

## **THE DESIGN AND DELIVERY OF TWO ONLINE ACTIVITIES FOR UNDERGRADUATE STUDENTS**

Sean Lancaster  
Southampton Solent University  
UK

### **Abstract**

This study considers two short online activities for second year undergraduate students studying a technology course. It makes comparisons between a traditional summative multiple-choice quiz and an activity that drew upon a number of theories of learning and motivation to inform its design and delivery. It was found that verbal briefing to reinforce context and learning outcomes, together with carefully designed questions to encourage structured developmental learning, resulted in a doubling of active participation in the activity.

### **Introduction**

This study considers two online activities undertaken by second-year undergraduate students studying a unit in Video Principles and Systems. This is a technical unit with a non-mathematical, systems-level approach that aims to give students a better conceptual understanding of how video works. The students are on a number of BSc (Hons) courses specialising in Audio and Video technology.

The unit has a traditional teaching structure, with core information being provided in weekly lectures, supported by small group tutorial workshops and practical sessions. Lecture notes, additional reading, practical examples and tutorial questions are provided on a Moodle-based virtual learning environment (VLE).

The aim of the activities was to encourage students to engage with the taught material, questioning their understanding and identifying areas that required more explanation. Both activities were on specific parts of the curriculum, targeted at particular concepts that are important for later elements of the unit. Importantly, neither activity formed part of the formal assessment for the unit, though both gave an indicative mark to the student. They were intended to be formative, developmental aids, rather than instruments of assessment. This expectation was made very clear to the students.

The first activity was based on a set of existing multiple-choice questions that had previously been used as a written test. This was presented to the students as an online quiz via the VLE in late October. The results were disappointing,

particularly in terms of participation, with less than half the students attempting the quiz. Of the students that did engage with the task, many appeared to lose interest as the quiz progressed, taking less care with their answers. It is recognised that the direct transfer of assessment materials from the classroom to online delivery has limited effectiveness (Myers-Wylie et al., 2009; Pallof & Pratt, 2008), so this was no great surprise.

The students were given a follow-up discussion task in-class to identify the factors they felt influenced their participation with the quiz, based on recent similar work reported by Catling and Mason (2010). The key conclusion of this from the students' perspective was a lack of motivation and, from the author's perspective, a lack of effective learning.

Much work has been done on effective online formative instruction and assessment (Gaytan & McEwen, 2007, for example), but few studies have applied a specific theoretical framework to activity design. It was therefore decided that the second activity would have entirely new questions and structure to reflect learning theory and research on student motivation. The specific content of the activity questions is beyond the scope of this report. Rather, it concentrates on the learning and motivation methods used to influence the presentation, structure and style of the second activity.

### **The Approach of the Learners**

Each student applies their own approach to their learning. Actually, the same student may apply different approaches in different situations: the demands of the task, the assessment procedure, the approach of the teacher, and the learning environment as a whole (Entwistle, 1996). However, students do tend to habitually apply one approach, often influenced by their social and educational background and experiences. Often, this approach can be predicted by their orientation. Ashcroft and Foreman-Peck (1994) identify four distinct types of student orientation: academic orientation, where students' goals align with the academic aspects of higher education (the "joy of learning"); vocational orientation, where the students are motivated by getting a job; personal orientation, where the chief goal of the student is their own development; and social orientation, where the student's lifestyle dominates.

Entwistle (1992) defines three key approaches of deep, surface and strategic learning. In each approach, the intention of the student differs — to understand the ideas (deep), to cope with course requirements and minimise workload (surface) or to achieve the best possible mark (strategic). So, academically orientated students are likely to apply the deep approach, vocationally and personally orientated students are likely to apply a mix of deep and strategic approaches, and socially orientated students are most likely to apply the surface approach.

It has also been shown that the student's perception of the learning context directly impacts on their learning (Prosser & Trigwell, 1999). This context is not only created by their prior experiences of education, their experiences on the course and their perceptions of the teaching and assessment they receive, but it is also created by the informal relationships the students foster within their groups and with their teachers. Effective learning can be aided by ensuring that the students are aware of the context in which they are being expected to learn and how this fits into the 'big picture.' Hence it is important that the activities sit within a well defined and unambiguous learning context.

### **Application to the Second Activity**

The second online activity contained a set of problems based on the application of material taught in lectures. These problems started as merely recall to give the students some confidence and motivation to continue, but got progressively 'harder' as they introduced concepts and methods that were as yet unexplored. The design of these more demanding questions was done with great care. Learners have a limited capacity for learning beyond their current level in what Vygotsky (1978) describes as the Zone of Proximal Development (ZPD). To get appropriate learning there needs to be sufficient challenge without exceeding the learner's capability (or ZPD). It has also been shown that effective learning happens when the learner is presented with new information that they can see is related in some way to previous learning (Ausubel et al., 1978). The understanding of new knowledge is assimilated by building bridges between existing ideas and new material.

Whilst students may be pre-disposed to a particular learning approach as discussed above, the aim of these short online activities was to encourage greater depth of 'understanding.' So, students may at first have employed a surface approach for the recall questions, but were encouraged to adopt deep or strategic approaches as they became more experienced.

A bigger issue was that of providing for different learning needs within the same class. The online activities had to manage the possibility that students were at different stages in their development, but encourage them to engage with the content in an enquiring way — developing higher order factual management skills. A question that requires the critical analysis of a fact is going to intimidate a student that is still at a stage of factual acceptance. To promote the deep leaning approach required, an absence of threat and anxiety is important, creating a learning environment that is conducive to reflection (Ashcroft & Foreman-Peck, 1994). So, careful question design was essential to ensure that students at different stages of their development felt comfortable that they could work towards an acceptable solution.

### **Motivation**

For effective learning to take place, the student has to actively engage with the learning environment. In traditional teaching, this may be stimulated by well-

structured quality teaching, an interesting physical environment (for example practical facilities or labs) or even the personality of the teacher. In an online environment, the opportunities for stimulation are more limited. Hence it is important to have some understanding of the motivation of students to use a VLE before designing content to populate it.

### Goal Orientation

One approach is to consider the goals of the learner. Students tend to exhibit two key types of goal: learning goals that increase knowledge and understanding for what is being learnt; and performance goals that are related to improvement of status. Timmis and Cook (2002) call these “open” and “closed” learning orientations, the characteristics of which are described below:

Table 1: Orientation and Characteristics of Learners

| Orientation            |                         |
|------------------------|-------------------------|
| “Open”                 | “Closed”                |
| Learning goal          | Performance goal        |
| Characteristics        |                         |
| exploratory            | controlling             |
| collaborative          | competitive             |
| motivated by curiosity | motivated by anxiety    |
| embraces failure       | defends against failure |
| creative               | mechanical              |
| fluid                  | rigid                   |
| self-motivated         | externally-motivated    |
| whole person involved  | mind alone involved     |

Beard and Senior’s earlier work (1980) relates similar goals to the academic, personal, vocational, and social orientations. They suggest that what we call here the open orientations are most likely to be associated by the academically orientated students. All other students will drift into closed orientation if the teaching and assessment climate is not carefully designed and managed.

### Intrinsic and Extrinsic Motivation

Another approach is to consider intrinsic and extrinsic motivation. Intrinsic motivation is that which is embedded in undertaking the task itself without any perceived direct tangible gain. For many students, learning itself is an intrinsic motive, so long as it is clear why it is being done. A lack of intrinsic motivation is likely to stem from learning that is imposed on the learner such that it fails to trigger natural curiosity or seems irrelevant or inappropriate. This fits in with the cognitive approaches to learning outlined above. In contrast, extrinsic motivation is more behavioural, in that it requires some kind of reward, such as improved marks (Beard & Senior, 1980). Whilst this may be a somewhat less desirable

motivation for students in higher education, it can be of value if it helps establish good study practices.

### **Application to the Second Activity**

The second activity was designed using Timmis and Cook's suggested motivational strategies for online learning (2002).

#### *1. Virtual learning needs to provide opportunities that are not available elsewhere.*

Whilst the students like to have the VLE available, most of them only use it as an information library. This is partly because they find it useful to be able to access lecture notes, handouts, tutorial sheets, etc. in chronological order and partly because it is what they are used to. The setting up of innovative and varied VLE activities is highly time consuming, and it is unrealistic to expect that this is a task that has been universally embraced by teachers and lecturers. Hence the VLE experience of most students contains little active learning.

It was stressed that students would get feedback on each of their answers to the activity, whether or not they were "correct," and that there would be extra explanation attached to the solutions that might help them build links between the topics covered. This meant that all students got their own, personalised feedback depending upon how they answered the questions. As they don't have one-to-one tutoring, this gave them a unique opportunity to personalise their learning. Of course, this required more work setting up the activity, with specific feedback that would be triggered by particular answers, but an example question was presented to the class, partly to show the extent of this work, and this was very well received (see also below.:

#### *2. Tangible extrinsic motivators should be built in to virtual learning.*

As the overall aim of the activity was to encourage students to apply deeper learning strategies, the questions were designed to be interesting examples of technology to which the students could easily relate. Ensuring the clear practical context of the questions was central to stimulating their natural interest in the subject and hence maximising their intrinsic motivation.

However, the students on the unit were very aware of the examination requirements for its assessment at the end of the year. Therefore it was realistic to acknowledge the link between the content of the test and possible examination questions. This was done by highlighting how an activity topic might be examined, using the more formal language of an examination, and how the student's activity answer might be re-phrased to provide a good examination solution. This built a direct link between active engagement with the test and enhanced examination success, providing clear extrinsic motivation.

*3. It must be clear to learners what is expected of them in the virtual learning environment.*

An example question was included in the activity that was demonstrated to the class in a tutorial session. The question was typical of the bulk of the activity, with a number of possible appropriate answers together with some common misconceptions. The students were shown how to access the activity, what styles of answer were required and how to enter these answers. They were then given the results of entering both correct and incorrect solutions and the feedback that was provided.

*4. Learners need guidance in how to make the most of the online environment within specific learning contexts.*

It was a secondary aim of the activity to encourage the students to value the use of the VLE in future units and to introduce them to some of the more interactive elements of online learning. So the final question of the activity was designed to require some collaborative discussion in small groups via Wikis on the VLE. This was a new experience for these students as virtually none of them had worked with others in an online environment before. The question was very carefully structured such that the students understood what the collaboration was for, what their personal role was within the collaboration and how it fitted into their learning.

*5. The level of threat must be managed through support, gradual induction and peer group working.*

Timms and Cook suggest that the public nature of the collaborative working may prove intimidating to some students, partly because of the lack of visual feedback that would normally be associated with a face-to-face discussion. To help overcome this, the students were asked to work in their discussion groups in a classroom to plan the structure of their discussion before attempting the task on the VLE. They were asked to present a short verbal report on their planning process to the class at the end of the session.

A key theme of the reports was that the face-to-face meeting established a structure to the discussion and even in some cases a hierarchy to the management of that structure. The students were generally uncomfortable with starting with a blank screen, suggesting that it was intimidating to be the first contributor. However, they felt far more able to contribute once they had the opportunity to negotiate tasks and roles.

## **Structure and Content of the Activities**

Based on the concepts discussed above, the structure and content of the activities is summarised in the tables below:

Table 2: Activity 1 Questions and Learning

| <b>Activity 1</b> |   |   |
|-------------------|---|---|
|                   | <b>Question style</b>   | <b>Intended learning</b>  |
| Q1–Q10            | Multiple choice with feedback for both correct and incorrect answers. Students allowed a second attempt if they answer incorrectly. | Summative revision of a number of key concepts. Drill and practice. |

Table 3: Activity 2 Questions and Learning.

| <b>Activity 2</b> |  |  |
|-------------------|--|--|
|                   | <b>Question style</b>  | <b>Intended learning</b>   |
| Q1–3              | Very specific multiple choice with feedback for both correct and incorrect answers. Students allowed unlimited attempts if they answer incorrectly.  | Established the context for the activity and the foundation point upon which the students built later questions. Also designed to give initial confidence.   |
| Q4–5              | Missing words questions in the description of complex processes covered in class. The list of missing words had both correct and incorrect solutions that reflected common misconceptions.   | This allowed the students to build a correct understanding of a process though having to structure its component elements.   |
| Q6–7              | Short answer questions developed from Q5. Moodle was looking for specific phrases within the answers (e.g., “Vertical Axis Switch”), which are unambiguous and demonstrate the students’ understanding. Again, feedback is given upon submission drawing student towards the correct solution. | These went beyond the material already taught to allow the students to analyse what they had done so far and develop suggestions for how the systems may be developed further. The feedback established boundaries that ensure the students stay on the right track and reach appropriate goals. |
| Q8                | A group question where students were required to design collaboratively an alternative system to the ones discussed above using a Wiki within the VLE.   | Encouraged discussion to reach the learning goal and students developing solutions based on others’ contributions. Reinforced the requirements of the system reflecting back to questions 1–3.   |

## Evaluation of the Activities

After the first activity the students were asked to complete two short questionnaires to aid with further development. Questionnaire one was based heavily on that of the Student Online Learning Experiences project (SOLE, 2002–2004). This was designed to reveal information about the students’ confidence with the unit specifically and VLEs generally. It also questioned the students’

motivations to study the unit and take the quiz. Questionnaire two addressed the effectiveness of preparation before the activity — the area considered most important for motivating the students to make an attempt — asking questions about access, clarity of requirements, expectations of structure, etc. If they had not taken the quiz, the students were invited to comment on why.

After the second activity, the students were again asked to complete questionnaire two, with a supplementary question about the effectiveness of the briefing session. Whilst this questionnaire provide only a limited view of the effectiveness of the processes, it was only intended to focus on the specific strategies of changing students' preparations of the activity and how well the different style of activity questions were received.

### **Summary of Findings**

Questionnaire one showed that almost all students were extremely confident using the internet, but were considerably less so learning online. When questioned about this verbally afterwards they explained that most of the VLE sites they were encouraged to use did not clearly explain what the role of the learner was, just how to obtain information. Generally, they were happy with the unit they were studying and most students were doing more than two or three hours work per week on the VLE.

Questionnaire one also gave some indication of the students' motivations for study. Nearly all students indicated that they wanted to get good marks (unsurprisingly) with few worried that they would not do well (12%). About half the students were genuinely interested in the subject, although only around 30% expected to do well. Very few students indicated that they felt it important to be better than other members of their group (8%) with a small number feeling forced to do the unit (12%). The average motivation for studying the unit was around 65%.

The number of students that attempted the first activity was 45%, with an average preparation of less than 20 minutes. Only around 55% of these found the activity genuinely useful. The commonest comment from students that did not attempt the activity was that they were concentrating on work they could clearly see was beneficial — mostly work that contributed to their formal assessment. There were also comments about lack of understanding of why the quiz was important and that the format was "boring."

After the second activity, questionnaire two presented a much more positive picture, with 85% of the students that attended the briefing session finding it very useful. A similar number felt the aims and structure of the activity were very clear. Around 50% felt they had engaged with the group element of the process and all agreed that they had identified their personal strengths and weaknesses. The preparation had gone up considerably, to around an average of 50 minutes. Most importantly, the participation was 85% with all participating students



finding the activity useful. Comments were all positive, with some students even stating that they had enjoyed contributing to the Wiki, despite their lack of experience.

## **Future Work**

The developmental structure of the second activity, from multiple choice through missing words and short answer to group discussion, should translate well to other technical subjects within the programme. Hence a study of similar activities is planned for a number of related subjects in the next academic year, to assess the effects of student familiarity with this style of activity. Studies have shown that regular use of similar activities have enhanced student learning (Angus & Watson, 2009). However, as the development of the activities occurred within the current academic year, it has not been possible to measure their impact on assessment performance. Hence, future studies will also try to gauge any impact on student attainment.

## **Conclusions**

This small-scale study identified some key elements of online activity delivery and design that encourage motivation and hence active participation. It has been shown that students show greatest satisfaction when online activities are combined with traditional teaching (Catling & Mason, 2010; Tanguma et al., 2008). It was found that students needed a traditional briefing on the context of the activity: how they should prepare for it; where it fits into their learning; why they should do it and what both learners and teachers get from it. The activity needed to be developmental, allowing students to construct their own pathway through the information, giving them appropriate guidance where necessary. Whilst questions were linked, they were carefully structured to allow students to recognise where they have made earlier mistakes and reconstruct their understanding accordingly. Students commented positively on the variety of question styles within the activity, though they tended perceive “multiple choice” questions easier than “short answer” (similar results have been shown elsewhere, for example, Kim et al., 2009). Finally, it encouraged students to include some discussion, to build up a consensus of their collected knowledge and share it with others, a process found to be positive for students, but problematic to conduct, in other studies (Vonderwell et al., 2007).

The different patterns of motivation and participation between an activity that followed these principles and an earlier ‘traditional’ quiz were particularly marked with around a doubling of the number of students who perceived real educational benefit.

### References

- Angus, S. D., & Watson, J. (2009). Does regular online testing enhance student learning in the numerical sciences? Robust evidence from a large data set. *British Journal of Educational Technology*, 40(2), 255–272.
- Ashcroft, K., & Foreman-Peck, L. (1994). *Managing teaching and learning in further and higher education*. London: Falmer Press.
- Ausubel, D. P., Novak, J. S., & Hanesian, H. (1978). *Educational psychology: A cognitive view*. New York: Holt, Rinehart and Winston.
- Beard, R. M., & Senior, I. J. (1980). *Motivating students*. London: Routledge.
- Catling, J., & Mason, V. (2010). An evaluation of student performance and preference for traditional and online delivery modes. *Psychology Teaching Review*, 16(2), 50–61.
- Crook, C. (2002). The campus experience of learning. In C. Steeples & C. Jones (Eds.), *Networked learning: Perspectives and issues*. London: Springer-Verlag.
- Entwistle, N. (1992). Student learning and study strategies. In *Encyclopaedia of Cognitive Psychology*. Oxford: Blackwell.
- Entwistle, N. (1996). Recent research on student learning and the learning environment. In J. Tait & P. Knight (Eds.), *The management of independent learning* (pp. 97–112). London: Kogan Page & SEDA.
- Gaytan, J., & McEwen, B. C. (2007). Effective online instructional and assessment strategies. *American Journal of Distance Education*, 21(3), 117–132.
- Jones, C. R. (2000). Understanding students' experiences of collaborative networked learning. In M. Asensio, J. Foster, V. Hodgson, & D. McConnell (Eds.), *Networked Learning 2000: Innovative approaches to lifelong learning and higher education through the Internet. Proceedings of the 2nd International Conference*.
- Kim, S., Spielberg, F., Mauksch, L., Farber, S., Duong, C., Fitch, W., et al. (2009). Comparing narrative and multiple choice formats in online communication skill assessment. *Medical Education*, 43(6), 533–541.
- Myers-Wylie, D., Mangieri, J., & Hardy, D. (2009). *The in's and out's of online instruction: Transitioning from brick and mortar to online teaching*. Parker CO: Outskirts.
- Palloff, R. M., & Pratt, K. (2008). *Assessing the online learner*. San Francisco CA: Jossey-Bass.
- Prosser, M., & Trigwell, K. (1999). *Understanding learning and teaching: The experience in higher education*. Buckingham: Open University Press.
- SOLE. (2002–2004). *Student Online Learning Experiences Project*. Retrieved April 14, 2011, from <http://sole.ilrt.bris.ac.uk>
- Tanguma, J., Liu, L. C., & Koong, K. S. (2008). Hybrid learning and effects on student assessment outcomes. *International Journal of Mobile Learning and Organisation*, 2(1), 36–47.
- Timmis S., & Cook, J. (2002). Motivating students towards online learning: Institutional strategies and imperative. In A. J. Kallenberg & M. J. J. M. van

- de Ven (Eds.), *The New Educational Benefits of ICT in Higher Education: Proceedings*. Rotterdam: Erasmus Plus.
- Vonderwell, S., Liang, X., & Alderman, K. (2007). Asynchronous discussions and assessment in online learning. *Journal of Research on Technology in Education*, 39(3), 309–328.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.