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Teaching Cycle II - Educational Technology (ET)

(Article)

An Effective Use of ET for Constructing Knowledge in Higher Education

Introduction

The 21st century is an information age, which is characterised by the increased accessibility of information through the medium of sophisticated technological tools. One of the most contested issues in higher education over the last few years is influenced by the increase in the use of technology in every aspect of our lives. The more each new generation becomes familiar with computers and the use of web-based sources the more their expectations from higher education increase. As Barzilai and Zohar have recently argued, many "educators point out that one of the goals of the educational system in the information age should be to prepare students for taking an independent and responsible role in the information society" (Barzilai and Zohar, 2008, 35). Furthermore, students need to "acquire the skills necessary for coping critically and effectively with large amounts of information from a wide range of sources" (Barzilai and Zohar, 2008, 35; See also Owston 1997; Breivik 1998; Land and Greene 2000; Slotta and Linn 2000; Law et al. 2005).

This teaching cycle aims to show how ET can be used effectively in order to meet the needs and expectations of students in the information age and encourage them to adopt a 'deep' and 'critical' approach to learning in higher education. First the differences between IT and ET are identified; secondly, three teaching methods of using ET are explained; and some reflections and limitations on using ET for future practices as part of continuing professional development are evaluated.

Knowledge vs. Information or ET vs. IT

Many educators in higher education face a dilemma in using information and technological tools for teaching and learning purposes. Such a dilemma is determined by the generational gap, personal preferences for traditional or modern ways of
teaching and the specific requirements of specific academic disciplines (Barzilai and Zohar, 2008: 36). For instance, when I began teaching in Aberystwyth University in September 2005 I was familiar only with very limited visual aids (Appendix N - Samples of Handouts and Slides). These were used as part of traditional ways of transmitting knowledge in my previous institutions. The first teacher-training programme, which I had to attend as a post-graduate teaching assistant, was rather inefficient to understand the complex connections between teaching and learning in the information age. The first book that I consulted was written by Graham Gibbs and Trevor Habeshaw, Preparing to Teach: An Introduction to Effective Teaching in Higher Education, in 1989 and it had one chapter on 'using visual aids that explained the benefits of using handouts and overhead projectors for effective teaching. However, there was no reference to either information technology (IT) or educational technology (ET). The advance of technology particularly proves that there are no fixed characteristics of a teaching/learning environment.

In the digital age it is evident that the new generation of students are more technologically oriented and frequently use internet-based search engines such as Google to acquire information. Therefore, students' increased dependency not only on computers, mobile phones and ipods but also, more importantly, on the easy access to web-based knowledge has forced educators to re-consider their teaching methods. The information age has its advantages and disadvantages: on the one hand, students can retrieve information in a 'keystroke'; and on the other, they have to shift through numerous documents and web-pages most of which are 'unrelated to user's quest' and, more importantly, unreliable 'as far as their content is concerned' (Wallece et al., 2004: 273). Both students and teachers need to be guided to retrieve 'information and knowledge' from reliable electronic sources and become computer friendly researchers.

According to a most recent research based on semi-structured interviews with academic researchers, the majority of the researchers (18 out of 24, or 75%) think that "computers created essential changes in their research" (Barzilai and Zohar, 2008: 42). Moreover, as Biggs argues, the development of information technology put teachers and their institutions under enormous pressure to harness this progress not only to improve the quality of teaching but also "enable their universities to sell their educational wares on the other side of the world" (Biggs, 2003: 213). While Biggs
does not attempt to identify what 'information' implies, Barzilai and Zohar make a clear distinction between 'information' and 'knowledge'. In their analysis, while information consists of facts, concepts, ideas or procedure "knowledge is a web or a network made of connections between pieces of information" (2008: 38). A comparison between information and knowledge illustrates their implications for educational purposes.

Table 1: Barzilai and Zohar's comparison of information and knowledge (2008: 38)

<table>
<thead>
<tr>
<th>Information</th>
<th>Knowledge</th>
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<tr>
<td>1. Information is discrete.</td>
<td>Knowledge is arranged in meaningful mental webs and networks.</td>
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<tr>
<td>2. Information does not necessarily require a context.</td>
<td>Knowledge is always contextualised.</td>
</tr>
<tr>
<td>3. The presentation of information calls for clarity.</td>
<td>The presentation of knowledge calls for conflict or ambiguity.</td>
</tr>
<tr>
<td>4. Information may be transmitted from teachers to students. Information is impersonal.</td>
<td>Knowledge cannot be transmitted from teachers to students. Knowledge is constructed by students.</td>
</tr>
<tr>
<td>5. Information acquisition is manifested in its reproduction (or retrieved from Memory.</td>
<td>Acquisition of knowledge is manifested by novel applications.</td>
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Therefore, the differences between information and knowledge, in fact, have important implications for teaching and learning in higher education. According to Biggs, knowledge is "created by the student's learning activities, their approaches to learning" (emphasis in the original). In his opinion, "the student creates knowledge - call it 'constructing knowledge' or 'constituting knowledge' as you will - so that knowledge is no imposed or transmitted by direct instruction". For him, this "means 'constructivism', with its emphasis on what students have to do, rather than how they represent knowledge" (emphasis is mine; Biggs, 2003: 13). Therefore, the aims of teachers in higher education should reflect their preferences for the construction of knowledge by their students rather than the acquisition of information. The 'ownership' of information in the technological age can only make sense when it is contextualised "through process of integration, connection-making, and knowledge construction" (Barzilai and Zohar, 2008: 49). In my opinion, hence, prioritising
'knowledge' over 'information' implies the use of technology for educational purposes rather than information technology.

**Using ET for Constructing Knowledge**

This paper argues that knowledge is essentially constructed by students, which is the key stage in the process of becoming a reflective learner. Moreover, there is evidence that many countries in the world have already implemented education reforms to integrate educational innovations, which are supported by the use of 'information communication technology' (ICT), into the goals and practices of education (Law et al. 2005: 5). While there is no magic formula for the infusion of ICT or IT; "there is much expectation surrounding the potential impact of educational technologies on teaching and learning" (Van Melle and Cimellaro, 2003: 265). Biggs draws our attention to the fact that

> We are concerned with educational technology (ET) not information technology (IT). ET has great potential in helping us reach our educational aims and objectives; in managing learning, in engaging students in appropriate learning activities, in assessing learning and in enabling off-campus learning (Biggs, 2003: 213).

I agree with Biggs that the use of technology is not about presenting more and more information, as the word 'information' before 'technology' implies in the case of IT; rather, teachers in higher education should not limit themselves to 'the information-handling facility of electronic technology' (Biggs, 2003: 214). The argument here is that ET can be used effectively for educational purposes and that is why the word 'education' comes before 'technology' in the case of ET.

As mentioned earlier, my search for innovative methods and approaches to teaching in higher education has been a result of personal dissatisfaction with traditional ways of learning and teaching. When I designed a new undergraduate module, *Islam, Foreign Policy and the Developing World*, to teach in the first semester of 2008/2009 I used this as an opportunity to incorporate the effective use of ET into my teaching.

Based on Biggs' identification of functions and examples of ET, I chose three functions and examples of ET - managing learning, information storage and presentation, and assessment tool - because they encourage students to adopt a 'deep'
and 'critical' approach to learning (See Table 2; Biggs, 2003: 227). In the module handbook, students were implicitly informed that the teaching method of this module was based on the use of ET (See Appendix G - IP39520 Module Handbook).

The most important reason behind the search for an innovative way of using ET was the student feedback. During the first teaching cycle, students were asked in separate occasions what they liked and what they did not like about my teaching style (Appendices, JK, L, M - Student Feedback). As reflective teacher, I always collect student feedback to see how my teaching can be improved and continually reflect on how I can teach better (Biggs, 2003: 6). Several suggested that it would be more helpful if I used PowerPoint presentations (See Appendix JK, L - Student Feedback). Clearly, student feedback supported Biggs' claims about the potential use of ET in managing learning and engaging students in appropriate learning activities.

Table 2: Uses of ET and some typical examples of each use

<table>
<thead>
<tr>
<th>Function</th>
<th>Examples of ET</th>
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<tbody>
<tr>
<td>Managing learning</td>
<td>WebCT, Blackboard, web pages presenting access to university/department/programme information; online enrolment; communications; bulletin boards</td>
</tr>
<tr>
<td>Information storage and presentation</td>
<td>Web-based WebCT, Blackboard, e-books, e-journals, search engines, Library/Cbyrary, web pages presenting access to university/department/programme information; online enrolment; communications; bulletin</td>
</tr>
<tr>
<td>Non web-based: PowerPoint and other Microsoft Office applications, videos, CDs.</td>
<td></td>
</tr>
<tr>
<td>Interactive tools</td>
<td>Simulations, virtual environments, bulletin boards, Knowledge Forum, electronic voting, Can be used synchronously/asynchronously, and individually or in groups</td>
</tr>
<tr>
<td>Assessment tools</td>
<td>CAA: MCQ item banck, either commercial or teacher produced</td>
</tr>
<tr>
<td>Open-ended: Knowledge Forum and bulletin boards generally, web-pages, ideal for self-, peer as well as teacher assessment</td>
<td></td>
</tr>
<tr>
<td>Off-campus</td>
<td>Synchronous: telephone, tele- and video-conferencing</td>
</tr>
<tr>
<td>Asynchronous: all web-based, as above</td>
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</table>

According to this classification, three functions and examples of the effective use of ET were identified:
The first function of ET was about 'managing learning' effectively and the key examples of ET was the use of Blackboard and email (See Table 2). Students were instructed that they must check their emails and the module Blackboard site regularly. The module handbook, lecture handouts, additional reading material, electronic resources, office hours, and any change to timetable details were posted on Blackboard. In particular, I emphasised the importance of using email as part of interactive communication.

The second function of ET was 'information storage and presentation'. This requires an effective use of Blackboard, e-books, e-journals, search engines as well as non web-based information sources such as PowerPoint and videos (See Table 2 - Column 4). Hence, the use of ET as an example of information storage and presentation was incorporated into my teaching in three ways: first, the reading and learning material was supported by web-based e-sources so that students would not 'waste' their time searching for unrelated and unreliable information (Barzilai and Zobar, 2008: 36) (See Appendix S - Additional Email for e-readings). Second, the lecturing method was supported by the use of PowerPoint presentations. The process of giving handouts to students was radically changed from a one page handout to distributing PowerPoint presentations that showed links to web-sources. Hence, I reflected upon the student feedback in the way I designed the lecture handouts and made them available to students on Blackboard (See Appendix N - Lecture Handouts and PowerPoint Slides). Third, as a non web-based source, students had to watch a video during the video week and each student had an option to choose a video from the list at the beginning of the semester. Students were asked to write a 500-word critique of the video for seminar discussions (See Appendix T - Learning Portfolio for the Video Week).

The last function of ET was related to 'assessment tools' (See Table 2). An additional assessment method was introduced. The Student Learning Portfolio was allocated to each student on Blackboard, as demonstrated in the third teaching cycle. How to manage a learning portfolio was explained in the first seminar and students were given clear instructions in the module handbook. The Learning Portfolio was graded as part of seminar participation, and it was worth 10% of the final overall mark. In order to enhance student learning, all students were expected to participate in seminar discussions actively. As part of the 'interactive use of ET', at least two or
three of the assigned readings for each week must be read before the seminar, and two of the seminar discussion questions have to be answered by the previous night via email. In each seminar, a number of students will be asked to present a summary and a critique of readings that will contribute to the outcomes of their Learning Portfolio for the module.

Students were instructed clearly how to complete this process that each entry in learning portfolio should contain the following:
(a) The seminar date, topic and student’s seminar group;
(b) The author and title of the books, chapters or articles student read as preparation;
(c) The students were advised to use succinct and coherent sentences to answer at least two or three of the seminar discussion questions. Students could choose which questions to answer depending on their readings.
(d) Students had to write what s/he found difficult or confusing and/or what s/he found most interesting or particularly informative in his/her readings.
A 500-word short essay was sufficient for each entry. The final portfolio entry should reflect on the module as a whole, as well as the final session.

After their submissions, students then were able to get feedback from their teachers by the end of week at the latest. Students had the opportunity to contact the teacher if they still had questions or did not understand the feedback (See Appendix S for Student Emails). Meanwhile, I constantly gathered feedback from students and peers through teaching observations to assess the impacts of the use of ET on student learning (See Appendices C and PQ, R, and T).

Reflections and Constraints

As indicated earlier, the use of ET was based on various examples of web-based (e-sources, Blackboard, email) and non-web-based tools (PowerPoint presentations, handouts, videos). At the beginning of my lectures, students were provided handouts with the PowerPoint slides on, giving them space to write their own comments. The majority of observers commented that there was good use of PowerPoint and handouts, with difficult terms and phrases explained, while the slides were well prepared, being clear and not too busy. PowerPoint materials contained just the right amount of information (not too little or too much) and were easy to follow, and
therefore, considered very effective by peer observations (See Appendix C - Peer Observations 21 April 2008; 14 November 2008; 28 November 2008).

My lectures were divided up in to 20 minutes sections separated by a 5 minutes video break, which is based on the research that students' attention is limited to maximum 20 minutes (Gibbs and Habeshaw, 1989: 42). The video break is usually supported by a short quiz to 'drill down' the key concepts and ideas that they heard in the video (See Appendices PQ and R for Quiz). I try to end the lecture with a 5 minutes question and answer session. I believe this mixed use of different methods can be much more effective than one long 50 minutes lecture.

Based on peer observations, I incorporated the following suggestions into my lecturing style: First, I incorporated the use of a combination of different teaching methods, as suggested by my mentor. Second, I introduced the use of additional visual aids as part of ET such as maps, charts, pictures and political cartoons in PowerPoint presentation. Third, I allocated more time to the video session turning it into a 'think-pair-share' discussion that students can engage with the material and key ideas they had been introduced in the video and lecture.

As peer observations indicated, in relation to the first change the use of a combination of 'different teaching methods' and 'blended learning' worked well. In particular, "the introduction of a short video at ½ time was very effective and well timed. The change of pace helped students to consolidate the material they had just been given and overcame the 20-minute attention lapse syndrome. The exercise used to 'drill down' some of the key points in the video was useful. (See Appendix C - Peer Observation on 14 November 2008).

For the use of additional visual aids as the second change, showing a regional map at the start of the lecture focuses students' attention and contextualises the material geographically (See Appendix C - Peer Observation on 14 November 2008). I included the use of additional handouts giving definitions of the specific terms in Arabic that students are struggling with (See Appendix 0 - Additional Handouts and List of Specific Terms). Furthermore, I introduced the use of animation in PowerPoint presentation, so that I can indicate exactly where I am in the slide. These changes were also well received. According to another peer observation, the "transition in and out of the PowerPoint and into the video were seamless" (Appendix C - Peer
Observation on 28 November 2008). Additionally, both students and peers commented on the effective use of a microphone to project my voice to the back of a large lecture room. I plan to continue using these technological tools as much as possible in the future.

The third change of introducing to use a 'think-pair-share' exercise in large lectures were also regarded as a good way of keeping students involved and engaged (Appendix C - Peer Observations on 24 October 2008 and 28 November 2008). However, I need to develop further this aspect of large group teaching. Hence, I plan introducing more student-led activities into lectures that will give students additional responsibility for learning.

In general, I was very encouraged by peer observations that reflected my approach to teaching and learning. As one observer commented, I take teaching seriously as a professional activity and demonstrate a clear altruistic concern for the progress and development of students. I am pleased to know that my peers think that students clearly respond very well to this (See Appendix C). In terms of limitations, I hardly encountered any negative comment from peers, my mentor and students about the use of ET (video, microphone, electronic map, political cartoons and e-sources) in lectures. The majority of students indicated that they found the use of video very helpful and informative, and a particularly good way of breaking down the lecture material (Appendix PQ - Student Feedback).

The last function of ET was related to 'assessment tools', as stated earlier (See Table 2). In this function, the main use of ET was extended to 'assessment and feedback' in the format of a student learning portfolio. Several students indicated that although the idea of a learning portfolio was good, however, preparing learning logs each week was not rewarding (Appendix S - Email communications). Some students felt that the amount of effort and time given to the learning portfolio was not reflected in the percentage of the overall grade, and in response to this I am going to ensure that learning logs count for more in the future. I believe students benefit from this exercise but there is no doubt that it also increases the workload for teachers.

To reduce the increased workload, I introduced an innovative use of an additional electronic tool called 'grade centre' on Blackboard, which reduced the workload for instructors. While students were able to gain instant feedback through
the system, the teacher could spend less time than traditional methods when returning feedback. This is why I developed my third teaching cycle on the electronic assessment of the 'learning portfolio' as I explain in the section on poster format.

References


