Emerging Patterns in Transferring Assessment Practices from F2f to Online Environments

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Abstract: This study explores the transfer of assessment practices from f2f to online environments by college instructors, with a particular interest in the factors influencing assessment in online learning settings. Assessment is a critical aspect of the learning environment, and considerable research has suggested various methods of formative and summative assessment for the f2f classroom. However, there has been less research into the ways in which these traditional forms of assessment are being incorporated into the online learning environment, or whether they may even be appropriate. This study investigated the perceptions of seven higher education faculty, with experience teaching courses in both the f2f and online environments, regarding the transfer of assessment practices between the two delivery formats. Specifically, this study explored the transfer of assessment practices from f2f to online environments by college instructors in two higher education institutions: a four-year college and a two-year community college. The authors propose that an understanding of both assessment for learning and of learning is needed to support effective faculty practices and enhanced student learning in online courses. Consequently, it is important to study the impact of assessment strategies and techniques faculty employ to better understand various instructional practices that effectively centre on enhanced student learning. A phenomenological approach was employed for the analysis of data involving seven online course instructors at two higher education institutions, a four-year college and a two-year community college. Findings indicate several factors that influence the transfer of assessment practices from f2f to online environments. Data analysis points to several areas of interest related to the design of online assessment: time management, complexity of content, structure of online medium, student responsibility and initiative, and informal assessment. Authors suggest the incorporation of traditional classroom assessment techniques in the online learning environment should be considered in light of the factors described above. In particular, assessments for continuous and improved learning are important for the development of an engaged community of learners in the online environment. As technologies continue to evolve, a pedagogical framework that considers the learning environment differences between traditional and face to face classes becomes increasing imperative, both in terms of understanding the delivery and mediation of instruction. Such a framework will need to address both aspects of process and product in assessment. Consequently, future research needs to examine what strategies of techniques are effective in the assessment for learning in online instruction.

Keywords: Online learning, online assessment, assessment for learning, assessment of learning, transfer of assessment practices, online faculty

1. Introduction

Online learning impacts current instructional practices and policies in universities across the country and the world, thus quickly changing the fabric of higher education (Rowley, Lujan, and Dolence, 1998). The rapid expansion of online instruction in K-16 education has been documented by the National Center for Education Statistics (NCES, 2003). A report from the Sloan Consortium found that over 1.6 million students were studying online in the fall of 2002 (Allen and Seaman, 2003). This report indicated an expectation of a substantial growth of online learning in the forthcoming years. In their 2006 study, Allen and Seaman report that nearly 3.2 million students took at least one online course during the fall 2005 term. They also note that about two-thirds of the very largest institutions have fully online programs, compared to only about one-sixth of the smallest institutions (Allen and Seaman, 2003: ¶ 7). Consequently, such a shift in the delivery of instruction relates to what Norton and Wiburg (2003: 4) call ‘defining technology;’ “a technology that results in fundamental changes in how people see themselves and their world”. Traditional pedagogical understandings of learning and assessment are not immune to this paradigm shift.

Swan, Shen and Hiltz (2006) state that learning and assessment are not two distinct phases in an online course, as both directly influence student learning. Key issues emerge with respect to online assessment, some of which include identifying appropriate and effective assessment methods, distinguishing between barriers and facilitators to their implementation, and adequately selecting and
managing assessment activities (Australian National Training Authority, 2002). Speck (2002: 5) argues that “insufficient attention to pedagogical questions and concerns arising from the practice of online teaching […] raises questions about assessment of learners in online classrooms”. It is important to understand current faculty practices of assessment as well as the factors that influence assessment in order to increase the quality of teaching and learning in the online environment.

This study explores the transfer of assessment practices from f2f to online environments by college instructors in two higher education institutions: a 4-year college and a 2-year community college. The authors propose that an understanding of both assessment for learning and of learning is needed to support effective faculty practices and enhanced student learning in online courses. The objective of the study was to identify specific factors that might assist instructors in moving f2f course assessment practices to the online environment to enhance pedagogical practice as well as student interaction and learning. Consequently, it is important to study the impact of assessment strategies and techniques faculty employ to better understand various instructional practices that effectively center on enhanced student learning.

2. Literature review

Assessment is an important aspect of teaching and learning systems (Benson, 2003). The appropriate integration of assessment processes improves teaching and learning. As such, it “[…] must be integrated into a holistic view of pedagogy. This means that any theory of assessment presumes and informs a theory of learning” (Speck, 2002: 6). While assessment practices have developed in f2f environments, “the principles of assessment do not change in an online environment” (Benson, 2003: 71). Nevertheless, there are differences between f2f and online environments which may present challenges to the effective implementation of both traditional and alternative forms of assessment.

Traditional assessment positions learners as recipients of knowledge where learning is measured and documented at the lowest levels of Bloom’s taxonomy as knowledge and comprehension (Robles and Braathen, 2002). This type of assessment does not allow for higher-order thinking skills, such as synthesis, analysis, and evaluation (Speck, 2002). On the other hand, alternative assessment assumes the role of students as inquirers who are actively engaged in the learning process. In this case, assessment activates learning at higher-order thinking levels and embraces collaboration (Anderson, 1998). Instructional activities can be used diagnostically to alter teaching and learning (Black and William, 1998). Whether formative (i.e., during the cycle of instruction) or summative (i.e., upon completion of the cycle of instruction), assessment plays an important role in the learning process to inform progress and further learning.

The Quality Matters (2006: ¶ 3) rubric suggests using assessment instruments that are “sequenced, varied, and appropriate to the content being assessed”. Assessment is important in guiding the design of online courses by using a variety of tools - such as self-assessment and peer-assessment methods – as well as tasks that encourage critical thinking and collaboration of students in their learning and assessment activities (Herron and Wright, 2006). Assessment strategies need to be diverse and provide multiple opportunities for learners and instructors to evaluate learning. Effective assessment techniques can improve an instructor’s understanding of student needs and provide the development of a learner-centered classroom.

Assessment of and for learning

There is a distinction between assessment of learning and assessment for learning; the latter places student learning at the center of assessment (Elwood and Klenowski, 2002). This approach to assessment guides an understanding that learners and instructors share the ownership and responsibility for evaluating their own interconnected performance and learning outcomes. Under these circumstances, comparing assessment of learning and for learning reveals the following (Elwood and Klenowski, 2002: 243):

Assessment of learning (assessment for the purposes of grading and reporting with its own established procedures) and assessment for learning (assessment whose purpose is to enable students, through effective feedback, to fully understand their own learning and the goals they are aiming for).
Online instructors can utilize assessment techniques and strategies to determine “what students are learning in the classroom and how well they are learning” (Angelo and Cross, 1993: 41). Classroom assessment provides instructors with immediate feedback on student learning and progress. Learners need regular practice in assessment to become self-monitoring and independent (Angelo, 1995). Classroom assessment techniques “require learners to engage in simple acts of metacognition to reflect on and assess their own understanding of the content they are learning” (Angelo and Cross, 1993: 120). Quality Matters (2006) suggests instructors provide self-check or practice types of assignments for timely student feedback.

Learner-centered assessment can encourage meaningful dialogue, increase collaboration, peer and self-evaluation, and a sense of community for a shared purpose (Morgan and O’Reilly, 2001). “Assessment should play a crucial role in helping students to develop as effective online collaborators” (Macdonald, 2003: 388). Online learners need to manage their own learning through self- and peer-assessment, discovery learning, reflection, and articulation (Australian National Training Authority, 2002). In order to manage their learning, students need to take an active role by planning, monitoring, and then reflecting and evaluating not only on the learning tasks, but on the processes of learning as well (McLoughlin and Luca, 2002). These processes require a learning environment that supports such an active student role. Assessment needs to be an ongoing and seamless process in order to address and scaffold properly the learning needs of all students.

As the role of students in online learning relies on self-monitoring and peer support, assessment should provide multiple avenues for both formal and informal assessment. Consequently, the instructor’s role in the online environment requires rethinking and reconstructing assessment practices traditionally employed in f2f settings. A study on student satisfaction and learning in online courses found that interaction with the teacher is the most significant contributor to perceived student learning (Fredericksen et al., 2000). Instructors need to balance immediacy by providing students a reasonable amount of time and opportunity to respond (Rovai, 2001). Such immediacy behaviors, when coupled with student expectations, might be influential in facilitating learning and metacognitive processes. Given these circumstances, instructors can structure a feedback mechanism that will encourage student inquiry, collaboration (Vonderwell, 2003), and metacognitive feedback and self-assessment strategies. Qing and Akins (2005: 58) suggest that instructors use a variety of assessment techniques and provide “opportunities for students to develop their own learning goals and assessment tools”.

Assessment of online learning differs from the strategies used in traditional, f2f classrooms. Instructor-student interactions in the virtual world are mediated by a computer interface rather than in a f2f setting structured by means of interpersonal exchange. The lack of visual cues, use of asynchronous conversations, and technical issues suggest assessment in online learning is not to be conducted as it has been in a traditional face-to-face classroom (Reeves, 2000). Promoting sustainable high levels of student performance depends not only on a thorough knowledge of pedagogical content, but also on a well-designed assessment process that concurrently informs teaching and promotes learning.

Addressing several misconceptions regarding online instruction, Qing and Akins (2005: 52) state: “face-to-face pedagogy can and should be used to inform online pedagogy. But this in itself cannot be the driving force to designing online courses; one must consider e-pedagogy to create a successful and meaningful course”. Additionally, Qing and Akins (2005) note that equating the assessment of online learning and learner participation with counting the number of messages in discussion logs does not adequately address student learning. Vonderwell, Liang and Alderman (2007) found that assessment of online discussions is influenced by structure, learning community, self-regulatory cognitions, learner autonomy and student writing skills. They note that “assessment as a process requires that online learning activities facilitate self-assessment, peer-assessment, self-regulatory mechanisms, and learner autonomy” (Vonderwell et al., 2007: 323). Speck (2002: 15) also suggests that instructors “design assignments that allow for interplay between process and product, between formative and summative assessment”.

This framework provides a lens through which to interpret the use of assessment practices in online environments, with a particular interest in instructors’ perception of the degree to which those strategies provide accurate assessment data related to student learning. The literature suggests that traditional forms of assessment employed in the classroom may not be appropriate for online
instruction. Consequently, there is a need to examine instructor assessment practices and any relevant issues that impact them in online courses. Such research can help college instructors determine ways in which to improve assessment practices. Moreover, identifying a wide range of effective assessment strategies and activities can inform subsequent development of formative and summative evaluative tools for online environments.

Under these circumstances, this study explores the transfer of assessment practices from f2f to online environments by college instructors, with a particular interest in the factors influencing assessment in online learning settings. The research questions underlying this investigation were:

- 1) How do participating faculty transfer assessment practices from f2f to online environments?
- 2) What factors influence the assessment practices of participating faculty in their respective online environments?

3. Methodology

Participants

Researchers accessed a list of instructors scheduled to teach online courses at a two-year community college and a four-year university in a large Midwestern city. All these instructors were emailed an invitation to participate in the study. The course management systems operating at the two locations were Angel and WebCT, respectively. For both higher education institutions, the selection criteria focused on: a) a wide range of skills related to online teaching, learning, and assessment; and b) an interest in investigating one’s own assessment practices designed to enhance student learning on a continuous basis. Seven faculty members agreed to participate, four females and three males. In terms of experience with online instruction, 5 considered themselves experienced by having taught online from two to seventeen years, with the remaining two professors self-identifying as first-time online instructors (see Table 1 for a further breakdown).

Table 1: Participant characteristics

<table>
<thead>
<tr>
<th>Name (pseudonym)</th>
<th>Gender</th>
<th>Years overall teaching experience</th>
<th>Years teaching online</th>
<th>Content area taught</th>
<th>Type of Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Jane</td>
<td>Female</td>
<td>5</td>
<td>0</td>
<td>Educational psychology</td>
<td>4-year college</td>
</tr>
<tr>
<td>2. Jim</td>
<td>Male</td>
<td>18</td>
<td>0</td>
<td>Educational technology</td>
<td>4-year college</td>
</tr>
<tr>
<td>3. John</td>
<td>Male</td>
<td>40</td>
<td>16</td>
<td>Math</td>
<td>4-year college</td>
</tr>
<tr>
<td>4. Jill</td>
<td>Female</td>
<td>4</td>
<td>2</td>
<td>English</td>
<td>2-year college</td>
</tr>
<tr>
<td>5. Judy</td>
<td>Female</td>
<td>8</td>
<td>3</td>
<td>Pathology</td>
<td>2-year college</td>
</tr>
<tr>
<td>6. Joe</td>
<td>Male</td>
<td>4</td>
<td>4</td>
<td>History</td>
<td>4-year college</td>
</tr>
<tr>
<td>7. Joan</td>
<td>Female</td>
<td>7</td>
<td>3</td>
<td>Nursing</td>
<td>4-year college</td>
</tr>
</tbody>
</table>

Procedure

The research questions followed a protocol of interview sessions in a comparative, pre-/post- fashion using a series of semi-structured items. The initial set of questions – used at the beginning of the semester – were designed to prompt the interviewees to contextualize their understanding of assessment in the larger perspective of online environments. A particular emphasis was placed on their initial considerations related to the transfer of assessment practices from f2f to online environments, based on which they were asked to elaborate on the design process for the latter.

Syllabi were collected from the participants as an additional source of information that allowed the researchers to get a generic picture of the different courses as a whole, both f2f and their online version. Whenever appropriate, follow-up questions were asked in relation to assessment practices included in syllabi, but not readily referenced by interviewees. In all instances, such questions prompted more thorough responses from the participants. This analysis indicated there were no discrepancies between the assessment plan documented by the syllabi and the actual set of strategies and tools used by these college instructors.

The second set of questions – used as a follow-up at the end of the same semester – was intended to focus on the analysis of perceived differences between the assessment strategies used in online environments compared to traditional, f2f settings. At the same, the participants were invited to
elaborate on the various factors they identified as being conducive to or restrictive in the effective use of assessment strategies in the online environment. Also, the participants were encouraged to reflect on reasons for which their initial plans for assessment of online learning may have differed from so-called “mid-semester course corrections,” deemed necessary by their own analysis of student learning by using pre-set assessment strategies and tools. Overall, the researchers were able to engage their participants in conversations about emerging patterns of assessment practices during the complex process of transfer from f2f to online learning environments.

Probing questions based on responses to questions in the first interview were employed to confirm transcripts and initial interpretations of the data. Additionally, interviewees commented on their planning and/or implementation needs for online teaching and learning.

Depending on the location of the participant, the semi-structured interviews, lasting approximately 45 minutes, were either conducted face-to-face or over the telephone. All interviews were recorded and transcribed by the researchers. Final transcripts were clarified with participants where difficulties of transcription or interpretation occurred.

Data Analysis

A phenomenological approach was selected in order to explore the experiences of the instructors as they reflected on their use and understanding of assessment because it requires the researcher to bracket out her/his personal perspectives (Lichtman, 2006). This seemed a plausible direction to take in order to eliminate any potential bias about assessment on the part of the researchers. In addition, this approach allowed for the exploration of categories within a wholistic framework recognizing the inherent differences participants may have regarding assessment strategies and outcomes.

Analysis of the data relied on the constant comparative method (Bogdan and Biklen, 2007; Glaser, 1978) which allows for examination of the data during both collection and the coding process. Moreover, this approach enables the identification of variations in the patterns to emerge and provides for the development of dimensions within the themes (Strauss and Corbin, 1998). Each interview transcript was analyzed independently by the three researchers to develop both open and in vivo codes that were organized into categories which were then compared for accuracy across the transcripts. Consensus among the researchers was used to select categories that appropriately reflected the data.

Generation of potential themes arose from analyzing and sorting patterns emerging from the categories as well as connections to theoretical understandings of assessment and conversations among the researchers. Analysis continued until each of the categories had been organized into a set of emerging patterns congruent with the data and agreed upon by the researchers. Based on the phenomenological approach, the emerging patterns and potential themes were analyzed and reduced to the essential foci related to the data as presented in the findings. Consequently, the analytic process was recursive as analysis informed further decisions on data exploration and data analysis, and grounded in the data as categories and themes developed based upon consensus agreement among the researchers. This process represented an ongoing process of meaning-making through the coding process, category generation, emerging patterns, and double-checking findings.

Because the focus of the investigation was on instructors’ understanding of their role as an assessor and of their assessment practices, the data was not analyzed in terms of differences related to subject matter or course content. While the researchers acknowledge this is a significant factor in designing and implementing selected assessment practices, both the sample size and the nature of the interview questions did not lend themselves to a comparison of assessment practices relative to course subject matter. Therefore, the data was analyzed with a view toward understanding the assessment practices employed and factors impacting their use.

4. Findings

Findings indicate several aspects influenced the transfer of assessment practices from f2f to online environments by the participating online faculty. Understanding how instructors develop and adapt/adopt assessment practices within the online learning environment can inform subsequent development of formative and summative assessment strategies and tools. It may also provide insight into fundamental characteristics that may form a framework for opening a dialogue regarding
the nature of online pedagogy. Since the circumstances under which participating faculty employed their respective assessment practices are qualitatively different, it is important to analyze the factors identified by the participants as having impacted their implementation in the online environment. In all of these instances, the interviewees reflected on how they went about transferring assessment practices from f2f to online environments. Of special interest to the researchers was the analysis of factors that either facilitate or hinder online assessment. In this light, the interpretation of interview data suggests five major themes to be taken into account when designing effective assessment plans for online environments: time management, student responsibility and initiative, structure of the online medium, complexity of content, and informal assessment.

Time management

Time management was found to be an influence on assessment in the online learning environment. Participants reported that students expected immediate response and feedback to their questions or to their test results. This aspect of online teaching and learning had a direct impact on the instructors’ time management process, as the medium of the online class heightened student expectations of much more frequent and immediate communication with the course instructor.

The degree to which time management is crucial to effective online teaching may be related to nature of individual access due to the instructor-student interface being mediated by email. John indicated that: “I have got to be there emailing them and be available more. It is probably more one-on-one instructor participation than in a face-to-face class.” This aspect of accessibility impacts the time spent both in responding to students and in evaluating learning. This was a common theme, concisely expressed in the following quotes:

- Instructor participation…it’s daily… I put more work into this online class than I did for my on campus class. (Jane)
- Time – you are providing feedback to every single student […] and the feedback is unique and specific […] I was grading around the clock […]. (Judy)

Issues of time management seem to provide a critical lens for the development and selection of the assessment practices employed by these instructors. This may be due to the need for instructors to compensate for fewer opportunities to use traditional informal assessment techniques. Also, due to the time-intensive nature of online interactions, the instructors realized that the structuring of content and related activities had to be maximized while using assessment strategies in appropriate ways for the online environment.

Participating faculty reported that the online environment enabled students to have frequent access to the instructor. Individualized feedback reflects expectations of an increased accessibility to the instructor via email, as John noted: “If I don’t keep up with them at least couple of times during the day, I’ve got 40 messages waiting for me. It does pile up quickly.” Therefore, learning and assessment seems to have occurred more on an individual basis through one-on-one feedback, which would correspond to an increased time commitment. We should also note the importance of time management as a factor for students, as the characteristics of learning in the online environment has direct implications on the overall performance in class. The participants indicated a sense that students viewed assignments in the online environment differently, since “in the online class they [students] feel the pressure of assignments, which does not happen face to face, so their perception [of assessment] changes” (Judy).

Student responsibility and initiative

Related to the notion of time management, participants indicated that online learning requires greater initiative on the part of both instructor and students in the process of the assessment of learning. Student initiative was found to be an important element to inform the instructor of her/his learning and overall progress in class. If students do not ask questions, online instructors felt they did not have sufficient informal ways of understanding whether student learning is taking place or not. A common theme echoed among the participants:

- If I don’t hear from them and I can’t understand what’s going on … We can look at how many times the students logged in – but that doesn’t mean that it’s sunk in … We don’t know the quality of the time that’s spent … You can tell the A students seem to log in a
lot more frequently than B and C students. The class is an afterthought for B and C students. They email me questions […] I can tell they haven’t read the questions. (Jill)

Due to the fact that online learning requires higher degrees of self-discipline and self-monitoring of progress, metacognitive processes were found to be an important influence on student assessment. The participants reported that students who seemed to have higher metacognitive skills tended to more accurately assess their own learning and showed more initiative in terms of their online learning. Student responsibility and initiative were viewed as significant factors to consider when designing effective online environments conducive for relevant teaching and learning because

Everything is pushed back on the student. [...] in a face to face class you can go in and sit down and let the lecturer tell me [sic] everything [...] Go and sit. Listen to the lecture [...] whereas an Internet class, it’s on your own. [...] I think the Internet class has put a lot more back on the student as far as their learning. (Jim)

From their comments, the participants appeared to struggle with the absence of the interpersonal interactions normally reflected in the f2f classroom, which often assist in the ability to gauge the quality of student learning. In addition, the lack of non-verbal or visual evidence of learning – typically collected by “scanning” the traditional classroom – influenced the balance of responsibility in terms of monitoring of progress between instructor and students by placing a heavier focus on the latter. While metacognitive skills and initiative are certainly important factors in any learning context, within the online environment it would seem that these along with motivation become increasingly critical across the electronic interface where traditional, nonverbal forms of assessment are not available.

Structure of the online medium

The online medium structure did seem to require a great amount of time spent on streamlining course requirements, online teaching resources, and so forth, often as a response to the concerns noted above. Participants indicated that all the information related to class requirements and due dates should be posted in a timely manner, thus allowing for more effective time management and immediacy of response to student inquiries. Derived from the fact that the online communication between instructors and students was done exclusively in writing, the medium influenced the way in which instructional planning and delivery of content took place in the online courses. For example, Jane said:

[…] It is very to easy […] to get feedback from them, but asking them to write it up while they’re already writing their documentation, it’s duplication for them … for them it’s just busy work … and … so, it means that, if I ask them to do it, something else has to be dropped [...].

Consequently, assessment for learning and assessment of learning sometimes overlap, which students may view as unnecessary work.

An interesting juxtaposition created within the online environment stems from the fact that while it is “difficult to get to know the students in the online class” (Judy), such a setting thrives on subject matter content-based interaction that supports a wide range of assessment strategies and activities. On the one hand, the anonymity of the online environment may enhance the range of assessment strategies as it offers some students more opportunities for interaction with the instructor. Students may sense a certain freedom to engage in discussion and state viewpoints specifically as a result of the lack of face-to-face interaction with the instructor. According to John,

[…] that may be part of that anonymity, whereas the professor is getting in front of you a lot of students are afraid to challenge the professor. That is not my problem, but some students are very afraid because they think it’s going to interfere [with] the grade they’d get if they challenge the professor. But on the internet side of it, I challenge them and they challenge me. I think that’s [where] the best learning takes place […] where the Internet course I think has a little bit of the edge on the classroom because [of] that anonymity, you are not so intimated by the presence of the professor in the internet class.

On the other hand, anonymity may play a role in peer relationships that do not face the same constraints in the online environment as they do in the traditional classroom.

I really think this is a way where some students who may not actually speak up in class for fear of being wrong like the anonymity of the discussion forum. The anonymity
provides them some sort of security. [...] So I think the discussion forum gives them the anonymity from me and from others. [...] Within this setting, they tend to disagree more with each other than they do in the land-based class. But they also get into why they disagree. That is something that doesn’t always happen in a land-based class. (Jane)

This was the only area where the participants clearly indicated a potential advantage of the online environment for student learning. What remains at issue is the ability of instructors to develop appropriate frameworks that integrate this aspect in such a way to address their concerns with student responsibility and initiative. In addition, facilitating discussion, whether in a synchronous or asynchronous format, typically requires more time in the online setting due to the fact that communication is written. Given the concerns mentioned by our respondents, creating appropriate assessments that address these issues remains a difficult balancing act of appropriateness and time management.

**Complexity of content**

Findings indicated that the less complex or applied the course content, the easier it was to transfer assessments from the traditional, f2f learning environment to an online medium. In other words, introductory-level courses that provide students with foundational knowledge imply a sequence of subject matter content that can be easily accommodated by online environments. Course content and assessments focused on knowledge and comprehension seemed to provide instructors with a simpler transfer of traditional methods to the online setting. Thus, “if the class was focused on the acquisition of knowledge, it would be easier to collect individual responses or assignments from students in the online environment [...]” (Judy).

As reported by the participants in this study, the more complex the content (thus requiring higher level thinking skills – such as analysis and synthesis), the more difficult student assessment seems to become. Under these circumstances, one interviewee brought up the issue of differentiating the content in an online class based on the distinction between undergraduate and graduate students taking the same (cross-listed) course. Consequently, the assessment strategies have to be reflective of the difference in question, whether it is content complexity or level.

The nature of the online environment requires re-thinking how certain assessments are conducted. For example, after reflecting on students’ performances on exams in a Web-based course Judy noted:

> They were the multiple choice questions. 100 question exams. I have them online for students. But I think it was last summer my class got all As. They did wonderful on these exams I have been using over and over. I knew they shouldn’t have gotten all As. Now what I do is I make them to come to campus to take the exam here… Pathology is more memorizing…. I think what they’d do is sit with their books and answer the questions.

Not only does complexity of content determine the ease of transition of assessment strategies, but instructors must also consider how the method of delivery may impact the completion of those assessments. For example, collaborative learning tasks were more difficult to implement and assess in an online environment due to the nature and structure of the class.

> Class presentations and discussions are different. Whether you do a power point presentation online or in person the presentation is the same but my ability to evaluate a student’s ability to present in front of an audience which includes the ability to convey the information in a professional manner, answer spontaneous questions etc. is lost. (Joan)

**Informal assessment**

The study findings showed that it was difficult for the online faculty to determine student learning and progress in the online environment compared to a traditional, f2f classroom setting unless students took the initiative to ask questions or inform the instructor with respect to their learning and progress. If this occurs on a regular basis, the direct effect is improved communication, reduced confusion, and enhanced student participation and performance in the online class. To some extent, informal assessment is tied to the issue of how often communication occurs. “I monitor student progress every morning, Monday through Friday; but I collect evidence weekly; in traditional classroom classes, I tend to do it less often (usually only during class times). The online class is more structured to compensate for the loss of face to face interactions” (Jim). The participants in this study indicated a high rate of daily connection to the course, either to respond to emails or to provide feedback on
assessments. Consequently, this means that the instructor has to devote a lot more time to establishing such effective communication with and among students both during planning and implementing the online course:

[Collecting evidence of student learning in the online environment] was a real problem for me because of not being able to use informal assessment, which I do in the traditional classroom. [...] in e-mails you get nothing but complaints, nothing seems to work [...] after a while you learn what needs to be addressed immediately and what can wait [...] I could interpret from their comments in online small groups who was involved and who wasn't. [...] [In the traditional, face-to-face class] I am doing much more informal observations and timely questions in class based on what is happening in there – you intuitively know what to ask because you have taught the class several times before [...] The only difference [between the online environment and the traditional classroom in terms of assessment of student learning] is to be able to make global assessment based on the performance in class as opposed to the individual feedback in the online class [...] tied with the time-intensive factor. (Jill)

Our participants indicated the difficulty of balancing the need to engage students in order to gauge the progress of learning with the demands of the amount of time needed to compensate for the lack of informal assessment cues provided in the face-to-face setting. Not only did this create questions of what assessments to employ, but also of how many assessments were needed.

Despite the fact that students in the online classes had frequent and direct access to the instructor, the participants in the study struggled with the process of transferring typical informal assessment practices from the face to face classroom to the online environment. The lack of visual cues in combination with the focus on student initiative seemed to present a dilemma to these instructors when considering how to best assess student learning in the online setting. Perhaps this is because many of the assessment practices employed by these instructors focused on the evaluation of a product without considering appropriate ways to evaluate the process, which represents an assessment practice often using informal techniques derived from interpersonal cues.

5. Discussion

Currently, there is a strong impetus for appropriate use of a wide range of instructional technologies designed to maximize student learning and participation. In light of such "expansion of technology," both higher education faculty and students have to become apt users (Sahin and Thompson, 2006). The findings of this study may help educators identify ways to improve their assessment practices as they transfer from traditional, f2f settings to online environments. Analyzing the factors that influence the design and implementation of appropriate online assessment strategies can inform subsequent development of formative and summative assessment activities and tools.

One particularly difficult issue to address in an online setting is replicating informal student feedback that in the traditional classroom is visual and based on physical, interpersonal cues. Rather than developing assessment contexts that are diverse, responsive and involve a process in order to tap into informal feedback strategies, the majority of assessment practices described by the participants suggest a product outcome. For example, while participants implemented online asynchronous discussions, typically they were used as a way to quantitatively measure student participation (i.e., as assessment of learning) rather than as a qualitative measurement of student growth and learning (i.e., as assessment for learning). Encouraging student reflection on learning as suggested by Angelo and Cross (1993) may help instructors develop strategies that employ process assessments that provide the sort of information typically obtained through traditional informal techniques. Assessment procedures, especially in the online environment, need to find a balance between formative (process) and summative (product) outcomes, which require increased instructor and student interaction within the online interface.

Bi-directional feedback between students and teachers is more individualized in the online environment. Feedback to and from the student was found to be based on writing, through which instructors tried to negotiate and manage content, instruction, an environment of a community of learners, as well as assessment expectations and requirements. Instructors described this process as time consuming and significantly influenced how informal assessment took place. The notion of a community of learners is often discussed as a constructivist approach to knowledge-building in the context of online learning. Although expressing a commitment to the idea of a community of learners,
instructors structured their courses toward a more independent and individual style of learning. Nevertheless, online learning and technologies have the potential to encourage and enhance interdependent learning which is collaborative and constructive. Tapping into such a potential requires the design and implementation of assessment practices appropriate for the online environment.

Factors impacting effective assessment practices in the online environment are not solely technological, but also managerial and pedagogical. Since online learning is delivered through computer technology and mediated by a computer interface, there may be a perception of online learning as occurring in an environment defined by technological tools. Perhaps, there needs to be a distinction made between the delivery of online learning and mediation and facilitation of online learning. However, these two concepts require clarification before any attempt to better understand the pedagogical potential of this new learning environment evolves. In order to shift from what Reeves (2000) describes as an instructor-dominated environment, the conversation regarding online pedagogy will need to move toward consideration of those factors which facilitate a more constructivist interaction across the computer interface of the virtual classroom. Developing a “responsive and responsible online” pedagogy (Boboc, Beebe, and Vonderwell, 2006: 261) implies conceptualizing online teaching and learning in a way that generates sets of interrelated characteristics influencing effective assessment strategies and tools. Consequently, the use of this particular type of instructional technology will be enhanced by the “result of the teacher’s analysis” (Zhao and Frank, 2003: 817).

6. Recommendations for practice and research

There is a need to construct an appropriate pedagogy of online learning and assessment within the environment of the virtual/online classroom. As traditional assessment strategies approaches differ from those employed in online settings (Reeves, 2000), there should not be a mechanistic transfer from one environment to the other without due consideration of their intended purpose and outcome. Future research should provide educators with tools and strategies in developing online-specific, pedagogically sound and appropriate learning opportunities that address assessment both as an outcome and as a process. That also means that both summative and formative assessment systems need to focus on creating and maintaining sustainable student learning in an online community of learners (Macdonald, 2003). The latter’s characteristics – dialogue, collaboration, and a common goal – support assessment for learning which, in turn, promotes high level thinking skills and better retention of relevant information.

Consequently, both students and instructors need to be informed about the effective implementation of assessment strategies in the online environment. This will also require further research regarding the necessary shift in the perception of roles in the assessment process. The high frequency and increased individualization of feedback in such learning settings will be associated with an emerging and increasing partnership between students and instructors. This was suggested by Joe’s reflection on the benefits of teaching online:

I gave my students more responsibility, I was in closer touch with them … it seems to be a much more effective approach to teaching than the traditional stuff […] Much more student-centered and, on the other hand, it puts more responsibility on the teacher […] you have to go online in order to communicate effectively, and in an online course this is put upfront.

In order to achieve such benefits, however, instructors (and students) will need to rethink traditional roles and patterns of interaction in order to allow for communication across the computer interface to create dynamic environments engaging a community of learners. Given the recent surge of technological advances, it is expected that as more learning technologies emerge, the more varied applications members of the online learning community will need to understand and incorporate in an attempt to identify the factors that maximize student participation and performance, as well as teacher effectiveness and overall instructional satisfaction. Joan captured the highly reflective process of sorting out ways in which to structure assessment and learning in online environments:

[…] it took a lot more work upfront than I knew it would take because you have to think through everything … every assessment part of it […] when I make a point of it in the online class, I have to ask myself about how to make sure that they do it … or what I can do to make sure that they do it… Those are the things that took me a lot of time in
the beginning, when I was planning the course ... I had to go through everything and rethink all the things that I did informally in class [the traditional, face-to-face course].

Faculty professional development programs on online learning need to emphasize assessment for learning as both a process and an understanding. Investigating appropriate, student-centered structures focused on assessment for learning can help produce accurate assessment data. Formative assessment techniques, such as the Minute Paper, the Muddiest Point (Angelo and Cross, 1995), online journaling, reflective blogging, and wikis can be utilized in online learning to check student learning and progress. As technologies continue to evolve, a pedagogical framework that considers the learning environment differences between traditional and face to face classes becomes increasing imperative, both in terms of understanding the delivery and mediation of instruction. Such a framework will need to address both aspects of process and product in assessment. Consequently, future research needs to examine what strategies of techniques are effective in the assessment for learning in online instruction. Understanding not only what practices are effective and in what contexts but also how instructors think about those practices in terms of assessment of and for learning will aid in the development of a framework leading to a pedagogy of e-learning.

References


Exploring Students’ use of ICT and Expectations of Learning Methods

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Abstract: This study investigates changing patterns in students use of electronic tools over a four year period, mapping changes in social communications with expectations in formal learning. The data, collected from 2001 to 2004, reflect the views of 2215 university entrants, the majority of whom were aged between 17 and 20 years across a range of disciplines (Business, Science and Engineering) on their first day at university. Although the data was collected prior to the emergence of the contemporary social technologies, it tests an underlying assertion that students expectations of learning are strongly influenced by their prior experiences. Results show no correlation between the extent of university entrants use of Information and Communications Technologies (ICT) and their expectations of how they will learn. Despite a dramatic increase in students use of ubiquitous technologies over a four-year period, their expectation of how they might learn at university remained relatively static over the same timeframe.

Keywords: ICT use, digital literacy, technology-enhanced learning, e-learning, students expectations of technology use, higher education

1. Introduction

Global, societal and technological changes are affecting the way we live, work and learn. There has been a transformation in daily communications, as electronic devices such as mobile phones, digital cameras, ipods, MP3 players and computer game consoles become ubiquitous. Social network sites (SNS) such as MySpace and Facebook are gaining rapid popularity, especially amongst groups of young people (Owyang, 2009). As the time spent communicating via technology tools increases rapidly, there is a sense in which young people wish to use them to support many aspects of their lives (Goldsmith, 2009).

Digital technologies and environments could have a significant potential to support learning in formal educational domains. However, their effective use requires students to move beyond using tools for social purposes and gain an understanding of how tools can be used to support learning (Beetham, McGill, Littlejohn, 2009). Students need to develop an insight into how tools can support a wide range of learning literacies, such as taking control of their own learning, engaging with discourses, constructing meaning and exploring identity (Sefton-Green, 2004).

Some educators consider that these literacies are inherent within school leavers entering university, sometimes referred to as the ‘NetGen’ (Net Generation) or ‘digital natives’ (Oblinger and Oblinger, 2005; Prensky, 2001). There is a belief that learners think and process information differently - that they are ‘multi-taskers’ who can ‘parallel process’ information more effectively than so-called ‘digital immigrants’ (Prensky, 2001). Recently these claims have been widely contested, since the underlying assumptions have not been explored and there is little evidence to draw upon.

There is conflicting evidence in the literature as to the ease with which digital literacies can be transferred across boundaries – see Beetham, McGill, Littlejohn (2009) for a review of this debate. Some studies conclude that students can acquire a range of literacies when they use digital tools for social purposes (Willett and Sefton-Green, 2003). Under certain circumstances, these literacies appear to be transferred to support learning in educational contexts (Conole, de Laat, Dillon, and Darby, 2006; Creanor, Trinder, Gowan, and Howells, 2006). However, other studies conclude that learners find it difficult to transfer literacies across boundaries (Carmichael, Miller, and Smith, 2007). An important factor inhibiting the transfer of literacies across boundaries appears to be learners’ expectations of how they will learn. During transition to university students have ideas about how they will be taught in class, their own academic abilities and study skills, how they should study and how ‘learning’ will take place (Ipsos MORI, 2007). During their period of study these expectations constantly change, as they are revised in response to new experiences (Bamburg, 1994).
Nevertheless these expectations shape how students expect to learn and study on transition to higher education.

Educational psychology literature reveals that prior expectations exert powerful influences upon student behaviour, whether they are internal, self-expectations of students or arise from external agents, such as teachers (Kirsch, 1999; Merton, 1968; Rosenthal & Jacobson, 1992). To date, most studies in this area have been short term; they do not provide data that allow reliable and meaningful trend analyses. Also, these studies have not investigated students’ expectations at the point of transition to higher education.

This article outlines an explorative study into students’ expectations of approaches to learning at university, measured during the transition phase (i.e. students’ their first day at university). The study investigates changing patterns in students’ use of electronic tools over a four year period, mapping changes in social communication with expectations in formal learning. Although the data was collected during the time period 2001-2004, when there was limited use of SNS technologies, the underlying assertion, that students’ expectations of learning is strongly influenced by their prior experiences, still holds true. The study is guided by the following research questions:

- What are students’ expectations of approaches to learning at university?
- How did these students learn before they came to university?
- What are the trends in using the web and email over a four year time period?
- Is there a relationship between students’ use of technology and their IT skills?
- Is there a difference between students’ preferred ways of learning (i.e. with or without technology) and their IT skills?

2. Methods

2.1 Data collection methodology and instrument

Data were collected using a paper-based questionnaire. The questionnaire was distributed to first-year students when they arrived at an induction session on their first day at university. The questionnaire was completed immediately and returned to the researchers during the session.

The questionnaire comprised seven questions exploring students’ experience of learning prior to entering university and their expectations of how they will learn at university. To avoid jargon, the questions referring to learning methods were worded in such a way as to make it easier for students to understand them (i.e. did they expect to make use of books / handouts, web resources, videoconferencing, online or face-to-face discussions and so on). Other questions related to whether or not students thought that they required support in ICT skills or other learning skills that would help them to use ICT. They were also questioned on their frequency of use of a range of ICTs (web, email, online discussion fora, text messaging, etc.). Preferred approaches to learning were assessed through multiple-choice questions. Questions relating to students’ perception of their own IT skills’ level were based on a dichotomous answer (yes or no). The frequency of use of various types of technologies was measured on a Likert scale ranging from 1(‘never’) to 5 (‘most days’). While the questionnaire as a whole was self-explanatory, all respondents were provided with verbal instructions and students were encouraged to ask questions if anything was unclear. The full questionnaire is included in the Appendix.

2.2 Respondents

Data were collected from a large sample of Business, Science and Engineering undergraduates on their first day at a single university (the University of Strathclyde in the UK) between 2001 and 2004 (n = 2215). Although the responses were collected at one institution, the data reflects the views of respondents who transferred to Strathclyde from a range of schools, colleges and workplaces. The majority of respondents were school-leavers in the age range of 17-20 years. The majority of participants had enrolled to study Science (n = 1492, 67%), approximately one third of the sample were Engineering students (n = 592, 27%) followed by a small number of Business students (n = 127, 6%).
3. Results

3.1 Background information

The first question related to students’ reasons for entering higher education. Many respondents believed a degree would help them enter their desired career (n = 1152, 64.3%) or would increase their earning potential (n = 459, 25.6%) (Table 1).

<table>
<thead>
<tr>
<th>Reason for going to university</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>Total 2002 - 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>It leads to your desired career</td>
<td>N= 410 students did not answer this question as it was not included in the 2001 survey</td>
<td>232 (60.3%)</td>
<td>494 (64.4%)</td>
<td>426 (66.6%)</td>
<td>1152 (64.3%)</td>
</tr>
<tr>
<td>Greater earning potential as a graduate</td>
<td>115 (29.9%)</td>
<td>200 (26.1%)</td>
<td>144 (22.5%)</td>
<td>459 (25.6%)</td>
<td></td>
</tr>
<tr>
<td>It was expected of you</td>
<td>16 (4.2%)</td>
<td>26 (3.4%)</td>
<td>25 (3.9%)</td>
<td>67 (3.7%)</td>
<td></td>
</tr>
<tr>
<td>Not quite sure</td>
<td>10 (2.6%)</td>
<td>17 (2.2%)</td>
<td>20 (3.1%)</td>
<td>47 (2.6%)</td>
<td></td>
</tr>
<tr>
<td>It’s better than a dead-end job</td>
<td>7 (1.8%)</td>
<td>16 (2.1%)</td>
<td>12 (1.9%)</td>
<td>35 (2.0%)</td>
<td></td>
</tr>
<tr>
<td>You’ve heard the social life is fantastic</td>
<td>3 (0.7%)</td>
<td>5 (0.7%)</td>
<td>7 (1.1%)</td>
<td>15 (0.8%)</td>
<td></td>
</tr>
<tr>
<td>It delays the problem of job seeking</td>
<td>2 (0.5%)</td>
<td>6 (0.8%)</td>
<td>4 (0.6%)</td>
<td>12 (0.7%)</td>
<td></td>
</tr>
<tr>
<td>You couldn’t get a job</td>
<td>-- (0.0%)</td>
<td>3 (0.4%)</td>
<td>2 (0.3%)</td>
<td>5 (0.3%)</td>
<td></td>
</tr>
</tbody>
</table>

The second question aimed to clarify participants’ perceptions of the difference between learning at their previous location (school, college or work) and at university. The majority of respondents (n = 1510, 84.4%) anticipated that learning at university would be different from their previous experience of learning (usually at school) (Table 2).

<table>
<thead>
<tr>
<th>Difference between school and university</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>Total 2002 - 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very different</td>
<td>N= 410 students did not answer this question as it was not included in the 2001 survey</td>
<td>311 (80.4%)</td>
<td>648 (85.3%)</td>
<td>551 (85.8%)</td>
<td>1510 (84.4%)</td>
</tr>
<tr>
<td>A little different</td>
<td>37 (9.6%)</td>
<td>60 (7.9%)</td>
<td>55 (8.6%)</td>
<td>152 (8.5%)</td>
<td></td>
</tr>
<tr>
<td>No opinion</td>
<td>39 (10.0%)</td>
<td>49 (6.4%)</td>
<td>35 (5.4%)</td>
<td>123 (6.9%)</td>
<td></td>
</tr>
<tr>
<td>About the same</td>
<td>-- (0.0%)</td>
<td>3 (0.4%)</td>
<td>1 (0.2%)</td>
<td>4 (0.2%)</td>
<td></td>
</tr>
</tbody>
</table>

Note: The original response options for this question included “haven’t a clue” and “never thought about it” (see Appendix). For analysis, the responses in these two options were combined into a “no opinion” category.

This response is at odds with answers to subsequent questions, indicating that the majority of respondents anticipated few differences in approaches to learning at university as compared with school, college or work (see 3.2). Subsequent studies revealed similar findings, reporting the main difference anticipated by students is increased personal responsibility for learning at university (Conole et al, 2006).

3.2 What are students’ expectations of approaches to learning at university and how did students learn before they came to university?

Learners’ preferred approaches to learning were grouped into two categories:

- Learning without technology support (books, printouts, library, face-to-face, TV/video/DVD),
- Technology-enhanced learning (email, internet, online discussion, CD ROM, videoconference)
The vast majority of respondents reported that, prior to entering university, their approaches to learning did not involve technology. They anticipated they would prefer similar learning methods during their university studies (table 3). When correlating preferred learning methods at school/college/work with learning methods expected at university, this pattern is confirmed ($r = .345$, $p < .001$, 2-tailed) meaning respondents’ preferred methods of learning at school/college/work significantly reflected their preferred learning methods at university. Note that the correlation coefficient is small; there may be other factors that contribute to the variance in students’ preferred approaches to learning at university.

Table 3: Number of students indicating their past and expected preferred method of learning per category per year

<table>
<thead>
<tr>
<th>Method of learning</th>
<th>Number of students indicating preference for method of learning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At school</td>
</tr>
<tr>
<td></td>
<td>2001</td>
</tr>
<tr>
<td>Non-technology enhanced</td>
<td>388 (94.6%)</td>
</tr>
<tr>
<td>ICT-supported</td>
<td>12 (2.9%)</td>
</tr>
<tr>
<td>Both (no preference)</td>
<td>10 (2.4%)</td>
</tr>
</tbody>
</table>

3.3 What are the trends in using the web and email over a four year time period?

The overall trend in students’ use of ICT technologies in their social life, (use of the internet, email, chatting online and text messaging, etc) was found to increase each year (table 4). Despite this increase in the use of ICT for social purposes, students’ expectations of learning methods at university centred around learning without technology, supported by non-digital resources (books, handouts) as well as classroom based discussions (surfing the web: $r = -.77$, $p < .001$; emailing: $r = -.054$, $p < 0.5$; chatting online: $r = -.056$, $p < .01$). It is interesting to note that although correlation coefficients are small for email and chatting online, there is a strong association for surfing the web, explaining almost 60% of the variance.

Table 4: Number of students reporting use the web, email, online chatting and text messaging at least once a week

<table>
<thead>
<tr>
<th>Number of respondents reporting…</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>To surf the web</td>
<td>262</td>
<td>301</td>
<td>730</td>
<td>552</td>
</tr>
<tr>
<td></td>
<td>(34.3%)</td>
<td>(79.0%)</td>
<td>(82.3%)</td>
<td>(86.1%)</td>
</tr>
<tr>
<td>To use email</td>
<td>248</td>
<td>277</td>
<td>560</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>(60.9%)</td>
<td>(72.3%)</td>
<td>(73.1%)</td>
<td>(77.7%)</td>
</tr>
<tr>
<td>To chat online</td>
<td>24</td>
<td>140</td>
<td>378</td>
<td>353</td>
</tr>
<tr>
<td></td>
<td>(6.1%)</td>
<td>(36.8%)</td>
<td>(49.6%)</td>
<td>(55.1%)</td>
</tr>
<tr>
<td>To use text messaging*</td>
<td>-</td>
<td>350</td>
<td>712</td>
<td>607</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(91.4%)</td>
<td>(92.6%)</td>
<td>(94.6%)</td>
</tr>
</tbody>
</table>

*In 2001, the answer option of text messaging was not part of the survey, and thus no data are available.
3.4 Is there a difference between students’ preferred ways of learning (i.e. with or without technology) and their IT skills? Is there a relationship between students’ use of technology and their IT skills?

In line with previous research question (3.3), general trends in the reported competency in IT skills increased each year (table 5).

Table 5: Number of students reporting the thought competence of their IT skills

<table>
<thead>
<tr>
<th>Number of respondents reporting their IT level to be…</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2001</td>
</tr>
<tr>
<td>Advanced</td>
<td>11 (3.3%)</td>
</tr>
<tr>
<td>High (A-level)</td>
<td>78 (23.7%)</td>
</tr>
<tr>
<td>Standard (GCSE)</td>
<td>97 (29.5%)</td>
</tr>
<tr>
<td>Basic</td>
<td>130 (39.5%)</td>
</tr>
<tr>
<td>Non-existent</td>
<td>13 (4.0%)</td>
</tr>
</tbody>
</table>

Frequency analysis indicates that those students who perceived their IT skills to be advanced were more likely to indicate that they would prefer to use technology-supported learning methods at university ($\chi^2 = 56.90$, df = 1, $p < .000$). Likewise, students who stated their IT skills were basic were also more likely to report that they expected to prefer learning without technology at university ($\chi^2 = 474.75$, df = 1, $p < .000$) (table 6).

Table 6: Number of students indicating expected preferred learning method at university compared with perceived level of IT skills

<table>
<thead>
<tr>
<th>Reported IT level</th>
<th>Advanced</th>
<th>High</th>
<th>Standard</th>
<th>Basic</th>
<th>Non-existent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-technology enhanced</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>104 (5.8%)*</td>
</tr>
<tr>
<td>ICT supported</td>
<td>20 (18.0%)*</td>
<td>38 (34.2%)</td>
<td>28 (25.2%)</td>
<td>23 (20.7%)*</td>
<td>2 (1.8%)</td>
</tr>
</tbody>
</table>

Further analysis was conducted on students’ IT skills and their use of IT technologies in their social time (table 7). Results indicate a significant positive relationship between respondents’ use of technologies in social time and reported advanced IT skills. This is to say that the more advanced students perceived their IT skills the more likely they were to engage in technology-supported activities such as chatting online and surfing the web at an *increased* frequency. Note that correlation coefficients are small, explaining less than 10% of the variance.

Table 7: Correlation Coefficient and significance value indicating the relationship between students’ use of technologies and their reported level of IT skills

<table>
<thead>
<tr>
<th>Students reporting to…</th>
<th>surf the web</th>
<th>email</th>
<th>chat online</th>
<th>text message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported level of IT skills</td>
<td>$r = .323$</td>
<td>$r = .257$</td>
<td>$r = .249$</td>
<td>$r = -.027$</td>
</tr>
<tr>
<td></td>
<td>$p &lt; .000$</td>
<td>$p &lt; .000$</td>
<td>$p &lt; .000$</td>
<td>$p &gt; .05$</td>
</tr>
</tbody>
</table>

4. Discussion and conclusion

The main aim of this study was to explore the relationship between new university entrants’ expectations of learning methods, their past learning methods and their use of ICT in social situations (outside formal education). We were particularly interested in evidence of students transferring their ICT skills from social setting (e.g. using email for social communication or the internet for information gathering) to educational situations (e.g. for systematic access to information and to support knowledge sharing). Much of the debate in the educational technology literature assumes a correlation between students’ routine use of ICT and their expectations of how they will learn at university. However, this assumption is largely anecdotal. Although there are some small–scale studies pointing to lack of correlation between students’ use of technology in social situations and in formal educational settings, there are few investigations, like this one, with large number of students.
This study reveals a more complex picture than an assumed causal relationship. There are a number of inter-related factors that lead to this complexity:

A major finding of this study is that, despite a dramatic increase in students’ use of ubiquitous technologies (in this case web, e-mail, online communication and text messaging) over a four-year period, their expectation of how they might learn at university remained relatively static over the same timeframe. Expectations of learning at university appear to be influenced more by prior experience of learning in formal situations than by use of technology outside educational settings. This is true even though the majority of students indicated they believed learning at university would be very different from learning at school/college/work. While it is clear that students know how to use e-tools, they might not have a clear understanding of how to use these tools effectively to support learning, or indeed they may not be motivated to transfer their skills to different settings. According to the LEX study (2007) students perceive personal, face-to-face contact with tutors as the backbone of their learning. The authors suggest that students may not fully understand how ICT and formal learning can work together outside an educational context. In addition, this raises a number of questions about students’ motivations for learning in university. If the educational system encourages students to focus on passing ‘traditional’ examinations focused on testing factual knowledge transmitted through lectures and textbooks, students may favour “traditional” approaches to learning even if outside institutions of higher education they learn and interact in a different way.

There is however a clear difference between students’ expected learning method at university depending on their self-perceived level of ICT skills. Students who perceived they had better ICT skills were more likely to favour technology-supported learning (i.e., use of online communication, videoconferencing, etc.). This finding indicates that ICT skills may be an important variable, although it is not likely to be the only contributing factor to students’ self-expected ability to use technology effectively in support of learning. A possible cause is higher digital literacy of students who have good ICT skills.

The concept of the ‘self-fulfilling prophecy model’ may have some bearing on the effects observed in this study (Merton, 1968). It is possible that students who believe themselves to have basic IT skills (regardless of whether these students’ assumption is correct) may intrinsically avoid using ICT supported learning methods. Bandura’s (1977) self-efficacy theory, the belief in one’s own capabilities and skills to manage a situation or reach a goal, along with motivational theories, may also be highly relevant in this context (Jernigan, 2004). While these theories have been examined in respect to what students expect to learn, they are yet to be linked to the question of how students expect to learn, and how their expectations may impact on their performance.

This study is explorative in nature, and findings presented require further research and investigation. While the research findings are statistically significant, correlation coefficients were small. For example the correlation between students’ self-perception of their IT skills and their use of technology tools in their social time was low. This indicates that there are additional factors that may explain this relationship better.

Despite these limitations, the study adds to our understanding of changing patterns in students’ use of electronic tools for learning, particularly since it draws upon a large data sample over several years at a mainstream, UK university. Given the data collection period, the sample obtained will be largely representative of the population under study. A limitation may be that the data obtained stems from 2001 to 2004, however, of importance here is the study of ICT trends and developments over a four year timeframe. This observation can be applied to current ICT trends and usage. Another positive outcome of this study is that the data collected captures new entrants’ expectations at this particular point of transgression from school to university. The findings presented here imply that students’ prior experiences of learning may be an important factor in shaping their approaches to learning at university. Students’ expectations and preferences are a positive (though not the sole) contributor to their preferred approaches to learning.

Many universities are already integrating a range of digital literacies into their curricula. These literacies extend beyond ICT skills, critical information literacy skills (Elmborg, 2006; Johnston and Webber, 2003) or social networking literacies (Boyd and Ellison, 2007) in isolation towards the integration of such literacies (Holt et al, 2006). While individual sets of literacies are well researched, very little work has been carried out on their integration and embedding within the curriculum.
(Beetham, McGill, and Littlejohn, 2009). Learners’ development of these sort of digital literacies is likely to be an essential aspect in dealing with the societal and technological changes occurring in the world.

5. Appendix: questionnaire-
Student Survey Science Faculty 2004

Welcome to the University of Strathclyde! You are about to participate in a Student Induction session which aims to help you make the most of your time at Strathclyde. Before the session begins, please fill in this form. It is important that you hand the survey in with your name and degree course written in black capitals.

### What was your reason for coming to university? (tick one option)

- It was expected of you
- It leads to your desired career
- You couldn’t get a job
- You’ve heard the social life is fantastic
- It’s better than a dead-end job
- It delays the problem of job seeking
- Greater earning potential as a graduate
- Not quite sure

### The difference between university and school is? (tick one option)

- Very different
- A little different
- About the same
- Haven’t a clue
- Never thought about it

### What were your preferred ways of learning before coming to university (tick three options)

- Books
- Printed handouts
- Email
- World wide web
- Library
- TV/video/DVD
- CD ROM
- Online discussions (eg. Chatrooms, bulletin boards)
- Face-to-face discussions
- Videoconferencing

### What will be your preferred ways of learning at university (tick three options)

- Books
- Printed handouts
- Email
- World wide web
- Library
- TV/video/DVD
- CD ROM
- Online discussions (eg. Chatrooms, bulletin boards)
- Face-to-face discussions
- Videoconferencing

Please tick the appropriate box for the following questions:

<table>
<thead>
<tr>
<th>advanced</th>
<th>Higher A-level</th>
<th>GCSE/Standard level</th>
<th>basic</th>
<th>Non-existent</th>
</tr>
</thead>
</table>

www.ejel.org 19 ISSN 1479-4403
At what level are your IT skills

<table>
<thead>
<tr>
<th>Most days</th>
<th>Once per week</th>
<th>Once per month</th>
<th>Less than once per month</th>
<th>Never</th>
</tr>
</thead>
</table>

How often do you surf the web?

How often do you use e-mail?

How often do you chat online?

How often do you use text messaging?

<table>
<thead>
<tr>
<th>Most days</th>
<th>Once per week</th>
<th>Once per month</th>
<th>Less than once per month</th>
<th>Never</th>
</tr>
</thead>
</table>

References


Willett, R. & Sefton-Green, J. (2003). Living and learning in chatrooms (or does informal learning have anything to teach us?) Retrieved 16 April 2006, from: http://wac.co.uk/sharespaces/chatrooms.pdf
Collaborative e-Learning: e-Portfolios for Assessment, Teaching and Learning

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Abstract: This paper presents an innovative approach to e-learning by exploring a number of initiatives where there is a move towards collaborative use of Personal Development Plans (PDPs) integrated with e-portfolios as mechanisms for delivering such plans. It considers whether such a move towards more product orientated assessment might enhance student learning experiences. Outcome based assessment and the use of e-portfolios also implies that a course may be delivered in a blended learning format and whether this change of culture in the higher education sector has an impact on tutors’ course delivery and students’ learning. The transition towards collaborative use of e-portfolios is presented in this paper. It addresses specifically the development of the Virtual Learning Environment (VLE) and the use of e-portfolios and how collaborative e-learning is achieved at the School of Education, Social Work and Community Education (SESWCE) of the University of Dundee (UoD). This transition is eventually assessed by listening to students. Their views have supported the e-learning experience achieved at SESWCE. Opportunities have been generated for collaborative e-learning and it has allowed UoD to work towards the national targets in this particular field.

Keywords: e-Portfolio, Virtual Learning Environment (VLE), online assessment, blended learning, collaborative learning, learning objects

1. Background

A growing number of universities and education authorities within United Kingdom (UK) as well as worldwide, are in the process of implementing the enhanced use of e-portfolios in Personal Development Plans (PDPs) as the main means of students’ learning and assessment. This, in turn, would cause a reduction in the number of courses utilising formal lecture and written examinations. The emphasis on e-portfolios during the process of PDP development is particularly informed by peer assisted collaborative learning and assessment using the Virtual Learning Environment (VLE). One of the major components of the VLE at University of Dundee (UoD) and elsewhere is the growing importance and utilisation of e-portfolios because it offers the potential to promote collaborative learning and other forms of learning.

Collaborative learning and peer assessment has undergone significant development for the past decade. Researchers and practitioners, for example Thorpe (1998) and Phillips, Parsons, Duranton et al. (2004) suggested the use of Computer Mediated Communication (CMC) and computer-based activities in continuous assessment as a means to promote collaborative learning. It was highlighted that effective opportunities can be created to enhance feedback on learning and develop skills of group work and using information technology which have not before been possible (Thorpe, 1998, pp 284). Acknowledging the transition from paper-based assessment to the use of VLEs and e-portfolios as a means for more collaborative learning, Eccestone (1999) raised concerns about the impact of critical reflection. For example, researchers and practitioners were cautioned against over-optimism in the use of PDPs and e-portfolios because of the tendency to gather a number of artefacts without reflecting on their significance.

However, the discussion as well as the discourse around the implementation of PDPs and e-portfolios was an ongoing process across universities in different countries. For example, the University of Georgia (UG) was making extensive use of e-portfolios in the International Technology Masters programmes. Students from the university were encouraged to present publicly a comprehensive e-portfolio of their design work as the culminating assessment in their programme (Department of Instructional Technology, 1999). Eventually, students annotated their e-portfolios via electronic journals or reflections. In a similar vein, Reeves (2000) forwarded the use of e-portfolios as a mechanism for formative assessment that allows tutors to pass comments on tutees’ work before final submission of projects or theses. It was also suggested that tutors would use this route to encourage
critical reflection among students about the artefacts they were collecting. These artefacts represented evidence of learning, practice and understanding of specific areas of a particular course. The evidence could take the form of files such as word document, power points and that would link to resources.

A major study from Netherlands, for example, identifies three goals for competency assessment with e-portfolios. These goals are selection, diagnosis and certification (Tartwijk, Driesen, Hoeberings et al., 2003). At the selection process, the suitability of a student for a study programme is assessed and the assessment outcomes are carried forward during the admission procedure. The diagnosis stage is used to determine and monitor the progress of the student’s needs through their e-portfolios. By the end of the study programme, the certification process that is based on the study requirements determines attainment level of each student.

Within the United Kingdom (UK), countrywide consultancy exercise undertaken by Quality Assurance Agency (QAA) for higher education emphasises the importance of developing a PDP system (Quality Assurance Agency, 2001, Quality Assurance Agency, 2008). As a number of universities are already investigating the implementation of PDP systems, the QAA has targeted a five year programme starting in 2005 for universities. It is projected that a majority of universities will have students graduating with a first degree and utilising e-portfolios-enhanced PDPs until 2010.

This move towards PDPs is not unique to the higher education sector. Under the Assessment is for Learning Initiative (ALI) for Scottish schools, research has been undertaken to find out if it is feasible to introduce Personal Learning Plans (PLPs) in Scottish primary and secondary schools (Robertson and Dakers, 2004). This report suggested that a skills-based model of PLPs would provide inherent articulation with curriculum-based outcomes that make sense to teachers and pupils in respect of their daily experiences in schools. It is argued that if a skills-based approach for PLPs is adopted, intermediary levels and mapping learning outcomes against skills would be required. This would eventually ‘enable teachers to integrate learning goals with both short and mid-term planning’ (Robertson and Dakers, 2004, pp 43).

2. PDP and e-portfolio development: policy implementation and practice

The policy context from different universities within the UK and outside the country, for example, the Netherlands in particular was explored. Sources of strong evidence from one individual research, the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre), two UK universities and one Dutch university are interrogated and the application of e-portfolios in PDPs are presented in Table 1. Barrett (2000), for example, suggests five key stages in the production of PDPs where artefacts are, at a first instance, collected as pieces of evidence from day-to-day teaching and learning.

<table>
<thead>
<tr>
<th>Source of study</th>
<th>Key functions of e-portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Research (Barrett, 2000)</td>
<td>Collection; Selection; Reflection; Direction; and Presentation</td>
</tr>
<tr>
<td>EPPI (Gough, Kiwan, Sutcliffe et al., 2003)</td>
<td>Planning; Doing; Recording; Reviewing; and Evaluating</td>
</tr>
<tr>
<td>Lancaster University (Lancaster University, 2008)</td>
<td>Record; Review; Plan; Complete record of work; Demonstrate skills; Insight into ways of learning; Confidence; Self awareness and identity, and Of use for CVs etc after graduation</td>
</tr>
<tr>
<td>Liverpool University (The Centre for Lifelong Learning, 2008)</td>
<td>Planning; Sharing Evidence; Monitoring; Review of Evidence; Review of Literature; Statement of Outcomes; and Target</td>
</tr>
<tr>
<td>Windesheim University (Wijnand, 2004)</td>
<td>Registration; Representation; and Personal Record of Progress; Planning; and Reflection</td>
</tr>
</tbody>
</table>

Then, through a selection process, these artefacts are reviewed and evaluated; an exercise that allows students to reflect upon. This reflection exercise precedes the setting of future learning goals. It was highlighted that this stage paves the direction for the transformation of e-portfolios for professional development and supports lifelong learning.

What is not clear in Barrett’s five stages is the organisational aspects of e-portfolio utilisation. This gap has been eventually filled by key findings from the study undertaken by EPPI (Gough, Kiwan,
Sutcliffe et al., 2003). As presented in Table 1, the study highlighted the importance of planning, doing, recording, reviewing and evaluating the constituents of the e-portfolio. In the context of practice being informed by both policy and research, a few examples of PDP implementation from other universities are interrogated.

As shown in Table 1, Liverpool University has established a generic set of assessment criteria for their Master Course in Education (The Centre for Lifelong Learning, 2008). Likewise, Lancaster University has developed an innovative, multifunctional and versatile VLE called ‘MyPlace’ for student to create, develop and refine their e-portfolios within PDPs (Lancaster University, 2008). The aim is to overcome the difficulty in deciding what it is to be assessed by using PDPs and at the same time maintaining academic standards. From the Netherland’s perspective of e-portfolio utilisation, Windesheim University, for example, takes a more holistic approach. Apart from presenting, recording and planning their work and then reflecting upon, students enter their university’s registration details into their e-portfolios.

3. PDP and e-portfolio development at University of Dundee (UoD)

Working in line within the national policy guidelines set by the QAA for higher education (Quality Assurance Agency, 2001) and recent developments at national level (Quality Assurance Agency, 2008), major developments of the VLE have been undertaken at UoD. The VLE at UoD that has been named as ‘MyDundee, is made up of two servers (University of Dundee, 2008). They are the Online-course Delivery Server (ODS) and Content Management Server (CMS). The latter is a depository for resources that are fed by tutors and students and the e-portfolio is a subset of the CMS. More specifically, the e-portfolio is used to store personal information, present personal competence matrix, learning plans and evidence of progress, achievement and reflection. It contains artefacts as evidence of learning and practice and attainment of standards. The evidence can be in the form of word and power point files as well as links to other resources.

To operationalise the use of e-portfolios, specific guidance is issued to students about what is expected. A representative user-interface for individual student is displayed as Figure 1 below. In addition, the student has the option and opportunity to personalise the user-interface. The menu items that appear on the user-interface and that need to be addressed in the final submission are as follows:

- Introduction
- My Profile
- My Educational Philosophy
- Standards for Initial Teacher Education (SITE) Audit - Record of Achievement
- Critical Reflection
- My Priorities
- Bibliography

As shown in Figure 1, these are hypermedia links that open in separate pages and allow students to either write directly on the page and/or attach other files.

Although such a menu is pedagogically focused by design, those features which are common to the outcomes are listed above.

By completing ‘My Profile’ and ‘My Educational Philosophy’ students become more aware of their own value-base and their own sense of identity. The ‘Standard for Initial Teacher Education Audit (SITE)’ that links to ‘Audit of attainment’ option contains links to artefacts demonstrating achievement (The General Teaching Council for Scotland, 2006). The ‘Critical Reflection’ demonstrates higher order thinking skills in the process of reviewing or evaluating the evidence students have gathered. ‘My Priorities’ that is at times known as ‘Development Targets’ indicate the professional skills that
students are likely to develop after having graduated and having entered the first year of employment in their profession.

Figure 1: A sample of the user-interface of a student’s e-portfolio at the University of Dundee

View the growing importance of e-portfolios in assessing students’ grades, especially for their first degree as targeted by QAA (Quality Assurance Agency, 2008), four major questions are raised. First, gathering artefacts and students commenting on these artefacts do not guarantee that the students’ submissions will be written in critical reflection mode. Second, what arrangements have been made by universities to maintain quality and standards and to prevent different forms of plagiarism. View the ease of availability of e-information, plagiarism is indeed a major concern (Elander, Pittam, Lusher et al., 2009). Third, how to differentiate between collaborative work and for example, student A simply does the work of student B. And fourth, as the use of e-portfolio has shifted the traditional examination, what system has been set up by University of Dundee and other universities to support lecturers and/or examiners.

As discussed earlier, although the collaborative elements promote reflection and learning, researchers and practitioners, for example Ecclestone (1999); Phillips et al. (2004); and Hennessy and Howie (2004) argued the necessity for both students as well as tutors to engage in the process of reflection. It is only by engaging reflectively that learning and progress would take place. Cottrell (2003), for example, carried this discussion further by stating that students need to set targets, attain those targets, keep reflective records and evidence of attainment.

As already stated at start of this sub-section, University of Dundee (UoD) has developed its own policy statement on the use of e-portfolios in PDPs as well as forging ahead with exploratory implementations of PDPs, utilising its chosen VLE and CMS. In this context, the School of Education, Social Work and Community Education (SESWCE), at UoD is piloting a new Post Graduate Certificate of Education Course for teachers (SESWCE, 2008). A substantial part of the course that would normally be delivered during school blocks will be dispensed using the university’s VLE, MyDundee. Table 2 presents the transition from the traditional mode of course delivery to a structure that uses the VLE. The traditional mode of course delivery and the new course structure are presented in Table 2.

The new structure of course delivery allows students who are on school placements, for example, to upload their lesson plans, resources used in these lessons, evaluations of lessons progression and
other such artefacts onto their e-portfolios. During the faculty based and distance learning time, they
work on a number of research projects and assignments, for which they produce both individual and
collaborative reports. As these are also seen as artefacts, they are uploaded onto their e-portfolios.
As each student progresses through the course, the number of such artefacts grows. Eventually, it
becomes the student’s own responsibility to ‘link’ these artefacts into the e-portfolio structure. This
linked e-portfolio then provides evidence of progression, coherence and reflection as the student
progresses towards course completion.

Table 2: The traditional mode of course delivery and the new course structure that uses the VLE at
the School of Education, Social Work and Community Education (SESWCE, 2008)

<table>
<thead>
<tr>
<th>Traditional Mode of Course delivery</th>
<th>New Course Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 six weeks school placement blocks (18 weeks)</td>
<td>3 six weeks school placement blocks</td>
</tr>
<tr>
<td></td>
<td>(18 weeks)</td>
</tr>
<tr>
<td>18 weeks faculty based</td>
<td>7 weeks faculty based</td>
</tr>
<tr>
<td></td>
<td>11 weeks distance learning</td>
</tr>
</tbody>
</table>

Very early feedback from students has indicated that they have sought guidance on the ways to
structure their e-portfolios. None of them, either during their first degree or subsequent modes of
employment, had experienced personal development planning or e-portfolio construction. With this in
mind, it was decided to give them a preset template as their user-interface. This template which has
been presented earlier in Figure 1 is structured to indicate what is required in terms of assessment
but, without discouraging their sense of ownership and personal commitment to the ongoing
construction of their e-portfolios. As the course is accredited nationally by the General Teaching
Council for Scotland (GTCS), students are to provide evidence that they have satisfied the Standards
for Initial Teacher Education (SITE) by the end of course. To assist students in this process, they are
provided with an electronic template of these standards in a tabulated format, in the form of a
columnar display. It is also known as the SITE template for example, as displayed as Figure 2 on next
page. The middle column lists required standards and the right hand column provides students with
space to evidence of attainment of standards. This evidence is reflective in nature and contains
hypermedia links to those files, such as teacher summative report (SE2), school placement reports,
lesson plans, any additional supportive work and the students’ formative report (SE1).
Figure 2: The user-interface an e-portfolio where students provide evidence of attaining stated standards

While students are in the process of completing this SITE template they share it with their peer learning group. This encourages peer collaborative learning and formative assessment; a process that is iterative in nature and provides feedback about learning.

As the course concludes, the e-portfolio evolves from a formative assessment instrument to one that is summative in nature. At this stage, students share their e-portfolios with their tutors who then cross-reference the e-portfolio with the SITE Audit targets ensuring that students have evidenced attainment of targets. As well as students satisfying the GTCS’s professional standards for initial teacher education, e-portfolios are also used to assess the academic quality of the course, as defined in the assessment criteria of the university’s validated course (SESWCE, 2008).

4. Student perception of PDP and e-portfolio development

4 weeks before the end of the first module, a sample of 26 students was issued an online evaluation questionnaire to complete. This evaluation was deliberately placed in the distance learning part of the first module because it also establishes whether students were actively engaged in the processes associated with the construction of their e-portfolios. The aim of the evaluation questionnaire was to identify which processes they were comfortable with and which would require additional support during forthcoming faculty based teaching blocks.

20 out of 26 students responded to the evaluation questionnaire. Those 6 students who did not respond stated time factor for non-completion. Those students who have responded said that it was their first experience with this kind of e-portfolios for collecting artefacts. This is justified because teaching, learning and assessment has been undergoing a transition from the traditional mode of course delivery to a blended learning format with the support of the university’s VLE. 12 out of 20 students find the use of CMS easy or manageable, for example, they can add artefacts to e-portfolios and they were excited with their e-portfolios. For example, a student commented that:

‘I am collecting my work in word and have managed to put some of these documents into my e-portfolio. I still feel rather overwhelmed by this aspect of the course’ (Student).

However, remedial support has been incorporated into the course at the introduction stage to those who finding it difficult. This can prove to be quite challenging as, immediately after this introduction, students are operating in a distance learning mode.

Most of them have reported that they understand the differences between the CMS, their content area on the VLE and their e-portfolios. This indicates that they differentiate between collecting artefacts and then building them into a cohesive e-portfolio. Those who do not understand require further remediation. Interestingly, it was found that more than 50% of students were able to successfully link folders in their content area. They have also linked individual files and other artefacts in their developing content area. The process of linking to folders, rather than files, is a second level skill and one that would be required in the final stages of building an e-portfolio. This early usage of linking artefacts into e-portfolios is encouraging, in that, students have demonstrated technical competences before moving onto a more reflective stage in using the e-portfolio as evidence of having achieved the SITE standards. To support this move, the SESWC is engaging further training in skills development in this particular area.

17 out of 20 students said that they have shared their e-portfolios with their peers. But, only 4 out of 20 have really commented the development of e-portfolios of their peers and even tutors’ comments have been limited. It has been reported that:

‘I’ve received some feedback from <Name of peer> and it’s been very useful. <Name of peer> gave feedback via Comments section in the e-portfolio. Good to get a bit of encouragement and to know someone else can actually access the material. I’m not very confident about this aspect of the course and tend to save everything in My Documents. I feel I could do with more tuition centred around the use of the e-portfolio system’ (Student).

Although students have shared their e-portfolios, they have not, on the whole, passed comments to each other, in relation to the contents of their respective e-portfolios. There are implications here for the initial set of lecture inputs for future cohort of students. The importance of peer collaborative
learning will have to be stressed at the introductory stage of the course and lecturers, in particular, have to be more proactive in encouraging students at these early stages. For example, it was reported that:

'I have received feedback on items in developing my e-portfolio from my subject tutor and have also received a little feedback on lesson evaluation summaries from my subject and generic tutors. Feedback has been via email and has been useful and encouraging’ (Student).

In this particular case, although feedback was emailed to ensure access by the student, the use of VLE needs to be encouraged. Stressing the importance of peer collaborative learning at the outset of the course is one of the longer term implications.

The expectation is that as students move from gathering artefacts together, towards reflecting on the significance of these artefacts, then there would be greater interaction between the students and their tutors. We anticipate that there would be greater interactions with the students’ peers during the next stage of the process – a part of the programme that requires greater emphasis.

5. Results and analysis

Rather than simply summarising the implementation of PDPs and e-portfolios as well as how students perceive the entire process, we conclude by further interrogating the transition towards collaborative e-learning.

Is it realistic to expect universities to adopt wide scale implementation of personal development?

The findings from the universities considered earlier in this paper indicate that implementing PDPs is feasible in the Higher Education sector. However, the implementation of PDPs and e-portfolios at the SESWCE, UoD and associated implications suggest that such usage would require a distinct culture change, on both the part of students and staff. If students are more familiar with traditional assessment by examination then moving to a more outcome based assessment model will have to be introduced with caution. It may be possible to implement such new models in one year post graduate courses, over a relatively short timescale, but for traditional 3 or 4 year degree programmes it will be more problematic. If such courses are modularised and each module is assessed separately, then implementing an outcome based assessment module would need to be considered on an individual module basis. The staffing implications are also considerable. Not only will staff have to accept the value of having an outcome based assessment model, but they will also have to spend additional time customising their existing courses with the new structure of course delivery as shown earlier in Table 2. The implementation of such a strategy will require considerable course re-alignment.

Can such implementations be achieved in an online format?

The emerging e-portfolios systems available, either as sub-systems within VLEs or bespoke systems in their own right, give scope for considerable optimism. In the case of Newcastle University, Cottrell (2003) describes how a home-grown e-portfolio system was developed and its successful application with medical students. In the Netherlands, for instance, the use of such systems has been incorporated in the study of Nursing, Medicine, and Professional Education (Wijnand, 2004). Nevertheless, the integration of a bespoke e-portfolio system with other systems, such as existing VLEs, student record system and management information systems poses certain issues such compatibility. As stated earlier, Lancaster University has investigated the possibility of using their bespoke e-portfolio system with their chosen commercial Virtual Learning Environment (VLE). This investigation has led to the development of a more versatile VLE called ‘MyPlace’ has been developed (Lancaster University, 2008).

At the University of Dundee (UoD), the chosen strategy is to adopt an e-portfolio system within VLE, ‘MyDundee’. Although this is a more integrated solution, with the first release of VLE’s e-portfolio components, we have faced and eventually overcome certain technical issues, such as downloading e-portfolios to compact disc (CD). However, there exist the potential for implementation of PDPs in an online format. As the technology evolves, whether it is a bespoke solution, on an ‘off the shelf’ package, it would become more robust as it has been the case at UoD.
If an online implementation is chosen, what competences will students need to develop, in order to successfully create and refine such plans?

The choice of online implementation of PDPs and e-portfolios require certain technical competences amongst both staff and students. What may be more difficult is to change a university’s assessment culture from one where the tutor is predominantly in control, to that where students take more responsibility for the development of their own PDPs and e-portfolios. From a change of culture perspective, we propose that students need to develop skills in the processes of collection, selection, direction, evaluation and reflection. But, we also suggest tutors to develop their own assessment and tutoring skills where the onus may be on quality assurance of PDPs, rather than grading of assignments.

What artefacts or resources are needed to be collected in order to demonstrate achievement of the goals set in such plans?

We suggest that collection of artefacts or evidence be carried further than just a number of word-processed assignments, power point presentations, spreadsheets and video files. The SESWCE, for example, emphasises collection of artefacts, such as lesson plans, school placement reports, tutor visit reports, feedback on written assignments and reflection on discussions that take place in appropriate online forums. These artefacts need to be relevant to the course and professional attainment targets that are in use as part of the course’s assessment criteria.

What effects will such a migration to Personal Development Plans (PDPs) have on the quality of teaching, learning and assessment?

The findings from this study indicate that most students are at their early stage of using PDPs, e-portfolios and online peer assisted learning. Interestingly, by the end of the programme it was also found that the majority of students have managed to complete their e-portfolios to a satisfactory level. The use of PDPs and e-portfolios is achievable, but to promote quality of teaching, learning and assessment through enhanced peer learning, we suggest that both students and tutors servicing the course have to be convinced about the advantages to adopt online peer learning into the course. We ask for a change in culture and invite further research in this area.

6. Conclusion

Acknowledging that this study engages a group of students at one university, the results are yet interesting. Rather than generalising our findings, we argue that the move towards PDPs, integrated with the use of an online delivery system, such as an e-portfolio system would help both students and tutors. The study at UoD suggests that students can develop greater sense of responsibility in relation to both the course process and the products, or assessment artefacts that they have to produce as part of their programme of study. These products and the professional competence they have mastered in the process of e-portfolio construction integrate their career development as they leave higher education and embark on their professional career. Hopefully, the professionals themselves will take cognisance of these PDPs and will endeavour, in some way to link into individual’s ongoing professional staff development. Although the target to use PDPs and e-portfolios is set for 2010 by QAA as stated earlier (Quality Assurance Agency, 2008), we acknowledged that there will be struggle ahead. To ease this struggle, we propose further research into this area to find effective ways in which the construction of such e-portfolios can be achieved more collaboratively.

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References


Sharing e-Learning Innovation across Disciplines: an Encounter between Engineering and Teacher Education

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Abstract: One of the major teaching challenges of higher education is helping students to bridge knowledge with real life practice. This is especially important in applied fields including medicine, social science, education and engineering. Traditionally, practicum and internship programs are the only means for students to step outside of classroom learning and to connect with the outside world, and a chance to apply what they learn to real life problems. Increasingly, information and communication technology (ICT) is being used to create yet another dimension for authentic learning beyond the boundaries of the classrooms, and in addition afford collaborative and flexible learning mode. This paper details a collaborative effort between the engineering and the education disciplines, in using ICT to support students’ professional growth in teacher education. An eLearning platform was created as a result of the joint effort for the training of student teachers in developing their professional knowledge in teaching and learning and gaining understanding of the work of a teacher. Through the platform, student teachers gain understanding about the teaching profession from different people of the education sector; and they can reflect and share their teaching practicum experiences with each other using the online communication tools.

Keywords: e-Learning, teacher education, engineering education, TPCK, Web 2.0, interdisciplinary collaboration

1. Introduction

Within higher education, one of the major teaching challenges has always been helping students to bridge knowledge with real life practice. This is especially important in applied academic disciplines including medicine, social science, education and engineering where professional knowledge are constantly being renewed and recreated through real practice (Curry & Wergin, 1993; Boud & Feletti, 1997; Savin-Baden, 2000; Cheetham & Chivers, 2001). The engineering discipline for instance, often emphasizes learning through self-experience and the capturing of first-hand knowledge through problem solving. And in engineering teaching, using a problem solving approach has proven to be an effective instructional method, as well as in motivating and engaging student in the learning process (Felder & Silverman, 1988; Kolmos, 1996; Perrenet, Bouhuijs & Smits, 2000; Mills & Treagust, 2003).

Traditionally, this problem based approach learning philosophy has been reflected by the substantial portion of internship that students within such applied fields have to undertake during their undergraduate years. In fact, practicum and internship programs used to be the only means for students to step outside of classroom learning and to connect with the outside world, and a chance to apply what they learn to real life problems. However, with the availability of Information and Communication Technology (ICT) and the rapid development of eLearning, ICT is increasingly being used to create yet another dimension for authentic learning beyond the boundaries of the classrooms and campus, and in addition afford collaborative and flexible learning mode. Compare to traditional methods of teaching that emphasize classroom lectures, the deployment of eLearning has increased the flexibility and effectiveness of teaching and learning by removing the restrictions of time and space in knowledge delivery and capturing. In a typical eLearning system, ICT components including computer graphics, animations, multimedia effect, databases, and other internet applications such as discussion forums and chat room facilities are incorporated. Such a stimulating learning environment engages students into a deeper learning process that can often elicit a high rate of information retention, and result in a shorter learning time (Ng & Komiya, 2000). In addition, such a multimedia education platform can be interactive, enabling students to control the content and flow of information capturing (Vaughan, 1998). The result is that students become active participants in learning and they take control of their learning processes.

In order to help their students to grasp the difficult concept of how industrial engineers work in the real world, and how they solve real life problems, a number of teaching staff at the Industrial and Manufacturing Systems Engineering Department (IMSE) of the University of Hong Kong started to explore the innovative use of ICT in their teaching since 2000 (Lee, Lau, Mak & Ma, 2004; Lau, Ma,
Mak & Chan 2004; Lau, Mak & Ma, 2004). The originally designed and in-house developed Interactive Multimedia eLearning System (IMELS) was the result of such experimentation. The main objective of the eLearning system was to create a virtual learning environment where students can immerse themselves and try to solve the problems embedded within the case studies scenarios. The program’s main features include animated virtual companies based on real industry case studies and an online knowledge base of engineering subjects. The program was used in several courses by the IMSE since 2002, and the impact of the program in improving teaching and learning was studied through focused-group evaluation. Results of the student evaluation indicated that the majority of students found the program had enhanced their understanding of the practical issues in industry, and that it provided an effective platform to assist them to produce solutions to these real-life problems (Lau et al., 2004; Lee et al., 2004; Lau & Mak, 2005a; 2005b). Students reported that they were stimulated by the use of the online and multimedia presentations, and the program motivated and aroused their interest in learning the discipline of industrial engineering as a profession (Lau & Mak, 2005a; 2005b).

In the year 2006, the IMSE Department and the Faculty of Education within the same institute created a joint project to re-purpose the IMELS eLearning system to serve teacher education students in relation to teaching practice. Similar to the situation of industrial engineering, the education filed also has a heavy professional practice component, and they too were seeking new and effective means to enhance their teaching practicum programs, and to strengthen their undergraduate learning in general. It was determined that the program scope would focus on the Education Faculty’s Teaching Practice (TP) program because it serves very similar educational purposes as those of the IE internship program. However, the project team was conscious of the fact that the functionalities and features that once applied to the engineering teaching and learning purposes may not fit exactly with the TP program’s objectives. The re-purposing of the original IMELS had to take into consideration the contextual differences between the two systems. One of the differences was that at the beginning stage, one of the crucial factors guiding the design principles was to solicit views and ideas from the end-users themselves (this element was missing from the original IMELS design). During the consultation session, both the teaching staff and the undergraduate students from the education faculty provided valuable suggestions about how the original IMELS eLearning system can be re-purposed and be further enriched by expanding its scope to cover more extensive contents and features. In particular, there was an emphasis on coming up with features to foster collaborative learning and the formation of active learning communities among student teachers and partners from the local schools. They pointed out the importance of having a virtual platform for sharing ideas, TP experiences, and knowledge about teaching and learning among student teachers as well as the faculty teaching staff, especially on interesting issues encountered during the TP. The undergraduate students who are being trained as future teachers in local schools felt a particular need to learn from each other, and from experienced teachers about the practical problem solving experiences which are hard to come by in normal lectures or tutorials.

The above mentioned new requirements posted a new challenge with which the previous programs had not encountered, yet highly relevant to the current educational reform initiative underway in our university. For instance, one of the main features of the university’s new curriculum is to provide students centered and diverse learning experiences (Transforming Student Learning, 2006). This paper reports the successful attempt to such a eLearning platform that would enhance students‘ learning experiences.

2. Web 2.0 learning technology for education

The e-solution that the joint venture project needed to provide was to come up with effective ways in creating desirable ICT features that are applicable to the teacher education discipline. There are two major design objectives: (1) to build features to satisfy the social and communication need of the student teachers (2) to build a video content platform which structure must be clear and simple so that navigation and access to content is easy and smooth. These objectives were found to coincide with the emerging concept of Web 2.0. Within eLearning development, the technologies that are being employed in various platforms are also changing. One of the more recent web development has been conceptually framed as Web 2.0. The concept or definitions of Web 2.0 are often varied, and usually point to not a singular technology, but represent certain design approach or web application strategies (Alexander, 2006). But many agree that a major characteristic of Web 2.0 is the enhanced social connection function of various web applications (Alexander, 2006; Anderson, 2007; O’Reilly, 2007). It is a more dynamic way of both accessing web based contents and connecting web users against the traditionally static and one way information web pages. Many also argue that Web 2.0
applications provides simple to use and easy to maneuver social and networking tools, and therefore are more appropriate for creating community-driven and collaborative user experiences (Guzdial, Ludovice, Reall, Morley & Carroll, 2002; Chen, Cannon, Gabrio, Leifer, Toye & Bailey, 2005; Hampel, Selke & Vitt, 2005; Alexandra, 2006; Byron, 2006; Duffy & Bruns, 2006; Levi & Stone 2006; Chao, 2007; Parker & Chao, 2007). Some of the popular emergent Web 2.0 platforms on the World Wide Web such as YouTube, Wikipedia and Blogging, etc. are essentially center around the online experience of individuals gathering and participating freely in various virtual groups and online communities. These web users possess diverse identities, interests and cultural backgrounds, nevertheless collaborating and contributing information or knowledge to the much larger World Wide Web space (Alexanda, 2006; Levi & Stone 2006). For example, YouTube allows individuals to upload and share their "home videos" onto a large online database while others can freely search, watch and comment on the video clips and link the video clips to their own blogs; Wikipedia is an ever growing online encyclopedia entirely constructed by individual users contributing, modifying and co-building their knowledge to share with the rest of the world, and Blogging is basically individualized online journal that can be published on the Word Wide Web while others can comment and build on issues and topics which interest them.

Within the current education landscape, there has been growing interest and heated discussions about the need for higher education institutes to explore these new applications of web technologies. People from the education sector began to realize that with the available Web 2.0 web software, more flexible and interactive eLearning systems can be constructed where students can share and construct their knowledge more easily with their peers. However, there has been a general lack of non-commercially developed, comprehensive and integrated eLearning programs that incorporate new Web 2.0 features. This is probably due to a general lack of deep level understanding and theoretical framework in the educational uses of constantly evolving ICT technologies (Mishra & Koehler, 2006). In terms of the commercially available educational Web 2.0 applications, there are TeacherTube which is essentially built upon the YouTube concept and structure yet educational content specific. There are also the educational blogs that are built upon the commercial blogging engines, used by teachers to teach particular subjects, much like the traditional teacher web pages, yet much easier to develop and maintain (Chao, 2007; Parker & Chao 2007). The strength of this project which built on previous experiences, therefore lies in its sound educational philosophy and a deep level understanding of the new teaching and learning needs of higher education which guides the design principals of the eLearning program. This kind of holistic approach to the implementation of ICT in teaching and learning takes into account of the inter-dependent nature and complex relation among academic content knowledge, pedagogical concerns, and the technology. The synergistic design process creates a unique type of knowledge all by itself increasingly known as Technological Pedagogical Content Knowledge (TPCK) which was first put forth by Mishra and Koehler (2006). According to TPCK, the knowledge that is both created and required when teachers try to adopt technology into their teaching and learning is both complex and context specific as a result of the interplay among content, pedagogy and technology (Koehler & Mishra, 2005; Mishra & Koehler, 2006). In other words, those who design eLearning environments need to take into consideration the unique pedagogical challenge that is inextricably linked to the subject knowledge of an academic discipline. In our case, teacher education which concerns largely a teacher’s professional knowledge may pose a number of pedagogical concerns and need to be addressed if new eLearning platforms are to be constructed effectively.

3. Understanding the instructional need of teacher education

The use of ICT in teacher education has been widely studied and documented since ICT has become increasingly influential in the education field in recent years. (Kay, 2006; Murray, Nuttall & Mitchell, 2008). One of the major uses of ICT in teacher education was being an instructional tool (Carter, 1999; Kapitzke, 2000; Mayer, 2002; Murray, Nuttall & Mitchell, 2008; Ryan & Scott, 2008). One of the survey studies reviewed the context in which ICT was used in student teachers’ learning, and suggests that a majority of the applications were in fact targeted at the teaching practicum component. It was pointed out that new approach to teaching such as the rising concept of teacher reflection couple with the availability of new web technologies has provided the ground for ICT development in teacher education:

Most of these focused on the use of online communications in the fieldwork component of programmes. This focus reflects a concern to explore the potential of technology to address ongoing problems in the practicum related to isolation and lack of connection

Like many other teacher education programs mentioned in the ICT research literature, the existing teacher education program of our study also comprises of a large Teaching Practice (TP) component of which there will be a total of nineteen weeks of student internship at local secondary schools throughout the 2nd, 3rd and 4th year of study. The TP involves direct field experiences where student teachers work often in pairs with school partners, mentors and the community of teacher practitioners. Teaching experience and knowledge sharing, reflection and mentoring are the pedagogical emphasis within the current TP program. Therefore, there has been an ever growing need and concern to provide the student teachers’ with more flexibility in knowledge sharing and collaborative learning experiences. There is also the need to create some kind of network where mutual support and building new knowledge can in fact take place among the student teachers.

Another major challenge for the faculty is one of knowledge integration and application. Currently, the curriculum structure is such that three major areas of studies are being taught and delivered to student teachers in a disconnected manner, they are (1) educational studies, e.g. educational psychology; learning theories, etc; (2) subject knowledge, e.g. Language, Mathematics & Science, etc.; (3) Pedagogical skills, e.g. effective teaching methods and strategies. Students learn these subjects separately from individual courses, however, student’s ability to integrate these different knowledge and to apply the knowledge to the real classroom teaching becomes vital to their TP and future career success. The current setting makes it difficult to provide the students with opportunity to generate their own knowledge integration prior to the TP because of time, space and resource constraints. It was apparent to the faculty that there is an urgent need to produce learning materials that are readily accessible and to provide the students with prior experiences of teaching. And last but not least the faculty needs to provide students with the means to access and share among themselves up-to-date information and new knowledge, especially from their TP practices. This is to ensure that their graduates are able to maintain a competitive advantage in the teaching profession field that is constantly changing. To summarize, the major instructional concerns of the TP program is to put it simply, the need to connect classroom learning with real life practice which keeps changing due to the rapidly evolving societies. The specific instructional concern of our study also coincides with the existing literatures which suggest that there are similar instructional needs of teacher education program shared among different tertiary institutions and across geographical locations.

4. The iTeach e-learning program

To come up with innovative solutions to meet these educational and pedagogical challenges, the IMSE Department worked closely with the teaching staff of the Education Faculty and focused on modifying and adapting the original IMELS architecture which was web-based and an open shell that can be flexibly extended to form an information portal for different disciplines. The new program continued to use the basic design concepts and structures of the original IMELS which has three major components, they are (1) authentic problems identified and constructed as case studies which serves as the major learning path for students; (2) subject knowledge content which serves as the bases of students understanding of the disciplinary knowledge, and (3) the contextual online, web based environment that integrate all the content material. In addition, the case study materials created for the platform were rich in content because unlike traditional paper based case studies, they were shot as video clips often in an authentic school environment, therefore bringing the rich flavor of contextual information to the viewer. Another major design in the new program, was to taken into consideration of students’ need for communication and collaboration among themselves and with others, and added the extra feature of collaborative web tools, in this case, a Blogging function. The evolution from the original design to the present design is portrayed below graphically in Figure 1.

The resulting new eLearning program known as iTeach has three major components, namely, (1) digital video based content materials/data repository (similar to the concept of YouTube), (2) a virtual classroom environment with a number of case examples highlighting the different scenarios in classroom teaching, and (3) a new blogging feature that allows online collaborations, discussions and publications among student teachers (Figure 2).
The generic structure from IMELS

Adapted system design

Figure 1: Design evolution

Figure 2: Final product - iTeach
When a student teacher enters the website, what he or she will see is the main page of the eLearning platform iTeach. All the navigation buttons and links to the various contents can be accessed on the main page on top of the screen. The main focal point of the web page is an embedded media player (can be seen in figure 2 as the black square) which plays all the video contents of the website. To the right of the screen are a list of available video clips of the website categorized according to topics. Underneath the media player are a set of open ended questions to prompt student teachers’ reflective thinking in relation to what they see in the video clips. A link to the website’s blog is put at the end of each question so that student teachers can discuss the guided questions with peers on the blog if they desire. The platform was designed to display mainly video contents. Text contents are kept at a minimal to reflect this moving picture oriented design. The viewing experience is similar to what people normally experience on YouTube, a video content sharing website, and the difference is that users cannot upload their own videos. This was due to the fact that all the contents of the website has gone through a careful selection and categorization process to ensure their legibility, clarity and ease of concept grasping. Moreover, the main learning attraction is the viewing of real classroom actions and the guided questions for students’ reflections. In other words, the platform is different from other video based platforms, such as video blogs and YouTube because it is essentially learning oriented as opposed to the more leisure viewing type of commercial websites.

5. Program evaluation and findings

A questionnaire evaluation was conducted on the beta version of the eLearning program with two cohorts of first year students from the faculty who undertook the Bachelor of Education (BED) program. These students represented approximately 31% of the total number of first year BEd students in the faculty. Prior to the actual survey, we tested the questionnaire design with six students randomly picked from outside the surveyed cohort. Their feedbacks were generally positive on both the quality and attractiveness of the program. And the written comments regarding the learning benefits of the iTeach were encouraging. Below are two comment excerpts:

SA: In order to have a general understanding, I spend approximately one hour for each topic, and I think it is of great worth as the videos do make me realize that to be a teacher in the future, there are still many things that I have to make more efforts to learn at the moment, not only the subject knowledge, but how to equip myself as a good teacher, say, in psychological aspects. The videos do make me think about questions like what I really want to achieve seriously.

SB: To me it is (referring to content material) more philosophical than educational. The topics not only provide information but lead to in depth reflections.

During the actual survey, we asked the students to rate the web program in two broad areas: (1) Program design and presentation (2) Web content and its educational value. We also asked the students to provide written assessment on the usefulness and learning benefits of the subject contents. A total of 38 students were given a paper questionnaire to be completed at their convenience and after they have gone through a self directed learning process with iTeach. Two class representatives were appointed to collect the completed questionnaires as students may complete them in different times although the deadline was set at one month. There were a total of 33 successfully completed questionnaires.

In terms of the items on program design and presentation, the students were satisfied with the structure of the program and how its contents are presented (the average rating is 2.01 on a scale from 1 being very much satisfied to 4 very much not satisfied). The ratings on two of the items are slightly higher than others. They are: (i) The contents are presented in a way that are easy to understand (mean 1.85), and (ii) The program is structured in a way that allow me enough freedom to choose when and where to engage with the content (mean 1.82). However, one of the item receives a slightly lower rating which is (iii) The program encourages me to learn collaboratively (mean 2.18). The higher rating on item (i) and (ii) shows that some of the design criteria that the project team had set in the beginning such as creating clear structure and easy to understand contents has been met. The lower rating on item (iii) was within the expectation of the project team because elements that encourage more user input and interaction among user themselves may give way to a more structured learning platform, although this is not always the case.

In terms of content and educational benefits, the students were also satisfied with the content and the learning experience (the average rating is 1.99). The ratings on three of the items are slightly higher than others. They are: (i) The topics covered offer a good overview of the various topics involved of
the main subject (mean 1.91), (ii) I was able to find new and fresh ideas about the subject after going through the contents (mean 1.91), and (iii) I would recommend this learning program to my fellow students (mean 1.91). One item that receives slightly lower rating is (iv) The topics covered are relevant to my experience and knowledge in the subject (mean 2.09). The higher rating on item (i), (ii) and (iii) showed that students were generally satisfied with the content material and the learning experience. The lower rating on item (iv) perhaps can be explained by the fact that those who participated in the survey were all first year students. They have not had any TP experiences yet, so they might find the content that emphasized TP experience to be slightly unfamiliar. This point was actually mentioned by a few students in the written comments.

Information gathered from the written responses of student teachers from our survey show some interesting learning issues and challenges that first year student teachers may face. The responses reflected the first year students’ lack of confidence in real teaching. They were aware of the fact that the lack of practical experience may have a toll on their future teaching. Many said they would like to gain more knowledge on practical teaching skills when asked what topics in the video contents they would like to discuss with their peers the most. And among those teaching skills, classroom management in terms of controlling students’ behaviors in the classroom was one of the most frequently mentioned.

S2: As I am a year 1 student, there is still not enough subject relating to education, for example, the skills of teaching. I think this eLearning program can provide us more knowledge in the field and let us prepare to become professional teachers.

S7: I wish to discuss with others about how to make the classroom more orderly, classroom management. It is because a good learning environment is very important if one wants to teach the students knowledge. Besides for a novice teacher, someone who has little teaching experience, the orderliness of the classroom is more difficult to control.

S17: (topics I would like to discuss with peers) How to handle students’ behavior problems. How to enhance students’ interest in learning. Pedagogy.

S3: School experience, classroom management because this is the most useful for student teachers. And we can use the examples and methods mentioned in the video clips to solve the problems we encountered during the practicum. The video contents also invoke our thinking.

Many responses also showed that student teachers started to reflect about their own conceptions and understanding of teaching and teaching as a profession after viewing the video clips of in-service teacher’s experience sharing.

S32: “Teachers must be inborn”, I doubt the statement.

S33: If teacher is a profession, how come a lot of people switch from other unrelated field to teaching profession without acquiring any professional qualification?

S14: The idea that classroom teaching is not just about ‘teaching’. In real teaching, teachers need to attend to many other aspects, such as (a Confucius quote) : “To teach about the path, to hand down the knowledge, and to clear confusion”.

S1: Yes. Teaching is a really demanding career. But those good teachers are proud of their students, but not proud of themselves.

Many agreed that the contents stimulated them to think more deeply about the teaching subject. Students became aware that sharing and hearing different ideas inspire them and provoke them to think deeper about themselves as future teachers.

S17: Yes, it has (stimulated my thinking). Teaching can be more than one-way transmission, more elements can be incorporated such as singing, so that students’ motivation in learning can be enhanced. Teaching should not be just about transmitting knowledge, it can also be enjoyable.

S4: Yes. Different people sharing their ideas makes me think more of the future and my role as a student-teacher.

S12: There are lots of teachers’ sharing on the Web. Their enthusiasm in teaching inspires me a great deal. It also makes me rethink why I decided to become a teacher and what sort of teacher I would like to be.
When responding to the question about the educational value of the eLearning platform, the feedbacks were generally positive with some very good praises. The following quote shows possible reasons why students may appreciate the eLearning program.

S23: Although I have only studied the BEd program for one year, and what I have learned are limited, but my impression was that we have been taught with some general theories. But I think for teaching, what's more important is the practical aspect which is different depending on each situation. Therefore, I'm really looking forward to the teaching practice in year 2, 3 and 4. And I think what I'll learn from TP will definitely be richer than the classroom learning. And eLearning program provides a good platform for those of us at the beginning level, or even for those who wants to become a teacher to know more about it. The videos also help to make certain concepts more concrete. And the sharing from senior students is also a very valuable reference.

It seems that students do acknowledge the usefulness of such ICT learning, however they also expressed concern over the actual usage. One response came from a student in Chinese language teaching reflecting that language was perceived to be a factor affecting ICT usage although most of the video clips were shot in local dialect.

S1: As I am just going through the first year, it's hard to give comments. But eLearning is not very popular among Chinese major students.

S33: I think so. Since I am just in my first year I don't think I have much suggestion to make. This kind of program may help but I doubt the participation.

In the conclusion below, we will offer some insights for the student responses mentioned above. Suggestions for how to improve the eLearning platform and the use of ICT in teacher education in general will also be made. And finally, possibilities of the kinds of further research in the field of ICT in teacher education is discussed.

6. Conclusion

The students’ feedbacks showed that the first year students display a lack of confidence in their ability to teach because they felt that they have not had any teaching practice experience yet. It is interesting to note that many of them mentioned the aspect of teaching that concerned them the most was how to manage a classroom in terms of maintaining order. Students were aware that such kind of practical knowledge is hard to obtain from university classes because every teaching situation is unique and different. They also pointed out that having actual experience in teaching is important for teacher education. The self perceived inexperience may also explain why many of them liked the in-service teachers’ sharing and found the stories inspiring and stimulating. They especially appreciated sharing on actual teaching skills such as how to build good relationship with students and design good lesson plans. As one student remarked, experience sharing is not only thought provoking but it is also how the teaching legacy gets passed on from one generation of teachers to another: “It's also a way to learn from others’ experiences and see if we can apply the same to my own teaching. It also helps to build my own teaching repertoire”. Other studies have suggested that the use of digital media contents in teacher education can often lead to learning that is more student-centered, authentic, and meaningful (Schaverien, 2003; Kearney & Schuck, 2006; Ma, O'Toole & Keppell, 2008). But as Murray rightly points out, little is known about the learning outcomes of the use of ICT. Our studies seems to suggest that eLearning platforms which are rich in contents about actual teaching experiences may have played a role in the process of knowledge transfer from one generation of teachers to another. The eLearning platform in fact provided the space and means for such kind of knowledge transfer. The following quote from one of our participants highlights the questions worth pursuing in terms of how the learning process may occur: “I am most interested in the process of student teachers becoming a teacher. How the shift occurring between these two identities…”.

Although the study does show some evidence that ICT is being used to good effect in supporting student teachers in their learning to become a future teacher, the data also reveals that student may not actively use or participate on the eLearning platform. This problem which is not uncommon to online learning (Pearson, 1999), may undermine the ultimate success of such online learning resources. However, the problem does not seem to be the contents or the platform itself because students were readily attracted by the rich contents that the video based case study provided. In other words, the contents were engaging enough so that students would take pleasure in going through the learning material. Some studies suggest that a facilitator or teacher’s involvement in the
online learning environment is important factor for students’ active participation and retention (Salmon, 2000; Woods, 2002; Mazzolini & Maddison, 2003). We argue, therefore that web technologies and good contents alone will not encourage more interactions among the student teachers, and the participation and facilitation by experienced teachers are perhaps needed. It was suggested that by integrating the eLearning program more tightly with the existing curriculum, and the active involvement of teaching staff who make use of it in their teaching might help to encourage student participation. In fact this would be a good hypothesis to be tested out in further research in this area. To summarize, although it appears that ICT and new web technologies play an important role in enriching student teachers’ learning experiences, the success of its application still depends on factors that are beyond the technologies or pedagogies. Nevertheless, the project has been a remarkably encouraging experience for inter-disciplinary/cross faculty collaboration in the effort to advance teaching and learning practices.

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A Case Study: Developing Learning Objects with an Explicit Learning Design

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Abstract: In learning object design an emphasis on visual attractiveness and high technological impact has seemed to persist while content frequently reflects a lack of clear pedagogical basis for the application of learning objects for online learning. Most apparent is the absence of supportive scaffolding for the student user; interactivity built on an exploratory approach can fall short of achieving its learning objective if support and guidance are missing for the student user who fails to grasp the learning point being offered. Research into developing an effective learning design for learning objects, undertaken by a research and development group in Modern Languages at the University of Southampton, has evolved an explicit pedagogic design for learning objects in English for Academic Purposes and study skills for international students and English native speaker students. These separable learning objects can be aggregated into resource sets or toolkits with multiple usage options for students and teachers. Moreover, this approach to designing effective online language learning materials is based in a defined pedagogy, which also has applicability in developing discipline-specific learning objects. It seeks to draw on key elements and processes identified in Laurillard’s Conversational Framework for teaching and learning (Laurillard, 2002). This paper will present a case study of the development of a toolkit of learning objects with an explicit learning design. It will present the pedagogic basis for the development of these learning objects; outlining how they operate both as micro learning contexts and as components within the wider teaching and learning framework of a face-to-face or online course. It will also describe research findings showing how learning objects have been received by students and tutors.

Keywords: Learning Objects, learning design, blended learning, teacher development, pedagogy

1. Introduction

Despite considerable investment in learning object technology over the last decade, they do not yet appear to have realised their full potential. Discussion persists in terms of the reasons for their limited impact (Collis and Strijker, 2004); the challenge of designing them for reuse or repurposing (O’Grady et al, 2005); and more recently, the means by which, as Open Education Resources (OERs), they might be shared effectively in an educational culture where ‘openness is a prerequisite to change’(Wiley and Hilton, 2009). In comparison, still very little is said about the important matter of their learning design or their pedagogical effectiveness although, in spite of the advent of social software and its different pedagogic affordances, learning objects continue to be developed and applied in a range of disciplines.

One influential factor in their limited impact may be that the power to create learning objects frequently still often lies with the technologist rather than with the usually less technically skilled, but pedagogically aware classroom teacher. Indeed, much of the software that has been available for creating ‘interactive web pages’ lacks a recognisable pedagogic basis or learning design. Moreover, such software does not offer support to those teachers who are learning to use it, in making the transition from producing paper-based materials for their classroom teaching to designing learning materials effective for the online environment.

This paper will address some of these issues; firstly, providing a brief overview of the different types of learning objects being produced, and then providing a case study of an approach to the creation of learning objects which is based in a defined pedagogy and which has also involved the development of a design template for creating reusable learning objects. Reference will be made to the development of one particular resource set of learning objects in English language and study skills for international students, the EAP (English for Academic Purposes) Toolkit. The process of developing this toolkit, in particular, has helped determine the key features of a pedagogic approach for learning objects in general. An examination of how this toolkit has been implemented and the user response to it also demonstrate how learning objects can offer versatility in the way they can be used by learners and teachers. This approach to learning object design offers teacher-developers a clear pedagogic framework for the production of effective learning objects for use with their own students.
2. Learning Objects: the simple, the complex and the reusable

Since 2004, an e-learning research and development group in Modern Languages at the University of Southampton, has been exploring and developing a range of web-based teaching and learning tools and resources for use in blended and online courses. The main activity underpinning the design and development of our online courses and resource sets (toolkits) has been the production of learning objects (LOs). LOs are a form of eLearning resource used across a range of subject areas, which are still being realised in various formats by those involved in the field of Learning Object technology. As a result, definitions of LOs abound (see Polsani, 2003) and this difficulty of ‘sharing a common understanding of the term’ as Hodgins (2000) notes, also points to different views held about online learning and instructional design.

In practice, at one end of the spectrum LOs take the form of simple digital resources which may offer potential for learning in relation to a particular topic but which lack development of this potential in the form of supporting information or an explicit learning activity. These have been referred to as ‘media objects’ by Hodgins (2000) and have more recently been described as representing a kind of ‘asset’ or ‘pedagogic asset’ (eLanguages, 2008a). These digital assets with pedagogic potential might include for example, video files or graphic images. Other LOs present as combinations of one or more digital assets with clear pedagogic intention. Some of the LOs that fall into this category are built predominantly as graphic Flash sequences supported by audio-visual resources and textual narrative and explanation; some also offer multiple choice tests for self-assessment or checking of understanding by the user in the final stages. A non linear approach is often preferred for these, allowing users to learn by exploring information presented in a variety of media about a single topic. They may involve considerable content in themselves (high granularity) and appear to be conceived and designed for stand-alone use rather than as part of a specific course or in combination with other LOs.

The approach outlined below offers a more activity-driven LO in which a pedagogic task or tasks forms the basis for the learning rather than the assets themselves. A single asset or combination of assets support the task(s), and might include video, audio, graphic or textual assets. Reflecting a more linear presentation, these LOs may appear to suggest prescription in how they should be used but in fact, they can offer considerable flexibility in how they are used by students. They also reflect a lower level of granularity, providing for ‘bite-sized’ chunks of learning, and can have a role alongside other LOs and other course components in teaching and learning contexts, both blended or wholly online. The LOs in the EAP Toolkit (eLanguages, 2008b) developed at the University of Southampton provide an example of this approach, combining pedagogic assets with staged learning activities and feedback which drives and scaffold students’ learning. Furthermore, these LOs aim to be reusable.

There has been a strong impetus to add scope for reusability to a number of the different formats being adopted for LOs. Reusability is an important consideration because of the time investment involved in creating LOs, and so the need to maximise the potential for re-use in new learning and teaching contexts is widely acknowledged (e.g. Wiley 2001, South and Monson 2001; Koper et al, 2004). The re-use of an LO may be possible in its original format, or through a process of revision, known as ‘repurposing’. Scope for re-use is a factor that is not generally supported by standard webpage authoring tools. Much of the available commercial authoring software supports the technical creation of web pages for interactive learning purposes but focuses on design at the level of the whole course rather than at the level of the smaller, more reusable chunk of online learning. Other software, some of which is by no means new, allows teachers to create quick and simple quizzes and question sets in a variety of interactive formats to support classroom learning, but predominantly for self testing and with questionable scope for learning.

Most of these available tools offer the user total freedom in how they create the learning materials. They do not offer a particular pedagogic approach or design template for the production of output with potential for reuse or repurposing. For the teacher-developer, failure to factor in re-use at the start of the design process can render materials unusable beyond the actual course for which they have been developed. Without a template for reuse, if an attempt is made at a later stage to repurpose learning objects, the amount of time needed to disaggregate and re-synthesise elements for a new context of use can be a lengthy exercise (Watson, 2007). Once teachers embark on the business of creating online learning materials for their students the desire to later re-use or repurpose them for different
contexts can lead to an unwelcome amount of extra work – unless re-use has been planned for in advance.

Much of the discussion around the reusability of learning objects has centred on the technical requirements to achieve this rather than on pedagogic aspects. The technical standardization of LOs has been a predominant concern, with the storing, searching and sharing of LOs through repositories as the driving force for this. However, reusability needs to be considered in the context of LO pedagogy too. Granularity or ‘size’ has been highlighted as a critical factor which impacts on the reusability of LOs (South and Monsoon 2001, Koper et al. 2004). As Koper et al. point out, optimally, a learning object should be as small as possible whilst maintaining internal consistency. Without guidance on what might be a suitable ‘size’ or level of granularity for any chunk of online learning being created, teachers developing learning objects for the first time, may produce ones of very variable size depending on the complexity of the topic or learning point encapsulated. The selection of too large a learning point/ topic coupled with a desire to deliver this in ‘completeness’ can result in very large LOs where focus and structure may be lost due to the amount of information provided. A complex point may be better spread over several LOs. At a later date, variably sized LOs brought together for re-use in a new course iteration are likely to require considerable work in their repurposing to produce a coherent and unified set. Maintaining general consistency of style and granularity therefore, facilitates repurposing and reuse from the course builder’s perspective, and, LOs which share a broadly similar set of design features within an online course, help to deliver an organised and balanced learning framework for the student.

2.1 Developing LOs with scope for reusability

The need to facilitate straightforward re-use and ease of repurposing of LOs was an important discovery during the design process underpinning the creation of a toolkit of 100 learning objects in English for Academic Purposes and Study Skills for international students in Higher Education. The initial selection of LOs for the EAP Toolkit required some considerable repurposing (see section 4 below) in order to create a coherent resource set (toolkit) in which each LO focussed on a discrete learning point and had a relatively low and consistent level of granularity for the reasons described above. This was a valuable experience and taught the importance of developing reusable learning objects with shared attributes both technically and pedagogically. All later additions to the toolkit adopted and reflect a consistent pedagogic approach which allows for reusability and ease of repurposing.

Besides consistency in level of granularity, another important feature which renders LOs more reusable is if they are made to be self-contained or separable from their context of use. Koper et al. (2004) refer to this as ‘encapsulation’. This can be achieved pedagogically in several ways. In the LOs selected and modified to form the EAP Toolkit, the introduction or lead-in to each LO establishes a micro-context yet does not refer to the specific course context in which the LO is being used. It might seem at first glance, that the lack of internal linking to context of use could lead to weakness in terms of overall coherence; however, LOs can be effectively embedded in a specific course and linked to ‘context’ within the environment of use, e.g. a Virtual Learning Environment (VLE) such as Blackboard, Web CT or Moodle. In other words, additional course scaffolding can be wrapped around an LO once it has been uploaded to a VLE. Figure 1 below shows how a sequence of selected LOs can be embedded in a specific context of use within a VLE (here, a pre-arrival online course on living and studying in the UK, delivered to international students in their home countries through Moodle). Reference to the theme, unit, week (as in Figure 1) or other part of a course that represents the specific context of use for an LO can be made outside the LO itself so that it continues to retain its potential for re-use elsewhere.

Designing LOs which allow for re-use requires some rethinking in terms of how online material development is approached. The major aspects of LO design which impact on reusability need to be determined and taken into account in the design template and ultimately reflected in any authoring tool. In the EAP Toolkit, a range of the micro components of LOs (e.g. task instruction, specific types of task developed in Flash) also present themselves as suitable for re-use or quick repurposing, thus providing the equivalent of a mechanic’s ‘toolkit’ for disassembling and rebuilding LOs to a general formula. To recap then, the key features that enable LOs to be reused or easily repurposed may be identified as:
being initially developed as ‘building blocks’ and designed to a formula which facilitates re-use in another course or resource set;

being self-contained and separable from individual context of use;

being constructed using micro components which are also standardised and separable;

being consistently sized and styled.

Figure 1: Scaffolding added in the VLE embeds re-used LOs in a new context of use

Besides highlighting the prerequisites for reusability, the development of the EAP Toolkit also allowed important pedagogic features shared by our LOs to emerge and be more clearly defined.

The desirable LO attributes which have been established can be summarised: LOs should focus on a clearly identified learning point, which, if complex, is unpacked and presented through several staged activities allowing for reflection, practice and productive types of activities to be combined. Through repurposing, the LOs in the EAP Toolkit were reorganised so that all were activity-led and aimed to engage the student in ‘learning by doing’ and active reflection. Activities were enhanced with more feedback, which included comments and explanations as well as answers in order to support and scaffold learning. Hints and examples are also options available to help students engage with tasks, and links are included to a glossary, online dictionaries and a web links page providing further practice or reference material associated with the learning point. The next section explains how these elements work together in the LOs, and presents the pedagogic approach in detail.

3. A pedagogic design for reusable Learning Objects

The LOs created by eLanguages combine multi-media assets such as audio or video clips, texts, graphics and web links with an activity-based approach to learning. Each LO focuses on a ‘bite-sized’ learning point. A sequence of staged activities around this, supported with feedback (answers, comments, explanations, hints, examples), offer a pathway through the LO. This sequence optimally provides between 20 to 40 minutes of learning activity and allows for flexible (varied) use by both the classroom teacher and the student user.

Although incorporating different media resources as ‘pedagogic assets’, these LOs, nevertheless, aim to be pedagogically driven. Some of the important pedagogic features that they exhibit are that:

- they are activity-centred;
- they aim to engage the student actively in reflection;
- activities allow for practice and production;
- activities are also personalised (learner-centred) where possible;
they are enhanced with significant amounts of feedback which helps to support and drive students’ learning;

- the design of the LOs accommodates different learning approaches.

An example of how these features are achieved and work together to facilitate student learning can be considered in ‘Using paraphrase in writing’, an LO from the EAP Toolkit. In Figure 2 below, a pre-activity task from this LO can be seen prompting the student to reflect about why paraphrase is more often preferred to direct quotation in academic writing. The first of three key activities is also visible – this requires the user to compare two paraphrases written by two different students in a typical course-related, assignment writing context, decide which is better, thereby recognising a good paraphrase.

### Using paraphrase in writing

In your own academic writing, the most common way of referring to the ideas of another writer is by paraphrasing them. Quotations are found less often and the use of paraphrasing has several advantages associated with it.

What do you think are the advantages of paraphrasing over quotation? Make a few notes in the box below and then check your answer.

**More concise**

**Can use own words**

In these activities you will evaluate two paraphrases produced by student writers and then practise paraphrasing yourself.

**Activity 1: What makes a good paraphrase?**

Two students, Chen and Sunei, are writing essays on ‘The Role of Stakeholders in Companies’ for their business studies course. They both want to refer to some of the key points made by the writer of the text below, which focuses on the interest that governments have in business enterprises.

**Read the text and compare it with the two paragraphs written by Chen and Sunei, paraphrasing the writer’s main points. Which student has produced a better paraphrase?**

**Chen and Sunei**

Two activities follow, building on this simple recognition task. The first requires the user to analyse the better of the two student paraphrases in order to identify the specific actions from a list that were involved in producing it and so arrive at a set of good practices for the production of a paraphrase. An analysis of the less effective paraphrase allows focus on what not to do when paraphrasing. Feedback allows for comparison of students’ responses and adds further comment (see Figure 3). The final activity requires the user to rise to the challenge of producing a paraphrase. Using another student-centred scenario the user practises making paraphrases of five short original text extracts for use in a student’s written assignment. Feedback includes model answers to compare against and a review of the key steps involved in producing a paraphrase for use in a course assignment.

Through the process of engaging with a short sequence of three staged activities, which become increasingly challenging, and their feedback, the student user is supported through their learning; this entails recognition of what constitutes a good paraphrase, abstracting from this some key principles and then applying them. The time needed to complete all activities is not likely to exceed 40 minutes, thereby providing a bite-sized chunk suitable for online learning. The pedagogic basis for the LOs seeks to draw on key elements and processes (involving ‘discussion’, ‘interaction’, ‘adaptation’ and ‘reflection’) identified in Laurillard’s model for teaching and learning (Laurillard, 2002:87). Laurillard’s ‘Conversational Framework’ provides a model for the inclusion of learning technologies as part of the teaching and learning process in Higher Education. At a micro level, the design of our LOs aims to reflect various elements identified by Laurillard’s iterative model of learning, including scope for:

- task ‘interaction’;
- ‘reflection’ about the learning concepts involved;
- ‘discussion’, which in the LOs is an internalised process through engagement with the activities and their feedback (when they are used for independent study);
- ‘adaptation’ of (students’) understanding through their engagement with a sequence of increasingly challenging activities centred around the learning point.
Activity 2: Recognising what makes a good paraphrase

Figure 3: Feedback scaffolds students’ learning in Activity 2 of LO on paraphrasing

Activity feedback in part assumes the role of an ‘automated tutor’, predicting where the student might have chosen a different answer and elucidating and explaining as necessary. Whilst this form of feedback is inevitably limited to predictable areas of student misunderstanding, it can help support learning where LOs are used independently by students, who can also make their own choice about when to view feedback. However, if LOs are inserted into a full learning context, the inclusion of a ‘live’ and reactive tutor in the learning framework - through face-to-face or online tutoring at the level of the macro learning context - can help realise the full iterative process described in Laurillard’s framework, particularly the need for ‘adaptation’. The ‘discussion’ element identified in Laurillard’s framework can also be met more dynamically through peer (and tutor) interaction, in class or through online discussion tasks overarching concepts covered in the LOs. The next section will illustrate how tutors at the University of Southampton have aimed to realise this practically using the LOs in the EAP Toolkit in face to face courses.

4. LOs as a versatile technology through the use of toolkits

The development of the EAP Toolkit represented a first step in distilling an effective pedagogic approach for supporting our international students’ online learning. The current toolkit LOs are equivalent to c. 80 hours of activity-driven learning focussing on a range of academic study skills and aspects of language development. It came into existence through the repurposing of, initially, 60 items of online learning material selected from several online EAP courses developed some years previously during a government-backed UK e-Universities (UKeU) Project by a consortium of six UK universities led by the University of Southampton. At the end of the project, in a search for a way of re-using the course material and building on the lessons learned, research and development continued at the University of Southampton.

This was the first context of re-use in which LOs were brought together to form a support resource (the EAP Toolkit) for a summer face-to-face pre-sessional course for international students in English for Academic Purposes. The chosen items from the existing online courses were disaggregated from assessed tasks and other course scaffolding, after which the LO design template was reworked to facilitate reusability, and a consistent style and desirable level of granularity determined for all LOs. Through the process of standardising the LOs, those exhibiting particularly effective and desirable pedagogic features were identified and refined, the basic elements of a learning design were distilled (as described in section 3 above) and an attempt made to map with Laurillard’s framework. Following the repurposing and refinement of the LOs, additions were developed to produce a coherent and comprehensive resource set primarily intended for independent use by international students. The
outcome of this process was a set of LOs repurposed for use in a new format – as an online resource set (toolkit).

It was envisaged that the LOs would perform the role of a set of self-access learning aids which pre-sessional course students could access at any time through a password-protected VLE from their own computer at home, or from any public computer workstation or personal laptop at the University. Being web-based and accessible at any time and from any place immediately gave it an advantage over other location-restricted online resources delivered, for example, on CD Roms. For ease of student access, the LOs were organised into a simple and flexible set of skill-related folders and uploaded to the University's VLE, Blackboard. An initial set of six skill folders has since been expanded to eight as the number of LOs has increased. These are:

- Learning to study
- Academic writing
- Academic reading and critical thinking
- Vocabulary for academic purposes
- Grammar for academic purposes
- Academic listening and note-taking skills
- Academic communication skills
- Discipline-specific needs (e.g. specialised types of writing assignment)

Interactive examples from the EAP toolkit and a full list of the 100 LOs can be viewed at www.elanguages.ac.uk. The LOs in the toolkit conform to a basic set of technical standards and offer interoperability - identified as an important attribute for LOs - especially if they are to offer the appropriate level of functionality to a community sharing their use (Koper et al, 2004). In other words, they can be uploaded and delivered via commonly used VLEs. Each LO is essentially a simple content package, comprising an html web page serving as the 'front end' containing the learning activities supported by digital assets such as embedded audio or video clips, images, with linked word document or pdf files, and so can be zipped and uploaded to a VLE. Alternatively, LOs can be organised into sets and linked together into a series of web pages and delivered through a password-accessed website.

4.1 Blended learning and other modes of use

During the first year of using the EAP Toolkit to support the pre-sessional course, course tutors began blending parts of LOs with their classroom teaching, linking to Blackboard through computer and/or SMART board technology in their own classrooms. This suggested to us that LOs could offer a new and potentially powerful type of classroom teaching resource. Teachers also began prescribing particular LOs to students for class preparation and consolidation; creating programmes of selected LOs for students to complement the course syllabus; adapting or adding to LO activities to create offline writing tasks which students could submit for tutor feedback. In other words, they began to embed LOs much more with their teaching, making them more integral to the course syllabus. This practice grew in subsequent years and a number of distinct ways of using and blending the toolkit with the pre-sessional and other tutor-led courses emerged. The different modes of use for the toolkit that have been identified to date are:

- as a stand-alone resource for students to use for independent study;
- as a remedial resource for tutors to direct individual students to;
- blended with face-to-face teaching and / or a specific programme of study such as the pre-sessional course
- through student use outside the classroom for lesson preparation/consolidation
- through adaptation into hybrid online/offline tasks
- and through tutor use in the classroom

The LOs have therefore proved to be flexible in ways we had not foreseen at the outset. Although their effectiveness as classroom teaching resources has not yet been formally investigated, observations of their use in classroom teaching suggest that both students and teachers readily adapt to them for this purpose. LOs collected into toolkits such as the EAP Toolkit and those forming a
growing resource bank continue to offer new possibilities for repurposing and re-use. Some of these possibilities have already been realised in further projects which are now being evaluated such as the HUMLO Project: repurposing learning objects to meet discipline-specific needs in Humanities (Watson, 2009) and the development of an open set of web-hosted LOs forming part of Prepare for Success, (www.prepareforsuccess.org.uk), a web learning resource for international students coming to study in the UK funded through the Prime Minister’s Initiative for International Education and the UK Council for International Student Affairs (UKCISA).

4.2 User evaluation of LOs

Since their introduction in the summer of 2004, a variety of data capture methods have been used to help evaluate the use of LOs in blended learning contexts. This has so far mainly focussed on use of the EAP Toolkit on pre-sessional courses and data has been gathered at regular intervals. Data format has included student questionnaires (800 gathered in total); observations of students using LOs during independent study sessions (70); tutor questionnaires (150); student learning log entries (120).

Figure 4 below presents a brief comparison of students’ responses in 2004, 2005 and 2008 in relation to frequency of use; ease of use; and perception of the usefulness of LOs in the EAP Toolkit for independent learning purposes.

<table>
<thead>
<tr>
<th>LOs</th>
<th>2004</th>
<th>2005</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of use</td>
<td>78% (once a day to once or twice a week)</td>
<td>74% (once a day to once or twice a week)</td>
<td>73% (once a day to once or twice a week)</td>
</tr>
<tr>
<td>Ease of use</td>
<td>90% (very easy/easy)</td>
<td>83% (very easy/easy)</td>
<td>76% (very easy/easy)</td>
</tr>
<tr>
<td>Usefulness</td>
<td>88% (very useful/useful)</td>
<td>92% (very useful/useful)</td>
<td>93% (very useful/useful)</td>
</tr>
</tbody>
</table>

Figure 4: A comparison of student responses concerning frequency of use, ease of use and usefulness of LOs over 3 pre-sessional courses

Since 2005, in order to embed the LOs more effectively in the pre-sessional courses, pre-sessional tutors have been inducted in use of the LOs before the course begins and, subsequently, each class of students has been guided through self-enrolment to the toolkit and received a hands-on induction with the LOs. Use of LOs has continued particularly through increased blending by tutors with their classroom teaching and through their directing students to LOs that consolidate classroom learning, although there has been a slight fall in frequency of student use. In 2008 a particularly large cohort of students (c. 700) passed through the summer pre-sessional on five or ten week courses. The challenge of inducting so many students and a range of other practical, contributory factors may explain why a drop in frequency of use was reflected in the responses of students surveyed that year, despite the fact that they also rated LO usefulness more highly than in previous years.

<table>
<thead>
<tr>
<th>LOs in the EAP Toolkit...</th>
<th>Student % agreeing or strongly agreeing</th>
</tr>
</thead>
<tbody>
<tr>
<td>are enjoyable to use</td>
<td>63% (2005) 62% (2008)</td>
</tr>
<tr>
<td>help me to understand a learning point</td>
<td>70% (2005) 71% (2008)</td>
</tr>
<tr>
<td>provide good feedback</td>
<td>66% (2005) 49% (2008)</td>
</tr>
<tr>
<td>support my classroom learning</td>
<td>62% (2005) 64% (2008)</td>
</tr>
</tbody>
</table>

Figure 5: Student evaluation of particular points concerning LO effectiveness in 2005 and 2008

In 2005 and 2008 the sample groups (312 respondents in 2008 compared with 260 in 2005) also rated the particular points concerning LO effectiveness. Their responses, summarised in Figure 5, reflect remarkable consistency with the exception of their perception of the quality of the feedback. One explanation for the decrease in student satisfaction with feedback (despite an increase in perception that the LOs help them understand the learning point) may lie in higher student expectations regarding the capacity of learning software to provide personalised feedback in every case.

Forty three pre-sessional tutors also completed a tutor questionnaire relating to the use of LOs in 2008. 90% felt that the LOs were ‘useful in terms of supporting students’ independent study on the course’, compared with 81% in 2005 when tutors’ views were also sampled. 65% felt that they ‘supported students’ classroom learning’, compared with 57% in 2005. In 2008, 79% indicated that they directed their students to LOs ‘regularly’ or ‘sometimes’ and 25% indicated that they felt the LOs had a role in their own classroom teaching as well.
Overall, students and tutors perceptions are that the LOs have a positive role in helping students learn and usage levels among students and tutors are high. The LOs (aimed at students with IELTS scores between 5.5 and 7.0 or equivalent) can present challenges to students at the lower end of this spectrum and lower satisfaction levels with activity feedback may point both to this and to the fact that online learning materials used for independent study can rarely measure up to the best feedback from a real tutor either face-to-face or online, when delivered as part of an iterative framework for learning as described by Laurillard (Ibid). Nevertheless, it is gratifying that in the opinion of the students and their class tutors, the LOs do help them understand and learn.

The precise role that the LO pedagogic model plays in this still needs much deeper investigation and a comparison with students’ use of more traditional materials for independent learning could also be undertaken. Clearly, there is much that needs to be examined but the results so far encourage us to continue with the development of learning objects following this pedagogic model.

5. Conclusion and further development

This case study has strived to show that, among the many other web-based possibilities for enhancing education in the twenty first century, pedagogically-designed LOs can provide a particularly versatile resource offering scope for sharing, blending, re-use and repurposing. However, in addition to the use of an effective pedagogic model for LO design, classroom teachers need to be enabled to create effective, versatile and reusable teaching and learning materials for their students’ online use without reliance on technologists to support their technical realisation. To this end, the pedagogic approach described above has been embedded in a simple LO authoring tool for teachers, the LOC Tool (Watson et al. 2008) which, despite being still in the process of undergoing further enhancement, is already being used by c.100 teachers. This software guides teachers through the creation of pedagogically effective LOs without the need for technical support. If classroom teachers can be thus equipped, LOs can play a significant role in helping realise a shift in the kinds of resources that underpin much of the learning and teaching in the twenty first century.

References

Retrieved 27th November 2009 from www-jime.open.ac.uk/2004/4


