIGINAL REFLECTION IN PRACTICE

Reflections of the Students

Table 1 illustrates the student's reflections of supplementary teaching exercise.   The feedback response rate was typically 69% per question.   The majority felt they had learnt from the experience, they didn't find the task too difficult, but did find it stressful, however not sufficient to make them be averse to repeating the exercise. Also a high proportion of the students believed they learnt more from the experience than from a conventional lecture on the topic which is consistent with the phase test results.

QUESTION	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	DON'T KNOW	MAYBE	CAN BE	NEUTRAL
Did it empower you?	4	19	16	4	8	5	4	19
Did it give you a sense of being in charge of your learning?	3	16	17	2	11	6	3	16
Did you find it stressful?	7	19	19	3	3	3	7	19
Would you like to do it again?	2	17	11	5	15	4	2	17
Did you learn more than if you had a lecture on the material?	4	11	20	5	8	5	4	11
Was it too difficult?	0	9	29	6	6	4	0	9
Did you learn from the experience?	4	31	6	2	4	5	4	31
Did you learn more than if you had a lecture on the material?	5	18	11	5	6	9	5	18

TABLE 1
THE STUDENT'S REFLECTION ON TEACHING

The reflections of the students to the on-line supplementary support are depicted in Table 2. The majority of students agree question and answer sessions should continue on-line and the academic should provide supplementary material in the form of on-line summaries. This is consistent with early feedback in the course from student year representative meeting.24

"The unit contents are fine. It was commented by the tutor that the student seminars would help students to learn information relevant to the topic and allow students to be confident in presenting technical materials. It was recommended that after the students' seminars the main points are highlighted by the tutor."24

QUESTION	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	DON'T KNOW	MAYBE
Was the on-line question and answer sessions helpful in clarifying lecture contents?	6	23	7	3	8	7
Were the academic on-line summarises helpful in supporting the lecture contents?	7	28	1	1	12	4

TABLE 2
THE STUDENT'S REFLECTION OF ON-LINE SUPPORT

Reflections of the Academic

The phase test analysis of the supplementary teaching provides evidence that the students are ascertaining a deeper level of learning and knowledge retention. The students were positive about the experience terms of supplementary teaching exercise and level of additional support through Blackboard; e-question and answer sessions and academic e-summaries. Academic intervention on the question and answer session was found to be minimum, however like any forum it is necessary to monitor the student activities to ensure no University protocols were being breached. However the e-summaries re-enforce the academic role of deliverer opposed to facilitator, the latter being the objective of this particular module. Also the e-summaries are time consuming to produce and not dissimilar to generating a lecture on a topic in terms of disseminating large quantities of information. Nevertheless, upon reflection Blackboard was found to be:
- an effective resource in disseminating information, i.e. via e-summaries to all the year
- an effective and efficient methodology for assessing level of learning and knowledge retention of the students

One solution to the problem of attendance and the academic acting as deliverer (though on-line) would be to incorporate a more patchwork text approach, where by breaking the supplementary teaching exercise into two halves;
1. students are required to deliver a lecture to a class on one topic
2. post an e-summary on another topic for class consumption.

As in theory patchwork texts promote and encourage greater level of exploration and discovery of a subject, 25, and is consistent with supplementary instruction approach and will assist in broadening the student learning in the course.

REVISED STRATEGY

The revised strategy adopted to deliver the course contents in 2003/2004 and 2004/2005 was a modification to the previous strategy. The students still defined the contents of the course, that is defined a list of topics that most satisfied the learning outcomes of the course. In terms of delivery a two part student supplementary teaching assessment was implemented, where-by:
1. groups of students delivered their chosen topic from the contents of the course.
2. the same groups of students disseminated another chosen topic from the course contents in the form of an e-summary (500 words).

This approach of on-line submission would ensure each group researched and disseminated an additional course topic. In theory the e-summary will continue to promote a higher level learning, as depicted in Figure 2, however not as complex and re-enforcing level of learning as for supplementary teaching, as shown in Figure 1, as it lacks the element of peer feedback through class observations and question and answer sessions.
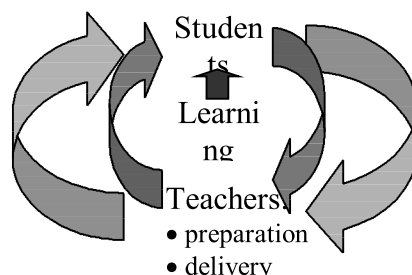

FIGURE. 2
MULTI-LEVEL OF LEARNING MODEL

REVISED RESULTS IN PRACTICE FOR STUDENT BLACKBOARD PARTICIPATION

The student once again adopted the strategy and continued with approach throughout the semester. As in the previous year each lecture concluded with a question and answer session and if time was short these sessions continued on the Blackboard discussion board.

2003/2004 Cohort

The course general discussion forum was actively used by the majority of this cohort of students, class size of 34, that is 165 messages posted by 16 participants; this included 33 threads and 24 clearly related to the course. Importantly the discussion board remained active until the 10th week of the course. The initial student posted e-summaries were well read, 70 times for the first lecture topic and only 11 times for the last lecture topic. However this is consistent with the reading of the academic summaries, the 55 times for the first lecture topic and 11 times for the last lecture topic. In addition 6 out of 10 groups used their groups personal discussion board, 3 only actively. Equally the on-line question and answer session and if time was short these sessions continued on the discussion board on Blackboard, total 10 messages by 6 participants. On-line answer and question session was not as actively used, total 10 messages by 6 participants, as the previous year as smaller cohort of students. Therefore less volume of students present at each lecture and hence more time for questions and answers in the lecture sessions.

2004/2005 Cohort

The on-line resource was poorly used by this cohort of students, for a class size of 26 only 4 messages, 3 threads were posted by 2 participants (one being the academic) on the general discussion board. Equally the question and answer session was poorly used only 2 participants and 4 threads and messages. The group discussion boards were also not

used, only 2 groups out of 10 utilised the file exchange facility.   However the on-line supplementary material was reasonably well read, as shown in Table 3.

ON-LINE MATERIAL POSTED	READING OF FIRST LECTURE	READING OF LAST LECTURE
Student e-summary	36	17
Student lecture handout	46	16
Academic e-summary	29	11

TABLE 3
NUMBER OF READINGS OF ON-LINE MATERIALS

However only 11 students accessed the supplementary material in the month prior to the phase test. Also, only 8 students extensively read the material, four in particular days prior to the phase test.

REVISED RESULTS IN PRACTICE FOR PHASE TEST

The same style of phase test was applied for 2002/2003 cohort - that is a pool of 50 multi-choice questions, typically 5 questions on each topic, each student was presented with 25 random selected questions.   The phase tests were moderated prior to the test date, each question was fine tuned, rejected/replaced, or accepted. The moderating process ensured that each question satisfied the assessment criteria for 5th level further education (2nd year degree level) assessment/examination, i.e. of sufficient challenge, clear and unambiguous in expression, and satisfactorily assesses the learning outcomes of the course.

2003/2004 Cohort

The class average was 42% and standard deviation of 14.   Further analysis of the phase test results highlighted that the class achieved:
- an average of 39% and standard deviation of 40 on questions relevant to their chosen supplementary teaching topic.
- an average of 39% and standard deviation of 38 on questions relevant to their chosen topic for an e-summary posting.
- an average of 42% and standard deviation of 14 on topic questions not researched and disseminated by the students.

High standard deviations illustrated are as a result of typically only 2 out of 25 questions were in relation to the supplementary teaching or e-summary topic.   These results illustrate that the level of learning of the students is questionable particularly in addition to the level of learning from supplementary teaching or dissemination.

2004/2005 Cohort

The phase test for this cohort attempted to assess less factual knowledge of the course contents, Figure 3 depicting 2003/2004 factual phase test, and assess more of the students understanding of the course content thorough applied questions, Figure 4 illustrates examples of 2004/2005 applied questions.
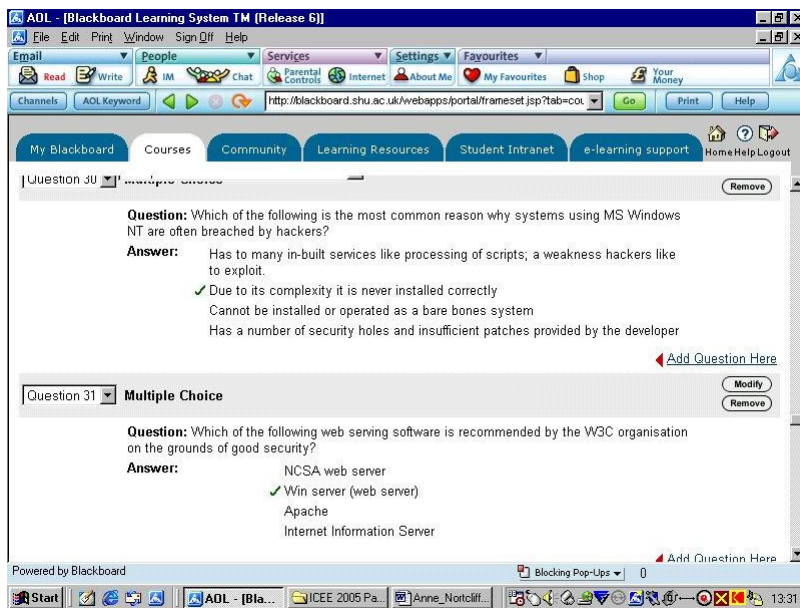
FIGURE. 3
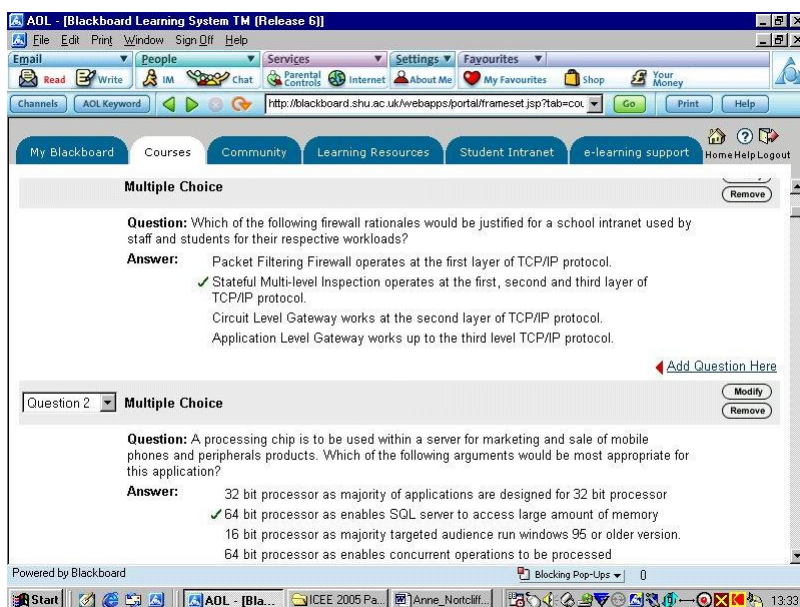SCREEN SNAPSHOT OF 2003/2004 PHASE TEST

FIGURE. 4
SCREEN SNAPSHOT OF 2004/2005 PHASE TEST

The class average for the phase test was 45% and standard deviation of 9. Further analysis of the phase test results illustrated that:

- the average phase test mark for the students who were active in reading the on-line supplementary material (8 students) was 45 and standard deviation of 9
- the average phase test mark for the students who were not active in reading the on-line supplementary material (remainder of the class) was 44 and standard deviation of 9
- the average phase test mark for the students who were active in reading the on-line supplementary material (8 students) was 45 and standard deviation of 9
- the class averaged of 43% and standard deviation of 11 on topic questions not researched and disseminated by the students.
- an average of 62% and standard deviation of 32 on questions relevant to their chosen supplementary teaching topic.
- an average of 50% and standard deviation of 40 on questions relevant to their chosen topic for an e-summary posting.

Typically only 2 out of 25 questions were in relation to the supplementary teaching or e-summary topic, therefore high standard deviation for analysis of supplementary learning exercises. These results clearly illustrated the biggest impact on the student level of learning is the supplementary teaching exercise both in terms of delivering via lecture or an e-summary. Equally the results are in agreement with the theory that the level of learning through supplementary teaching is greater than for on-line dissemination as it lacks the elements of peer feedback. Therefore to improve the level of learning through on-line dissemination the exercise should include an element of peer feedback, i.e. fellow peers critique the summary to provide formative feedback. It should also be noted that through this cohort attendance was good, 85% for the first lecture, 58% for the lowest attendance recorded for a mid-semester lecture, the results indicate that student lecture lacks the elements that assist an audience to learn a subject.

REVISED REFLECTION IN PRACTICE

The students' reflections of the supplementary teaching exercise for 2003/2004 cohort illustrated in Table 4 and Table 5 for 2004/2005 cohort. The feedback response rate was typically 94% per question for 2003/2004 cohort and 88% per question for 2004/2005. In both cases the majority felt the exercise gave them sense of being in charge of their learning and learnt more from the experience than receiving lecture on the topic. The previous year found the task less difficult than the current cohort, however both found it stressful, neither set of students are clear whether they want to repeat the exercise. However both cohorts agree with 2002/2003 cohort of students that they believe they learnt more through the supplementary teaching exercise than receiving a conventional lecture on the topic.

QUESTION	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	MAYBE	DON'T KNOW
Did developing and giving the lecture empower you?	0	15	9	2	2	4
Did developing and giving the lecture give you sense of being in charge of your learning?	0	21	5	2	3	1
Did you find developing and giving the lecture stressful?	7	12	10	0	3	0
Would you like to do the developing and giving the lecture again?	1	8	7	9	5	2
Was developing and giving the lecture too difficult?	3	5	20	2	1	1
Did you learn from developing and giving the lecture experience?	2	21	3	1	4	1
Did you learn more from developing and giving the lecture than if you had lecture on the material?	3	16	2	8	3	0

TABLE 4
THE 2003/2004 STUDENT'S REFLECTION ON TEACHING

QUESTION	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	MAYBE	DON'T KNOW
Did developing and giving the lecture empower you?	1	11	6	2	2	1
Did developing and giving the lecture give you sense of being in charge of your learning?	3	9	5	3	3	0
Did you find developing and giving the lecture stressful?	5	9	5	3	3	0
Would you like to do the developing and giving the lecture again?	1	9	4	5	4	0
Was developing and giving the lecture too difficult?	2	9	9	0	1	2
Did you learn from developing and giving the lecture experience?	2	12	3	2	4	0
Did you learn more from developing and giving the lecture than if you had lecture on the material?	5	10	2	3	3	0

TABLE 5
THE 2004/2005 STUDENT'S REFLECTION ON TEACHING

Table 6 and 7 illustrate respectively 2003/2004 and 2004/2005 cohort of students' reflections on disseminating a topic via an on-line summary. Both cohorts agree that they learnt from the experience and gained a higher level of learning from the exercise than from a conventional lecture of the topic. However this year's cohort did not give them the sense of being in charge of their learning, they found the experience stressful, therefore don't wish to repeat the exercise unlike the 2003/2004 cohort of students who were more positive of the experience.

QUESTION	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	MAYBE	DON'T KNOW
Did developing and posting the summary empower you?	0	12	9	3	3	5
Did developing and posting the summary give you sense of being in charge of your learning?	0	14	9	2	5	2
Did you find developing and posting the summary stressful?	1	7	18	3	1	2
Would you like to do the developing and posting the summary again?	1	13	5	7	4	2
Was the developing and posting the summary too difficult?	0	4	21	6	1	0
Did you learn from developing and posting the summary experience?	1	15	6	4	3	3
Did you learn more from developing and posting the summary than if you had lecture on the material?	1	12	6	6	6	1

TABLE 6
THE 2003/2004 STUDENT'S REFLECTION ON E-SUMMARY

QUESTION	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	MAYBE	DON'T KNOW
Did developing and posting the summary empower you?	1	9	9	2	1	1
Did developing and posting the summary give you sense of being in charge of your learning?	2	9	8	2	2	0
Did you find developing and posting the summary stressful?	4	9	7	0	3	0
Would you like to do the developing and posting the summary again?	1	8	4	7	3	0
Was the developing and posting the summary too difficult?	2	8	9	1	1	2
Did you learn from developing and posting the summary experience?	1	9	5	3	4	1
Did you learn more from developing and posting the summary than if you had lecture on the material?	1	11	3	3	3	2

TABLE 7
THE 2004/2005 STUDENT'S REFLECTION ON E-SUMMARY

The reflections of 2003/2004 cohort of students illustrate in Table 8 that the majority are positive about the on-line support found all on-line facilities, i.e. discussion forums, student and academic summaries helpful.   However 2004/2005 cohort of students were less than positive, however one has to question the credibility of these statistics when blackboard statistics illustrate very poor student usage of the on-line support, only small proportion of the students accessed information and participated in discussions.

QUESTION	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	MAYBE	DON'T KNOW
Was the on-line question and answer sessions helpful in clarifying lecture contents?	1	11	7	2	9	2
Were the student on-line summaries helpful in supporting the lecture contents?	3	17	4	5	1	2
Were the academic on-line summarises helpful in supporting the lecture contents?	3	19	6	1	1	2

TABLE 8
THE 2003/2004 THE STUDENT'S REFLECTION OF ON-LINE SUPPORT

QUESTION	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	MAYBE	DON'T KNOW
Was the on-line question and answer sessions helpful in clarifying lecture contents?	0	9	5	2	4	3
Were the student on-line summaries helpful in supporting the lecture contents?	1	11	3	2	5	1
Were the academic on-line summarises helpful in supporting the lecture contents?	4	6	8	1	4	0

TABLE 9
THE 2004/2005 THE STUDENT'S REFLECTION OF ON-LINE SUPPORT

CONCLUSION

The phase test results illustrate that students who engage with their chosen topic for supplementary teaching and dissemination achieve a higher level of learning, as clearly demonstrated by 2004/2005 cohort of students who solely achieved in their chosen topics.   Previous research has illustrated student lectures can be boring and lack the key elements to achieve a good lecture,[15] , that is motivation, class participation, and promotion of learning, [2].   Also it was noted that 2003/2004 cohorts of students particularly found the supplementary teaching exercise stressful, upon speaking with the students the general consensus was that the students were being over assessed in their degree course per se. Over-assessment and stress can inhibit learning,[2] , this might be one explanation for the lack of attainment by this cohort of students.   However

Despite 2003/2004 lack of attainment, both 2002/2003 and 2003/2004 cohorts demonstrate a strong sense of community through the highly active participation in the Blackboard discussion board forums.   Previous research has demonstrated that students with a strong sense of community perceive greater level of learning.[18]   Therefore the greater the participation in an on-line module community, the greater the level of learning across the spectrum of the module.   Hence the possible explanation for the narrow difference between the phase test results for supplementary researched topics and non-supplementary topics.   This hypothesis is somewhat supported by the results 2004/2005 cohort of students, these students had no on-line community and only demonstrated a deeper level of learning in the supplementary topics, and a very poor level of learning in the non-supplementary topics.   Therefore an on-line community should be encouraged to discuss all topics from a module, as this process will assist in increasing the level of learning in the non-supplementary topics.   One methodology that might encourage this process would be to substitute the e-summary for e-critique of a topic delivered by a group of students.   This assessment process is still consistent with a patchwork text approach and supplementary teaching and dissemination.   As the students would be still required to choose to research and deliver a topic (lecture and handout) and choose a delivered topic to critique.   The latter exercise still requires the students to research and disseminate a topic, in order to confidently and correctly critique the delivery of the topic.   Another methodology that may assist in encouraging the students to engage with the on-line materials, i.e. read the materials, is for each group to generate, in reflection to the lecture delivery and fellow peers critique, a few sample phase test questions for their chosen supplementary teaching topic.

This module has demonstrated that Blackboard was an effective means to monitor class and individual group activities outside the classroom. The course statistics provided a useful log of usage, and by whom, and therefore a greater breadth of data that can be analysed to appreciate the level of student learning on a module. For example 2004/2005 class phase test results indicate a poor level of learning, however further analysis of the data illustrates that supplementary teaching and dissemination exercises were a success and a greater level of learning was attained, the level of learning of the other topics was poorer. Nevertheless the Blackboard configuration at Sheffield Hallam University is such that course statistics have to be accessed every month otherwise the data is lost. This process is time consuming, as it requires logging and printing in order to maintain a record of course statistics. Also Blackboard is time consuming to configure, in particular generation of group space involves large proportion of mouse-work and the risk of RSI. In addition the forums do need to be carefully monitored to ensure University guidelines are not breached and to provide support where necessary. Each of these processes are time consuming, however the process itself may be a worthwhile exercise if it promotes a sense of community as will promoting a greater level of learning.

In conclusion Blackboard does facilitate in the learning process via the analysis of the course statistics providing evidence of the level of learning through assessment. Also it provides an alternative medium for supplementary material and promotes a sense of community that in turn increases the level of learning.

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