Interactive Case Study Sessions Using Technologically Enhanced Learning & Teaching Environment: Use of Electronic Voting System, ULearn (WebCT Vista), & Tablet PCs

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“objective of active learning is to stimulate lifetime habits of thinking to stimulate students to think about HOW as well as WHAT they are learning and to increasingly take responsibility for their own education” (Hatfield, 1995: p40).

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Introduction
Higher education deliveries, primarily lectures, predominantly tend to be monologues. Good teaching no longer refers to this kind of one-man shows in higher education. “Good teaching is getting most students to use the higher cognitive level processes that the more academic students use spontaneously” (Biggs, 2003: p5). In this paper, certain active learning interventions, namely integration of computer lab sessions, use of electronic voting system, and use of tablet PCs for case study sessions were introduced in undergraduate final year finance module for better learning and teaching. The interventions were selected based on availability of resources and their effectiveness stated in existing literatures.

Background
This particular action research took place at the School of Management, University of Surrey, Guildford, Surrey GU2 7XH, United Kingdom. The school has several established undergraduate programmes in the area of business management, hospitality management, tourism management, and retail management. In finance subject area there are 4 modules in offer at HE Level 3 i.e. financial management, financial derivatives and financial markets, risk management, and real estate finance and investment. This particular research involved one-year worth of deliveries in Real Estate Finance and Investment during the academic year 2007 – 2008. Similar intervention was implemented in the year 2006 – 2007 with limited planning and without a specialist technologically enhanced environment. Active learning interventions were implemented followed by module end structured and unstructured evaluation to measure the effectiveness of these interventions. From the experience in year 2006 – 2007, it was apparent that the tablet-PCs were not particularly user friendly, the sessions seemed long and tiring, and the problems were too complicated to handle within the given time frame. On the other hand the participants were very appreciative of the brainstorming nature of the group based case exercises and praised the electronic voting system as an excellent learning intervention. The highlights are included in the appendix.

The Module: Real Estate Finance and Investment
This module started during the academic year i.e. 2006 – 2007 as a 10 credit module delivered in spring semester. It covers corporate finance and investment management topics applied in the real estate market. It had an enrolment of 30 participants, which was an encouraging response given it was the very first delivery. All the participants were surveyed after experiencing the Tablet PC based case study sessions. Some of them left voice recorded feedback on the intervention, the highlight of which is included in the appendix. These feedbacks forms the basis of the current TeNT project (Teaching with New Technology project funded by the e-learning unit of University of Surrey). In the academic year 2007 – 2008 similar case study sessions were designed to be delivered in this module enrolling 68 students. This time the location was technologically enhanced with WiFi connection, projectors, laptops, and writeable walls.

The Problem
In Real Estate Finance and Investment corporate financial concepts were applied in real estate industry. Concepts involving risk & return, portfolio theory, and capital budgeting were difficult to teach solely based on graphical representations and formula utilization from typical finance texts. Biederman (1992) expressed the
concern of teaching portfolio theory using graphs and demonstrated a numerical method to teach various levels of risk aversion, portfolio theory, and limitations of mean-variance analysis. Although appealing the numerical method proposed by Biederman (1992) requires rigorous mathematical training that the participants lacked at the School of Management, University of Surrey. Similarly the capital budgeting techniques e.g. calculation of net present value can be taught using text book equations or perhaps using more sophisticated methods like return-on-asset and return-on-equity methods as demonstrated by Miller and Bradford (2001) but requires adequate mathematically trained participants.

The Apparent Solution
An easier method of using MS Excel spreadsheets to demonstrate portfolio theory, capital budgeting, and asset valuation (e.g. mortgage valuation) was formulated for better intuitive understanding of the above mentioned concepts without error. It also allowed the participants to handle the problem at their own ensuring learning by doing.

Innovative and IT intensive case study sessions were incorporated for deeper understanding of applied corporate finance concepts in real estate industry. Use of case studies for business education is an established pedagogy improving learning through interaction, brainstorming, and team work (Steadman, 2000, McAlister-Kizzier, 1999). Moreover it was found that the use of computer-based teaching methods requiring hands-on student use appear to offer an advantage over traditional methods and over computer-based methods not requiring hands-on student use in providing a forum for exploratory analysis during class and for acquiring technical procedural knowledge (Leidner and Jarvenpaa, 1993). This motivated to use case studies requiring use of computer-based spreadsheets for real estate finance and investment module.

Methodology
Action research is inquiry or research in the context of focused efforts to improve the quality of an organization and its performance. It typically is designed and conducted by practitioners who analyze the data to improve their own practice (Ryder, 2007). It gives educators new opportunities to reflect on and assess their teaching; to explore and test new ideas, methods, and materials; to assess how effective the new approaches were; to share feedback with fellow team members; and to make decisions about which new approaches to include in the team's curriculum, instruction, and assessment plans (Miller, 1990, Miller and Bradford, 2001, McKay, 1992, May, 1993). Mertler (2005) highlighted eight specific steps of conducting an action research, which were followed in this specific TeNT project. Table 1 shows these steps with description of relevant actions taken for each steps.
<table>
<thead>
<tr>
<th>Steps</th>
<th>Step titles (Mertler, 2005)</th>
<th>Specific actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Identifying the topic</td>
<td>Identifying the limitations in Real Estate Finance module deliveries. Targeting integration of active learning interventions for increased participation and better learning.</td>
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<tr>
<td>2</td>
<td>Reviewing the related literature</td>
<td>Literature reviews on financial spreadsheet analysis, electronic voting system, and use of case studies with Tablet PC support for business education.</td>
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<tr>
<td>3</td>
<td>Developing research plan</td>
<td>Modifying contents and deliveries of lectures and tutorials in test modules to incorporate active learning interventions and approval of the board of studies and module leaders.</td>
</tr>
<tr>
<td>4</td>
<td>Implementing the plan and collecting data</td>
<td>Implementing financial spreadsheet analysis, electronic voting system, and Tablet PC supported case studies in Real Estate Finance module. Collecting data through open thought posting, structured questionnaire, unstructured group discussion, and interviews.</td>
</tr>
<tr>
<td>5</td>
<td>Analyzing the data</td>
<td>Statistical analysis of collected data, transcribing the recorded open thought posting, group discussions, and interviews for analysis.</td>
</tr>
<tr>
<td>6</td>
<td>Developing an action plan</td>
<td>Improving incorporation of active learning interventions in Real Estate Finance module based on participants’ feedback, observers’ feedback, and reflection on module deliveries.</td>
</tr>
<tr>
<td>7</td>
<td>Sharing and communicating the result</td>
<td>Arrangement of school-wide staff development seminar and presentation of conference papers for dissemination of acquired knowledge.</td>
</tr>
<tr>
<td>8</td>
<td>Reflecting on the process</td>
<td>Designing continuous feedback and reflection mechanism for continued improvement in learning and teaching environment of the test modules.</td>
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Use of Tablet PC for Case Study Sessions: Implementation Model

Resources
1) Tablet PCs: 1 for group of 5
2) Electronic Voting System
3) Facilitator’s PC with Data Projection
4) Wireless (preferable) internet connection

Facilitator: equipped with a PC that is connected to ULearn for delivering material and installed with an Electronic Voting System (EVS) to prompt questions through PowerPoint slide projection.

Group 1: Each group is equipped with a Tablet PC (A laptop PC with an interactive touch screen that can be used as an input device like a paper note book using stylus for group work). All tablet PCs are connected to ULearn for material download and have access to MS Excel for spreadsheet analysis.

Group 2: Each group has 5 members and all of them have handsets to cast their vote for any questions asked by the facilitator using the EVS.

Group 3

Group 6

Case Study Session Plan using Tablet PCs

Step 1: to facilitate participants’ theoretical understanding of corporate financial concepts applied in real estate market

Step 2: to train participants on how to use formulas using short problems during the lectures/tutorials using basic spreadsheets

Step 3: to design and schedule case study sessions using challenging yet creative cases from the real estate market that involves creative brainstorming, calculation, spreadsheet analysis, and interaction considering the time scale of each session

Step 4: to introduce participants to tablet PCs with time for familiarization prior each case study session

Step 5: to deliver the case using ULearn during each session with chat facility to promote discussion among groups and facilitator

Step 6: to deliver useful tips and formulas through ULearn occasionally to facilitate case solution

Step 7: to ask crucial questions to all group simultaneously using EVS to maintain a sustainable and balanced pace across all the groups

Step 8: to reflect on such practice by accumulating feedback from the participants at the end of each session
**Intervention Analysis**

In the year 2007 – 2008 delivery the case study sessions were designed in SCEPTrE (Surrey Centre of Excellence in Professional Training and Education) room 1, which is equipped with three overhead projectors, high-speed internet WiFi connection, state of the art high-spec laptops, wheel mounted furniture that can be arranged in different form easily, and writeable walls. This technologically enhanced environment immediately had a positive impact on the participants and motivated them to work harder for a period of three hours in group solving complex cases in real estate finance and investment (please see comments e.g. 5, 10, 13).

![Participants in group study session](image)

In previous academic year the length of the slots was an issue yet participants found them struggling to solve problem within such long time slot. Whereas, in the last academic year participants were relaxed and utilized the technology with joy to solve the cases (please see comments e.g. 38, 43). During this TeNT project the cases were directly sourced from the past exam paper, which enabled the participants to practice for the exam (please see comments e.g. 5, 10, 33, 36). It was major motivator as well for the whole intervention to work smoothly. Moreover, the EVS (electronic voting system, see comment 12) played a major role in keeping the participants in track without intervening too much to spoil the exploratory nature of the intervention. It was observed that the participants tend to work hard in group and pose relevant questions through discussion forum on ULearn despite of the fact that the cases were unseen to them. During the lectures of this module, various techniques and concepts were delivered but their applications were only exercised in these case study sessions. Hence it was really encouraging to see how participants were learning-by-doing (please see comments, e.g. 2, 25, 34, 37).
One of the major issues was the uncertainty around verifying the correctness of the group solutions. The sessions were not designed to accommodate any discussion among the groups or any presentation by the groups for greater interaction. The EVS questions were at times indicative of the right kind of numerical results but the analysis part was not communicated in detail to acknowledge accuracy of the group solutions. In fact there are few comments around such suggestion from the participants, which convinced us that we should incorporate group presentation or reflective account of the groups’ work at the end of the sessions from next time onward (please see comments e.g. 11).

From the perspective of the facilitator this is a very good intervention that harbours active learning by providing an immersive experience to the participants. The sessions require ample designing, planning, and prior preparation but it runs very smoothly without any engagement from the facilitator’s part. Giving the responsibility of the learning to the learners is one of the best things we can do as facilitators. This session is a living testimony of such situation where learners learn by themselves with minimum hand-holding from the facilitator (teacher). This session has already been replicated in other modules and would definitely be continuing in Real Estate Finance and Investment module.
Dissemination of the Action Research

This project was presented as a poster at the Learning and Teaching Event in March 2008 at the University of Surrey. It was also presented at the 4th European Real Estate Society Education Seminar, Bucharest, Romania, in December 2008. In both the occasions the project attracted lots of interested educators who showed interest in implementing similar sessions in their modules. In particular the project sparked the idea of a steering group in Europe to record technological intervention in real estate education. Such documentation of various technological interventions in real estate education would then be published in article form in Journal of European Real Estate Research. Within the School of Management, University of Surrey, this project surfaced a lot of discussions around practical case study sessions that can be supported with technology for better self-learning to equip the future business leaders with transferable skills.
Appendix

Feedback from Participants 2007 – 2008

Comment 1
More exercise preferred. The tutorial is very useful. Learn a lot in the session.

Comment 2
Useful to see theory in practice with tutor’s help.

Comment 3
The session was very useful for the exam.

Comment 4
The laptops are very annoying!!!

Comment 5
Very good resources. Prefer use of computers. Excellent environment. Groups of worked well. Great exam revision. Write on walls useful.

Comment 6
Very useful

Comment 7
Vey useful. Thanks for this and for the help 😊

Comment 8
Should have more sessions like this one as easier to follow than lecture.

Comment 9
Great chance to practice formulas and set up on Excel.

Comment 10
Helps us practice for exam. Fairly good environment; cause of interaction with class. May be more group interaction … group with groups.

Comment 11
Good working environment. Could have stopped and gone through questions @ end. In future each group could do one question and then present to everyone. Increase interaction.

Comment 12
Great facilities, laptop, white board, online voting system.

Comment 13
Enjoyed group work. Very good learning environment.

Comment 14
Good facilitator/student ratio.
Comment 15
Nice 2 have different environment.

Comment 16
Challenging

Comment 17
Brilliant

Comment 18
No comment

Comment 19
Interesting

Comment 20
Different

Comment 21
Good learning experience.

Comment 22
Challenging, helpful, good learning environment.

Comment 23
I thought that the experience was extremely helpful although challenging.

Comment 24
Stressful. Good experience.

Comment 25
Positive way to work – brainstorming!!

Comment 26
Good facilities. Good working in team.

Comment 27
Hard. Interesting.

Comment 28
Very useful.

Comment 29
Good practice.

Comment 30
Optimal learning environment.

Comment 31
Eye opener.
Comment 32
I’m Ron Burgandy?

Comment 33
Good session. Facilities excellent. Very helpful to understand the correct method of working out the answers. Helps give some idea of exam situation.

Comment 34
Really good learning experience. Enjoy practical element, aids understanding far more than lectures. Thanks!

Comment 35
Very useful, found it a good learning experience. May be a bit too long time span.

Comment 36
Really helps give me an idea of how the exam will go.

Comment 37
Seems impossible at first, I understand it much better now!

Comment 38
Lots of hard work (3hrs is a long time).

Comment 39
Easier if spread over two sessions.

Comment 40
Really helps having small class size.

Comment 41
Challenging.

Comment 42
Fast computers.

Comment 43

Comment 44
Useful. Drawing on walls. Highlight revision essential.

Comment 45

Comment 46
Innovation. Fast computers.
Comment 47
Group task. Hard questions – challenging.

Comment 48
Awesome!!

Comment 49
Scary.

Comment 50
Beneficial but shows I need to revise.

Comment 51
Innovative.

Comment 52
Worried about exam now!

Comment 53
😊

Comment 54
Scared!

Comment 55
Less scared about exam.

Comment 56
Difficult, stressful, useful.

Comment 57
Interesting.

Comment 58
Will I be able to remember all this for the exam? Why can’t the exam be open-book?

Comment 59
Hungry

Comment 60
Excel 2007??

Comment 61
Useful.

Comment 62
Helpful.

Comment 63
Very useful but makes my brain hurt!
Feedback from Participants 2006 – 2007 (Highlights)
Response Scale: 5 - Strongly agree, 4 – Agree, 3 – Neutral, 2 – Disagree, 1 – Strongly disagree

Statement 1: Case study sessions are useful for deeper understanding of concepts (Average = 4.09)
Statement 2: Solving case studies in group is effective and efficient for learning (Average = 4.00)

Statement 3: Use of computers in solving case studies enhances the group work efficiency (Average = 4.33)
Statement 4: Use of tablet PCs (with touch screen) in solving case studies enhances the group work efficiency (Average = 2.71)

Statements with regards to use of Electronic Voting System Responses

<table>
<thead>
<tr>
<th>Statements</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Right balance of listening and discussing</td>
<td>80%</td>
</tr>
<tr>
<td>2. Need more opportunity to discuss</td>
<td>15%</td>
</tr>
<tr>
<td>3. Anonymity is the prime advantage</td>
<td>55%</td>
</tr>
<tr>
<td>4. Usefulness of knowing how other people answered</td>
<td>80%</td>
</tr>
<tr>
<td>5. EVS made me think more compared to other lectures</td>
<td>100%</td>
</tr>
<tr>
<td>6. Never chose not to vote using EVS</td>
<td>100%</td>
</tr>
<tr>
<td>7. EVS Helped to better understand the module topics</td>
<td>100%</td>
</tr>
<tr>
<td>8. Like to use EVS in future</td>
<td>100%</td>
</tr>
</tbody>
</table>
**Responses from Recorded Feedback (year 2006 – 2007)**

“Umm … they are bit long bit difficult … they take … quite time consuming … um but overall once we’ve done them … um … it made the exam lot easier once we’ve already done sort of an example of it … so …”

“… I found the case studies in real estate module useful … When I’ve done them … um … I was able to understand it clearly and I felt it helped me in the exam and the coursework.”

“I think definitely out of all the finance modules I have done this year definitely by far the best module, definitely most interesting, um … a lot more interactive, um … and I definitely got a lot more out of it than the other modules”.

**References**


