

Innovations in Learning and Teaching Approaches using Game Technologies – Can “The Movies” teach how to make a movie?

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Introduction

The use of games technology in education is not a new phenomenon. Even back in the days of 286 processors, PCs were used in some schools along with (what looks like now) primitive simulation software to teach a range of different skills and techniques – from basic programming using Logo (the turtle style car with a pen at the back that could be used to draw on the floor – always a good way of attracting the attention of school kids!) up to quite sophisticated replications of physical problems, such as working out the trajectory of a missile to blow up an enemies’ tank. So why are games not more widely used in education (especially in FE and HE)? Can they help to support learners even at this advanced stage in their education?

We aim to provide in this article an overview of the use of game technologies in education (almost as a small literature review for interested parties) and then go more in depth into one particular example we aim to introduce from this coming academic year (Sept. 2006) to help with teaching and assessment of one area of our Multimedia curriculum. Of course, we will not be able to fully provide the reader with data on how successful this is but we will be running a blog (<http://themoviesineducation.blogspot.com/>) to keep interested parties up to date with the progress of the project and to hopefully help others to set up similar solutions themselves. We will also only consider a small element of the implementation here and cover how the use of such assessment processes could be used in a broader context.

The use of a game to aid learning and improve achievement is suggested because traditional methods of engagement are currently failing on some levels. By this it is meant that various parts of the production process we normally cover in our Multimedia degree are becoming difficult to monitor and continually assess.

The Current State of Play

Games in education is a wide ranging subject area, taking in some extremely technical considerations (setting the game up, running it securely on a school network, the social implications of running games in an educational setting) right down to what seems like simplistic issues (is this actually going to help the student?).

There have been movements towards investigating the use of games in education (see the excellent overview of literature at <http://tinyurl.com/mlsc3> - Kirriemuir & McFarlane, 2004) but not really any proof that a. It works and b. It is more effective than traditional teaching and learning techniques.

Where does that leave us? Well, in actual fact, we believe in quite a good position. There are numerous "one off" examples of teachers who have started to use games in the classroom – for instance, Tim Rylands (who won the 2005 BECTA prize for ICT In Teaching) uses *Myst* as a means of getting student's imagination fired for creative writing. He does not play the game with them as such, more using the game almost as a prompt tool (you can see a video of his work on his website). It is immediately apparent that the children he teaches love the interactive aspect of the whole experience and that helps them to come up with some imaginative writing. Isolated examples such as this help others to realise that it is possible to create something useful in a classroom environment using games – and it's this realisation that we can all be pioneers that is what we believe is a positive aspect of the use of gaming technology in education.

Another reason why Tim Ryland's approach is successful is because, we believe, he's not using an educational game in education. This might confuse some readers, so let's elaborate. In the NESTA literature review for gaming (Kirriemuir & McFarlane, 2004) it is mentioned that most educational games fail for a number of different reasons. One that we feel is important is that "the target audience becomes aware that it is being coerced into 'learning', in possibly a patronising manner" (ibid). When watching Tim Ryland at work it is apparent that he lets the game speak for itself but then structures the lesson around what he wants the students to learn (thus overcoming another problem with educational games, that "the tasks are poorly designed and do not support progressive understanding" (ibid)). It's also clear that *Myst* is a lovely looking game, which helps the students take it more seriously – it's a shame, but as most are used to the graphical prowess of their Xbox360s and PSPs, anything below "mind-blowing" on a graphical scale has the chance of being ignored or written off by some students. This helps to foster an environment of using the game as a supplement to learning, much in the same way that video has been used in recent years. It is important to realise that students will not "just learn" if they are stuck in front of a game – they need structured ways of progressing through the game and to relate their learning to real-world problems.

Structuring the path through a game has drawbacks, however, as a lot of the gains for learners when using games come through exploration. If we structure the experience too much we run the risk of designing out the positive aspect of the game. Therefore, we need to make sure that any structure we give them allows the student to learn and reflect without being a too prescribed experience – a delicate balance that we can try to accomplish by using some recent developments in eLearning technology, as well as referencing more traditional learning techniques and theory. (We think that it is possible to structure learning in a game using this new technology, a point we discuss in more depth later on in this paper).

Kolb (1984, via Atherton, 2005) developed the famous Kolb Cycle to show how learning can take place. If we relate this cycle to games playing, we can see that casual gaming does complete the cycle in isolated cases – for example, if we were playing Project Gotham Racing 3 (PGR3) (a driving game on the Xbox360) we might be able to hit the stages of the cycle in a couple of tries at one of the challenges. When playing PGR3, the game is broken up into challenges (one might be, for instance, to go round the track in the quickest time; another might be to overtake 10 cars in 2 minutes whilst racing, and so on). In the Kolb cycle, we can see Concrete Experience (the first stage) with a player completing the tutorial level so that they know what button does what. This would then progress, say in the first level, to the Reflective Observation stage, where the player might think about how they control the car and try to improve on it (this is usually where the famous benefit of games - the improvement of hand-eye coordination - would come into play). The next stage of Abstract Conceptualisation would come when the player tries a level and finds that their previous knowledge no longer works – maybe the level is longer, or has more turns than they are used to. They would then have to examine why the game works in a certain way to try and beat it – for example, learning the best route through a level, or applying the idea of “racing line” (i.e. when it is best to turn and how best to go through a turn to maximise the speed) to their driving. The final stage would be where they try out their new ideas (Active Experimentation) in the level to see if they work. If the new ideas work, the player then mentally stores that way of playing so that they can beat the game again next time, thus completing the cycle.

This is an example that uses a game where we might not want players to “hold” their learning. We don’t really need an entire generation growing up thinking that they can race cars around London in the dead of night with no repercussions! Morally, then, games designers and teachers have an obligation to contextualise the learning in games – a point that leads us onto more serious uses of game technology.

America’s Army is a First Person Shoot-em-up (FPS) in the style of Counter Strike. It basically replicates the experience of being a soldier in the US Army. The learning that takes place in this style of game could be deemed inappropriate (i.e. killing) but the game balances this with some other, less controversial skills (such as life saving techniques). In essence, it trains people how to be soldiers without them having to actually train in the Army. Again, we have to question here if we want students to retain a lot of this information – do we really want to train people to kill outside of the supportive environment of the Army?

This example brings up an interesting side avenue - that of the new genre of games called Serious Games. There is strong movement towards using games such as America’s Army to simulate real world issues and train people in responding to those issues. The Serious Games Initiative is trying to pull together as many interested people as possible and there is already a blooming research environment around this type of gaming. For instance, a lot has been made recently about the new titles available in Japan on the Nintendo DS (a handheld games console) called various

names in translation, but originally known as “Kahashima Ryuuta Kyouju no Nou o Kitaeru Otona no DS Training” (<http://uk.ds.ign.com/objects/740/740437.html>) which is a series of short, sharp mental tests that have been proven to boost the mental capacity of the player when played over a reasonable time frame. There have also been examples of modding the Half Life 2 engine to provide a virtual Emergency Room to train medical staff to deal with emergencies such as a terrorist attack.

These points obviously gloss over the fact that most players will be able to separate “the game” and “the real world”. Of course people will be emotionally affected by games – they are a form of media, after all, and they are a lot more tactile than cinema, a lot more visual than a newspaper. The key balance here is that the player ultimately has control over both the game and their real life. They will not feel compelled to drive faster in real life if they have played a driving game because they understand that real life has a different rule structure. Most people can understand this and apply the rules when appropriate. Therefore we come back to the point that for games to be used effectively in education they must have a clearly defined purpose and a supportive learning structure built around them.

What We Propose

We feel that there has been a general decline in our school (Computing and Mathematical Sciences) in the level of creative drawing ability in our students on the Multimedia degree. The cause for this is unclear but we have noticed, especially in the last 3-5 years, that many students claim that they “can’t draw” and that, even with assistance, they still do not engage with activities that require drawing. The main activity that we have seen this problem in is storyboarding for video production. Many students will point-blank refuse to draw a storyboard even after discussing the fact that the storyboard does not have to be a work of art. They have even been known to produce a storyboard after the production has taken place, making the exercise more of a way to achieve marks than learn the process. It is unclear if this is symptomatic of a more general aversion to drawing in schools or if this is a cultural shift (e.g. “why draw when I can take a photo?”) but there is a definite resistance to using traditional drawing techniques when planning a video shoot. Even when given the chance to create storyboards in alternate ways (e.g. using photos) students still fail to see the relevance and usefulness of a well planned storyboard in creating a coherent and thoughtful video.

There are many techniques that could help with this problem. One, for instance, is something we already do – bring in an artist to work through the basic drawing skills such as line weight, perspective, colour etc. with the students so that they can approach the storyboard phase with more confidence. This approach has limited success in as much as students like the work until they have to create a full storyboard – then the lack of confidence in their abilities crops up again and we are back to square one! So, we started to think about how we might use alternative media to assist with this issue.

We have tried in the past to use the special features of DVDs to show why storyboards are important – a small selection of DVDs used in the past to do this include X-Men, The Emperor's New Groove, Star Wars, Family Guy and Shaun of the Dead. All of these usually feature a storyboard comparison (you see the original storyboard alongside the finished film) and it's easy to then explain the relevance of the storyboard in the planning process to the finished article. However, this is a very passive experience for the students – it certainly does not help to complete the cycle of learning model discussed earlier, and if approached incorrectly, can actually fall into the worst type of teaching (where facts are just thrown at students in a Basiel-style Behaviourism model and they are expected to learn them all, a very shallow/superficial type of learning which does not result in a positive learning experience). Even when used in a more active discussion setting it still does not seem to make a large impact on the student's mode of working. The use of a game has been suggested to enable the students to complete the production process in a logical order. This is an area discussed by Hill et al (2003) who state that differing students have differing learning styles – making it more important to incorporate multiple teaching techniques in lecture and tutorial sessions. It also has the advantage of making the students feel more comfortable with the idea of learning, as they feel more involved in the process if the teaching style matches their learning style – an obvious point unfortunately all too easy to overlook!

The method of involving students in teaching is something Anderson et al (1997) identifies as a link between ownership and effective teaching. This is something that could be enhanced using a game to involve the students in tasks. Getting students in a class helping each other to learn is also something that Anderson et al (1997) discuss to enhance the learning process. So the use of games could be an ideal opportunity to allow students to help and aid each other in the learning process.

Another aspect of using games to aid learning is something that the NESTA (2006) report points out by stating that *" 91% [of teachers] felt that players developed their motor-cognitive skills, while over 60% thought that users would develop their higher order thinking skills and could also acquire topic-specific knowledge"* (NESTA, 2006). So using games to aid teaching is something that can develop higher order thinking skills, to not only improve the access to a higher level of autonomy, but self assessment.

We aim to use a game called "The Movies" to teach students the pre-production process of video production. We will use the game in a structured lab environment where students will work through the game, in groups, based on lab sheets we provide and they will have to electronically submit evidence of work completed each week.

"The Movies" is a game made by Lionhead Studios, a very famous games company probably best known for the ground breaking god game "Black and White". The idea behind the game is that you create a Hollywood style studio from the ground up (the game begins in the early 1930s and you have complete control over all

aspects of the studio development). The idea is that you then have to manage the studios output to create money and fame. The game currently retails in the UK for £19.99 and a demo can also be downloaded for free from Lionhead's website.

We propose using the game in a structured environment with both level 1 and 2 undergraduate students on our Multimedia degree over a period of 3-5 weeks in two courses: Multimedia Production 1 and Multimedia Production 2. This time will be when they have to learn the techniques they will need to successfully produce a video. In previous years they have had to produce: 30 second adverts for the University's radio station; a music video; an advert for the 2012 Olympic Games bid and a remake of a 5 minute chunk of their favourite film. All of these projects share common goals, and common problems with the pre-production stages. In almost every instance, the pre-production of each of these projects was felt by the students themselves, in their evaluations, to be below the level needed for the creation of an effective end product. The normal reason is that students left it too late to put the whole thing into production (so issues with time management, project planning) and, when they did put it into production, found that their storyboard and treatment were not detailed enough to shoot effectively on location. This is despite being taught these skills in the level 1 and 2 courses, so there must be an area for improvement.

The game allows players to assign virtual people to roles in the movie making process, such as script writers, directors, actors etc. It also enables, through the use of "expert" modes within the game, the player to create their own scripts and films based around common movie making conventions (e.g. you can create a script type that follows the traditional story-telling model of setup, conflict and resolution). The limitation of this approach is that the player does not have complete control (for instance you can only shoot films in the sets you have built at the time in the game). However, there appears to be enough flexibility available for this to be used in an educational establishment, as long as there is a framework of learning outcomes that can be met through playing the game. This area is still being developed but we will have a series of learning objects available for students to work through by the time we start teaching again in September. This is where the structured aspect we discussed earlier comes into play.

To help with the structuring of the learning experience we are going to use LAMS (Learning Activity Management System). The use of this technology to assist learning helps to engage learners and maintain their motivation, often identified as the most important factor in learning. Bajcsy (2002) identifies a number of ways to use this type of technology as an enabler, including to "help organize and provide structure for the teacher's material to students" (ibid). So using a system such as LAMS, to track and monitor learning, is vital to the organisation and structure of the students' materials. It is envisaged that LAMS would be used to set tasks and monitor a progress in learning and reaching learning outcomes. The use of this technology has many advantages recognised by Race (1996) among others, but Chen & Arnold identify an advantage of technology driven education as a way to "help overcome

the two enemies of learning: isolation and abstraction" (Chen & Arnold 2002). This advantage allows the students to interact with not only each other but with the systems they are using, enhancing learning on two levels (reflective and peer), something that Hinrichs (2002) also identifies as a positive. From this work it is possible to see that learning can be enhanced through the use of technology; however the methods in which this is undertaken is vital to a successful model.

Let's hope that the use of this technology and form of teaching (using LAMS and "The Movies") will not distract from the importance of lecturers and tutors in the education system and their role in student learning. This is something that Bajscy et al stress, stating that "human teachers and tutors who can provide expert instruction, provide inspiration, encouragement and discipline, and serve as exemplars of the kinds of expertise a learner can aspire to achieve" (Bajscy et al, 2002). The use of learning management systems and the development of learning objects is quite a new area in educational theory, so the human element is still very much at the forefront of our plans.

There will be various considerations and challenges in the implementation of using a game in teaching. "The Movies" is a way in which we can limit the student's propensity of attempting to complete the production process in the wrong order. The methods of progressing in the game outlined above will teach the student why the process is not only important but how it can affect the production process if not completed correctly. The game also requires that the production elements are completed in a logical order. By restricting the student in this way it is hoped that they will focus more on the creative and technical aspects of video production rather than the process itself. This in turn should allow the student to gain more knowledge through experiencing the full production routine, rather than the version they experience at the moment where they sometimes make up pre-production work as they go along. Furthermore, this experiential approach is a valuable way of stimulating deep learning, and, as Kolb, A & Kolb, D (2006) identifies, many institutions and educators are "*embracing experiential learning as a practical model to design and implement programs and curricula that promote maximization of student learning and more holistic, experiential modes of assessment*" (Kolb, A & Kolb, D 2006).

The use of a more flexible approach to assessment could also be implemented with this form of learning. Using games can not only engage students by maintaining a broader approach to learning styles but the methods of assessment could be more flexible to the learner. By this it is meant that the student could maintain a record of their progress through the game using a diary or blog, and also the use of tutorials could be used to engage peer assessment of student progress. However this approach would need to be managed appropriately and the learning outcomes/objectives need to remain focused, something Anderson et al (1997) recognises. This flexible approach could also be used with the students pace of learning, because as long as the student completes the processes of the game, up to a certain level, by week 5 then they would have met the learning outcomes

intended. That said, this approach could also present an opportunity for the student to “rush” the work towards the end of the assessment period. A suggested approach to counter this could be to have weekly progress assessment, and through peer assessment the learners could give feedback to the progress of each other’s game. This form of assessment should also be formalised by the lecturer to allow for a fair approach to all of the students, and is also something that LAMS allows tutors to achieve very simply.

Using “The Movies” as a teaching aid for the Multimedia Production courses does need to be considered carefully. Audley, R (1996) clearly identifies a few key areas that relate to the integration of games into a degree course. Briefly he outlines the importance of motivation stating that “ *there must be motivation. It is hardly enough to provide a game and to expect students to participate*”. He goes on to say that “ *this motivation is achieved by three things; the game should form a structured part of the instruction, and should be seen to be a continuation of the lesson by the students. The lecturer should know how long to allow the game to continue*” (Audley, 1996). These key points outline how important it is that the context of the game is communicated and utilised in both lectures and tutorials. The students would need clear weekly goals and be able to clearly see where the learning outcomes line up with the assessment taking place. LAMS is designed with this in mind (although not explicitly so). These guidelines, of course, are also applicable to any eLearning style solution, such as the use of blogs, message boards etc. in learning and assessment.

Conclusion / Recommendations

In conclusion, it is clear that the use of games in teaching to enhance learning could have clear benefits. However as with many strategies in education it must be approached with caution and an air of adaptability. The use of “The Movies” to help improve achievement and a sense of going through the steps of a production process seems like it could be very useful. Not only does it allow the students to progress at their own pace (and within the structure of a learning object that can be refined if needed), it also offers an option of location to study (as the student could easily run a copy of the game at home). Both of these elements would allow the course to maintain a flexible approach to learning, something Race (1996) identifies as being an important aspect to improved learning.

The use of assessment needs to be clear and the students need to be made fully aware when they are doing something, what learning outcome it relates to. There is a possibility that the students could get too carried away with playing a game and forget the point – to meet learning outcomes. This could be tracked using a portfolio system where the student is required to maintain screen grabs of their progress and make notes or save the game at certain intervals – when a learning outcome has been achieved. This would mean the tutor would only have to confirm the learning outcome was matched and the student could continue

progressing. It would also make sure that the students were getting something more out of the game than simply entertainment.

This model of assessment (using games) also has the advantage of being very fair because the game requires certain elements of the production to be completed before proceeding to the next level. Without these elements progress will be held up, so this method would reflect student knowledge, an area of assessment that FairTest (1995) makes clear when trying to design a fair assessment model.

A final and equally important factor of mixing traditional and e-learning resources are the management structures and planning. Of course to enhance learning using these methods adds a certain amount of management time and preparation. This is something we hope to tackle and meet successfully, but only the future can tell us if it was all achieved and successful.

The main issue we face at the moment is that, although a lot of the literature points towards games being a successful addition to the armoury of the teacher, there are presently many issues that need to be discussed before games can be fully integrated into the curriculum. At some levels of education, this could be parental concerns over the use of games in the classroom. At FE/HE level, there are concerns from a managerial point of view (JANET forbids the use of its network to play console games, although it is not completely clear on the use of PC games) and a wider social view to consider. Teachers will be concerned with the time and difficulty it might take to integrate games into their lessons. However, we believe that it is possible to use gaming technology in the classroom. At the moment we cannot say how successful this could be. It is hoped that by taking the plunge, and following the limited examples of good practice already available, we can start to create a useful and valuable addition to our teaching toolkit.

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<http://www.mathsisfun.com/games/tanks.html> - An example of the Tanks simulation to teach trajectory.

<http://mckoss.com/logo/> - Learning LOGO. Some good examples!

<http://www.timrylands.com/html/educashun.html> - Excellent video of Tim Rylands at work showing how Myst can be used in the classroom.

<http://www.seriousgames.org/index2.html> - The Serious Games Initiative.