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PLEASE SCROLL DOWN FOR ARTICLE

MUSEUMS, GAMES, AND HISTORICAL IMAGINATION: STUDENT RESPONSES TO A GAMES-BASED EXPERIENCE AT THE AUSTRALIAN NATIONAL MARITIME MUSEUM

Leonie Rowan, Geraldine Townend and Catherine Beavis
with Lynda Kelly & Jeffrey Fletcher

Abstract: *Digital games feature prominently in discussions concerning the ways museums might reimagine themselves—and best serve their audiences—in an increasingly digital age. Questions are increasingly asked about the opportunities various games might provide to foster historical imagination, and, in this process, contribute to the curation, construction and dissemination of knowledge: goals central to the work of modern museums. This paper reports on the experiences and perceptions of three groups of year 9 students (aged 14-15) as they engaged with one purpose built digital game—called The Voyage—at the Australian National Maritime Museum in 2015. The researchers sought students' feedback on the strengths, weakness and possibilities associated with using games in museum contexts (rather than at home, or at school). In presenting students' perspectives and their associated recommendations, the paper provides vital end-user input into considerations about how museums might maximize the potential of digital games, to enhance historical awareness and understanding, build links to formal curriculum, and strengthen partnerships between schools and museums.*

Key Words: Digital games; historical imagination; learning; curriculum; museums

Introduction

For well over a century now, the museum's interconnected roles as an agent and place of learning have been recognized as central components of its work. In the late 1880s, for example, Goode emphasized the need for museums to function as both knowledge creators and knowledge disseminators, and as producers of learning (Kelly, 2010; Goode as cited in Kohlstedt, 1901/1991). In more recent times, the digital world has begun to change the face of the museum and, by extension the ways these joint imperatives—that is, the need to create and disseminate knowledge and, by extension enable learning—are enacted. This has opened up both challenges and opportunities that have been met in diverse ways in different contexts. Much of the debate around these issues reflects a growing understanding of the need for museums to be relevant to their audience…and thus to respond to their audiences' expectations. 'In a digital world,' notes Greene (2014 n.p.), 'it is the responsibility of museums to continue to describe and present their collections in a way that is useful and comprehensible via channels that are most relevant to our audiences'. Similar points are made about museums' role as a site of learning, and the ways in which the educational dimensions of this role are (or should be) enacted with contemporary learners. An awareness of the exponential rise of connective technologies and online experiences has seen museums, like other institutions, increasingly explore the link between digital games and education: and how they might be used to contribute positively to the educational experiences of diverse learners in a range of 'not school' (Sefton-Green, 2013) educational environments. This includes closer consideration of the benefits that can, do or might flow from various forms of game-based learning (Facer,

2011; Kirriemuir & McFarlane, 2004; Perrotta, 2013) and the ways contexts impact upon what games do and/or become in various sites of play.

Underlying many debates about the potential use of games in museums and, indeed other non-school educational contexts, is a set of questions and assumptions about the extent to which it is actually possible to capitalize upon games' widely cited ability to engage, motivate, (obsess?!?) so very many young people within and beyond schools. The growing interest in the educational uses of 'serious play' (de Castell & Jenson, 2003) reflects the recognition that contemporary youth spend much of their time navigating on-line worlds, and/or actively playing diverse kinds of digital games, as well as an acknowledgement of the increasingly blurred boundaries between formal and informal learning. Rather than there being sharp divisions between various formal or informal educational locations, learning is now widely understood as 'situated intricately and intimately in a matrix of 'transactions': experiences, life trajectories, voluntary and involuntary learning contexts, affective frames and social groupings that make up experience across our life-worlds' (Estad & Sefton-Green, 2015, p. 1). Orientations or dispositions towards learning, and prior learning experiences flow between contexts, with expectations developed in one context lapping across into others.

But while there is increasing experimentation with digital play in many settings including museums, relatively little is known about how students respond to these educationally motivated opportunities for different kinds of play based experiences, particularly when they occur neither at home, nor at school: but in the school-like environment offered by excursions into a museum space. This is important information to know. Studies based in formal school settings have shown that students' responses to digital games in formal educational contexts (such as schools) cannot be taken for granted (Bourgonjon, 2010; Perrotta, 2013; Rowan, 2016: in press). Contrary to a commonly circulated opinion, students are not automatically engaged, motivated or inspired by digital games or virtual play spaces, any more than they are automatically disengaged or demotivated by more familiar, materially based experiences. For museums to make best use of digital games and the ways they are utilized, much can be gained through paying attention to students' beliefs about how gaming initiatives can/should/might be used to achieve various educational goals within settings that both are, and are not, 'like school'. This is the focus of this paper.

The Research Background: *The Voyage* at the Australian National Maritime Museum

To explore the ways in which students experience games in the museum context—a context which is both similar to, and different from, regular school day—a team of researchers located at the Australian National Maritime Museum (ANMM) and Griffith University set out to investigate the responses of three groups of secondary schools students, aged 14-15 (and in year 9), to the educational game, *The Voyage*, played during a school visit to the museum. *The Voyage* was purpose built for use by the ANMM and clearly articulates with its overall work as a museum centred on maritime experiences (Roar Films, 2015). The game explores the life of convicts on board transport ships to Australia in the 19th century. Acting as the commanders/surgeon-superintendents of a convict ship, students make decisions about such things as which ship to sail (considering issues of size, speed, and weaponry); what provisions to put on board and how to manage the convicts and treat their various illnesses. The overall aim for the game player is to arrive in Australia with as many convicts as possible alive and well. It also includes a range of mini-games during which players try to complete certain activities in a timed challenge: such as hanging out washing and catching rats.

The game is part of a suite of activities and resources that form part of the museum's educational program – 'curriculum focused museum programs that synthesise game-playing with onsite experiences including exhibitions, hands-on artefacts, dramatisations, role play, vessels like HMB Endeavour, research and investigation tasks and augmented reality experiences' (Beavis et al., 2014, p. 6; Fletcher, 2014). *The Voyage* articulates directly with the Australian Curriculum for history (Australian Curriculum Assessment and Reporting Authority, 2015) but also relates to other curriculum areas including literacy, numeracy, science hospitality etc. and cross curriculum capabilities such as critical and creative thinking, personal and social capability, ethical understanding and intercultural understanding (Beavis et al., 2014; Fletcher, 2014).

In this paper we focus specifically on students' beliefs and views about the value of including digital games in the museum. Key questions concerned:

- The reasons for, and value of, using digital games in museums
- The impact of game use upon learning
- The impact of game experience upon historical imagination
- Ways in which games can best be incorporated with other museum experiences
- Issues for museum educators to consider in their use of games

From here, the paper is divided into four sections. The first provides more background to the design of the research project by briefly reviewing key issues and questions in related literature that shaped both the development and conduct of the study. The second provides an overview of the research process itself, and describes the data sets that were generated. The third presents a thematic analysis of the students' responses to their experience playing *The Voyage* and draws upon different forms of data visualization strategies to communicate this analysis. The paper concludes with the students' recommendations, and a discussion of implications that arise from this research for those working with young people in museums and other not-school educational settings.

Background to the study: literature informing the research

Games in the museum

In their review of the use of digital media in afterschool programs, libraries and museums, Herr-Stephenson, Rhoten, Perkel & Sims distinguish between three dominant approaches to the use of digital media and technology in museums: as content, as outreach, and as a hook (2011, p. 43). Digital games arguably flourish as all three. *The Voyage* initiative—including the focus, design and introduction of the game into the museum—reflects interdisciplinary conversations relating to the potential relationship between digital innovations, game play, young people, education, history and the contemporary museums. Museums have traditionally been places where young people learn about history via exposure to (and sometimes interaction with) the material objects on display. In contemporary times however, museums are in transition to new roles and new formations. Audiences and expectations too have changed. As young peoples' worlds are increasingly characterized by immersion in digital culture and the online experience, the development of 'digital dispositions' (Rowan & Bigum, 2012) toward learning increasingly comes into play. As we and others have noted elsewhere, 'the dual imperatives of digital technologies for the museum, the digitization and web archiving of material objects and collections, and the transformed nature and expectations of twenty first century learners means that the ways museums once worked are undergoing a

process of rapid change' (Beavis et al., 2014, p. 2). In this context it is not surprising that museums—in common with both schools and other not-school educators—are investigating the potential of games to help museums reach their educational and outreach goals. This, of course, is a major and developing area of scholarship.

Games, engagement, learning

The past decade has given rise to a wide range of powerful portrayals of games as 'learning machines' that have, by virtue of their common structures and designs, an inbuilt educational potential which is just waiting to be harnessed by those who work closely with generations of students variously (often problematically) portrayed as 'generation y', 'clickeratti' and 'thumb people'. It has been argued that games have the capacity to foster deep learning (Gee, 2009) and the development of a range of twenty first century skills (play, performance, distributed cognition, collective intelligence, judgement and the like, (Jenkins, 2009). This potential is often connected to the idea that learning through games based learning environments may be 'richer' than traditional schooling models (Jenson, de Castell, Thumlert, & Muehrer) and that gaming, specifically online multiplayer games, can generate 'accidental learning or learning through doing' (Greene, 2014). These and related discussions have influenced not only a commonly optimistic uptake of digital games in various school contexts, but also a growing number of investigations relating to the ways in which games might be used in other, non-school settings: such as galleries, libraries and museums.

Student/audience/visitor understandings of and responses to games

Within Museum Studies specifically and Games Studies more broadly, the ways in which visitors/students/players make sense of and respond to their gaming experiences is a topic of considerable interest. Fine-grained analyses of what actually happens when digital games are brought into formal educational contexts have increasingly highlighted a number of important points. One of these is that there are, of course, many different types of digital games, and not all games that are used in education are valued in the same way, or for the same reasons, by students or their teachers or caregivers. Thus, adding a game into a learning environment is not a simple matter of 'anything goes': choices need to be carefully thought out and based upon previous research about how, and why, students engage with particular games. This leads to a further, closely related point. Not even the most popular or most engaging digital games function as automatic or magical educational machines that guarantee learning wherever they are found. The effectiveness of games in supporting learning of particular kinds is not a given. While boundaries such as those between 'school', 'like-school', 'not-school' and 'home' are blurred and permeable, it is nonetheless the case that the ways in which games are used and the context in which they are located significantly shape the ways they are seen and engaged with, and consequently, how they do (or do not) shape the acquisition of disciplinary knowledge and learning. We need to know more about the ways in which students respond to different types of games, in different educational contexts, for different discipline or subject areas. This includes the need to more about differences between playing an 'educational' game at home, at school, or in 'intermediary spaces for learning' (Herr-Stephenson, 2011), such as the museum.

Research into how students make sense of games in museum contexts also articulates with growing interest in how online cultural and digital citizenship in an intensely contemporaneous and global world, impacts upon young people's relationships to, and interest in, country-specific histories and historical perspectives. In Australia, the new national curriculum includes History as a core subject, on the basis that '[a]n awareness of history is an essential characteristic of any society, and historical knowledge is

fundamental to understanding ourselves and others' (Australian Curriculum Assessment and Reporting Authority, 2013). In a time when the study of history may seem unimportant, print-based and dry, schools and museums are faced with complex questions about how to support young people to develop deep-seated understandings of history, an informed and reflective engagement with the past, and critical perspectives on the ways in which present and future societies have been and might be shaped by history.

Brought together, these interrelated strands of literature clearly indicate the value of ongoing analysis of 'what happens when…' games (and particular types of games) are used in various ways within various non-school (but perhaps like-school) contexts. The next section of this paper therefore provides an overview of how research investigating students' reactions to the experience of playing *The Voyage* in a museum context was designed and conducted.

Research design

In 2014 and 2015 three groups of year 9 students from two Australian high schools (48 students in all, aged approximately 14-15,) were observed during their visit to the Australian National Maritime Museum, as they played *The Voyage*. For one group this game play took place before a tour of the ANMM replica of *The Endeavour*. For the other groups, the game was played before a tour of various museum displays and artifacts.

After playing the game students completed short, paper based surveys (collecting a mixture of likert scale and free text responses) and focus group interviews and discussions, at the museum (groups 2 and 3) or back at school (group 1). The subject matter with which *The Voyage* deals - the convict voyages to Australia in the late eighteenth century and early nineteenth century - appears twice in the Australian curriculum in year 5 and again in year 9. Students visiting the museum for this study had for the most part, studied this topic previously, at a lesser level of complexity.

The comments and conclusions presented here are thus drawn from two sets of data:

- A short paper survey (composed of questions that were based upon a review of the literature, and previous research projects identifying common beliefs about games).
- Focus group discussions with 3 x groups of 5-9 students. Group 1 students came from an all-girl school in Year 10 at the time of the focus group, but were in Year 9 when they attended the Museum. Group 2 and 3 students were Year 9 at the time of interview, were interviewed on site, and comprised a mix of both male and female students from a co-educational school.

These were complemented by researchers' use of a simple observation schedule designed to record on instances of 'on task' and 'off task' behavior; verbal and non-verbal indicators of engagement and enjoyment; instances of collaboration; problems experienced with technology; and overall tone, tenor and content of the students' conversations and interactions. This observational data is not included in detail within this paper. Nevertheless it provided the research team with important contextual information about the tacit and emotional/affective dimensions of students' interactions with material and immaterial elements in their engagement with each other, with exhibits and with the game. This context shaped the ways we coded the data and, as well, the issues which we identified as significant and consistent across the three groups.

Data analysis involved 2 phases. In phase 1, all student responses to the written questionnaires were converted into rates of response and percentages to be represented graphically. This produced graphs relating to student beliefs about the game, about what had been learned, and about games and museums more generally. In phase 2, focus

group interview transcripts were analysed using two complementary tools: three level thematic coding—open, axial and selective (Strauss, 1998)—and thematic coding by the software program, *Leximancer*. *Leximancer* is an automated system for the content analysis of text. It generates a concept map of emergent themes linked to the prevalence and co-occurrence of key words and concepts, and the relationships between them (Smith, 2006; Townend, 2015). The *Leximancer* analysis—and the visuals it produced—helped confirm themes identified in the three-level coding analysis.

In what follows, we present first, student feedback about their specific gaming experience with *The Voyage* and the ways in which they related this to the value of gaming in museums more broadly. This analysis focuses on issues commonly linked to arguments for the use of games in schools: engagement, enjoyment, and learning of information/skills/concepts/facts. From there, the analysis focuses on what might be considered 'bigger picture' or more complicated issues relevant to future planning of museum educators; teachers and game designers. These include student perspectives on the way the games and game play informed (or not) their understandings of history, of the convict experience, and of museums more broadly. Underpinning all of the analysis is the recognition that as research participants and researchers themselves, students have valuable roles to play in shaping the ways educational settings and museums specifically engage with technology into the future, and about the ways in which games might best be used in both school and non-school settings to promote learnings of this kind.

Analysis Part 1: Student perspectives on *The Voyage,* digital games and museums

Four key foci emerged from the first phase of thematic analysis. These emphasised the link between games and:

- Fun and engagement (theme 1)
- Learning and knowledge (theme 2)
- Historical imagination and/or empathy (theme 3)

Theme 1: Games, fun and engagement

Selective coding across the data for this theme identified the following recurring points made by students in all three groups:

- Engagement with the game – interesting, fun, interactive, entertaining
- Length of game
- Engagement with technology
- Notion of ownership in game
- Engagement with history/key issues
- Historical empathy and imagination
- Use of technology to develop historical imagination (transcending cultural/historical situatedness)
- Immersion
- Co-creation and Creativity
- Discovery and interaction
- Opportunities to socialise
- Preferences for museums using technology and gaming

Survey responses showed students to be enthusiastic about *The Voyage*, seeing it as interesting and enjoyable. Responses were affirmative of the potential for games more generally to be used effectively for educational purposes in museums.

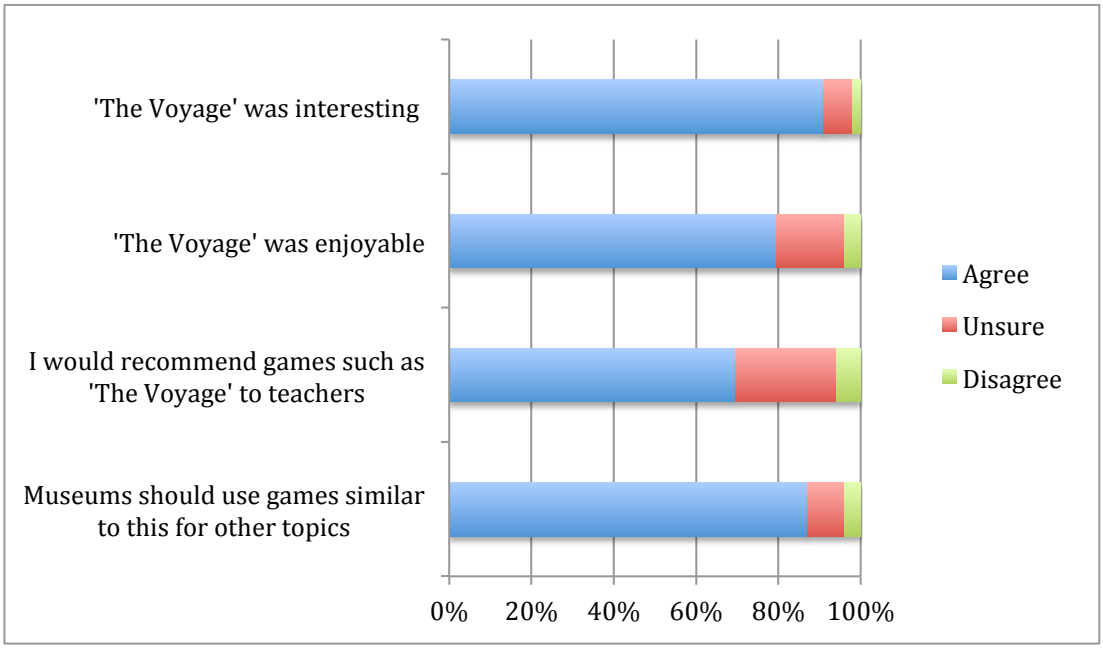

Figure 1. Responses to questions *About the Game: The Voyage*

These sentiments were strongly echoed in the focus groups. Games could be used 'to make things more interesting', 'to engage people more', 'to make the topic more interesting', because they were 'interactive' and 'so they have got people involved in the history of something'. One student compared his experience of learning about this topic through the game and his prior experience of doing so without it:

> *I did it in year four. The method used was just sit in front of PowerPoint and try and take notes. I don't know, but I retained just as much information from that game than I did from six hours of sitting in front of a PowerPoint learning information.... if the goal is to retain the information and to want to learn, then yes it was reached.*

Another (highly articulate) student noted the close relationship between the game and the ability of schools and museums to cater for the diverse needs of the student cohort: Games could 'combine audio, visual and kinaesthetic learning in a way that helps children, especially younger children who aren't too interested in reading big blocks of text, to better absorb the information.'

Theme 2: Games, learning and knowledge:

Selective coding here encompassed forms of learning and the learning of historical knowledge, concepts and facts. Students noted (and appreciated) that games allow for:

- Engagement with history/key issues
- Epistemic knowledge of the past – essay writing, assistive
- Co-creation and Creativity
- Discovery and interaction
- Knowledge creation and dissemination
- Notion of 'what is history' – facts vs. empathy (and understanding?)

- Knowledge and understanding of content (enhancement)
- Challenging content
- Collaboration

Students' beliefs about the skills and knowledge they believed *The Voyage* was 'good at teaching', are shown in Figure 2. Numbers represent percentages of agreement.

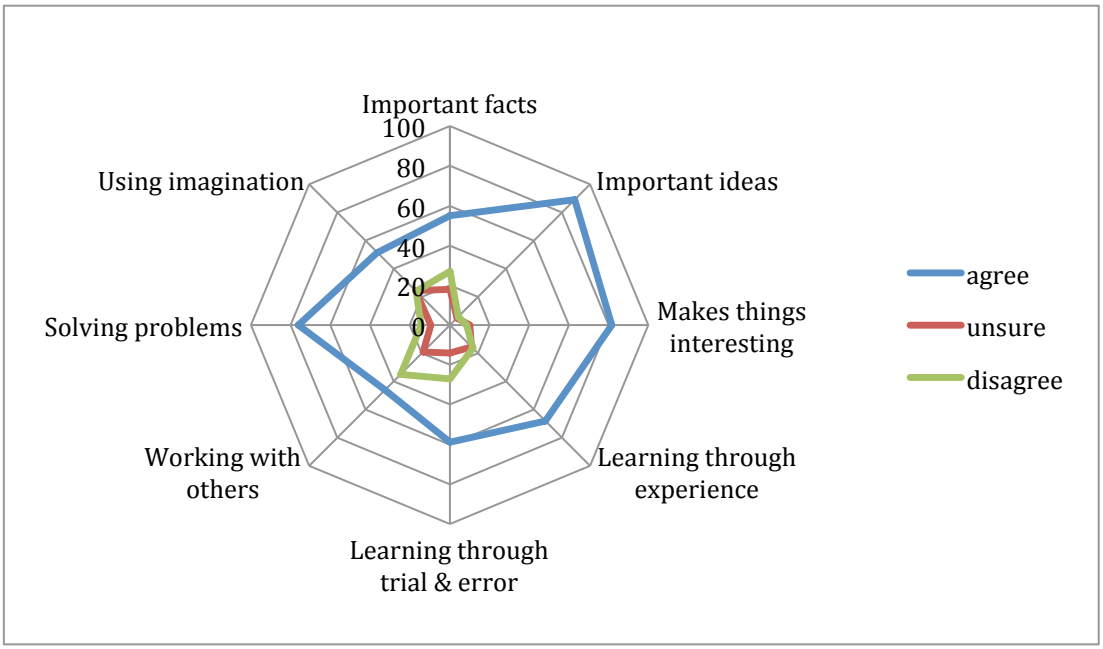

Figure 2. What was *The Voyage* good at teaching

Responses correspond to items listed in the survey that were reflective of forms of learning linked to games in much of the games-based learning literature. Of particular note in student answers is that 80% or more students believed the game was 'good at' teaching important ideas, solving problems and supporting learning through trial and error. The most contested response was related to the item 'working with others' with fewer than 50% agreeing with the statement, and almost 40% disagreeing. This outcome may have been due to the variation within the groups in terms of how the game was actually played. Students generally played the game on their own devices however some students were sharing a console during the game and others were working alone.

In relation to historical facts and knowledge, students expressed a range of opinions regarding the potential for games to help teach historical facts and 'deliver' the curriculum in a new way. The data relating to this issue is slightly more complex - an important reminder of the need to always acknowledge the broader context within which game play takes place before drawing conclusions about what work with games can/cannot achieve.

In both the survey and the focus groups students were asked to reflect upon 'What I have learnt'. One question on the survey asked students to state whether they agreed, were unsure, or disagreed that *The Voyage* 'contains important historical information that was relevant to my high school education'. Students were equally divided between agreeing and unsure/disagreeing. Comments need to be read in relation to where they were up to in their schooling at the time. As outlined above, the students in Cohort 1 who played these games in 2014 were in the final stages of year 9 and visited the museum in December of that year. In the following year, students in Cohorts 2 and 3 were also in year 9, and played the game half way through the year. They had all previously studied

the topic that is the focus of the game: transportation and convict life. Many students agreed that *The Voyage* contained important historical information, but noted that they had already covered this particular topic on multiple occasions during their primary schooling. As a result they were happy to recommend that the game be used in schools (and noted its educational benefits as outlined above), but suggested that it would be more suited to primary school students. This impacted upon their overall evaluation of the historical knowledge taught through the game. As one student commented:

> *I think that if we were learning about convicts and transportation for the first time in primary school it would be useful – but having studied it for 4 years in a row it seems like the same information. [It] would be great at first. In fact we studied it first in Year 3.*

This point was also made when students were responding to the question 'would you recommend the game to other students and teachers?' While the response was definitely 'yes', they offered the following caveat: 'I would recommend it to Primary teachers, as in high school the kids would get bored as it does not feel like you are getting there until the end.'

Implicit in these comments is the close alignment students recognised between the game and content of their official school curriculum. Some noted that they had, in fact, learnt new material and that the game introduced them to new topics relating to planning for the voyage; the illnesses of the convicts; and details about the ships themselves: 'Dysentery - I now know what it is and had no idea before', 'facts about the ship – how fast it traveled – 9 knots – how many people were on each ship – the soldiers and crew and convicts and what was required to keep them alive' as well as more ironic 'facts' pertaining to the playing of the game: 'Not to fill the entire hold with Rum!'

Students also identified the relevance of aspects of the game to other curriculum disciplinary areas including Human Society and Environment, Geography; Mathematics and Commercial/financial studies. With respect to History, almost 90% of the students believed that games similar to *The Voyage* should be used by museums in relation to other topics. Suggestions included the Australian gold rushes, world wars and ancient history, with games providing a fresh perspective. In the words of one student 'the Greeks in Athens versus Sparta would work really well because you want the lifestyle. [And] you can also look at the wars without going—all that kind of looks like my dad'.

They argued that the use of games to explore particular aspects of a historical period—rather than an entire large event—had great potential benefit. As one girl put it, 'if you're going to look at a huge event, that's sort of maybe difficult to put into one game, sort of like a specific lifestyle or a really certain event, like you're looking at [the navy], that would be good for a game.'

Theme 3: Games, historical imagination and empathy

Selective coding across the data for this theme identified the following potential benefits from working with games:

- Immersion in learning
- Opportunities for co-creation and creativity
- Discovery and interaction
- Engagement with history/key issues

At a general level, as Figure 3 indicates, over three-quarters of students who completed the survey agreed that *The Voyage* enhanced their imagination about what it was like to be part of these early convict fleets. They were less in agreement about whether playing games in the museum altered how they felt about museums. Fewer than 50% agreed that 'playing *The Voyage* has made me think differently about museums' and

80% 'would visit a museum again even if there were no games involved'. This suggests that for these students at least, that far from altering their sense of the museum, they did not see games as anomalous or out of place, and that they felt also that museums in and of themselves were worth visiting.

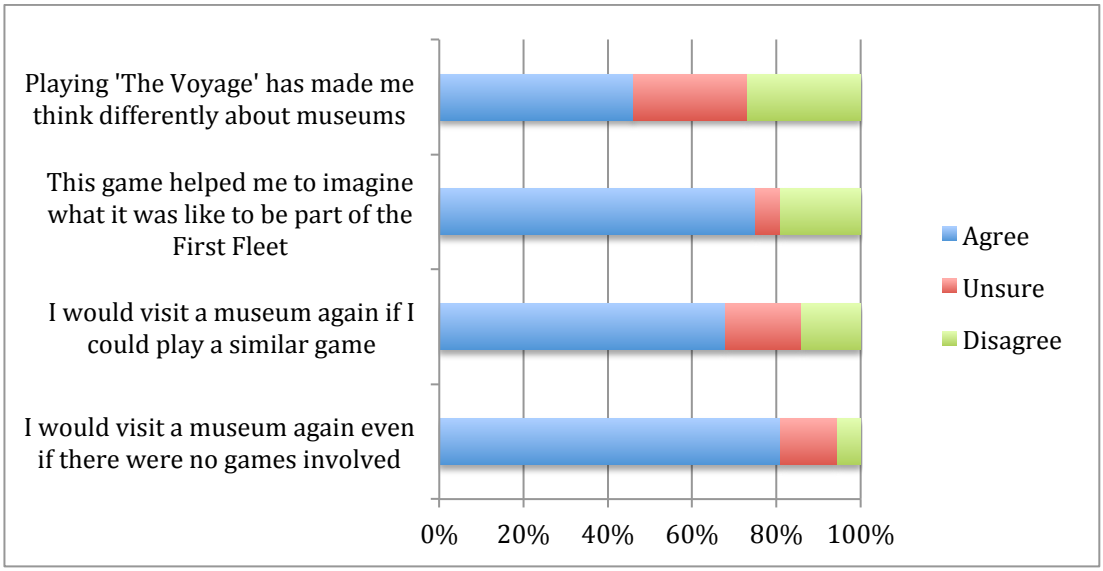

Figure 3. The use of games in museums.

Core arguments in the literature for the contribution games and gameplay might make to the development of historical imagination and empathy link to the specific qualities and affordances of games and gameplay (Elliott & Kapell, 2013). Interactivity, the subject positioning of the player, the player's agentic power and the capacity to determine or intervene in the game narrative; competition, action and mini-games and the lavish immersive pleasures of the world portrayed, all contribute to position players experientially to develop insights and empathy playing as first/second and third person participants in the games world.

Complementing the broad brushstroke agreement/disagreement survey answers convey are the focus group comments, which provide a more nuanced account of the development of historical understandings, imagination and empathy and playing the game, and are linked to game affordances and qualities and the expectations they have of games. In response to the question 'Has the game helped you imagine what it would be like to be on a boat like the First Fleet?' comments included 'not really'; 'I don't know', and 'maybe', with the 'maybe' linking back to the known strengths of games and gaming qualities - in this instance, the role of the player and the design of the game:

> *Maybe – I would probably would have died of dysentery. I still felt like I was [coming] from an outside perspective and I was not emotionally involved– but if we had been playing as a first person or had been given a character then it is likely you could connect and empathise more.*

On the other hand, for some students, while less strongly interpolated into the game than first person role-play might allow, playing as the captain/surgeon meant they felt a strong sense of responsibility to their passengers, where wrong choices resulted in convicts dying: 'I felt responsible. Every time I made a bad decision I started again – so I only got to the first green cross in the game. Not very far in.'

Another group felt the game did help them imagine life on the convict ships, but did so less at the level of atmosphere and more at the level of ideas: 'it just gives you the

general idea…you don't really get the atmosphere but you get some of the main ideas.' This is an interesting inversion of claims sometimes made about 'educational' games: that they provide atmospheric verisimilitude but are factually or conceptually weak.

There was some considerable cross over between students' perspectives on imagination, and understanding of convict experiences, and the idea of empathy. Some students felt that the game impacted upon their ability to relate to the convict experience. The varied nature of these responses is indicated below:

Qu: *Has the game helped you imagine what it would like on a boat like the First Fleet convicts? Did it help you imagine what it would be like?*

Multiple: *Yes.*

Qu: *What about you guys, do you remember anything about it much? No? Do you remember much about it?*

Student 1: Yes, it shows the perspective of people on the boat at that time, dealing with disease, rats and things like that.

Student 2: *Yes - I think it was good that we could oversee the whole thing rather than just from the point of view of the convict*

Student 3: *It sort of showed what made them happy or sad but not just from the convict but from somebody from the outside*

Another student noted that it allowed her to 'see through the people at the time's perspective'; while one final comment indicates an appreciation that historical imagination can develop over time:

Student: *if you were to play the game in primary school and then you were to revisit the topic in high school, you'd have a better foundation which would help you just do better in history I guess, and appreciate history.*

Qu: *So going into the role as needing to stop the ships and all of that helped that - trigger that imagination, yes?*

Student: *Yeah.*

To summarise, therefore, the survey and focus group data both suggest that students saw the relevance of game play to museums; enjoyed the opportunity to play the game; recognised the clear potential for the game to impact positively upon knowledge of the history curriculum; and saw some potential for the game to impact, as well, upon imagination and empathy. Significantly, students also offered advice about how educators and museums could improve or perhaps maximise these potential outcomes: this is explored in relation to theme 4, and the discussion that follows.

Analysis Part 2: Students as *experts*: recommendations for the museum regarding *The Voyage,* digital games and museums

The data explored thus far provides information about the ways in which students make sense of their gaming experience and their belief that games have a valuable role to play in the museums of the present and the future. We turn now to the final theme to emerge from our reading of the data.

Theme 4: desirable game features and recommendations re game use and game hardware

Theme 4 concerned students' recommendations about desirable game features and game hardware to facilitate game play in museums. In this area, particularly, students spoke not simply as informed *consumers* of these technologies, but as well informed, and powerful advocates for particular kinds of gaming uses. They speak about games and game technologies in general, and about their experiences specific to this game.

Selective coding across the data for this theme identified the following recurring topics about which students spoke in detail:

- Length of game
- Engagement with technology
- Glitches, lags, Wi-Fi, running of the game (hardware rather than content)
- Game well organised and easy to navigate
- Platforms suggested for gaming in museums
- Preferences for museums using technology and gaming

First, students offered a large amount of advice about how to improve the gaming experience of future plays: advice that related to issues such as Wi-Fi and bandwidth. Clearly this is not directly related to the game design, but definitely indicates the kind of environment within which game play is most likely to be enjoyed. One student commented: There were some problems with lagging and freezing and some buttons stuck – it happened so many times for me.' For another, 'There were many Wi-Fi issues – so need the bandwidth for them all to take part. This impacted upon the way the game was played as many students were not willing to watch the introductory video because it took 'too long' to load.

Students also had firm views about the most desirable platforms for this particular kind of game. Figure 4 illustrates the responses showing that iPads were the most popular. This reflects survey and focus group feedback about the benefits of touch screen technology (tablets, smart phones), and 'anything that does not glitch'. This feedback is echoed through the observations of students, and the group discussions. Students working without a mouse, or on a very small screen (such as a smart phone) found it much more challenging to complete some of the tasks within the game.

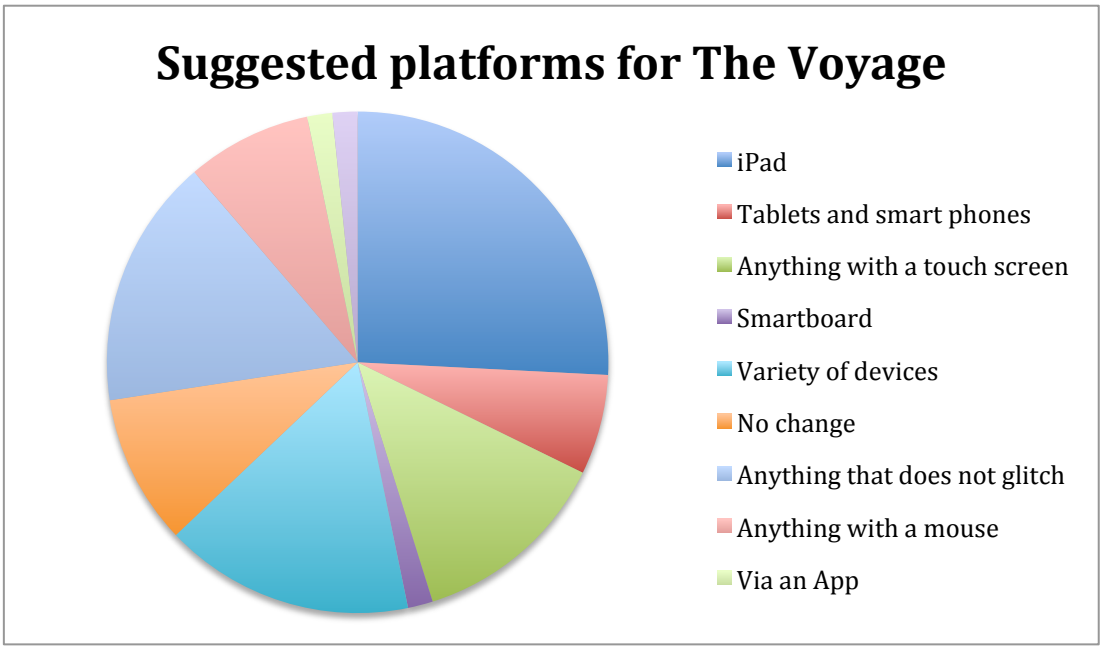

Figure 4. Suggested platforms for The Voyage

Students suggested a range of design features that could improve the game and the learning it supports, including the provision of instructions as the game progresses; 'checkpoints' and auto-saving, as well as the allocation of sufficient time to allow the

game to be played through to the end. They argued powerfully for 'the need for checkpoints that allow a game to be re-started without players having to return to the beginning', noting that 'it would be good to go back to a checkpoint if you all die, instead of the very beginning.'

This issue of checkpoints was seen as particularly important for younger audiences. As one student commented:

> *Me and my partner had an issue with where we tried - we had some trouble, we made a wrong turn so we were like, can we go back? We clicked the back button at the top of the Internet Explorer thing and it took the entire game back to the beginning. I know that if two 15 year olds can make that mistake, then 20 six year olds can do it too.*

The amount of time it appeared to take in order to complete the game was also a common theme. Indeed, across the 45 minutes of game play undertaken by the three groups the researchers did not find a single student who completed the journey. Students made the following comments: 'I think the game takes a long time to complete.' 'Nobody got to the end but we got to the middle of the Indian Ocean. We would all be interested to know how the game finishes.' On a related point, some made points about the need to adjust their playing strategy to allow the game to be completed: 'If it was - the whole point was to get them to Australia, it would have taken a very long time to - at the rate of that boat, it was taking a very long time - having to fast-forward it, to make sense of it.'

Some students also noted that their experience might have been enhanced if they were able to see more clearly the consequences that followed from various choices they made. Throughout the game students had to choose their boat; captain; convicts; supplies; direction of travel and also how to treat various convicts when they became ill. Each of these decisions impacts upon the survival of the convicts, and their arrival in Australia - the successful completion of the game. The fact that students did not finish all parts of the game may have limited their ability to recognize this link, as suggested by the following exchange:

Student 1:	*Well I had at the end 20 people sick and 5 people dead and nothing happened.*
Qu:	*Didn't they die? Isn't that a consequence? (Attending teacher, Focus Group 3) (Group laughter)*
Student 1:	*Well they just said 'this person is dead' and then nothing. I would have liked to have seen something a bit more realistic in the consequences. Maybe the game ended.*
Qu:	*Well there was one group up here where they did all die and the game ended*
Student 2:	*They got angry after a day…*
Student 3:	*Yes but suddenly they were all dead and the game just stopped.*

Student advice was not, however, confined to these familiar 'gen y' funds of knowledge. Rather they put forward multiple recommendations about how the game could best be integrated into a visit to the museum and connected to the Australian history curriculum in meaningful and effective ways. These insights are significant not only because of their immediate relevance to analysis of this gaming experience, but also in terms of the way they highlight the importance of actively seeking student/audience feedback. This recognition is based upon an understanding that students can be simultaneously positioned as consumer and producers of knowledge (relating to games and museums): if their views and insights are actively sought and carefully curated.

This level of expertise is seen in diverse ways. For example, students offered a range of suggestions concerning the kinds of topics that would be suitable for other games in museums, as mentioned earlier. Figure 5 indicates their main suggestions:

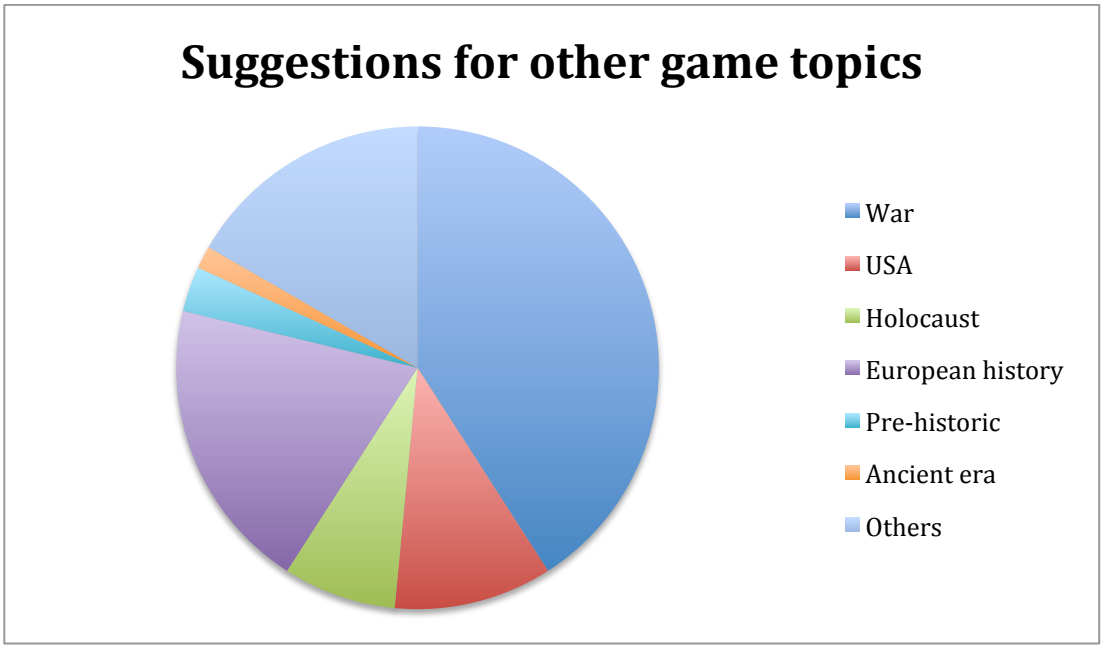

Figure 5. Suggestions for other game topics

War was the most comment student suggestion. However, student comments show that these suggestions were not for 'first/third person shooter type' games but rather, political, decision-making games 'I think politics pre-WW1 would be good – but how to avoid the war!' Included in the war games recommendations were specific historical subjects such as the Opium Wars, the Cold War as well as large military campaigns. This, of course, is a common theme within many different kinds of games but it is obviously possible that students are not exposed to some of these resources. Of note was that many of the focus group suggestions for other game topics were similar to the individual surveys and reflected topics that had been studied at school. One girl also noted that some topics would not be suitable for gaming: 'You can't have a holocaust [app].' Similarly insightful was the comment from another participant who noted that gaming might be more suited to in depth study of a specific event, rather than to an overall historical period: 'If you're going to look at a huge event, that's sort of maybe difficult to put into one game, sort of like a specific lifestyle or a really certain event, like you're looking at [the navy], that would be good for a game.'

Perhaps most significantly, given literature which continues to investigate the role that context plays in gaming experiences—students made valuable suggestions about pedagogical issues relating to games in museums, pointing in particular to the link between where and when a game is played and kinds of learning that are supported. They agreed, for the most part, that playing the game in the context of the museum, rather than the classroom, had the potential to re-shape how they looked at and interacted with the museum displays and artefacts. While they had mixed advice on whether to play the game before or after a shipboard experience (specifically exploring the replica of the *The Endeavour* nearby), the value of combining the virtual with the material was clear. One group offered the following set of comments:

- *I would play the game then go on the ship as it would make more sense and you could re-enact the game.*
- *I would go to the ship then play the game – then you have a better understanding and could play the game better and make better decisions.*
- *Could you go on the ship before and after the game? I mean you could go on first and learn about how it all worked – it would help with the context of sailing etc. with the game.*

- *I think the game is a better introductory – it helps you start learning, then go onto the ship.*
- *I think it would be better to go on a ship first – you could see how it was controlled and give you a better idea of what you are doing – this gives you a better idea of the scale*

Another group was more emphatic in their advice, highlighting the value of being on *The Endeavour* prior to playing the game:

Student: *The boat gave us a background to the game. We did it first so - and with the guide who told us stuff about the game*
What they ate and how they ate and all that sort of stuff.
Q: *Okay, put it in perspective. So when you saw them, you knew how low the ceilings were and how small the bunks were and - okay, so…)*
Student: *The big barrels of food.*
Student: *How they prioritised the food. In terms of food versus medicine, they had the bottles of ointment and stuff and how important they were. In terms of keeping people healthy, which was more important, to keep them full, fed, or keeping them from getting illnesses.*

On a related point, students also highlighted the potential value of diverse forms of museum/school collaboration; particularly collaborations that would allow them to springboard from the game into ongoing exploration of the topic via engagement with museum artefacts and through use of other strategies such as role-play. For example, one student noted the value of making explicit links between the game and the museum exhibits: 'Make real sort of - what do you call them? Real…artefacts and things like that [linked] to the game so you can be like, "oh, that's from there, that's from over there"'. Another recommended linking the game to various roles: 'the game could be turned into a role-play—you are issued with a role such as captain or convict or nurse. Then if somebody had a sickness and you could step into that role and treat them or be them.' These comments, and those made earlier, are consistent with findings from other studies about the key themes identified when young people's voices are heard - 'the importance of real objects', 'the use of creation, creativity and pretence' (Dockett, Main, & Kelly, 2011), and the importance of participation e.g. as a personal persona or avatar in case study simulations or scenarios (Hawkey, 2004).

To summarise, across the various focus groups students made insightful comments about both the challenges and opportunities associated with gaming, but they also expressed the clear belief that the opportunities were worth pursuing. Across their recommendations and feedback students were united in their beliefs that games have a role to play in museum and similar contexts. It might even be argued—as one boy did—that museums are *expected* to make use of things such as games in order to get 'more modern'. As shown earlier, in Figure 4, some students already have a positive relationship with museums and don't need any 'new' experience to encourage them to visit. However, in a parallel point to that made earlier about the lack of surprise many students felt about the presence of games in the museum, for others, playing the game had indeed changed how they thought about museums; and impacted positively upon their desire to visit museums again in the future.

Conclusion

We conclude this paper with three points.

The first relates to the tensions and paradoxes inherent in working with digital games in any 'formal' context. Games are quintessentially composed of play, and arguably privilege ludology over narrative, where 'ludology, like the games it studies, is not about

story and discourse at all but about actions and events' (Oxford Dictionary, 2016). The narrative-ludology debate (Frasca, 2003) and the consequences of this dichotomy, is nowhere more visible than in the research reported upon here. Tensions entailed in history games by their very nature lie at the heart of the student responses. Their comments reflect the related but finally quite divergent aims of history-based videogames. It has been argued that there is 'a conflict between the rules of the game and the rules of history: history is designed with the goal of knowledge, understanding and enlightenment in mind; videogames are designed to be won or lost, but their ludic nature – the playing – is the key' (Elliott & Kapell, 2013, p. 6).

Elliot & Kappell highlight three elements that are entailed in the shaping of historical narratives: the selection of facts, ('which concedes we are limited not only by those facts selected by the historian but also by which facts are available in the first place, which ones are known and which ones are assumed'); 'the assemblage of those selected facts to form a narrative' and 'the shopper, the "we" that present, select and assemble the history in the first place' (Elliott & Kapell, 2013, pp. 6-7). Taken together these elements highlight the fact that any understandings of history 'made' available through games-based learning tend to be imaginatively and impressionistically powerful, rather than tightly argued in the way that more traditional documentary, 'factual' representations of histories might be. Thus, as part of a suite of resources within a museum's educational program—in this instance as a game that complements the physical experiences linked to exploration of the life-size replica of *The Endeavour—The Voyage*, and games like it, clearly have an important role to play in terms of bringing to life not just history (as it is constructed in school) but also in supporting young people's imaginative engagement with historical perspectives and past times.

Our second point concerns the *value* of museums continuing to work with digital games. We argue here that games have an important role to play in supporting the efforts of contemporary museums to capitalize upon new levels of connectivity and digital literacy in order to achieve three core goals introduced above: knowledge curation, knowledge dissemination, and support of/for learning. This small scale research study has demonstrated not only the potential of games to support the development of historical knowledge (and thus to support the formal objectives of schooling) but also the value of actively seeking the insights that visitors can provide about gaming experiences. Through research, museums acquire the specific, and fine-grained knowledge, about what happens when games are used in museum contexts for diverse students, and can use this to shape current and future practices related to the 'gamification' of museums.

This point leads directly to our third and final point: the importance of recognizing what student researchers have to say when analyzing what happens when games are brought into educational settings. In their study, 'Consulting young children: Experiences from a museum' Dockett, Main and Kelly (2011) identify such attention as a key feature of impactful, relevant audience centred research when describing the young people who participated in one of their research projects: underpinning the project was a commitment to recognizing young children as 'competent social actors, with the right to be consulted on matters that are important to them' (Dockett et al., 2011, p. 13). Not only do we profoundly agree; as our research shows also, listening to the voice of experts - to young people as players and researchers with differing degrees of technological expectations, saviness and expertise, provides what is too often a missing piece of the puzzle: informed feedback from those for whom all this is designed in the first place. Listening to the students in this research provides excellent advice on the next steps that might be taken: both literally in regards to the development and deployment of games such as *The Voyage,* but also metaphorically as our explorations of the opportunities

linked to digital game play continue: in what are still, for many, turbulent, unknown, and unpredictable waters.

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