Annotated Bibliography

The articles and journals appearing in this annotated bibliography are listed under four headings, A Post LMS Era? Mobile Learning, Mobile Apps and Game based learning. The order of the topics is determined by the order that they were encountered during the module.

A Post LMS Era?

Mott, J. (2010). Envisioning the Post LMS era: The Open Learning Network. *Educause Quarterly*, 33(1), retrieved from http://www.educause.edu/EDUCAUSE+Quarterly/EDUCAUSEQuarterlyMagazineVolum/EnvisioningthePostLMSEraTheOpe/199389

In this article Mott reviews the Learning Management system (LMS) and Personal Learning Environment (PLE) and discusses the strengths and weaknesses of both systems. Mott suggests that the PLE does offer an alternative to what is termed the inflexible LMS but it too has its own limitations. Mott suggests that the choice of either LMS or PLE leads to "significant trade-offs" whichever option is taken. However Mott contends that there is an alternative which is a "mash up" of the best that the LMS and PLE have to offer, this is an Open Learning Network (OLN). The article identifies the three key features of the OLN and looks at the initial implementation of an OLN at Brigham Young University. Mott concludes by referring to Gardner Campbell's argument that it is no longer adequate to use technologies that excel in "pointing students to data buckets and conduits " already made for them and suggests that the OLN meets the challenge by combining the efficiency of the LMS and the affordances of the PLN.

Mott provides a clear picture of the limited usage that LMS platforms have been put to since they have made an appearance in higher level education. He cites Lanny Arvan who argues that the LMS doesn't challenge the instructor and in turn the instructor doesn't challenge the LMS, so the student gets the benefit of electronic distribution of documents but not much more. When Mott moves to discuss PLN he uses such terms as participation, conversation and innovative explorations. However having described the more negative aspects of the LMS and the more positive of the PLN he goes on to outline the strengths and weaknesses of both systems and in so doing, suggests that rather than having to choose between one system or another there is a further option. While Mott acknowledges that there have been attempts

to reconcile the LMS and PLN paradigm he contends that the Open Learning Network is a viable answer. The article provides a conceptual image of the OLN this illustrates clearly and simply how it is intended to work before going on to provide detail around the practicalities of how the system is being implemented in Brigham Young University.

My argument for the LMS has been based on its ability to deal with privacy issues, system reliability and data continuity. These are areas of significant importance to both the student and the institution and are areas of weakness in the argument for the PLE. This article indicates to me that there is a move towards finding a solution. The OLN at the time of writing was in the first stages of deployment at Brigham Young University, recently I logged into the university website and the new system is fully available for use by all students and faculty. It would appear that the system has been tested and is deemed ready for use. As with all new systems I'm sure there will be a transition period as existing students and faculty make the move from the previous one. Mott claims that OLN will be "secure and open, integrated and modular, private and public, reliable and flexible". It would appear consistent with the concept that Pugliese has described as LMS 3.0. Whether OLN has all the answers or not time will tell but it a progression towards a solution that both faculty and learners are looking for.

Pugliese, L. (2012). A Post LMS World, *Educause Quarterly*, *47*(1), retrieved from http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume47/APostLMSWorld/244412

In the article Pugliese acknowledges that the LMS has been one of the fastest growing technology phenomena in the 400 year history of higher education. The experience gained in the last number of years has provided insight into the challenges of effective online instruction. He believes that advances in interoperable systems and the demand for e-learning solutions make the time right for a new type of LMS. Pugliese describes it as LMS 3.0 and suggests that LMS 3.0 will adapt to teaching rather than faculty having to adapt to technology. The article continues with Pugliese describing the four essential components of LMS 3.0 design and concludes with suggesting that as we are in a time of rapid change, how e-learning technologies will evolve will remain to be seen, but emerging technologies are supporting greater engagement with the open world which is significant for the future.

From his previous position as CEO of blackboard and current position as CEO of moodlerooms Pugliese is well positioned to comment on the challenges experienced within learning management systems over the last number of years. Rather than suggest that the LMS is obsolete Pugliese suggests that the new LMS3.0 will "flip the traditional equation" and the LMS will move from a vendor controlled to a user focused technology. The essential components of LMS 3.0 are outlined by Pugliese. They are learning grids, e-learning intelligence, content clouds and open architecture. Each of these components point towards a system that has improved flexibility, encourages collaboration, and is a platform for continuous improvement of content and student learning experiences. The article is prefaced by the Department editor Ethan Benetan who asks what opportunities should be seized as the LMS shows symptoms of "impending obsolescence". Pugliese provides an answer in identifying the components that are required but this comes with a warning that the future of LMS design will be defined by any trade-off between the administration and knowledge-creation capabilities of e-learning and LMS 3.0 design cannot sacrifice one ideal for the other.

My experience with learning management systems and Moodle in particular is in its infancy compared to Pugliese. As Pugliese states the original design of the LMS was primarily about the M in LMS. His description of the function of the traditional LMS describes in a nutshell how it is used in the organisation I work for, it simplifies how learning is "scheduled deployed and tracked". It has done this very successfully in its short history and any move to LMS 3.0 may be greeted with the question why fix what is not broken. Yet in the world of higher education and my own brief experience with Blackboard, I can understand the need to move on from the traditional model. Pugliese and Mott use a similar phrase in their articles and it is "trade off". Pugliese suggests that LMS 3.0 cannot trade off administration for knowledge creation capabilities. Mott argues that when left with the choice of either LMS or PLE there is significant trade off required whichever path is chosen. The "trade off" is the reason that I will sit on the side of the LMS for the moment. However if Mott's implementation of the OLN is successful trade off may be an option that doesn't have to be considered.

Sclater, N. (2008). Web 2.0, Personal Learning Environments and the Future of Learning Management systems. *Educause Centre for Applied Research*, Research Bulletin issue 13 available at http://net.educause.edu/ir/library/pdf/ERB0813.pdf

Nigel Sclater looks at the continuing discussion of Personal Learning Environments (PLEs) versus Learning Management Systems (LMSs) and suggests that institutions need to ask themselves is it possible to bring the social networking facilities popular among students into the institution? Should tools hosted elsewhere on the net be used? And should learners select the appropriate tools themselves? The article starts with the PLE and describes the three directions that may be discussed when it comes to its implementation. Sclater looks at these three options and what they may mean for institutions. He goes on to fight the cause of the LMS outlining the important administrative functions it carries out and how it must evolve. The discussion continues with a look at universities using social networking sites as an LMS / PLE and concludes with some further questions for institutions to consider.

In writing this article Sclater has included references from blogs on the topic that ensure all sides of the argument are well represented. The questions at the beginning of the article serve to focus the reader on the reason why there is a need for the discussion while those at the end serve to provide food for thought on what type of system should be adapted based on what has been discussed. Sclater does not appear to be advocating one system over the other but rather provides an informed view of what the challenges and capabilities are of both systems and the benefits (or not) for faculty and the learner. That there is a need to move from the current version of the LMS is clear and the article illustrates requirements such as common interoperability standards that are needed for PLEs and also for LMSs if they are to adapt and change.

Having read the article one thing that is certain is that this is a topic that fuels much discussion and as long as issues such as interoperability, consistency of service and the cost of supporting "free" online learning systems exist the discussion will be around for a while yet. As a student the prospect of my own personal PLE is appealing and Sclater suggests the possibility of learners being able to download the PLE of their choice. Sclater cites Morrison (2006) who states that the learner may request their PLE to dock with a virtual learning environment "mother ship" to refuel that is to upload content and submit its own. So the most visionary description of the PLE still relies on a centralised administrative system to

function fully. From a student perspective I like the idea of choosing the tools that Sclater describes allows the customisation and sense of ownership that is currently not available with an LMS. However although I'm currently a student I'm also an administrator and the important aspects of the LMS such as consistency of service, back up facilities, lifelong learning records and security that Sclater discusses are too important to forego until the equivalent or better are found in a PLE.

Mobile Learning

Park, Y. (2011). A Pedagogical Framework for Mobile Learning: Categorizing Educational Applications of Mobile Technologies into Four Types. *International Review of Research in Open and Distance Learning, 12*(2) 78-102.

For Park the main purpose of the study is to provide a better understanding of the characteristics of mobile learning in the context of distance education. To achieve this Park firstly compares mobile learning with electronic learning and ubiquitous learning. Based on the comparison Park describes the technological attributes and pedagogical affordances of mobile learning. Secondly, the author takes Moore's Transactional Distance (TD) theory and modifies it by adding two distinctive forms of distance learning which are labelled individualized and socialized. The result is the classification of four types of mobile learning. Park classifies previous studies completed according to the four types of mobile learning and concludes that through the use of the framework, instructional designers and instructors will be aided in designing and implementing mobile learning more effectively.

The mobile learning characteristics defined by Traxler with the exception of class room situated learning lend themselves to distance learning. With TD theory, distance is considered not only as geographic separation but also as a pedagogical concept. Park suggests that the result is, the theory enables the inclusion of education where the principal form of communication is through technology and where technology mediated communication is ancillary to classroom learning. It is acknowledged by the author that whilst previous studies of TD theory have indicated its usefulness in understanding distance learning and evaluated its usefulness as a pedagogical and philosophical framework the studies have also raised issues. Park does not propose a newer theory but an adapted version. In this adapted version Park chooses to regard TD as a single continuum from high transactional distance to low transactional distance and suggests that the inter learner

dialogue and structure should be included by adding a dimension that ranges from individual to socialized activity to create the framework that is outlined in the diagram.

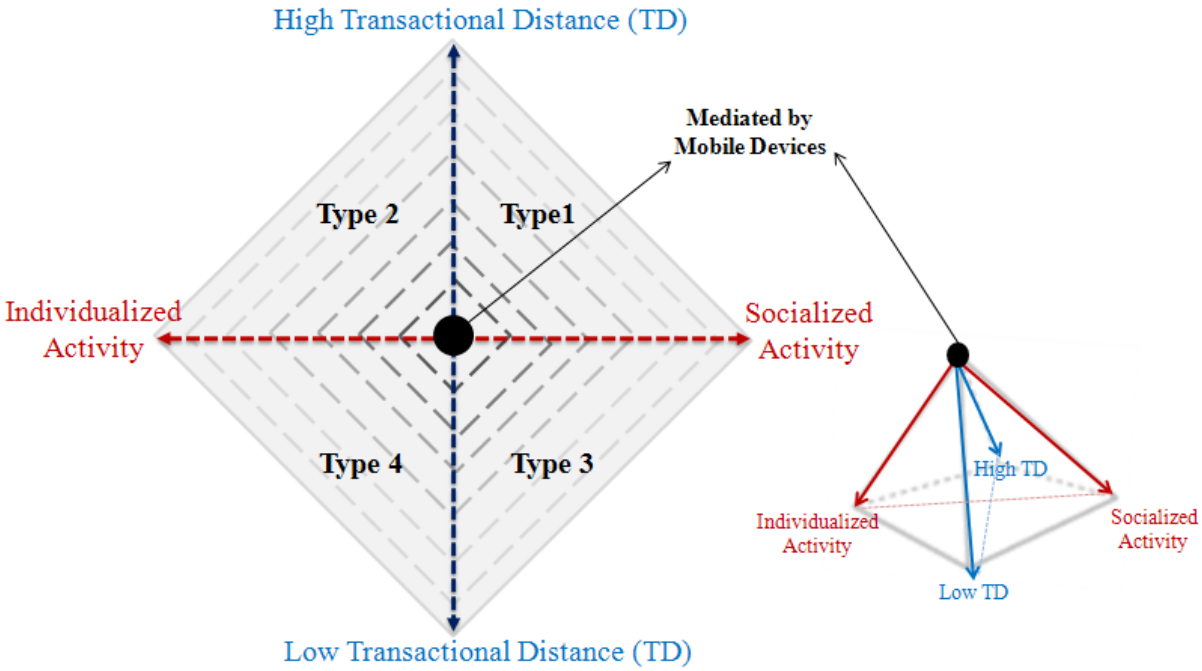

Figure 1. Four types of mobile learning: A pedagogical framework. Adapted from Park

From my own perspective Park makes a good argument for choosing TD theory and for the modified version that is proposed as a framework for the classification scheme. The resulting types are high transactional distance socialized m-learning, high transactional distance individualized m-learning, low transactional distance socialized m-learning, and low transactional distance individualized m-learning. The examples offered by Park provide me with an indication as to the types of activity that could take place in each area. Park also highlights what instructional designers should be aware when setting out to design a new activity and the need to increase or reduce structure, dialogue and learner autonomy as appropriate. The adapted framework provides a simple classification of four types of mobile distance learning for instructional designers, but more importantly it works towards providing an evaluation methodology, an aspect that Traxler has indicated is necessary to sustain the credibility of mobile learning.

Traxler, J. (2007). Current State of Mobile Learning. in M. Alley (Ed.), *Mobile Learning Transforming the delivery of Education and Training* (pp 9-24). Edmonton: AU Press Athabasca University

This chapter begins with Traxler suggesting that whilst theory is a contested topic in the mobile learning community there is a need for a conceptual base. He argues that such a base would provide a starting point for evaluation methodologies grounded in the unique attributes of mobile learning. In order to provide a theoretical conceptualisation of mobile learning Traxler suggests that there is a need to define it, but reminds us that because it is essentially "personal, contextual and situated" it is problematic for definition and evaluation. The chapter goes on to provide definitions of mobile learning and looks at the case for mobile education. When looking at evaluation Traxler provides us with the attributes of good evaluation rather than a specific method and closes with a look at mobile education in universities and colleges.

The chapter provides us with the current state of mobile learning in that it illustrates to us the categories of mobile learning that have emerged as a result of various case studies and pilots that have taken place. The definition of mobile education is not restricted to what can be provided purely through technology but seeks to define it looking at the underlying learner experience. Traxler makes the case for mobile education on "purist" grounds explaining that mobile learning will support a variety of conceptions of teaching and "impurist" grounds which recognise that learning takes place in a wider social and economic context. In evaluating mobile education Traxler argues that the diversity of mobile education and the complexity of the technology make existing forms of evaluation inadequate. He suggests that there is a need for evaluation to have a structured approach and be underpinned by sound principles. Traxler indicates these principles and illustrates how they can be used to underpin appropriate evaluation methodologies.

This chapter has expanded my knowledge of mobile learning through the identification of the many categories of mobile learning and through the definition of mobile education using not just the affordances of the hardware and technology but drawing on the learner experience as well. Traxler is very much a proponent of mobile learning and this comes across in his writing. His descriptions of e-learning as "conventional" and "tethered" are a little unfair in my opinion. "Conventional" and "tethered" e-learning in my organisation has released learners from travelling long distances to seminars as they can complete courses at home, at

lunch time or before or after their work day. Further enhancements to technology which will be delivered throughout the organisation this year will see bite sized "just in time" and "just for me" e-learning delivered to desktops. I acknowledge that mobile learning would provide further freedoms to our learners especially those who work out on the road and it would provide an added dimension if introduced into face to face interventions. I too am a proponent of mobile learning but I am unable to tag our current e-learning modules with the adjective "tethered" just yet.

Mobile Apps

Mobile Apps (2012). *NMC Horizon Report: 2012*, Higher Education Edition. Available at http://net.educause.edu/ir/library/pdf/HR2012.pdf

The most recent Horizon Report puts mobile apps in the near term horizon which suggests the time to adoption is one year or less. The article opens up by comparing the effect of the mobile app on the software industry to the recent changes that have taken place in the music and publishing industries. It suggests that apps are changing the way we think about software and comments on the wide range of apps available. On the topic of education the report highlights that institutions are rapidly developing their own apps and making use of existing apps across a wide range of disciplines. In addition colleges are recognising that apps are an important feature in the business world and have responded by providing app development courses that enable students design, develop and market their own app. The report concludes by commenting that educational institutions are investing in infrastructure to support mobile access and sponsoring programs to provide devices to students who don't already have them ensuring that the growing capabilities of mobiles are available to more students in more locations every year.

2012 is the year of the app or so it would seem. Prensky has just identified the "app gap" and now apps appear in the near term horizon as an emerging technology in their own right. Apps have been mentioned in previous editions of the report but only in the wider discussions of mobile devices and mobile learning. While the download statistics provided in the report would suggest that near term horizon is accurate for deployment, what the report doesn't tell us is the number of educational apps that are available and the number that are downloaded. A statistic that is also missing is the number of apps that are downloaded and subsequently deleted by users. Indeed even if the app is not deleted there is no evidence in

the report that just because the app is downloaded that it is used regularly. In a discussion available at http://www.youtube.com/watch?v=Rr3WOBeBdvM on mobile apps Larry King of Ironworks admits to having 130 apps but only using 16 on a regular basis. That apps are here to stay cannot be denied but whether they should be placed in the near term horizon is another discussion. Only time will tell if apps follow the trend of other emerging technologies that have appeared and continue to appear in the Horizon Report as technologies that will be deployed in the near term.

Prensky, M. (2011). Eliminating the "App Gap". *Educational Technology* Jan-Feb 2012 Retrieved from http://marcprensky.com/writing/Prensky-EDTECH-EliminatingtheAppGap-Jan-Feb-2012.pdf

In this article Prensky discusses the issue that although a lot of students attending university have access to smartphones and apps not all students do. He defines this as the "app gap". The article continues by Prensky outlining the "strong and unique" factors that apps bring to the education table and suggests that the most powerful thing about apps is that if there isn't one to suit the needs of the student then it is possible to create one. He concludes by predicting that apps will become a huge piece of the 21st century learning process and urges educators to eliminate the "app gap" immediately.

When reading this article it is easy to get carried away with Prensky's enthusiasm for apps. He makes a good argument for what apps can bring to education and cites how his son is successfully using apps to learn languages, history and geography. Prensky suggests that apps are better than books or laptops and argues that they benefit "every student". But as every student doesn't have access to apps, there is a need to eliminate the "app gap". In eliminating the gap there will always be a question of cost. On the subject of providing devices, Prensky tends to generalise suggesting that cost is not really an issue but "many details have yet to be worked out". His argument regarding the cost of apps themselves is more substantive as he makes the point that many engaging apps are free and those that cost work out at equal to or less than the cost per chapter of a text book. Prensky also comments that where it's not possible to get the appropriate app, institutions can develop their own leading to a possible source of income and real world skills being acquired by students who become involved in developing apps. That Prensky is convinced of what apps can achieve is clear and for him the issue is the need to take advantage of this technology immediately

I stumbled onto this article after I had put together my presentation on mobile apps for peer review. Most of the articles that I had read during my research provided examples of studies that had taken place and reported on how apps are used by universities. Other studies reflected what Prensky suggests and reported on how app development programmes are providing students with the opportunity to develop commercially viable apps. Prensky's article differs in that he provides the "strong and unique" factors of what apps can do if used in education. This is an aspect that I intend to include in my presentation. The challenges of different mobile platforms or the impact on network infrastructure when high numbers of students are using web applications are not addressed in this article but it is a short article and Prensky's aim is to get educators to sit up and take notice of what this new technology can deliver and eliminate the "app gap".

WorkLight Webinar Series *Native Web or Hybrid Mobile App Development* [PowerPoint slides]. Retrieved from http://www.scribd.com/doc/50805466/Native-Web-or-Hybrid-Mobile-App-Development

This presentation is provided by WorkLight an IBM company as part of a series of webinars. The presentation analyses the various approaches that can be taken when developing a mobile app. It looks at native, web and hybrid apps and discusses the difference between mobile web apps and mobile browsing. The presentation concludes by looking at each type of app from a business perspective and looks at future trends.

The presentation is written from the standpoint of the developer. This does much to enhance the presentation as it is written logically and clearly. There is a high level of technical information provided regarding the steps and the processes to create the various apps described. Although my technical knowledge does not extend to the level of this presentation I'm not excluded from what the presentation delivers. Graphics and flow charts provide visually rich information that enable the viewer understand some of the technical aspects that determine the difference between these distinctly different apps. There is no preference suggested for either app. The pros and cons are discussed and whilst the author suggests that there is no single approach that is right for everyone ample information is provided that will allow an informed decision to be made.

In my struggle to come to grips with the difference between mobile apps and web apps I found this presentation explained both of these concepts succinctly. Furthermore it introduced me to the concept of hybrid apps and clarified the issue of mobile web apps versus mobile websites. As previously mentioned the information delivered is quite technical. However the technical feel to the presentation means that the facts are presented in an objective manner allowing the viewer to make up their own mind about the advantages for them of one type of app over another. That this presentation can be viewed by people with varying levels of technical ability is a tribute to its author. In addition to the information furnished, the presentation provided me with a concept as to how my own presentation could be delivered. I have included this presentation here as it was an invaluable resource for me which I constantly referred to, it is written for businesses which may be considering developing a mobile app; however all the information and issues identified are those which any university would welcome advice on.

Games

Carstens, J. Beck, J. (2005). Getting Ready for the Gamer Generation *Tech Trends, 49*(3), 22-25.

Carstens and Beck have completed research indicating that the new generation of workers is different from the previous one in significant and verifiable ways. They suggest that the differences are driven by one central factor and that is that they have grown up playing video games. This article doesn't provide the detail of the research but rather outlines the belief system that games create when played up to adulthood. Carstens and Beck suggest that in order to harvest the potential of gamers, training needs to reflect this belief system and trainers should take time out to understand the mind set of gamers and what motivates them. They conclude that games and gamers are known for their rapid evolution and to stay on top of this phenomenon it will be necessary to keep up with what gamers are thinking not only today but also tomorrow.

In this article the authors suggest that sooner or later those who grew up without video games will have to understand the gamer as the game generation starts to take over the workplace. Statistics are provided to illustrate the extent that Americans are playing video

games and Carstens and Beck contend that while young children and teenagers are playing video games they are doing so at a time when structural maturation of the brain is taking place. The authors argue that this combination of factors leads to gamers' brains being "hardwired" with a particular set of assumptions and beliefs about how the world works. Carstens and Beck commissioned a study of 2500 Americans with all levels of gaming experience to seek to confirm these new beliefs. Their research has led to the publication of a book on the subject. In this article they outline some of the beliefs found in gamers in the study and suggest that these beliefs will lead to gamers acting differently in the work place. One example is that gamers believe that the world is a competitive place and as a result in the workforce they are proactive workers who evaluate different ways to solve issues.

This article like Prensky's, aims to identify the skills that gamers cultivate while playing video games. It provides a set of six guidelines on what trainers should consider when designing training for gamers and the reasoning behind them. I would argue that these guidelines would not provide any new information for trainers who have been designing engaging and interactive training already but may provide some suggestions for trainers who have used a chalk and talk approach. That the research has provided some food for thought regarding gamers and their beliefs cannot be denied, however in this article it is suggested that gamers of this generation have different attitudes in the workplace compared to those older than them who didn't experience game technology growing up. To compare the gamer of today to the previous generation seems a little unfair in my opinion when so many other aspects have shaped the previous generation's way of thinking other than the lack of video games. The research does good work to highlight the skills of gamers but more balance may have been achieved if the gamer and non-gamer of this generation were compared in the article

Prensky, M. (2004). The Seven Games of Highly Effective People. How computer games help you succeed in school work and life. Retrieved from http://www.marcprensky.com/writing/Prensky-The_Seven_Games-FINAL.pdf

Prensky refers to Steven Covey's book "The seven habits of highly effective people" and asks the question how do people learn these habits? He suggests that one way people are learning them is by playing computer games. Like Covey, Prensky looks at the habits in two groups; the first three are "individual habits" which Prensky suggests are fostered by playing

any type of game. The second group of three are described as “group habits” and Prensky suggests that they are fostered mainly through multiplayer games. The final habit is called “sharpen the saw” and refers to working to continually improve skills and learn new ones; Prensky contends that no group does this as well as gamers do. The article concludes by citing research to support the theory that game playing can lead to becoming more successful in the work place.

Prensky is a proponent of game based learning and has written many articles and two books on the subject. In this article Prensky uses Steven Covey's popular 7 habits to further the cause of games. The article motivates the reader to look beyond the bad press that games often get and notice the underlying skills or in this case habits that gamers can develop through playing games. In taking each habit individually Prensky explains how gamers develop these habits in order to become successful gamers, he suggests that it’s not possible to be successful as a gamer without them. The article also highlights that the habits once acquired are continuously worked on to be improved as gamers are continually practising and seeking out new ways of improving their skills. Prensky contends that the skills acquired don’t remain tied to gaming but become part of the gamer’s everyday life.

For me it’s interesting that Prensky along with Carstens and Beck look at the effect that games have already had on a generation and how the skills they are gaining are affecting how they live and work. In both articles the gamers are playing as a leisure pursuit so the learning is taking place outside the formal context of a classroom. Neither articles talk about the use of games in the educational context. While Prensky looks at the habits gamers cultivate during game play, Carstens and Beck review the beliefs gamers have about themselves, how the world works, how people relate to one another and about the goals of life in general. Carstens and Beck state that gamers believe the world is a competitive place and there is a need to be proactive to succeed. One of the habits Prensky discusses the need to be proactive to be successful in game playing. These articles illustrate that playing games lead to cultivating habits and beliefs that foster 21st century skills.

Torrente, J. Del Blanco, A. Marchiori, E. J. Moreno-Ger, P. and Fernandez-Manjon, B. (2010). <e-adventure> Introducing Educational Games in the Learning Process. *Educational Engineering Educon (2010),* 1121-1126. doi: 10.1109/EDUCON.2010.5493056

In this journal Torrente, Blanco, Marchiori, Moreno-Ger and Fernandez-Manjon suggest that there is a need to update content and interactivity in education in order to improve motivation and engage students. One proposal to achieve this is the use of video games based on their potential to enhance the learning process in numerous ways. This interest in the use of games in education has provided the basis for the e-adventure project which is discussed in the article. Torrente et al identify issues that have prevented the adoption of games in education and describe how the issues have been addressed within e-adventure. The authors continue by describing further research they are completing and how it will be integrated into e-adventure and finally conclude that that they will continue to conduct new research and test it within the e-adventure platform.

In writing this article Torrente et al have identified that there are factors that affect the adoption of video games in education. They suggest that these factors are at all stages of the process from design to implementation and deployment. The information gleaned through their research has positioned them to identify traits that make some games more suitable for educational purposes than others and based on their findings they suggest story driven games can be effective as they improve problem solving skills and promote reflection instead of action. Their findings have influenced the development of the e-adventure platform which appears to be a practical solution that will do much to include the instructor at the design stage without the requirement of any kind of technical background.

During our discussions on game based learning it was mentioned that a factor preventing the adoption of games in education is the lack of software that can enable educators develop games that meet learning outcomes without the need of technical expertise and of course at a reasonable cost. As a result of reading this paper I have checked the e-adventure site. The software developed by the authors is currently available for download as an open resource and could provide the starting point I need to introduce learning games. One of the issues with game based learning is how to assess what has been learnt. The developers have solved this by providing an option to package the e-adventure file as a web object that can be uploaded into Moodle. The communication between Moodle and the game indicates the

areas of the game successfully completed and those that may require further attention. The additional benefit of deploying the game through Moodle is that there is no need for the installation of software to allow the game to run on learners' machines. The e-adventure web site invites developers to check back in the future if they don't like e-adventure in its current format, indicating as the paper has advised that they are continuously researching to improve the software. I would like to explore this software before coming to the conclusion of how effective it is in its current format. In the meantime as the paper has identified how the software overcomes the issues that may be encountered from design to deployment, I am cognisant of the characteristics that I should be aware of if evaluating software for game development.

Whitton, N. Hollins, P. (2008). Collaborative Virtual gaming Worlds in Higher Education. *ALT-J, Research in Learning Technology, 16*(3), 221-229.

This paper acknowledges that there is a growing interest in the use of virtual gaming worlds in education but argues that collaborative gaming worlds have been in use much longer than these games and much wider in scope. Whitton and Hollins explore the educational benefits of gaming environments in higher education and review pedagogical approaches. They discuss the practical aspects that need to be considered when using virtual gaming worlds in the formal setting of higher education and provide development options. In particular they suggest the potential of Alternate Reality Games (ARG). The paper concludes with a look to the future outlining two areas where gaming in higher education may be used, providing a warning that the novelty effect of using these environments should be considered both from the student and teacher perspective as this may influence long term acceptability and effectiveness.

The authors acknowledge that the focus of the paper is unashamedly on the use of gaming environments with adults in higher education as this is an area that they feel is often neglected in terms of research. In addition Whitton and Hollins recognise that gaming environments may be used effectively for a variety of pedagogical approaches but concentrate solely on the constructivist perspective. The paper flows from beginning to end as each topic finishes with a summary that leads to the next subject for discussion and while the authors are proponents of the use of gaming environments within the context of higher

education they illustrate the issues and challenges that can be experienced and provide possible solutions. This paper is well written and provides the reader with practical suggestions and advice on the topics of pedagogical design, the practical use of virtual gaming worlds and the selection of virtual gaming environments.

The discussion with regard to virtual gaming worlds in this paper has allowed me to consider their use within a workplace context. The area where they could prove to be effective is in the provision of a safe environment that would allow new learners gain the skills required to conduct on site surveys. Indeed the context would be equally effective with existing learners allowing them to update and improve their current skills. However the authors point to the development time and expense that is involved in creating effective educational environments and although they suggest a possible alternative in the use of Alternate reality Games (ARG) the time and development costs of ARG would suggest that there is a significant investment required that would prohibit their introduction at present. Although costs and time are factors that cannot be overlooked, Traxler also mentions the culture of the organisation as a barrier to the introduction of technology. There are a significant number of non-gamers within the organisation. Reflecting on this my thoughts are that regardless of the time spent on the development of the gaming environment there is a need to spend time preparing the learners to ensure a positive experience within the gaming environment. At the moment the solution may be to start introducing game based learning on a smaller scale and work towards virtual learning worlds as a possibility of the future.