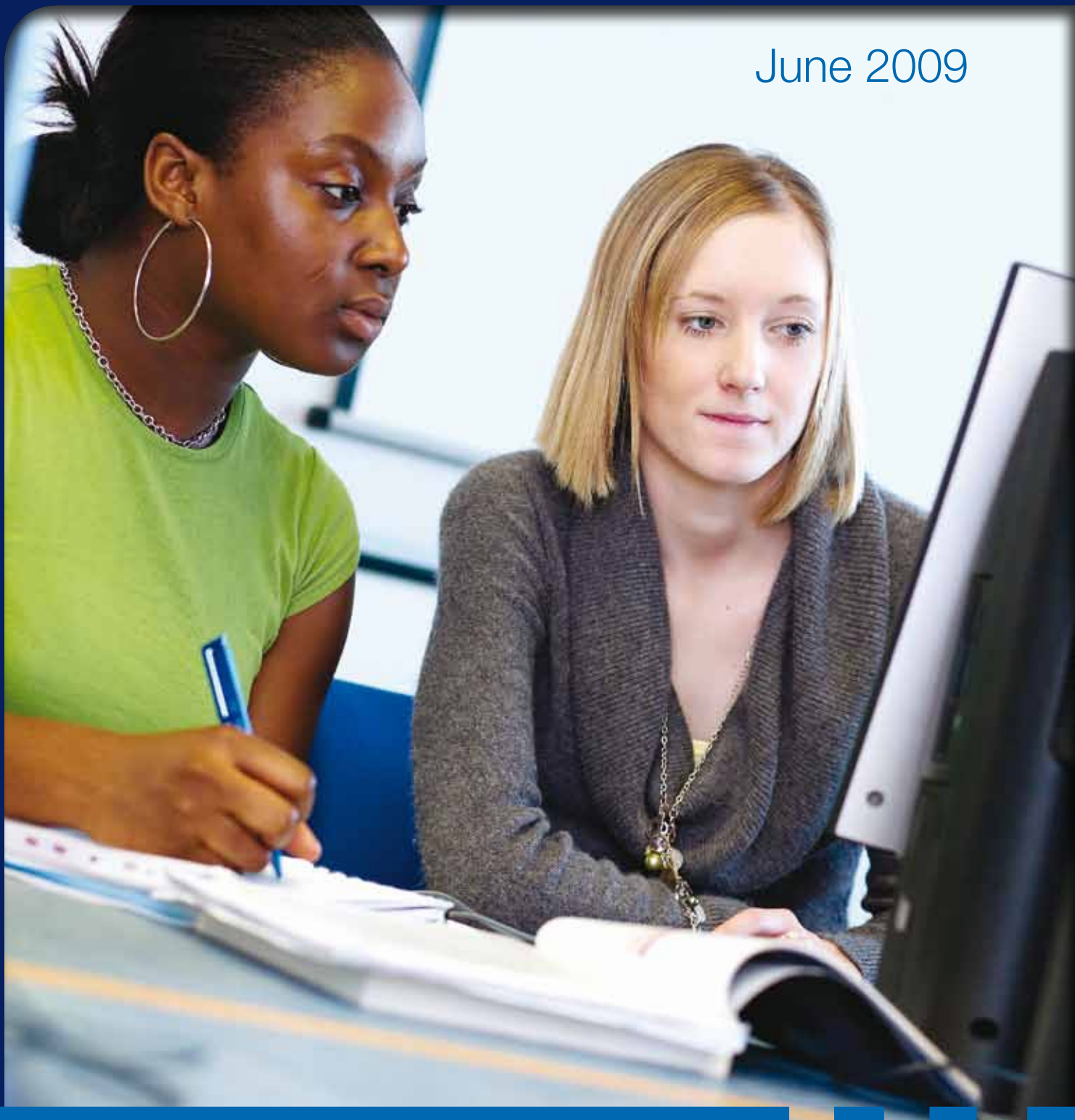
Blended Learning in Practice

June 2009



University *of* Hertfordshire

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Editorial

Phil Porter and Amanda Jefferies

Whether you are reading this through the online version or one of our print copies, we would like to welcome you to the first issue of Blended Learning in Practice, a new e-journal published by the University of Hertfordshire's Learning and Teaching Institute.

We are delighted to be developing this journal to showcase some of the innovative pedagogic practice and research which is taking place at the University of Hertfordshire through the Higher Education Funding Council for England (HEFCE) funded Blended Learning Unit. The journal is a bi-annual publication and we intend it to appeal to all who teach within the further and higher education sectors as well as being of appeal to established pedagogic researchers. Additionally, we are very pleased that the journal offers our students the opportunity to have their views and experiences of learning and teaching in further and higher education shared with the wider academic community. We have deliberately adopted an e-journal format to allow full use to be made of a variety of multimedia approaches and therefore several sections contain links to audio-visual files to expand upon the traditional text-based content.

The journal comprises three main sections:

Research papers: This section provides an arena in which teaching staff can present findings from pedagogic research that adopts a blended learning approach. Three papers will be published in each issue.

Case studies: This section showcases detailed examples and case studies of blended learning techniques in practice that can be deployed in our teaching. In this issue Phil Porter demonstrates how to make the most of animations in Microsoft PowerPoint to enhance learning and teaching.

The student voice: Each issue includes a specific section where students discuss their experience of learning and teaching. In issue one, the theme is 'where I learn' and students discuss learning environments, making full use of photographs and video clips. In our next issue, students consider the use of technology in their learning.

Please select this multi-media icon throughout the e-journal to view videos and hear podcasts.

Editorial

All of the authors in this first issue have links with the University of Hertfordshire and some are well known for their areas of research, in addition to being familiar faces in the learning and learning community locally and nationally. Guillaume Alinier and Indra Jones are both recipients of National Teaching Fellow awards in recognition of their contributions in the use of simulation scenarios for healthcare training and reflective practice respectively. In their paper they combine their expertise to discuss their research into the enhancement of student learning through the use of reflective practice, with a particular focus on the use of simulation models. Maureen Field's paper considers the use of student-centred approaches in the design and delivery of teaching sessions from the point of view of being a practitioner in Further Education. Lisa Lione presents a critical evaluation of assessment methods from the viewpoint of a new lecturer setting examination questions for the first time.

Sally Graham is well known within the School of Education for her work on creativity in learning and teaching. In this issue she has invited some of her students to consider the advantages and disadvantages of the various learning environments they experience during degree level study. This 'student voice' article presents the views of students who are engaging in their own learning development.

Ericka Durgahee is a final year BA Humanities student who volunteered to take part in some of the data collection for the Joint Information Systems Committee (JISC) funded Student Reflections on Lifelong e-Learning (STROLL) project . Her reflections from participating in this project and contributing regular video diaries show how students can benefit in unexpected ways by contributing to research investigations.

Phil Porter is a Senior Lecturer in Physical Geography in the School of Life Sciences who has extensively used two and three-dimensional animations to assist in the explanation of complex concepts in his area of glaciological research. Here he demonstrates some simple techniques to add life to your PowerPoint presentations using graphical animations.

We hope that you enjoy exploring this first issue of Blended Learning in Practice in print and online at http://www.herts.ac.uk/blip . We would welcome your comments and would also welcome contributions for future editions. If you are interested in contributing then please contact us via Liz Mellor l.mellor@herts.ac.uk.

We are grateful for all the editorial assistance and online support provided by colleagues in the Learning and Teaching Institute/Blended Learning Unit (LTI/BLU) and Learning Information Services.

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Amanda Jefferies is a University Teaching Fellow and a Principal Lecturer in the School of Computer Science at the University of Hertfordshire. She is seconded to the Blended Learning Unit (CETL), where she is Evaluation Coordinator and leads on Scholarship, Research and Evaluation. Her own research interests relate to students' experiences of using technology to support learning.

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Phil Porter is a Senior Lecturer in Physical Geography and has been active in glaciological research since 1993. After completing a PhD (Leeds) in borehole instrumentation of fast flowing glaciers, Phil took up lectureships at Manchester and Leeds and joined the University of Hertfordshire in 2003. His current research interests concern the response of the cryosphere to environmental change. Phil is also a LTI teacher taking a lead on 'research informed teaching'.

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Physicist by training Guillaume developed an interest in biomedical engineering that led him to the world of medical simulation where he works on different committees at national and international levels. He received several awards for his work in realistic scenario-based simulation training in healthcare education and has been instrumental to the recent development of the new HICESC (Hertfordshire Intensive Care Emergency Simulation Centre) at the University of Hertfordshire which is one of the largest European multi-professional simulation centres.

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Dr. Indra Jones, a former University Teaching Fellow and Assistant Director of Learning and Teaching is currently a fellow of the Higher Education Academy and National Teaching Fellow. Indra's expertise spans over 15 years of teaching, researching and developing Reflective Practice in health care and postgraduate education curricula supported by a number of national and international publications.

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Lisa Lione is a Senior Lecturer in pharmacology within the School of Life Sciences at the University of Hertfordshire. This is her first year at the University of Hertfordshire and her first lecturing post. Following her PhD in neuroscience at the University of Bristol in 1997, Lisa has worked in drug discovery research in biotechnical and pharmaceutical industries, with particular focus on neurodegeneration and pain.

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Maureen Fields is an Early Years Lecturer in the Higher and Professional School of Education at West Herts College, Watford. She returned to teaching in school for a short period whilst undertaking research for her MA in Education in 2000. Her interests lie in how children and adults learn, and quality provision in teaching, learning and assessment.

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Sally Graham is CPD Programme Director in the School of Education (SoE). She believes strongly in the importance of listening to students' views to improve student participation. The increased availability of digital photography is providing exciting new ways of enhancing the learning experience, which is Sally's main research interest.

Introduction of a new reflective framework to enhance students' simulation learning: A preliminary evaluation

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Abstract

Over the last decade reflective practice has become an integral component of simulation learning that is aligned to learning outcomes in various undergraduate and post graduate health care curricula at the University of Hertfordshire (UH).

Ongoing formative evaluations of learning and teaching methodologies in the simulation context have identified the need for an integrative pedagogic framework in order to maximise reflective learning from simulation approaches. This culminated in the development and design of a reflective simulation framework (RSF) to guide and enhance the students' abilities, both during and after their simulation learning experiences.

A recent preliminary survey (n=42) was conducted with undergraduate nursing and paramedic students to identify the actual and potential use of the RSF. The data collected indicated that the majority of students are in favour of using the framework for addressing a variety of learning needs, including knowledge development, reflective assignments, and more particularly for feedback and review of the simulation experience and clinical practice issues. The aspects of the framework less favourably scored related to the embedding of reflective learning and planning future actions, suggesting that some students use the framework more for their immediate practical needs rather than for the intermediate planning and longer term applications of reflective practice such as synthesis of learning. That is not to say that students do not think about those aspects of the reflective process and further in-depth studies are strongly recommended for exploring these results in more details.

Introduction

Simulation learning categorised as a "significant form of experiential learning" (Jarvis 2004 pp113-114) is gaining widespread recognition in a wide range of healthcare professions, not only by Higher Education Institutions (Alinier 2007a) but also by professional and governmental bodies (Department of Health, 2006; Donaldson, 2009; Nursing and Midwifery Council, 2007; QAA, 2004). In order to maximise simulation learning, reflective practice is considered to be an important component of this approach and is designed to enhance the students' learning and clinical competencies through the closer integration of theory to practice. This article describes and discusses the results of a preliminary study that set out to evaluate the use of a reflective framework pertaining to the learning experiences of health care students in a simulation learning context.

Background to simulation learning

Simulation learning is not a new idea and has been successfully used in the aviation industry and medical education for well over forty years (Abrahamson *et al.*, 2004; Helmreich *et al.*, 1999; Rolfe & Staples, 1986). At the University of Hertfordshire, reflective practice, already well embedded in nursing curricula since the late 1980s has subsequently become integrated into the paramedic undergraduate curriculum since 1996 with the particular emphasis that contemporary paramedic practice needed to adopt such an approach beyond the traditional protocol and standard guidelines approach to emergency care management. The traditional approaches were considered to be no longer wholly adequate for meeting the diverse health care demands of the 21st century (Jones & Cookson 2000).

Since 1998 reflective practice at the University of Hertfordshire has become a major component of our experiential learning based sessions through low, intermediate and high -fidelity simulation exercises within the various undergraduate and postgraduate healthcare curricula.

The word 'simulation' often means different things to different people (Alinier, 2007b). Consequently, different approaches may not provide the same learning experience to students. Quinn (2000) defines simulation as being "*an imitation of some facet of life, usually in some simplified form. It aims to put students in a position where they can experience some aspect of real life by becoming involved in activities that are closely related to it"*. Gaba (2004) defines simulation as "a technique - not a technology - to replace or amplify real experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner". For purposes of our learning, teaching and research initiatives at UH we define simulation here as being 'a scenario-based clinical practice situation performed and facilitated within a safe and controlled environment using either low, intermediate, or high-fidelity approaches' in order to actively enhance the students' learning and clinical performance.

The level of 'fidelity' underpinning simulation is governed not only by the technology used, but predominantly by the way faculty staff actively participate, either as tutors, actors, or abstain from taking part in the simulated scenario. Scenarios may be entirely student-led, tutor-led or a combination of both (Alinier, 2007b) with an initial emphasis on formative learning. In the context of high-fidelity simulation, scenarios are generally student-led, however educators can remotely control and modify the scenario in a dynamic way, in response to the students' actions and identified patient outcomes. Although clinical scenarios are usually partly predefined, they are intended to be dynamic and flexible, as their progression depends on the students' learning needs, the necessary curriculum outcomes and the interventions that must be matched appropriately to the patient simulator or actors. These can include specific clinical skills as well as inter-personal skills such as communication and teamwork. Scenarios may be conducted solely from a control room in the simulation centre or by engaging the educator directly as an actor within the scenario itself. Afterwards the educators conduct the simulation debriefing as facilitators

rather than as instructors to encourage and support students' learning in a peer context. This approach generally mirrors the debriefing approaches used in the real world clinical field but without the restrictions of time constraints.

As part of our on-going pedagogic evaluations of simulation learning and facilitation, we had identified the need for providing students and educators with a framework that could help to better facilitate the students' reflective learning, both around the actual scenario -based simulation exercises and hopefully for use in real work place settings.

The next section of this paper will identify and discuss the merits and benefits of reflective simulation including the use of the specially designed reflective simulation framework (RSF).

What is reflection/reflective practice?

The terms 'reflection' and 'reflective practice' are used interchangeably in the literature and there are many definitions emanating from various disciplines, most notably nursing and teaching (Loughran, 1996; Reid, 1993). Arguably, it is not a unified concept and it is said to be used loosely "to embrace a range of concepts and strategies" (Hatton & Smith, 1995). However, it is generally agreed by many writers that both these concepts relate to a learning process that leads to new understanding of an experience or situation that should inform future learning developments.

In the context of our curriculum learning outcomes, we identified a need to make more explicit connections between reflective practice and simulation learning in order to emphasise the synergies between the two concepts and maximise the students' learning. We have therefore defined reflective simulation as a 'focused, flexible, and critical learning process for recapturing, exploring, and interpreting an episode of practice-based activity (i.e. scenario) in order to develop, enhance, and modify the necessary knowledge, skills, and attributes that can be transferable to real life situations'. This definition emerged from our own pedagogic practice and is intended to inform how the teaching and learning processes around reflective practice could be achieved through the use of a structured approach. Furthermore, a structured approach is compatible with and aligned to our curricula structure of Knowledge, Skills and Attributes (KSA) learning.

Why a framework for reflective simulation?

Since the emergence of Kolb's cycle (Kolb, 1984) a number of other models/frameworks have emerged (e.g. (Boud *et al.* 1985; Gibbs 1988; Johns 1993, 2004) to encourage students to organise and structure their thinking and learning reflectively that is distinguishable from the casual everyday simple reflection. Other writers (e.g. Platzer *et al.*, 1997) suggest that reflective learning can be more potent if a framework is used to guide the inherent processes that make up pedagogic reflectivity. We rationalised the need for a reflective simulation framework (RSF) based on two pedagogic premises that fit well with our curricula outcomes:

- The first premise is that reflective practice should follow a structure that incorporates higher order thinking skills such as analysis, synthesis and evaluation.
- Secondly, that such skills should progress the learning experience from thought to action and future solutions, thereby encouraging an active process rather than the passive activity commonly associated with reflective learning concepts.

The application of higher order thinking skills, as noted above, are important considerations for tutors as well as for learners to ensure the competent transfer of graduate skills appropriate to healthcare professionals who will be expected to demonstrate such characteristics in their day-to-day practice and continuing professional development.

Our design of the RSF is rooted in Dewey's (1933) ideas of reflective thinking, which distinguished a structured approach from that of "automatic, unregulated thinking" (pp 4-9).The framework also promotes the reflective practice ideologies of Schön (1983, 1987) who argued that it is not possible to tell exactly what students learn from reflection *in* and *on* practice thereby providing further justification for our simulation approaches to use a guided approach through the use of a framework. Schön was also a proponent of coaching environments for reflective learning such as simulation settings. In the context of nursing, Benner (1984) had similarly identified simulation as a useful way for students to learn and develop. Lastly, from evaluations of our learning and teaching experiences of simulation developments, we concur with Moon (2000) that reflection does not just 'happen' and students by themselves are not always able to initiate reflective learning processes effectively, thus further impetus for providing guidance to the students through the introduction of RSF.

Previous reflective practitioner work undertaken in our simulation centre identified that students at different levels of study tended to approach the simulation experience with varying degrees of dependence, interdependence, and independence. A substantial critical review of some of the popular existing frameworks in the literature-both cyclical and linear previously conducted (Jones 2008) aimed to explore their use by paramedic students' over a full curriculum cycle. A quantitative survey of final year students' views and observation studies in our simulation learning centre exploring their applications of reflective practice in a particular context, concluded that existing frameworks e.g. Gibbs' Reflective Cycle (1988) were only partly used thus resulting in limited and ritualised reflectivity. Further, it is argued here that some of the models/frameworks reviewed (Gibbs 1988; Johns 1993) are based on the assumption that all learners can interrogate or follow the model equally or that they all have the same learning needs (a one size fits all approach); hence our rationalisation for an alternative framework that emphasises the particular learning context and is responsive to the diverse learning needs of our students.

One of the prime advantages of simulation is that learning takes place in a risk free and controlled environment thus enabling a tailored learning experience to be repeated, reviewed as many times as the learners need to, and as the learning needs change. It

also allows for protected time for feedback, something that is rarely provided or possible in real world clinical practice. Additionally, simulation learning lends itself to the use of structured and focused reflection. We identified that the use of a framework incorporating both reflection *in* and *on* action and aligned to curricula outcomes could be useful for guiding immediate, interim, and long-term reflective learning according to the students' needs both individually and collectively.

Development and description of the reflective simulation framework (RSF)

The Reflective Simulation Framework (RSF), originally designed in 2004 at the University of Hertfordshire, comprises six dimensions (Figure 1). It is a learner centred framework which can be used flexibly to explore the simulated experience in order to enhance learning and practice, and crucially, act as a basis for multiple feedback systems. The framework features six components which are multi-directional in order to accommodate learning in a flexible way. Some of its key design characteristics were intended to:

- Facilitate individual and collaborative reflection
- Focus and integrate reflective learning - linking theory and practice
- Emphasise active learning
- Promote reflection before, during, and after simulation activities.

The RSF is designed to provide students with immediate and continuing reference points on what the issues were in order not to lose sight of their immediate concerns as well as any subsequent issues that may arise. The framework also allows the students to signpost their concerns and prioritise their learning accordingly. In the short term, for example, their concern might be the immediate patient outcome, in the medium term their concern might be about the process of intervention (i.e. protocols, documentation), and in the long term it may be about alternate future actions that could help them to develop their competence, confidence, and safe practice.

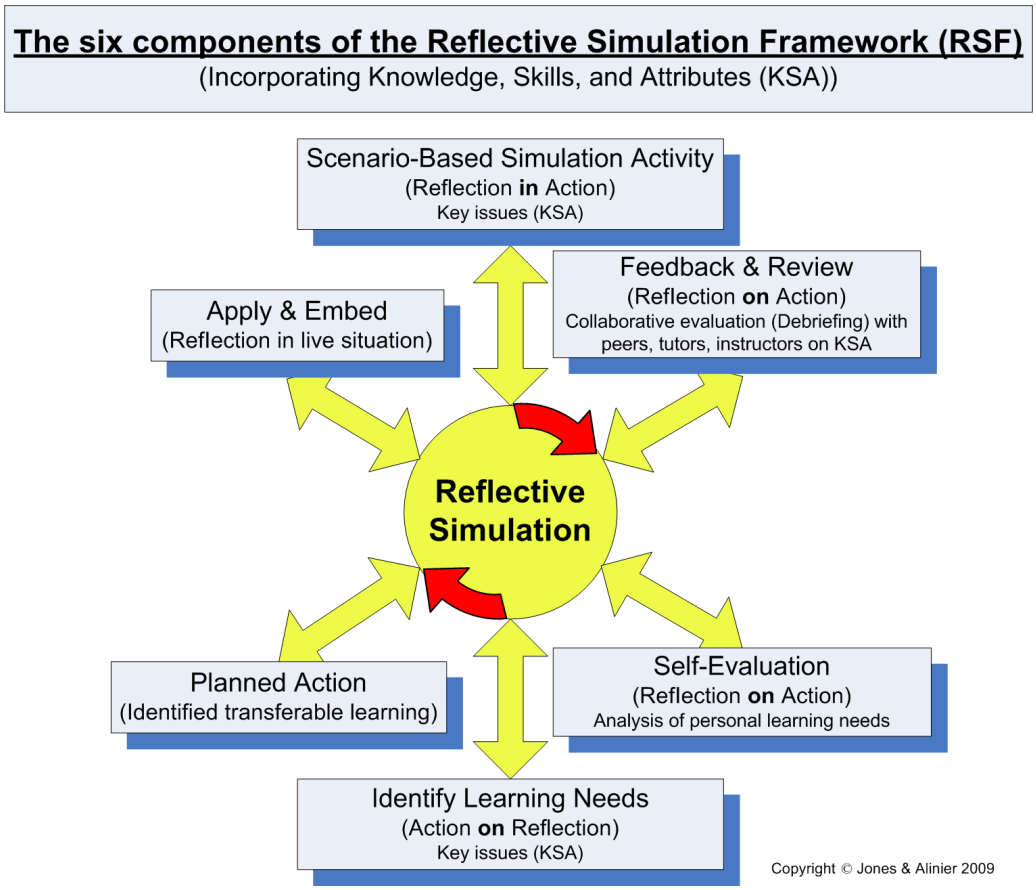
The multidimensional design of the RSF incorporates the cognitive, affective, and psychomotor aspects of learning and integrates simulation learning by promoting a holistic approach. The key concepts inherent in the framework are the promotion of reflective learning for feedback and feed-forward purposes. The supporting rationale is that learning from the simulation experience can be lost given that the scenarios can be highly challenging and complex at times. The result is that students can often become overwhelmed when attempting to process their learning in an objective way, hence the need for an objective supporting framework to bridge any missing gaps in reflectivity and a structure to provide recordable evidence of the activities.

Furthermore, the framework can be used to promote written reflection as well as verbal debriefings by educators and students alike. The framework is intended to be transportable in pocket size cards and can be used to guide the debriefing post scenario experience. It can be used as an aide memoir for quick reference to trigger and focus the reflection process appropriately. In the card format the intention is to provide an

immediate visual source of reference while the reverse side of the card can be used to write brief comments for aiding later reflective learning.

Overall the RSF can be considered to be a dynamic framework for structuring the debriefing of dynamic scenarios which in simulation learning can be quite complex (Breuer & Streufert, 1996).

Figure 1: The Reflective Simulation Framework



In the following section we present the results of a preliminary study that was conducted to test the use of the framework with a range of undergraduate healthcare students at the University of Hertfordshire.

Preliminary evaluation of the reflective simulation framework

A series of non-participant observations undertaken in 2007 as part of normal reflective practice sessions within our simulation centre with final year paramedic students, identified that students focused more on analysis of clinical aspects e.g. technological equipment, physiological signs and symptoms, and personal issues such as confidence and competence at the expense of other important aspects of KSA such as synthesis of what had been learnt and how this might influence experiences thus incomplete reflectivity.

As a result of these observations we decided to introduce the use of the RSF to identify whether or not students would benefit from the use of a framework to draw out the wider benefits of simulation learning, such as communication and inter-personal skills, synthesis of learning and further learning needs.
The current preliminary study reported here was conducted under the University of Hertfordshire's Reflective Practitioner Guidelines (UPR AS/A/2) which permit the evaluation of learning and teaching tools that fall outside the parameters of empirical research which require formal ethical approval. However, we ensured that all questionnaires were anonymous and written informed consent was nevertheless sought from all the students who agreed to take part.

A survey questionnaire comprising 11 questions asked nursing and paramedic students (n=42) to comment on the following areas:

- The usefulness of a framework for reflection of the simulation experience including debriefing
- Component of the framework which triggered its use
- Potential use of the framework outside the simulation context
- Most and least useful aspects of the framework
- What 'learning needs' did the reflective framework help them to identify
- Use of the framework for academic learning as well as clinical practice
- Usefulness of having a pocket size card of the framework
- General views of using the framework

A summary of the results are presented below.

Results

In this section we present a selection of the raw data. The results suggest that for some of the questions some of the students selected more than one item even though they were asked to identify only one component as shown in tables 1 and 2.

In terms of usefulness to having a framework, a 5-point Likert scale (1=not useful, 5=very useful) was used to measure the responses from the students. The mean response was 3.98 (SD 1.05). With regards to the component which initiated their use of the framework, 71.4% of students identified "Feedback and Review". However, 80% of the students indicated that they would use the RSF outside the simulation context. This result prompted us to look for any emergent patterns or themes i.e. "*linking categories conveying similar meanings*" (Holloway, 1997 p152) in the students written responses to this question.

Following thematic analysis of the raw data of 'where else' outside of the simulation context students might use the framework, a majority of the responses related to clinical practice e.g. "all placements"," work environments". Some of the reported benefits to academic studies included: "having a step by step guide", "writing reflective notes" and

"improvement of knowledge". Students generally identified that "Feedback and Review" and "Simulation activity" as the two leading items in the framework (Table 1). It is interesting to note that students identified knowledge and skills equally, more so than for personal learning (Table 2). When asked to identify their learning needs as a result of using the framework, 47.6% of students indicated that clinical skills were the leading item (Table 3). Finally, 64.3% of the students said they would find it useful to have a pocket size copy of the RSF to further assist their learning.

Table 1: Components of the framework which was identified as the most useful by the students

Most useful component of the RSF?	Responses	Percentage response
Simulation activity	17	40.5
Feedback & review	22	52.4
Self appraisal	6	14.3
Identify learning needs	6	14.3
Planned action	3	7.1
Apply and embed learning	4	9.5

Table 2: Aspects of the framework which were found the most useful by the students

Aspects the framework is the most useful for?	Responses	Percentage response
Learning about yourself	11	26.2
Developing skills	20	47.6
Increasing your knowledge	20	47.6

Table 3: Learning needs identified by the students as a result of using the framework

Identified learning needs:	Responses	Percentage response
Communication skills	14	33.3
Guidelines/Protocols	11	26.2
Clinical skills	20	47.6
Theory	12	28.6
Patient assessment	16	38.1
Diagnosis/Treatment	15	35.7
Technical skills	6	14.3

Discussion

Reflective simulation is an emerging concept in our undergraduate healthcare curricula which has been developing more formally over the last 5 years through the use of the RSF. This preliminary study has presented some findings of a small scale evaluation designed to test the usefulness and acceptability by students of a structured reflective simulation framework for its actual and potential use in supporting their reflective learning. We acknowledge the limitations of the raw data and suggest that our study is best seen as a springboard for further developments where currently there were little or no similar studies on reflective simulation available up to the time of reporting.

Evidence of formal evaluations of reflective frameworks/models in the literature is notably absent apart from one theoretical review (Ghaye and Lilyman1997) and limited evidence in one study (Burnard 2000) which showed that a structure can be perceived to be limiting by some students. Our evaluation suggests that the majority of students (over 70%) generally found the use of a framework helpful to their learning and clinical practice.

While it is encouraging that the majority of students are favourable to key aspects, such as the development of knowledge and skills, we have also identified that other key components of reflective simulation (i.e. Identify learning needs, Planned action, Apply & embed learning) as indicated by key theoretical concepts of Kolb (1984), need to be highlighted to students and educators alike so that fuller reflectivity can be achieved. Fuller reflectivity necessarily involves 'synthesis' of learning which is argued to be *"the operation that gives extension and generality to an idea as analysis makes it distinct" (*Dewey 1933 p158). Analysis and synthesis of learning are explicit outcomes to be achieved in the curricula context and for eventual transfer to work-related situations. Crucially, the purpose of reflective practice is to actively seek opportunities for future actions and applications of what has been learned otherwise it remains a theoretical and passive concept.

This idea is supported by key proponents of reflective practice e.g. Boud *et al.* (2006) who advocate that reflective practice needs to be reviewed and resuscitated so that it is more closely aligned to real world practice. We believe that high-fidelity scenario-based simulation especially, closely mirrors real world practice and that the RSF provides real opportunities for achieving a renewed impetus for active and effective reflective practice learning.

Although we offered students the opportunity to comment openly on their experience of using the framework, unfortunately the majority were not forthcoming. Only two students responded to this request in the survey and indicated that the framework could be useful to reflect on 'life experiences' and 'plan care treatment'. A more in-depth study of the use of the framework would need to be carried out in order to gather qualitative and quantitative data that might illuminate some of the students' responses in more detail. Externally, however, other interests in our preliminary work are emerging.

Two other Higher Education institutions nationally and internationally have expressed interest in this work following our earlier dissemination of the RSF (Jones & Alinier, 2006) suggesting that there is a potential for wider implementation of the RSF beyond the disciplines studied.

Although the RSF has been designed and evaluated within a healthcare simulation context involving a preliminary study, we suggest that the framework has the potential to be applied to other groups of learners in a variety of disciplines where reflective practice might not currently be a feature of their curriculum as well as where it may already be established and/or being further developed. For example, work on formative assessment such as the use of Objective Structured Clinical Examinations with nursing students (Alinier, 2003) has been adapted with support from a grant from the Higher Education Academy Engineering Subject Centre to be implemented in electronic engineering (Alinier & Alinier 2006a; Alinier & Alinier 2006b). This year (2009), marked the fifth anniversary of the successful use of OSTE (Objective Structured Technical Examination) at UH which incorporates reflection as a formative assessment tool within a first year module. The next stage, including a whole curriculum approach to simulation learning is planned for further research development of the RSF and will be reported elsewhere.

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Getting the best from PowerPoint: 2 and 3-dimensional animations

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Introduction

PowerPoint is a package that many academics and teachers use routinely in teaching and research; the days of presentations being in the form of carousels loaded with slides are a distant memory for most. PowerPoint offers clear advantages over traditional slides in that presentations can be carried on a laptop or other portable media such as a CD or USB key and even with a relatively basic understanding of the package, professional looking slides can be rapidly produced.

Yet in common with many software packages, the majority of us will only ever use a small percentage of the full functionality of the package. PowerPoint offers another significant advantage over traditional slides in that the presentation does not need to be 'static' if the animation tools are utilised or an embedded video clip is inserted into the presentation.

Here I present an overview of the animation of text and objects. A useful resource for those new to PowerPoint animations is provided by Murphy (2004) who presents a series of general hints and tips for embedding video, audio and animations into PowerPoint.

Each of the slides below can be viewed in animated form by clicking on the multi-media icon.

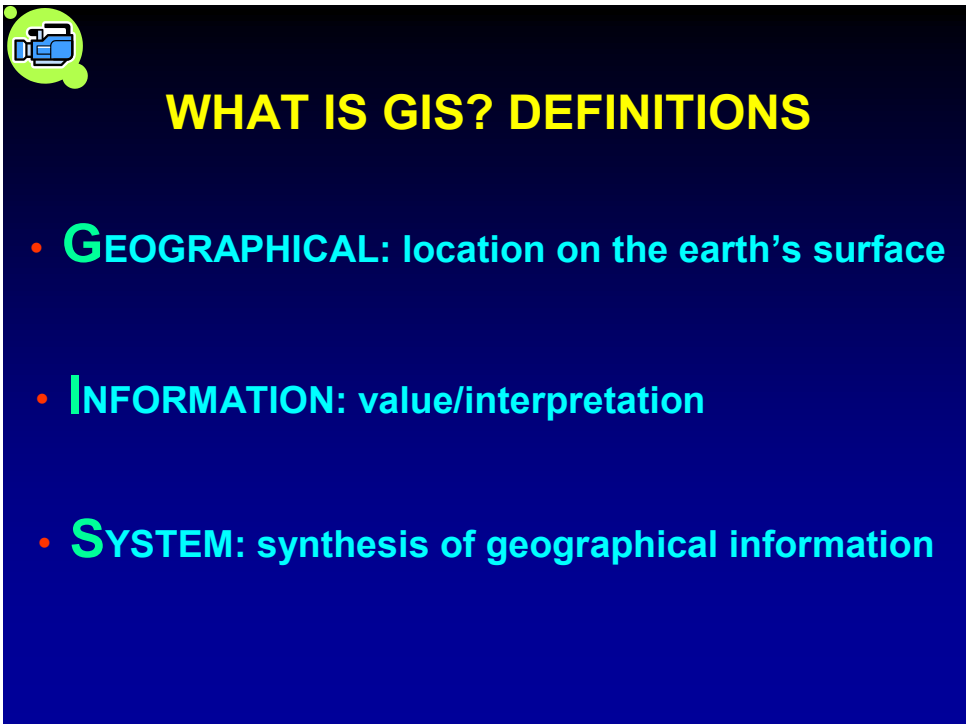
An overview of all the techniques discussed and a step-by-step guide to producing a three-dimensional animation can be seen by clicking on this multi-media icon.

Text and objects can have a large number of animation effects applied to them and objects can also be drawn in three dimensions, potentially offering greater scope for graphical animation. The most common use of the animation tools is to allow text on slides to 'enter' and 'exit'. Many teachers use simple animation techniques to show bullet points line-by-line on a slide, reminiscent of the technique used in the days of overhead transparencies where a teacher covers the transparency with a sheet of paper or similar and then reveal a line at a time by progressively removing the paper. The following slide shows an example of an animated bulleted list. Please click on the slide to see the animation working.

Each bulleted line is made to appear on successive mouse clicks. The animation is performed in the custom animation menu and the entrance function 'fade' is chosen in each case, with the speed of the animation set to 'fast'.

Animating Text

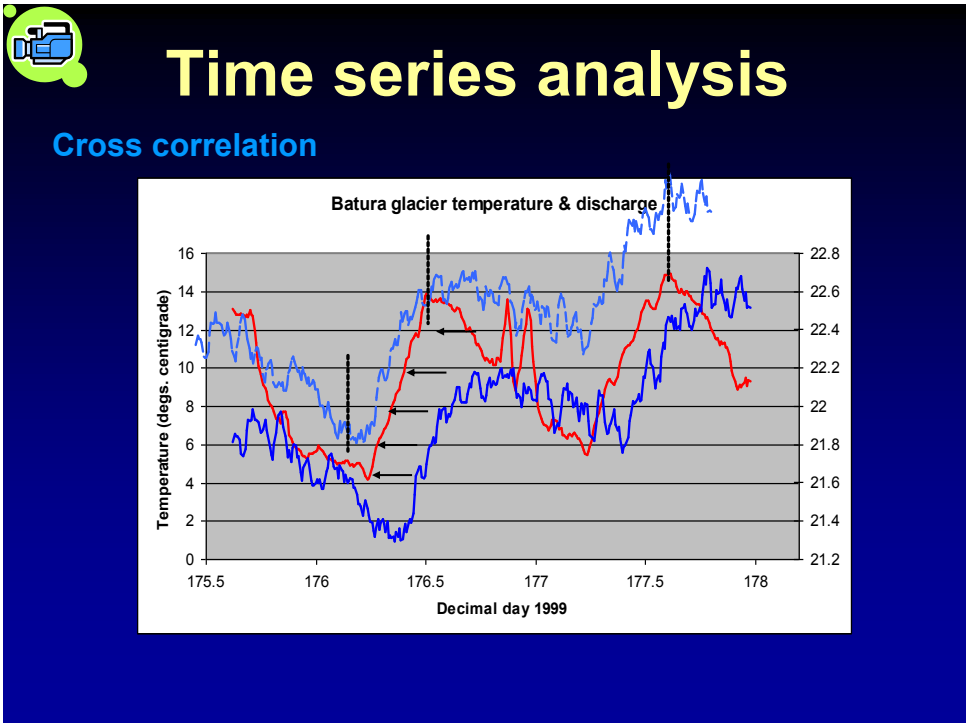
Text animations such as this are easy to implement, but even this most basic level of animation needs to be used with care. Halazonetis (2000) suggests that slide after slide of text-based animations rapidly become tiresome for the audience and attempts to add interest by selecting different entrance or exit functions are unlikely to make things any more engaging. Similarly, the use of sounds to accompany animations is unlikely to add anything of substance to the presentation, while the timing of animations should be set to start on each successive mouse click, not by setting an automated sequence (Halazonetis, 2000).



Animating Two-Dimensional Objects

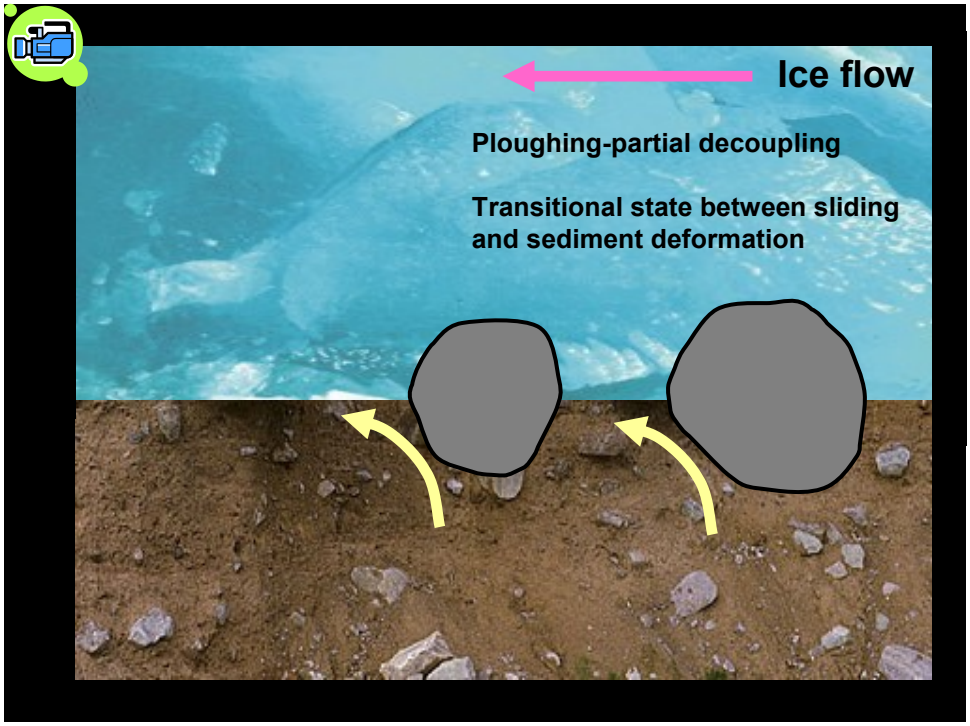
Animating two-dimensional graphical objects offers a powerful tool to enhance learning. Aside from the obvious benefit for visual learners, the animation of graphical objects can assist in the explanation of more complex concepts. Some excellent examples of the application of graphical animation to the teaching of orthodontics are provided by Halazonetis (2000a and 2000b). In this paper I will use examples from my own teaching and research in the field of glaciology to demonstrate the application of PowerPoint animations. The techniques covered however, are applicable to a vast range of disciplines. My interest in applying more advanced animation techniques to graphical objects came after I was asked to present a series of lectures on subglacial hydrology and dynamics to a group of Norwegian undergraduate students. Given that the first language of these students was not English I had to try and make some rather complex and technical subject matter as accessible and easy to understand as possible; animating graphical objects in PowerPoint provided one means of doing just that.

The slide below is one that I use to show the time lag between temperature maxima on the surface of a glacier and the resultant discharge maxima in the meltwater stream emerging from the front of the glacier and how cross-correlation techniques can be used to investigate this. Simple animation of the discharge data set allows students to visualise how shifting one date set in time with respect to the other allows the peaks and troughs to become more closely matched as indicated by the dashed vertical black lines. To animate this slide I used a simple linear motion path to shift the discharge data sets and the black arrows from right to left, then a simple 'appear' function to insert the vertical black lines. Each movement is initiated by a mouse click.



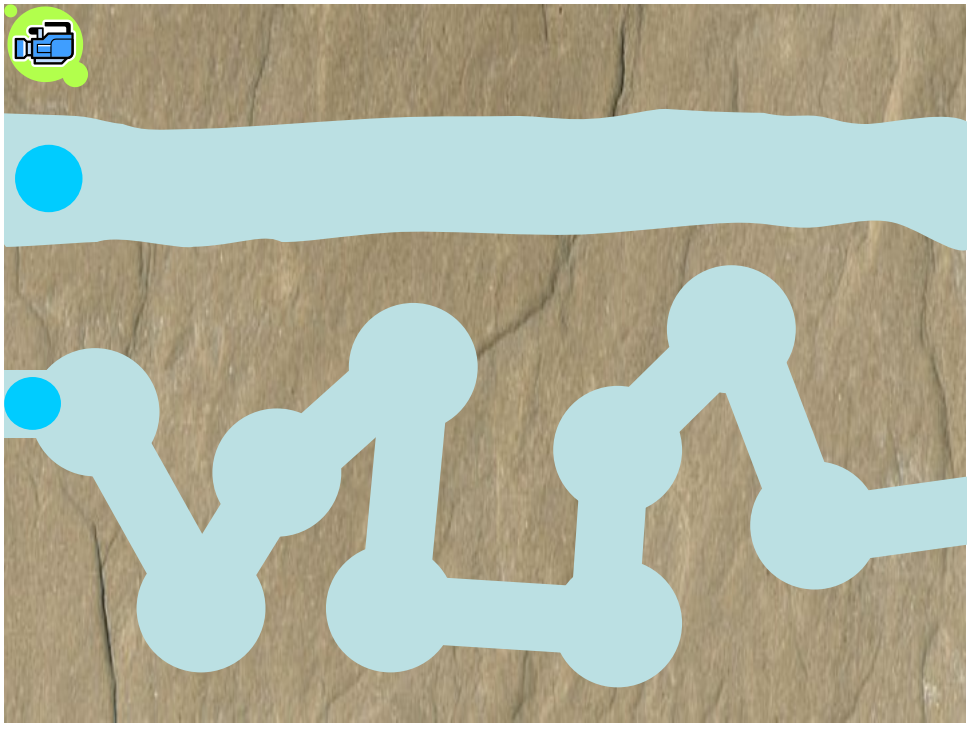
Adding Images

Taking things a step further we can use imagery to add interest. In the slide below I am demonstrating the process of sub-glacial 'ploughing' whereby a glacier drags sediment particles through the sediment layers at the base of the glacier, thereby inducing localised deformation of that sediment, indicated in this example by the yellow arrows. The pink arrow, the words 'ice flow' and the particles and yellow arrows are all grouped together using the 'group' function which can be found in the 'arrange' button from the 'home' menu if PowerPoint 2007. However, also in this group is an imported image of blue glacier ice that has been suitably cropped. Simple black rectangles to the right and left of the slide mask the glacier ice as the whole 'group' is moved on a linear motion path from right to left, once again initiated by a mouse click. The subglacial sediment is also a photographic image that has been imported.



Adding Emphasis

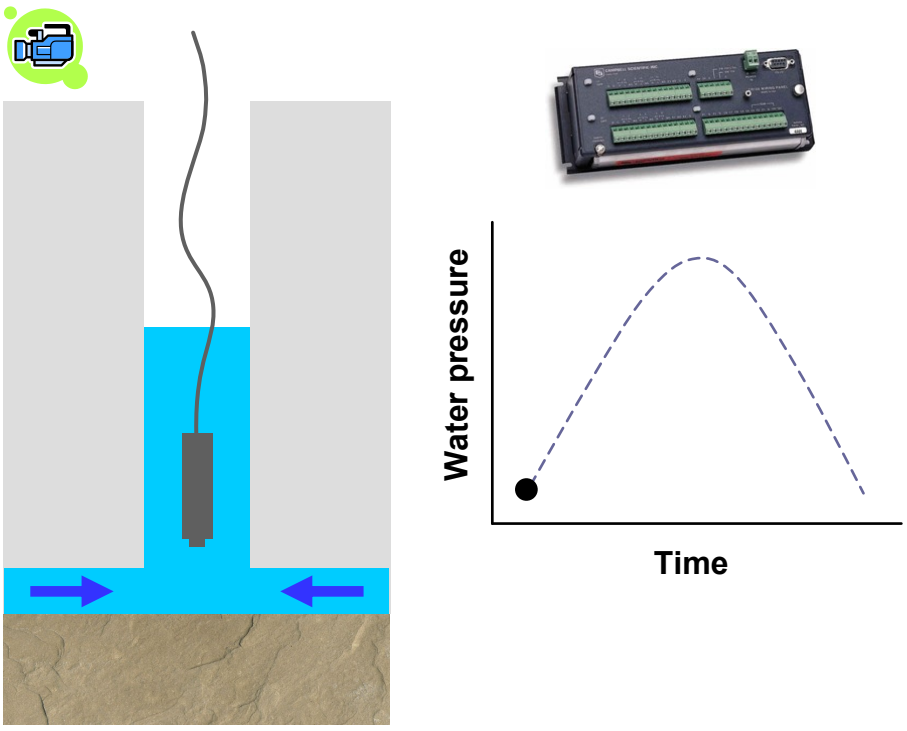
As well as movement, it is also possible to emphasise objects and one useful function here is to use the 'colour blend' function where the user can select one colour for an object and progressively blend that initial colour into another colour or shade. In the example below I am illustrating how water moves beneath a glacier in two different forms of meltwater channel. The upper channel is a fast-flowing and efficient channel and a parcel of water moving from left to right will not pick up significant levels of sediment as it flows beneath the glacier. Conversely, the 'parcel' of water within the lower channel is following a more tortuous and inefficient route, accessing a larger area of the glacier bed and thereby picking up a higher sediment load. This difference in sediment load can be visually represented using the colour blend function and in this example the lower 'parcel' of water changes from blue to a very dark grey, while the upper 'parcel changes from blue to a light grey to represent the difference in relative sediment load. Both motion paths are custom motion paths which are simple to draw, but the timing is a little more complex. The whole motion sequence is initiated with a mouse click that sets the upper 'parcel' moving, but then all the other functions (colour blends and lower 'parcel' motion path) have their timing set to 'with previous', speed set to 'very slow' and the repeat function set to 'end of slide' so that the animation repeats until the next mouse click, at which point the subsequent slide in the presentation appears.



Multiple Movements

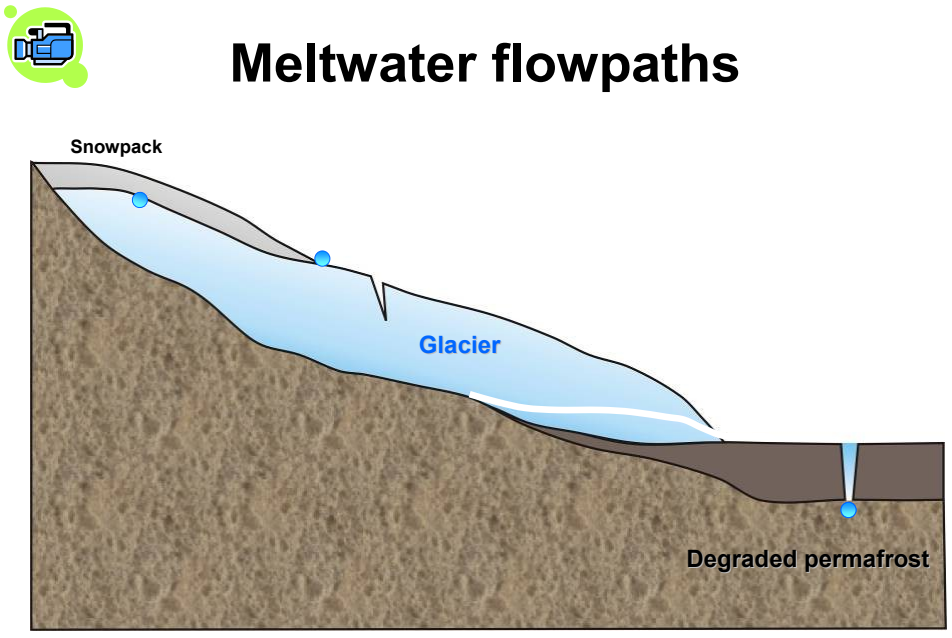
The slide below may appear at first sight to be a more complex animation than the previous one, but it is in fact rather simpler. The slide illustrates how fluctuations in water pressure at the base of a glacier can be measured by installing a pressure sensor in a borehole drilled to the base of the glacier. As water pressure rises and falls, the level of water in the borehole rises and falls and the resultant pressure change is monitored by a pressure sensor suspended in the borehole that outputs a signal recorded by a datalogger. The image of the datalogger provides a visual prompt for the teacher, while the black disc moving along the graph illustrates how the signal output from the transducer will change as water level in the borehole changes.

The creation of this animation is very simple. The water level rising and falling is simply a blue rectangle moving along a vertical motion path, grouped with the two arrows that follow horizontal motion paths. The black disc follows a custom motion path that has been superimposed on the graph and is set to run 'with previous' (i.e. with the movement of the blue rectangle and arrows) and as before, all motion is set to continue until the end of the slide.



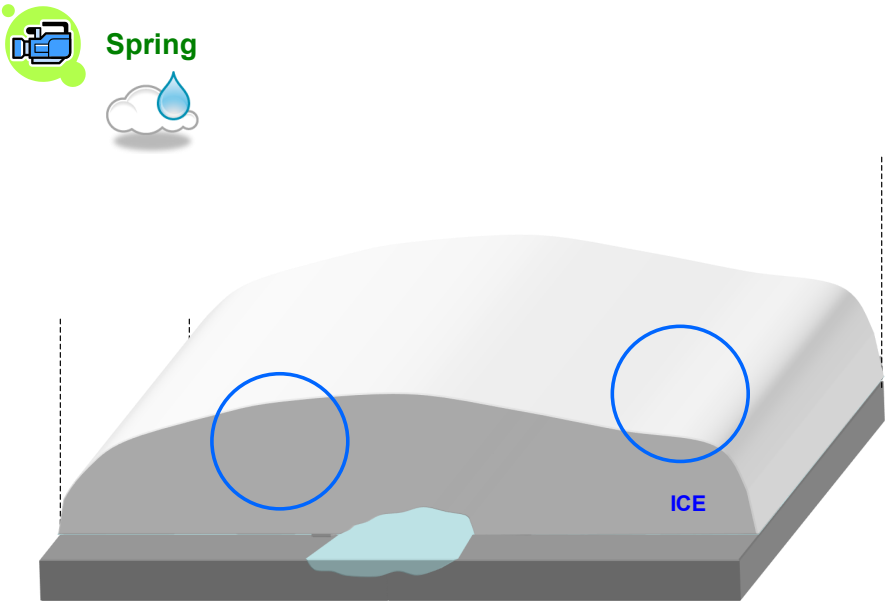
Adding Complexity

The next slide is a little more complex. The image of the glacier has been produced in a graphics package and imported into PowerPoint as a picture. Then a series of blue discs move around the slide to illustrate the various routes that meltwater can take on the surface, within and beneath the glacier. However, to avoid the glacier image becoming covered in multiple discs for the duration of the slide each disc has been made to appear and then disappear in sequence, or 'entrance' and 'exit' using the terminology in the custom animation menu in PowerPoint. 'Entrance' and 'exit' of each disc takes place on a mouse click, as does motion and the 'fade' function has been used as the entrance and exit function in most cases. Finally, two photographic images fade in and out using exactly the same entrance and exit functions and serve to illustrate in photographic form some of the concepts being illustrated by the animations in the slide, as well as adding interest for the audience.



Animating Three-Dimensional Objects

Finally, the slide below shows how three-dimensional objects can be animated to aid in the explanation of complex concepts. This slide is one of a series of three that shows the seasonal evolution of meltwater channels beneath an alpine glacier. The three-dimensional shapes are drawn using the drawing tools available within PowerPoint and the glacier itself is 'lifted up' using a vertical motion path. Small blue discs are then animated with custom motion paths to represent the flow pathways of water, while the circled brown shapes represent sediment laden waters emerging from subglacial cavities. What appears to be a complex animation is in fact a series of simple motion paths, the only real difference between this slide and previous slides being the use of three-dimensional objects rather than two-dimensional objects.



The use of the animation tools contained within PowerPoint offers the opportunity to add a new dimension to our teaching with multiple benefits for both teachers and students. The techniques described in this paper may be particularly useful for visual learners and to assist in the explanation of more complex concepts. Furthermore, utilising the animation tools provided within PowerPoint avoids the need for educators to have to learn a new package in order to create animated images, file size is kept lower than if animations are imported, the techniques described here are quick to learn and implement, while the ubiquitous nature of PowerPoint means that access to this technology is generally unproblematic.

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Theoretical perspectives on classroom learning

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Abstract

Research into classroom practice indicates that student-centred teaching and learning activities allow students to develop deeper engagement with a given topic. A reflection on and evaluation of a teaching session undertaken with a group of 10 BTEC Higher National Certificate (HNC) in Advanced Practice of Work with Children and Families (Level 4) students is presented. The challenge faced with these students was to develop their cognitive level of engagement with the topic in order that they achieve assignment tasks. A student-centred approach was adopted in the design, planning and teaching of the session in order to meet the needs of this group. Techniques that were found to be particularly effective included the use of a virtual learning environment, online discussion for student preparation for the session, clear, and visible outcomes aligned to teaching and learning activities, which focused on student learning. Assessment tasks which were purposeful and the creation of a learning environment to permit autonomy were also found to be valuable.

Introduction

One defining characteristic of a 'good teacher' is a teacher who is always willing to consider adapting and changing their practice. Evaluating teaching needs to be a continuous process (Ramsden 2003) that allows for development; Biggs and Tang (2007) suggest that reflection on its own is insufficient. What is required is 'transformative reflection' (2007pg.221) not just what you see (reflection) but what you might become (transformative). Brown and McCarthy (1999 in Brown et al 2007) state that reflection aids transformation into knowledge. This paper critically evaluates the process of transformative reflection within a teaching session.

The session aimed to enable students to develop a more evaluative stance on recent policy and legislative developments within Early Years Care and Education. This focuses on practitioners developing a more holistic approach as encompassed within the 5 outcomes of Every Child Matters enshrined in The Children Act 2004 (Walton & Goddard 2009). During their second year of the HNC programme, students need to develop a perspective which considers a broader view of government initiatives, research, legislation and policy impacting upon working practice.

Students also had the opportunity to develop their understanding of the agenda behind the creation of Children Centres through watching a video clip and further research into

the rationale for the creation of Children Centres. Assessment of learning during the session took place through feedback from group activities, completion of the mind map and writing a reflective log for their portfolio.

Planning and Designing

In planning and designing the session, careful consideration had been paid to the type of teaching and learning activities with which the students would engage to further their understanding and achieve the expected outcomes. A deliberately student-centred approach was adopted (e.g. Ramsden 2003, Biggs & Tang 2007, Race 2007, Gosling 2007) where the needs of the learners were the focus for planning the session. Reflection on past teaching had identified a more teacher-centred approach with more thought being given to what the teacher, rather than the student, did during the session. Race (2007:16) sees a student-centred approach as continually concentrating 'on student learning, rather than our teaching'. Ramsden (2003) and Biggs and Tang (2007) refer to Theory 3 teaching where students remain at the centre of class activity and teaching is continually being renegotiated. This involves flexibility in approach, as more time may need to be spent on concepts that have not been fully grasped, rather than what was initially planned. Biggs and Tang's (2007) theory of constructive alignment was used, as this was seen to be key in enabling students to move from their present understanding of the topic to a higher cognitive level of evaluating and application of knowledge. Constructive alignment could be likened to Bloom et al's (1971 in Biggs & Tang, 2007) mastery learning. In this theory there needs to be alignment between the intended learning outcomes, the teaching and learning activities and the assessment tasks (Biggs & Tang, 2007) as outlined in Table 1. The aim and outcomes of the session were made clear, signposting that the session would enable them to meet the requirements of the assignment, which includes reflection on the impact of their new understanding upon their working practice. Student preparation for the session was crucial to indicate prior knowledge of the topic to be covered. To this end, reading was posted on the virtual learning environment (VLE) well in advance for students to download. To check engagement with this, questions were also posted on the discussion forum a week in advance. All students were expected to engage with the online discussion on at least one occasion before the session.

Prior knowledge of the capability of these students ensured that the first activity of the session was planned at a manageable level and to set the context for further enquiry (Ramsden 2003). It was evident that this was achieved through observing student engagement and participation. Reinforcement and clarification was given of different contexts in which children were cared for and educated, which added to student understanding. Light and Cox (2001) see teacher behaviour that draws out student knowledge and approves/reinforces their contributions, as a student-centred approach.

Table 1: Overview of a teaching session

Learning Outcomes:	Activities:	Assessment Tasks:
Identify the range of contexts in which children are cared for and educated	✦ Storm contexts & write up on flipchart	Comparison of current workplace and Children Centre in form of visual display
Summarise the political agenda for Early Years Care and Education in a mind map format	✦ Reading & engagement with on-line discussion prior to session ✦ Mind map political agenda for early years care & education	Reflective log for Continuing Professional Development Portfolio (CPD) which demonstrates student understanding of Every Child Matters Agenda enshrined in The Children Act 2004
Apply their understanding of Children Centres in discussion	✦ Discussion on rational for Children Centres ✦ Video: Children Centre agenda ✦ Feedback & discussion ✦ Websites given for further research	Reflective log for CDP demonstrating an in depth understanding on rational for Children Centres

Student Response

Throughout the session it was apparent that group activities provided for a co-operative sharing of understanding. Co-operative learning is seen by Ramsden (2003), within his six key principles to effective teaching, to have very positive effect on student understanding, and by Biggs and Tang (2007) as more effective than transmitting information. Jacques (2000) sees group work as valuable in stimulating thought and developing critical thinking. This was very effective in mixed ability groups. When engaged on mind mapping the political agenda, it was noticeable that students were relating to the reading posted on the VLE to describe and argue points made, this being indicative of the beginnings of a deeper approach to learning as seen by Biggs & Tang (2007). Saljo (1979 in Ramsden 2003) states that students need to use lower levels of metacognition in order to reach higher levels. This was evident, as they identified and described aspects of the articles. Biggs and Tang (2007) support this view in stating that as students work collaboratively in dialogue they “shape, elaborate and deepen understanding” (pg.21).

Alignment of tasks to higher order outcomes did lead to deeper learning as evidenced by the completed mind map and reflective logs (Biggs, 2003 in Walsh, 2007). There was also evidence that the first two teaching and learning activities allowed students 'acquisition and ownership' (Ramsden, 2003:94) of the material and the opportunity to learn by 'doing' (Race, 2007). Bruner (1966 in Ramsden, 2003) states that learners need 'to participate in the process that makes possible the establishment of knowledge' (pg. 111). This places emphasis on the 'process of learning' which Spady (1988, 1989 in Berlach & McNaught, 2007) argues as being equally important as the outcome. The online discussion before the session provided evidence of those students who might need more targeted support during the session. These were those who had given superficial answers to the online discussion question. 'Think aloud modelling' (Biggs & Tang, 2007) which is where the teacher publicly self analyses aloud his/her thought processes whilst extracting information from the text, was used, in order to make explicit to these students how to analyse text in more depth (Dearing, 1997 in Ramsden 2003).

Discussion

The session began with a clear statement of the aims and learning outcomes. This can be defined as using advance organisers which Ausabel (1968 in Biggs & Tang, 2007; Race, 2007) suggests gives students a conceptual framework of what will be covered. Jacques (2000) states that aims establish direction, without which students may follow their own agenda. McKeachie (1994 in Horgan, 2007) writes of the need to build bridges between what is in the student's mind and the structure of the session. Links to previous learning enabled these bridges to be built. The session was structured to allow for frequent changes of activity and development of understanding. Multi-sensory approaches were also used, such as language, visual activities of mind mapping, watching a video clip and the use of co-operative learning in discussing and noting key points. Biggs and Tang (2007) state that actions are easier to remember and semantics harder, which was the reasoning behind visual aids to aid recall of information covered and discussion, which allowed engagement with the reading. It would appear that this approach was successful in promoting more thoughtful reflection and in enabling students to make links to their practice as evidenced later through reflective logs in student portfolios. Reflective logs also benefit recall and reinforcement, which Minton (2005) states is critical to retention of information.

A multi-sensory approach was also used to meet the diverse needs of the group. It had been identified through the online discussion that some learners had not engaged with the reading in sufficient depth. A transmission mode of delivery was deemed to be inadequate to meet their needs. For students to develop an evaluative stance on the material covered, a student-centred model was considered to be more effective. Opportunities for co-operation and communication (Race, 2007) enabled all students to achieve greater depth in their written logs. Race (ibid:26) states that "We need to remember that learning is done by people – not to them". This 'doing' by the students was a very successful element of the session.

Students responded positively to the online discussion, as all had participated in this at varying levels before the session, having engaging with the reading posted on the VLE. Discussion responses identified the integrated approach, diverse services and good outcomes for children, which Children Centres offered. Most students had grasped these main ideas from the reading. The reading and online discussion served two purposes. Firstly, being student-centred, students were able to contribute at a time to suit them and without teacher control (Benfield, 2002). Secondly, online discussion was linked to an assignment assessment task. Ramsden (2003) argues that if tasks are seen as purposeful students will adopt a deep approach in their learning. The students themselves stated that it was helpful to read the responses from others and to be able to revert to the discussion at a later date. Future use of online discussion to ensure continued and deeper engagement will be explored subsequently.

In adopting a student-centred approach, thought had been given to creating a learning environment conducive to deepening understanding. Biggs and Tang (2007) suggest that if teachers are committed to Theory 3 teaching, which is student-centred, they will promote a Theory Y learning climate where student learning is the priority. Within this climate students are given freedom and space in which to learn. It was apparent during the session that students engaging in group activities felt at ease to co-operate, contribute, and respect the points of view of others, whilst being cognitively challenged. Light and Cox (2001) see these elements as the purpose of group activity and discussion, as they allow “freedom from dependency” (pg. 117).

The student-centred approach adopted in this session was effective in so far as it enabled a higher level of thinking within the session and promoted the production of a more detailed reflective log in evident in student portfolios. However, key questions for consideration in the design of future practice were recognised. Ausubel (1968 in Race 2007) emphasises that the most important factor in influencing learning is what the student already knows. Biggs and Tang (2007) term this “phenomenography”, where the learner dictates what is learnt not what the teacher intends. In a student-centred approach where Theory 3 teaching (Ramsden, 2003; Biggs & Tang, 2007) is adopted, teaching needs to be continually renegotiated with students at the centre. Ramsden (2003) emphasises that teaching is concerned with “finding out about student misunderstanding, intervening to change them” (pg.110). Teaching and learning is then seen as a process of working co-operatively with learners in order to promote understanding (Ramsden 2003). This places assessment of prior learning and feedback from classroom tasks as central to planning, which involves teacher observation of individual student engagement and questioning to ascertain understanding of subject knowledge.

Conclusions and Recommendations

Whilst this analysis and evaluation focuses on one particular taught session it has raised a number of issues, which require continued reflection and development for future practice. Adopting a student-centred approach through constructive alignment has transformed perceptions of what is key to student learning. What was effective within this session was the ability to identify needs beforehand, to focus on the process of learning within the session and the use of multi-sensory teaching approaches during the session. Also valuable was observing and assessing understanding of the subject during the session in order to renegotiate learning. The teacher is then seen to be working co-operatively with the learner to promote understanding. Online discussion was beneficial in preparing for the session. However, thought needs to be given as to how this can be developed to ensure continued use. Student ownership of learning could be secured through students preparing discussion formats in small groups or pairs. Students formulating questions themselves on topics covered would enable deeper engagement and reinforcement of learning. Areas for continued development are clearly assessment of prior learning, making explicit to students their progress in developing higher cognitive skills and the use of online discussion. Continuous improvement needs to be an ongoing process, eliciting student feedback to identify where teaching might be improved.

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Student reflections on taking part in a research project

What course do you study?

English Language with Philosophy, B.A.

What project were you involved with?

The University of Hertfordshire, Blended Learning Unit

STROLL project (STudent Reflections On Lifelong e-Learning)

which is a JISC funded project, Mar 2007 - Feb 2009

Ericka Durgahee

What did you do?

Every 6 months, I was given a camcorder and instructions on recording my daily life for a short period of time [anything between 3 and 6 days] with relation to technology and learning. I would normally record at the beginning of my day my plans for the day and then at night as to what I'd done that day along with an answer to a question relating to technology and my learning. After the allotted time had passed, the cameras would go back to the Blended Learning Unit and my footage was watched and edited. I have attended several other sessions where I've been recorded, including meetings about the ownership of several technologies as well as meetings with other people at the University so that they could further understand the things I did on a day to day basis.

Why did you volunteer?

I wanted to see what it was all about and hopefully help make some changes concerning technology within the University. My ideas have been used and incorporated into the University system as well as others' ideas. I think this was through discussion with other people about why I was recording myself on a daily basis! This project seemed really interesting, I studied psychology in the first year and this longitudinal project mapped what we were studying.

How do you think you benefited from taking part?

Partaking in this project has helped me to understand and recognise how much of a big part technology plays in my life. Nearly everything I do with relation to studying is linked with some form of technology and I think it's important that I appreciate that and only hope that it can continue to progress in a good direction.

Did you learn anything about how you learn and use technology?

I did, especially with the wonders of StudyNet (the university MLE). It really is a learning database and without it, my degree would probably have an entirely different outcome! It meant that if I was ill or suchlike, I wouldn't have missed out entirely on a lecture or learning, because the notes from the lectures are always uploaded to StudyNet. I also learnt that technology is very important to my learning, it has actually made me wonder how people got degrees 40 or 50 years ago without the access to technology we have now!

Senior lecturer to assessor: Appraisal of theories related to assessment from a new lecturer perspective

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Abstract

Essay style questions and multiple response questions (MRQs) have long formed the basis of unseen examination in higher education. These standard assessment methods have proven to be valid, reliable, effective and efficient. Over the last decade, growing student numbers, reduced resources and wider availability of computer networks have led to the increased use of online MRQs as a method of assessment in higher education courses due, in part, to a perceived greater efficiency. However, the design of effective and valid MRQs can be time-consuming. In this paper, assessment methods used in the Biosciences programme at the University of Hertfordshire (UH) are evaluated from the viewpoint of a new lecturer setting examination questions (essays and MRQs) for the first time. Key theories and approaches to assessment of and for learning are critically appraised by considering why and how students are being assessed, with specific reference to a second year undergraduate module.

Introduction

There is no doubt about the importance of assessment. New lecturers may feel daunted when tasked to prepare their first examination questions, made all the more difficult by the fact that the examination questions are often required before the lectures have been prepared. The new role of 'lecturer' is rapidly re-focused to 'teacher, learner and assessor'. Setting examination questions for a new undergraduate module with no precedent within the first few weeks of anyone's teaching career is challenging but has allowed for reflection on the bigger picture of teaching, learning and assessment and how they have to be intimately linked. John Biggs has described this in depth in many of his books and often refers to 'constructive alignment' (Biggs, 2003) whereby the learner constructs his or her own learning through relevant learning activities and the teacher sets up the learning environment such that these learning activities achieve the desired learning outcomes. Why is it essential that we assess students' learning outcomes? The student voice unequivocally states 'assessment is the curriculum' (Biggs, 2003), in other words the students will learn what they think they will be assessed on, not what is in the curriculum, or even what necessarily has been covered in lectures, workshops and practicals. If then, all components in the teaching system *i.e.*, the curriculum (programme and module) and its intended learning outcomes, the teaching methods used and the assessment tasks are aligned, the learner may then find it difficult not to learn what he or she is intended to learn.

So how does this help in preparing examination questions which form part of a high stake (in this example, 50%) summative assessment for a new module? The programme and module learning outcomes need to be the major focus. Writing eighteen MRQs each with 5 true/false responses, following protocol criterion (after Bloom, 1956; Biggs and Collis, 1982) based on related modules at this level in the Bioscience programme at the University of Hertfordshire, was resource intensive, particularly in the absence of any

lecture material.
This led to a number of specific questions:

- why and how we assess students?
- is this necessarily the right way to assess these second year undergraduate Bioscience students?
- how else are these students being assessed to measure the qualities and skills demanded of a professional scientist?

Why do we assess students?

The time and attention that goes into designing and moderating examination scripts and coursework can appear vast. It seems that both lecturer and student lives are dominated by assessment. Wakeford (2003) describes why assessment is important for two very different reasons. Firstly, assessment has to be accurate to grade students and set credible standards both internally and externally to provide quality assurance for all (Quality Assurance Agency (QAA), 2006). It is now widely accepted that for most students good assessment is the main driver of their learning (Race *et al.,* 2004) and therefore, secondly, assessment has to be an integral component of the teaching and learning system, aligning it in such a way that it focuses the student activity on meaningful learning. This is embedded in the University of Hertfordshire learning, teaching and assessment strategy for 2008-2012. By explicitly implementing transparent assessment methods that encourage meaningful learning (*i.e.* relate theory and practice) this will allow students to measure their own achievements, help them consolidate their learning and provide feedback to guide improvement for both student and lecturer (Race *et al.,* 2004).

How do we assess students?

There are two approaches to assessment that underlie educational practice; the traditional norm-referenced whereby students are graded and ranked in relation to one another and criterion referenced whereby students need to meet preset criteria that reflect their understanding of the learning outcomes, irrespective of how they are ranked in their cohort. Formative assessment and feedback inform students and lecturers on how well they are learning and teaching and how they can improve, but do not count to the final grade and are therefore low risk. Summative assessment and feedback on the other hand are high risk as they count to the final grade/attainment.

Continual summative assessment starts in primary schools (SATs) and continues into secondary schools (GCSEs) forming an integral part of the United Kingdom education system. It can be argued that continual less formal assessment stimulates learning through focusing students and providing ongoing feedback, but because it is also summative it can temporarily shift both student and teacher attention to simply obtaining the right grades. Many of our students are used to this way of continual assessment but now need to adapt to become more active independent learners. A clear distinction therefore in higher education is the additional need for assessment for learning. Given the assertion that good assessment and feedback drives learning (Race *et al*., 2004), one

way to encourage and develop the independent, proactive, critically thinking student is to ensure the right balance of methods of assessment are employed at the right stage throughout the undergraduate experience. Of course good assessment methods and prompt feedback will help drive and stimulate activity and hence learning, but are just two tools in the box and the student needs to complement these with other sources to inform their learning. The literature suggests that feedback on performance (assessment *of* learning) facilitates learner motivation; however this will vary across the cohort depending on the ability of students. For example, there will be group dynamic issues that affect individual motivation where a small group may have a sense of cohesion and less peer-to -peer competitive motivation (e.g. Johnson, 2008).

Chickering and Gamson (1987) describe seven principles for students and staff to improve teaching and learning, one of which is to provide prompt feedback on performance. Feedback cannot occur without some form of assessment and assessment without timely feedback contributes little to learning (Chickering and Gamson, 1987). This applies particularly to new students to guide and help them improve their performance by encouraging them to move from being surface learners to deep learners. In accordance with Chickering and Gamson (1987) one of the key messages from today's students (National Student survey (NSS)) and QAA code of practice is the need for prompt feedback which allows feedback to be as meaningful as possible (*i.e.* fresh in the students minds) as well as allowing the student to apply the feedback to inform subsequent assignments. In response to feedback from the NSS and in line with the QAA code of practice and sector norms this university has recently reduced its turnaround time for returning feedback on assessed work.

How are we assessing students in the Bioscience programme in the School of Life Sciences?

To be effective, assessment needs to be valid (appropriate), reliable (accurate and consistent) and fair for our diverse student body. Validity can be seen as having three aspects:

- face (appropriate content for level);
- construct (ensure assessment methods and Learning outcomes measure the skills they are supposed to measure);
- impact (impact that the assessment has upon the behaviour of students, largely related to students perceptions of what is rewarded and what is not (Wakeford, 2003)).

Given the 'diverse' University of Hertfordshire student body, a diverse, inclusive range of assessment methods are adopted to allow all students to have an equal and fair chance to demonstrate their learning. Wakeford (2003) discusses the advantages and disadvantages of the most common assessment methods likely to confront new lecturers in higher education, including essay questions, short answer questions, multiple choice/ response questions (MC/RQs, of which there are many varieties), practical/laboratory work/reports, oral examinations and tutorials. These assessment methods along with a

final year project dissertation/viva, poster presentation and self/peer assessment are all encountered in the School of Life Sciences Bioscience programme. Of all these assessment methods, unseen examinations remain a significant means of summative assessment within the Bioscience programme and scientific disciplines in general (Overton, 2004), even though they cannot easily assess the range of qualities and skills required of a professional scientist. However, one distinctive feature of experimental science is the regular assessment (sometimes self/peer) of written laboratory reports to assess the essential development of practical application and critique.

How are we assessing our students for this new module?

The learning outcomes for this new module had been designed to provide students with an equal balance of examination and coursework (all summative) to measure both their declarative (*i.e.* 'declare' what they have learned and now know, surface approach) and functioning knowledge (*i.e.* demonstrate their understanding by thinking and behaving like scientists *e.g.* learning outcomes 2 and 4, see table 1, deep approach). There is a balance of words used in learning outcomes to measure 'know-how' and 'know-why' and different elements of learning outcomes are reflected in the assessments.

Table 1: Learning outcomes for a second year undergraduate module in the Bioscience programme.

Learning Outcome	Exam	Progress Test	Full report	Poster
Describe how disease processes affect human biological systems at the cellular, tissue, organ and systemic level of organization.	√	√		√
Explain with examples how human disease results in biochemical, structural and functional abnormalities at different levels of organization.	√	√	√	√
Identify tissue types and the main organs of the human body	√	√		
Demonstrate the evidence for a range of key pathological processes through the use of laboratory experiments.			√	

This module used a mixture of learning experiences including lectures, workshops, practicals, and a revision slot comprising a mock written examination and set assignments (poster group work, peer/self assessment of lab report). Four different assessment methods were used in this module (MRQs, essay questions, peer assessed laboratory report and group poster) to help to ensure that the same students were not disadvantaged time after time by their lack of skills with just one or two particular formats. Furthermore,

the assessments directly correlated to the module learning outcomes, showing a clear alignment between what is being assessed and the intended learning outcomes.

Table 2: Module assessment content.

Nature of assessment	Summative Value	Deadline	Feedback
Progress Test (MRQ)	10%	Wk 8	Wk12
Full laboratory report (peer assessed)	20%	Wk 11	Wk12
Group Poster (various titles)	20%	Wk 11	Wk12
Examination (MRQ/essay)	50%	Wk 19	By wk23
Log Book /workshops	Formative compulsory	Wk6-12	Ongoing

There was a balance of effective assessment methods aligned to the learning outcomes in this module (Table 1). Peer/self assessment of laboratory reports involved the students assessing their own and each others' work to deepen their learning, and help them to understand how to conduct assessment, in line with Nicol and MacFarlane-Dick's (2006) first principle of clarifying what good performance is. This method assesses the professional skills required of a scientist, both practical and written, and importantly the ability to engage in scientific enquiry. The poster assignment further allowed the students to engage in peer dialogue learning in small groups, choosing their topic along with preparing and presenting their poster as would be expected at a scientific conference. Formative feedback for learning was prompt for each assignment and for most groups clear learning communities had developed. Feedback from students is also crucial for any new module and this was collected in the form of a questionnaire at the end of the module. Feedback sought from students should aim to focus on why they learn, why they do not learn, and why they favour or criticise certain aspects of their learning experience in relation to the planned learning outcomes.

Unseen examination (MRQs and essays) assessment formed 50% of the summative assessment within this module. MRQs (progress test and final exam) are widely used in the Bioscience programme for first and second year undergraduates and in higher education generally. Amongst the main reasons suggested for this are growing student numbers, reduced resources and increased availability of computer networks (Nicol, 2007). MRQs do offer clear advantages over other methods in that feedback can be provided very quickly and questions can be designed to assess student knowledge of the entire module content. There are however, also disadvantages compared to other methods. Limited formative feedback can be given to true/false responses (Scouller, 1998). However, confidence based marking (CBM, Gardner-Medwin, 2006) may

encourage students to think deeply about their answer and self reflect on their own reasoning following Nicol and MacFarlane-Dick's (2006) feedback principles of self reflection/assessment and motivation. MRQ design takes time and can be problematic if answers are not necessarily completely true or false, especially when we are trying to teach our future scientists that there is rarely a single correct answer to a given problem, although this is more applicable in the final year when MRQs are not used. Nicol (2007) discusses how MRQs can be used to enhance learning by manipulating the context within which these tests are used. In the School of Life Sciences electronic voting systems are now an integral part of the first year undergraduate student learning environment; students respond to MCQs using their own handset and the responses inform the teacher to adapt teaching to students needs. This might include a recap of some of the lecture, provision of MCQs as preparatory work, peer instruction to work in groups to discuss with one another whether or not they have the correct answer ('just in time teaching' Novak *et al.*, 1999). Furthermore, one way to include MRQs in final year undergraduate assessments would be to base MRQs or CBM on case studies or research papers for data interpretation and critique purposes, or to task students to construct MRQs that encourage peer assessment (Fellenz, 2004).

Essay questions are perhaps more appropriate for second year undergraduates, as they measure higher level cognitive skills such as collating and critiquing new ideas or theories, all essential skills for a professional scientist. There are limitations however, since it may be difficult to permit enough essay questions in the time frame to cover the entire module content. As Biggs (2003) describes, students will always second guess the assessment task, and then learn what they think will meet those requirements, *i.e.* revise only the topics they need to (Biggs 2003). Essay questions also need to be carefully worded for the appropriate level (Bloom, 1956; Biggs and Collis 1982) and to ensure the question is unambiguous and therefore interpreted in the same way by all students.

Conclusion

Previously many teachers may have focused on teaching, assuming students are skilled at learning activities such as note-taking, researching, essay writing and revision. It is clear we need to involve students as much as possible with assessment in order to provide them with the student-lecturer interaction that they request (Time Higher Student Experience Survey, 2009) as well as to enhance their learning.

This reflective account has considered the differences in assessment for a specific module at second year undergraduate level in the Biosciences programme at the University of Hertfordshire. There was a clear balance of unseen examination and coursework within this new undergraduate module in line with the Biosciences programme. Coursework increases the assessment load for lecturers but provides a reliable assessment of student capabilities over time as well as the continual opportunity for detailed feedback for learning. In contrast, unseen examinations eliminate plagiarism, but encourages rote learning (Entwhistle, 1984), favouring those students that perform better under acute stress but often narrowing the range of learning outcomes that can be measured, particularly in the case of essay questions. Increasing the use of different

formats of MRQs not only allows all learning outcomes to be measured but also encourages a deeper approach to learning.

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Student Voice

Where I learn best...

Hello, my name is **Elizabeth Terry**, and I am a Business Studies student at the **University of Hertfordshire**, currently on placement with the **Blended Learning Unit**, as a Marketing Assistant.

Below are some examples of where I **learn** well....

A month or so before exams commence, I practically live in the LRC (Learning Resource Centre). I love the fact that it is open 24/7, and offers a range of study facilities to students. I am a big fan of the silent study booths, as I am able to concentrate and get a lot of work done in them.

I go to the **gym** at least four times a week. Whilst cycling/ running, I take the opportunity to read my lecture/ revision notes.

Whilst trying to get to sleep at night, **instead of counting sheep**, I recite important formulas that I need to learn for a test.

When performing group work, I often suggest that we meet up for a **coffee**. I suggest this as it creates a relaxed atmosphere for us all to discuss ideas in.

Where I learn best...

Hello my name is **Gemma Ketcher**, and I am a Mental Health Nursing student at the University of Hertfordshire, currently in my common foundation year.

I like to prepare for lectures by reading at home. I find it easier and more relaxing as I don't feel put on the spot like I might at lectures. I can concentrate better as there are no distractions.

I love the practical sessions where we learn to do essential skills such as measuring blood pressure or giving injections. Actually getting my hands onto the equipment helps me to learn and test my skills before I try them out on real people.

I find getting together and talking with my friends is a great way to learn. We usually meet for a coffee when we talk about our work. I also like to talk in our group discussion sessions where we reflect on our practice.

When I've had a busy day I find that my drive home is normally a time I can order my thoughts. After placements, I go over what happened that day in my head. I think about what I have learnt and reflect on how I might deal with similar situations if they were to arise again.

The Learning Resource Centre (LRC) is really helpful for finding resources for reading. I find the best way to find articles is through the databases via StudyNet. I tend to look through them while I'm there and copy any articles I need.

Student Voice

Hello, my name is Lauren Anderson, and I am a Marketing student at the University of Hertfordshire

Where I learn best!

At the end of each day I like to lie in bed and think through my days activities. I think of new ideas or remember things that I need to do.

I find that I can learn a lot from listening and talking with friends. I like to hear what they have to say and also their opinions on my ideas.

When I am driving I think about the work I have. This is because it is often one of the very few times I am alone. Having time to myself gives me time to think without any distractions.

In the summer I love to lie in the sun on my trampoline. I feel most relaxed here and often get my study books out to begin learning.

Having my desk in my bedroom allows me to use this time as valuable learning time. I sit at my desk whilst reading books, online journals, writing essays and revising. Here is where I get most of my work done as I am more focused and shut off from the outside world.

The LRC has all of the resources needed in order to learn. I particularly enjoy learning in the LRC during group work as it is a place where we can all meet and work together. If there was no LRC, it would be more difficult to meet for group work.

Where I learn best...

Hello my name is Lloyd Hendricks, and I am an American part time Masters student at the University of Hertfordshire where I work as a technician in the School of Education.

One of my jobs is organising and distributing resources. I load them onto my trolley and take them to teaching rooms. I've learnt a lot about the different objects, exploring artefacts such as old washboards. I also look at some of the books, but the stuff I really like is the hands-on things, like the warming pan - look closely at the picture and see if you can spot it! I would have thought it was something you cook with, but turns out it was for placing hot coals under your bed to stay warm at night. Amazing!

I often learn from watching programmes on TV. Did you know that it's illegal in California to set a mousetrap without a hunting license? I found that out from Discovery Channel. I soak up all kinds of things; from Greek philosophers to Amazon frogs. Watching interesting documentaries is the way I learn best.

I love the thoughtful solitude I get in the shower each morning. It helps me to mentally organize my day and to just think. Some of the best ideas I've ever had have come while I've been in the shower.

I learn lots from sitting at home reading magazines, journals and newspapers and often read them from cover to cover. Almost everything I know about motor cycle engines, for example, came from reading articles in magazines. I just find I can soak up information this way.

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