ABSTRACT

There is a growing interest in many parts of the world in utilising the capacities and affordances of digital games to support learning within the formal arenas of curriculum and school. The use of games-based pedagogies via online and mobile Internet-based technologies is seen as providing much potential for innovative, effective and accessible contemporary teaching and learning (Beavis, 2012). The Australian National Maritime Museum (ANMM) in partnership with roar films (Tasmania), Screen Australia and Screen Tasmania have developed an educational game, The Voyage, based on the nineteenth century convict experience. The Voyage takes the user on a journey from London to Van Diemen’s Land (now known as Tasmania) where players, as the ship’s Surgeon Superintendent, are rewarded for the number of healthy convicts they deliver to the fledging British colony. The game is based on detailed historical data, utilising documented ship paths, convict and medical records and diaries. Using The Voyage as a case example, this paper will focus on how museums can best exploit the principles learning in games-based environments underlying these. The paper will also discuss what museums can learn from how young people engage in and learn in gaming environments, addressing how could museums develop and evaluate products based around games and gaming technologies.
Background

Young people today are growing up in a different and exciting world, with far reaching implications for how they learn, how schools teach, and the role of informal learning contexts, such as museums. Globalisation and the digital age have opened up new worlds to young people with better connectivity, and the capacity to link anywhere, anytime, meaning that children and young people are highly active online; engaging with known and unknown others and events across the world, whether through online games, social networking sites, YouTube, or a myriad of other platforms and digital interactions. As an example, in 2012 young Australians were the highest users of social media in the world; by December 2013, 90% of Australian teenagers had Internet access in their home, almost entirely via broadband and by 2014 98% of homes with children under the age of 18 had a device for playing computer games (ACMA 2014).

Among the many implications of these figures, two stand out. First, young people are increasingly at home in the digital world, with their experience of the material world mediated through a mix of on and offline communication, virtual worlds and all manner of social transactions and information exchange (Burnett et al, 2012) and the development of digital dispositions towards learning, knowledge and ways of being in the world (Rowan and Bigum 2012). Second, young people’s sense of identity, community and belonging is shaped by their presence and interactions in these worlds (Beavis et al, 2014) in what is characterised as participatory culture (Russo et al, 2008). Online culture and digital citizenship position contemporary children as intensely present, and as citizens of the global, networked world.

Within this context there is a growing interest in many parts of the world in utilising the capacities and affordances of digital games to support learning within the formal arenas of curriculum and school. The use of games-based pedagogies via online and mobile Internet-based technologies is seen as providing much potential for innovative, effective and accessible contemporary teaching and learning (Beavis, 2012). Green and Hannon (2006) identified that learning through gaming, specifically online multiplayer games, was often referred to as ‘... accidental learning or learning through doing’ (p.23). Salen (2012) also recognised the synergies between gaming and learning: ‘We see a huge intersection between games and learning, partially because the way game environments are structured is a lot like what good learning looks like’ (n.p.). Given these trends how could museums utilise games in their learning programs, particularly those focussed on formal educational audiences?

Museums have traditionally been places where young people can learn about history via imaginative engagement through material objects and exhibits on display. In contemporary times however, museums are subject to change. Museums are in transition to new roles and new formations, moving from an initial approach to digital technologies as ‘... add ons to existing problematics and practices’ [to embracing] ... more integrative approaches that see technologies as means of communication, interaction and exchange’ (Drotner and Schroder, 2013, p.1), and as a connected museum within the world of social media and mobile technologies (Kelly, 2013).

In contemporary times, the dual imperatives of digital technologies for the museum, the digitisation and web archiving of material objects and collections, and the transformed nature and expectations of twenty-first century learners, mean the ways that museums once worked are undergoing a process of rapid change. This has required museums to become more aware of the worlds they operate in: ‘... the ways museums communicate and interact with their audiences has undergone a dramatic and profound transformation. This has been especially noticeable over the last five years, due to the rise of the Internet and social media together with the explosion in mobile technologies’ (Kelly, 2013, p.54). While there has been considerable exploration and experimentation with respect to social media and digital technologies in museums (Drotner and Schroder, 2013; Hawkey, 2004; Kelly and Russo, 2010; Russo et al, 2008), until recently (with few exceptions) limited attention has been paid to digital games, although this is changing rapidly; ‘Games allow the audience to look at objects in different ways’ with a shift in museums’ role ‘... from a traditional “keeper of artefacts” to “keeper of stories”’ (Beale, 2011, p.24-25).

Digital Games

An emerging area in contemporary pedagogy are digital games which have an enormous impact on the lives of children. The 2014 Digital Australia report commissioned by the Interactive Games and Entertainment Association, showed high levels of participation in gaming across teenagers and children. 43% of those aged 1-5 were reported to have spent at least one hour a week playing games, 87% of those aged 6-10 and 96% of those aged 11-15 (Interactive Games and Entertainment Association, 2013). The ANMM undertook a pilot study with a class of Year 9 students (aged 14-15 years) from a Western Sydney high school asking them questions around their use of games (and The Voyage in particular). Students in this sample reported accessing a wide variety of games and playing them across a range of devices – but most predominantly their smartphones and laptop computers (Figure 1).

The study also showed that, when asked what kind of games they liked to play, young people accessed a broad range of games, and didn’t distinguish “traditional” board games, such as Chess and Scrabble, from digital games – they played them all! With reference to digital games the favourites were also those that could be played on a smartphone and/or via social media, particularly Facebook, and had elements of social interaction and sharing with friends (Figure 2).
Games and pedagogy

In Australia and internationally, there is increasing interest in the use of digital games to teach, motivate and engage twenty first century learners across a wide range of areas (Young, et al, 2012; Johnson, et al, 2014). Games have the capacity to foster deep learning (Gee, 2009) and the development of a range of twenty-first century skills such as play, performance, distributed cognition, collective intelligence, and judgement. In teachers’ views, game-based teaching appears to be particularly effective for low performing students (Beavis, et al, 2014). Gee (2003) argued that the compelling nature of video game participation is in part due to the underlying social, cognitive, and developmental learning principles around which game designers build successful games. Games do well because they encapsulate powerful design principles for learning environments. When school leaders and teachers begin to appreciate the captivating nature of gameplay and the powerful learning principles embedded in games as positives, they then can consider how games might inspire alternative approaches to learning, both within the existing contexts of schooling and in the development of new and informal learning environments such as museums.

Yet the claims made for games are not automatic. Despite hyperbolic assertions to the contrary, research has shown that the effectiveness of games in educational settings, and the degree to which the learning and knowledge made available are taken up, varies considerably (Beavis, 2012; O’Mara and Gutierrez, 2010). Influential factors include the contexts in which games are played, ownership and purpose for players, levels of investment and scope for agential play, the looseness or tightness of fit with respect to formal curriculum and assessment requirements, the role of the teacher, opportunities for creativity, analysis and reflection, what counts as knowledge and the recognition of differences between home and school play. However, researchers are finding that current literature does not provide adequate evidence of the presumed link between motivation, attitudes and learning outcomes. It has been suggested that there is a need for more finely grained research into the realities of games-based learning in educational contexts, on the ground. Knotty questions crucial to games-based learning need further exploration for diverse learners and with various games in the context of ‘not school’ (Sefton-Green, 2013).
Games themselves are also important with some games better suited to enacting and enabling these elements than others. In their review of key literature and studies since 2006, Perrotta, et al (2013) identified five principles of effective games-based learning: intrinsic motivation, learning through intense enjoyment and fun, authenticity, self-reliance and autonomy, and experiential learning.

Interestingly, in the ANMM study, much of what the students said about why they played games echoed these principles – students think games need to be entertaining, challenging, fun, social and skilful with a sense of adventure:

- I play Subway Surfers and Candy Crush because they are entertaining and challenging.
- Action games because they offer a fun sense of adventure mostly Minecraft.
- I like to play Scrabble, Candy Crush, checkers because it is fun and I can also learn new skills.
- I like to play action video games because the missions are full of action and multiplayer. I also like adventure games.
- I like a game on my phone called Paradise Cove. I like this game because it’s about building your own town and it is really adventurous.
- I’m not one to like games but chess is very edgy.

The Voyage Game

The Voyage is an educational game based on one of the great migrations in world history - the transportation of convicts from Britain to Australia in the early 1800s. This was one of the largest mass migrations of the nineteenth century and because it was recorded in great detail in the Tasmanian Convict Records, which have been included in UNESCO’s Register of the World.

The convict voyages were actually commanded, not by a ship’s captain, but by a Surgeon Superintendent. This was because convicts were considered “precious cargo” as they were the driving force behind the building of the then British (now Australian) Colonies. Successful completion of a convict voyage with minimum loss of life or sickness to prisoners was the way for a young Surgeon Superintendent to make money and gain reputation and position, particularly in the Colonies.

The inspiration for The Voyage came from Professor Hamish Maxwell Stewart, Associate Dean of History at the University of Tasmania, and his team who work on the Founders and Survivors project. The game is based on UNESCO-listed Tasmanian Convict records, giving it a sense of authenticity that is missing from many games found online and elsewhere. For example, the Surgeon’s Journals are the foundation of the game and are based on actual journals held in the British Archives at Kew. In The Voyage the player takes on the role of the Surgeon Superintendent making key decisions relating to convict health and well-being from the time the ship left London to its arrival in Van Dieman’s Land.

The Voyage includes a number of mini-games and challenges that present themselves as the player sails which are designed as light relief from the game, yet with an underlying level of skill needed to play. For example, the Rat Catcher, apart from being a fun challenge, is to convey the problems associated with rats on board ships. Depending on how well the player fares, they may have to play this game several times to keep rats from becoming a major disease problem on board the ship. In another mini game, Catch the Flying Fish, the player needs to catch as many fish as possible to help supplement the diet, as any addition to the boring and relatively unhealthy provisions was welcome.
The Voyage as an educational tool

The ANMM and game developers in consultation with potential users (students and teachers) have been carefully considering how the game could be used in education programs either at the museum’s physical site in Darling Harbour (also home to several tall ships from within the era of the game), online, via a mobile device, a multitouch table or in the classroom. Given that the museum’s educational role is to augment and broaden what happens in the classroom with unique experiences, the challenge is providing opportunities for choice, pathway creation and collaboration wherever the game is played.

Some aspects the team are considering include (Fletcher, 2014):

- Curriculum-focussed museum programs that synthesise game-playing with on-site experiences including exhibitions, hands-on artefacts, dramatisations, role-play, vessels like HMB Endeavour (Figure 3), research and investigation tasks and augmented reality experiences.
- Mixed and responsive resources utilising primary and secondary sources, museum artefacts and collection searches, links to other on-line collections, interviews with curators, historians, gamers, students, developers, designers, convict descendants, pre- and post-game class activities; sharing playing tips and activities; suggestions by students, student micro-site for resources connected to assessment tasks and on-line publishing of students’ work.
- Virtual excursions with key personnel, connect with other players, gamers and virtual site visits to sites such as Hobart and Port Arthur – important sites of early European contact and eventual convict settlement.
- Using the ANMM collection and other historical and cultural resources in break-out games, for example medicine and surgeon’s kits and the convict hulk model.
- Possibilities for inter-school connections at local, national and international levels through either school-based or museum-based initiatives.

Figure 3. The HMB Endeavour: replica of the ship Captain Cook sailed around the world from 1768-1771

Feedback from teachers attending a workshop at a recent technology in education conference suggested that The Voyage has great synergies across a wide range of curriculum areas, and as an enhanced activity within the classroom, as a multi-player online game, or at a site such as the museum. One interesting discussion centred around the use of 3D resources allowing students to “touch and experience the things in the game” (Teacher respondent). Teachers also recognised that the museum’s collections can be a great source of inspiration and would enhance the game by giving them “a visceral experience based on real physical items” (Teacher respondent), in the understanding that the museum can provide rich sources of material not accessible in the classroom. Gamification, in terms of earning rewards was also see as having potential with “leader boards ... always good for bragging rights and goal setting” (Teacher respondent) and the suggestion of a Twitch television channel to enable viewing “another
student’s version of history as it unfolds in real time [to enhance] shared experience/social learning” (Teacher respondent).

Australia is in the process of implementing a National Curriculum across all states and territories (ACARA, 2010). To date the take-up has been patchy, however it is expected that the majority of schools across Australia will have implemented the National Curriculum by 2016. There are several areas of the National Curriculum that relate to different aspects of The Voyage in terms of content, outcomes and skills, giving the opportunity for the museum (and museums in Australia generally) to look at cross-curriculum links beyond that traditional history, for example Technology in game design, development and programming; English in creating and interpreting texts, language, text and graphics; Maths covering measurement, navigation, arithmetic, computers; Science with medicine, navigation, forces and motion; Geography in mapping and globalisation; and Visual Arts through graphic and visual design (Fletcher, 2014).

There are obvious connections with Stage 3 history (The Australian Colonies) and Stage 5 History (The Making of the Modern World) through the required depth studies such as the Industrial Revolution where references to technology and inventors could cover topics like the technology of tall ships in transporting convicts and cargo more quickly, and historical figures such as Harrison who solved the longitude problem which, in turn, was a huge turning point for shipping and transport across the globe (Fletcher, 2014).

As the aim of the Surgeon Superintendent on these voyages was to obtain a land grant and set up a local practice, these goals can be used as a starting point for studying the effect of convicts and free settlers on the development of Australia as a nation as well as the (often disastrous) effects on Indigenous peoples. This could be overlaid with outcomes and skills requirements, particularly around primary and secondary sources through looking at the voyage from the perspectives of the convicts, the Surgeon Superintendent, the British Government and the inhabitants of the colony at the time (Fletcher, 2014). These are just initial ideas – there is so much potential in The Voyage for rich, deep and meaningful student activities and learning that are just beginning to be explored.

Where next for The Voyage, and for games in museums?

Our initial pilot study and discussions with university academics and educational practitioners have identified a real need for further research into the potential of games and gaming for educational pedagogy generally, and museum education programming specifically. Some of the questions raised include what is the potential of digital games to support learning and can digital games be used to enliven and energise visitors’ experiences of the museum? Another area for investigation is the best way to work with digital games to support engagement, historical imagination and connection with museum collections, and with school curriculum.

These questions will form the basis of a two-year Australian Research Council Linkage project, exploring ways in which museums might capitalise on the tremendous potential of games to connect with twenty-first century learners – young people who have never known life without the Internet and digital games. The project will focus on what museums might gain from the incorporation of digital games, and how to maximise the use of games to support formal and informal learning and historical experience.

Taking a case study approach across a range of locations in Australia and the UK, the research will explore games-based teaching and activities, and the perceptions and experiences of students, museum visitors and museum staff across different sites, using different games, and at different points of the research journey. The kinds of research planned includes:

- Tracking the experience of different cohorts of students undertaking supported games-based activities related to museum exhibits and areas of school curriculum.
- Tracking the experience of different cohorts of students undertaking games-based activities related to museum exhibits and areas of school curriculum, without specific support.
- Tracking the experiences of casual visitors to the museum who informally engaged with games.
- Interviewing museum staff about their intentions, observations and reflections about the use and take up of digital games, how this engaged historical imagination, connected to museum objects, and to the curriculum, about who benefited most and under what circumstances, and about what worked more and less effectively in their experience and view.
- Interviewing teachers about their perceptions of students’ attitudes, imagination and understandings as a result of museum experiences with digital games.

This will provide museums with feedback and data on the effectiveness of digital games, for different cohorts and with different levels of resourcing and support, as well as professional learning and research training for museum education staff. It is planned to develop a set of guidelines for working with digital games in museums based on research and user feedback.

We will be publishing our work as we go so watch this space.
References


