Donna Burton-Wilcock

MissionMaker: Why Games?

> 'Games are ... the most ancient and time-honored (*sic*) vehicle for education. They are the original educational technology, the natural one ... We don't see mother lions lecturing cubs at the chalkboard ... in light of this, the question, 'Can games have educational value?' becomes absurd. It is not games but schools that are the newfangled notion ... Game-playing is a vital educational function for any creature capable of learning.'[1]

Background

In 2003 Immersive Education was approached by the Institute of Education (specifically the Department of Media, Youth and Culture and later becoming the London Knowledge Lab) to draw up a joint bid for research funds. The aim, as stated at this time, was to produce a software tool that:

> ... will enable 11-14 year olds to create their own 3D computer games. The research will inform the software's development and develop pedagogic models to support its use in schools and in the leisure sector.

In particular, the project outputs were specified as:

- a game authoring tool within a 3D environment allowing children to design their own role-playing and action adventure games
- a model of game literacy building on the growing belief that children should be aware and conversant with a range of multi-modal literacies outside the traditional text literacy which examinations and, therefore, schools generally endorse
- a pedagogic model identifying how such game literacy can be taught in a school context
- a model for industrial design incorporating children's and teachers' feedback.

The resulting product is MissionMaker.

What is Mission Maker?

As with all Immersive Education software, MissionMaker is fundamentally a creative tool. It enables both students and teachers to plan, build and play a range of games before evaluating and revising them according to end-user need. Its open-ended approach means that it can be used to support a range of curriculum areas as well as cross-curricular projects.

Unlike a level editor, MissionMaker allows users to start with a relatively blank canvas and provides a number of choices enabling game-makers to select their own game-playing genre based mainly around the chosen locations and the consequent narratives they suggest. The choices range from baronial courts, through modern

[1] Crawford, C (1982) *The Art of Computer Game Design*, www.vancouver.wsu.edu/fac (Search 'game design' for entire text of book – now out of print)

streets to science fiction space stations. All can be customised by the addition of locally produced visual and audio media.

In summary, MissionMaker is a game authoring tool that enables users to become critical producers of games as opposed to mere consumers.

Educational Benefits

Benefits dependent upon:
- tasks set
- feedback
- teacher mediation
- type of game

Given the amount of research produced in the last twelve or so years, it is with some confidence that we can say there is a wealth of potential educational benefits waiting to be tapped through a co-ordinated approach to game-making and playing (see the Reading List at the end of this paper). There has been much media attention, numerous academic articles and a host of educational conferences dedicated to the subject. However, we maintain that, as with all creative tools, the specific benefits will be largely a product of: the tasks set; the method of feedback and target setting employed; the quality of teacher mediation as well as the type of game. Therefore, 'teachers assume an important role in creating contexts'[2] for learning using game-based tools. Being able and willing to do this, isn't, necessarily, a given:

> 'Simply using computers or connecting to the network does not ensure that teaching is easier and more effective or that adolescents will be automatically well prepared to read, write, and live in the 21st century. Instead, making good use of new technologies increases the demands on teachers, at least initially. Educators face major challenges to use these technologies to expand the possibilities for learning ... it is teachers who make the difference.'[3]

It would also be presumptuous, given the number of variables, to say we can define precisely what the benefits are, but we can explore the potential. This view is supported by Kirriemuir and McFarlane.

> ... the differences between genres, and even between games within one genre, differentiate the way they are played, and their potential to support learning ... there are few hard and fast findings in the literature.[4]

Likewise, what we may perceive as benefits, in terms of motivation and the learning that occurs, depend on your view of what education is for. This is an area even more hotly debated than the use of technology. According to King and O'Brien, 'Gee draws a useful distinction between certification and education. Settling for certification means that minimal levels of thinking, reading and writing are now acceptable'[5]. Maybe we wouldn't go quite this far, but having said this, many educationalists

[2] Beach, R and Bruce, B 'Using Digital tools to Foster critical Enquiry' in Alvermann, D Ed (2001) *Adolescents and Literacies in a Digital World*, Peter Lang

[3] Bruce, B 'Diversity and Critical Social Engagement: How Changing Technologies Enable New Modes of Literacy in Changing Circumstances' in Alvermann, D Ed (2001) *Adolescents and Literacies in a Digital World*, Peter Lang

[4] Kirriemuir, J and McFarlane, A (2004) *Literature Review in Games and Learning*, NESTA Futurelab

agree, at least to a certain extent, with Bruce that, 'The present (economic and social) conditions ... call for an expanded view of learning ...how to integrate knowledge from multiple sources ... to think critically about information that can be found almost instantaneously throughout the world ... participate in ... collaboration. [Furthermore, taking into consideration] globalization ... Rather than learning to solve well-structured problems of the kind seen in text books, there is the need to know how to engage with a complex situation and turn it into a problem that can be solved; thus to find problems rather than just to solve them ... help them engage that world as informed participants and critics'[6]

Gee makes a similar point believing we should make 'schools the sites for creativity, deep thinking, and the formation of whole people – sites in which all children can gain Portfolios suitable for success defined in multiple ways and the ability to critique and transform social formations in the service of creating better worlds for all.'[7]

With MissionMaker the identification of learning benefits is further complicated. In the first instance, there are the benefits associated with authoring games. There are also player benefits, particularly marked when the game has a curriculum focus.

[5] King, J and O'Brien, D 'Adolescents Multiliteracties and their Teachers' Needs to Know: Toward a Digital Détente in Alvermann, D Ed (2001) *Adolescents and Literacies in a Digital World*, Peter Lang

[6] Bruce, B 'Diversity and Critical Social Engagement: How Changing Technologies Enable New Modes of Literacy in Changing Circumstances' in Alvermann, D Ed (2001) *Adolescents and Literacies in a Digital World*, Peter Lang

[7] Gee, J 'Millennials and Bobos, Blue's Clues and Sesame Street: A Story for Our Time' *ibid*

Learning Benefits

Development of cognitive skills ...
Key Skills
- Communication
- Application of number
- Information technology;
- Working with others
- Improving own learning and performance
- Problem solving

Thinking Skills
- Information-processing
- Communication
- Reasoning
- Enquiry
- Creative thinking
- Evaluation

Understanding of:
- grammar of game design
- needs of game player

Critical thinking about the medium of games and how they work

Making curriculum-based games can help:
- consolidate learning
- demonstrate understanding

Authoring

One might argue that the learning benefits associated with games authoring are mainly associated with the development of generic cognitive skills. These can be mapped to Key Skills (Communication, Application of Number; Information Technology; Working with Others; Improving Own Learning and Performance; Problem Solving) and Thinking Skills (Information-processing; Reasoning; Enquiry; Creative Thinking; Evaluation) as outlined in the (about to be reviewed) National Curriculum. The breadth of potential learning is more eloquently described by NESTA Futurelab's Ben Williamson in his description of James Gee's work on semiotic domains. Although this talks about playing games, it seems equally, if not more, applicable to the process of making and evaluating games.

> ... players must understand what they are doing and develop their comprehension of both a game's internal design grammar, or the ways in which its content is presented, and its external design grammar, or the ongoing social practices that determine the principles and patterns through which members of the domain recognise all the activities and practices which comprise it. Such systematic thinking, Gee argues, allows players to think about and critique games as systems and designed spaces rather than simply moment-by-moment playable environments. Such critical thinking is not only absent in many schooling practices, but goes unnoticed in much appreciation of what games can offer in terms of learning.[8]

In considering audience and purpose, game authoring builds on more traditional authoring skills.

In MissionMaker the games can be made by the software producers, teachers and, most importantly, by students. In the last example, as well as the valuable cognitive skills involved, if students are required to make curriculum-based games for each other the task can link closely to traditional subject-based curriculum work and can provide a way for students to consolidate learning and demonstrate understanding.

If, in the current education climate characterised by testing, we need to be more specific and make links to particular curriculum subjects it seems that generic games authoring can be seen as relevant to, most obviously:

- production skills in Media Studies – historically it has been possible to be both a consumer and producer of most of the media studied with the exception of games; increasingly games are being analysed and are now a part of at least one A level Media course, but the focus is still analysis rather than production – having said this, production can also support analysis by making the theory concrete thus enabling a

[8] Williamson, B (2003) *A Review of Gee's 'What Videogames Can Teach Us About Learning and Literacy'*, NESTA Futurelab.

constructivist approach to study

- design process in D&T – through the process of planning, building, playing, evaluating and refining games students engage in an end-to-end design process
- writing - MissionMaker can support both the development of transactional writing skills (instructions, clues etc in pop-ups) and creative writing (scripts, narrative frames) as part of the literacy curriculum
- programming, sequencing and control in ICT with MissionMaker acting as a programming language for a specific purpose (much as other computer languages are) – in particular with objects being linked by rules with properties and actions (methods) it introduces students to object oriented languages.

Developing notion of multiple literacies that demand:

- multimodal approaches
- multi-layers
- levels of interpretation
- multiple readings

Taking literacy further, Brindley argues that, 'It is my contention that schooled literacy, which traditionally sees the acquisition of the ability to construct and interpret text as largely an individual activity, bounded by the concept of text as linear and fixed, is no longer adequate ... computer literacy ... is a lifelong literacy. This entails the ability to construct and manipulate text, which is no longer seen as linear but multidimensional and multimedia and which is no longer fixed but infinitely changeable. The model here is far closer to that required by school leavers at the beginning of the new millennium's world of literacy ... when reading skills need to extend beyond book print to screen print ... (*and arguably other media*) ... ICT is the medium of access and construction[9].

[9] Brindley, S 'ICT and Literacy' in Gamble, N and Easingwood, N (2000) *ICT and Literacy*, Continuum

Learning Benefits
- problem-solving
- decision making
- strategic planning

Prensky:
- rapid information processing
- deciding relevance
- synthesising information from range of sources

Doing in order to learn, rather than learning in order to do!

Playing

Many of the skills developed during the making of a game can also be applied to thoughtful gameplay. How the player solves problems, makes decisions, thinks about their situation and formulates a strategy can be captured within Mission Maker thus aiding the assessment of process as well as product. In Williamson's 2003 review cited earlier, he refers to the work of Marc Prensky:

> Prensky's ten characteristics of new methods of learning could be described as young people developing the ability to process information very quickly, determining what is and is not of relevance to them; the ability to process information in parallel at the same time from a range of different sources; the familiarity with exploring information in a non-linear fashion ... creating links rather than following a story; the tendency to access information in the first instance through imagery and then use text to clarify/expand and explore... and having a model of doing in order to learn, rather than learning in order to do. (ibid)

Games players do all of these things throughout their gameplay.

Game-play promotes active and critical learning:
- Multi-tasking
- collating and processing information
- planning
- thinking strategically
- trial and error
- perseverance
- plural reading
- decision-making
- testing hypotheses, options, and imaginative alternatives
- active learning
- reflection

Various academics in this field also list what they consider to be the key benefits of game playing. Atkins says that game-play promotes 'Multi-tasking, collating and processing information, planning, thinking strategically, trial and error, perseverance... plural reading – decision-making, ... testing hypotheses, options, and imaginative alternatives.' [10]

Whereas, talking about game worlds Bartle maintains, 'Virtual worlds offer educators the following features: they are collaborative; they are motivational; they involve language use; children find it easier to express themselves in them ...' [11]

Games encourage students to become active learners, positive about the experience of learning. 'The game encourages him to think of himself as an active problem solver, one who persists in trying to solve problems even after making mistakes; one who, in fact, does not see mistakes as errors but as opportunities for reflection and learning ... Video games have the potential to lead to active and critical learning ...They situate meaning in a multimodal space through embodied experiences to solve problems and reflect on the intricacies of the design of imagined worlds and the design of both real and imagined social relationships and identities in the modern world ... the potential of good video games played in environments that encourage overt reflection.' [12]

Games:

In addition, where specific curriculum-based games are made the

[10] Atkins, B (2003) *More Than A Game*, Manchester University Press.
[11] Bartle, R (2003) *Designing Virtual Worlds*, New Riders.
[12] Gee, J (2003) *What Video Games Have to Teach Us About Learning and Literacy*, Palgrave Macmillan.

- engage people intellectually and emotionally
- contextualise learning
- encourage enquiry based approach

learning benefits can be linked to subject specific skills and learning objectives. Some of their value lies in their, 'capacity to engage people intellectually as well as emotionally, to enhance the contextual aspects of information, and to encourage integrated, holistic responses.'[13] Games encourage active process of enquiry rather than passive memorisation of facts.

Finally

According to Egenfeldt-Nielsen, 'So far we have primarily shaped educational use of computer games with conservative practices.'[14] Interestingly he argues, counter to current comments from the DfE, that computer games are not used as widely as they might be in education, not because of the lack of 'robust research' but because of; 'market conditions ... publishers have failed to innovate ...; cultural position ... with [fear of] violent and stereotypical content ...; school structure ... short lessons, few cross-disciplinary courses, tight curriculum design, closed teaching practice, sparse computer equipment and no budget for software acquisitions; [and lack of] practical experiences.

We may remedy this if, as Buckingham suggests, we 'move the discussion forwards, beyond the superficial fascination with technology for its own sake, towards more critical engagement with questions of learning, communication and culture.'[15]
Some of the following questions when using software may help provide this focus (there are many other suggested evaluation criteria):

- What objects or outcomes are being served by the use of these digital tools?
- What kinds of literacy practices and inquiry strategies are being fostered through uses of these tools?
- Are students using tools to actively produce texts or hypertexts in ways that lead them to interrogate those texts?
- Are these tools being used to reify or to challenge consumerist values?
- How are students contextualising uses of tools in terms of objects/outcomes, roles, rules, beliefs and traditions?
- Are tools being used to foster open, thoughtful exchange of ideas and beliefs in ways that lead to the development of new beliefs?
- Are teachers themelves engaged in uses of tools so that they can demonstrate these uses to students?
- How are tools continually evolving in ways that challenge status-quo systems and create new systems with new objects outcomes and ways of constructing identities?[16]

'... technology does not have effects in and of itself: on the contrary its impact, for good or ill, depends to a very great extent on the contexts in which it is used, the motivations of those who use it, and what they attempt to use it for' [17]

Reading List

[13] Laurel, B (1991) *Computers as Theatre*, Addison-Wesley
[14] Egenfeldt-Nielsen, S (2007) *Educational Potential of Computer Games*, Continuum
[15] Buckingham, D (2007) *Beyond Technology: Children's Learning in the Age of Digital Culture*, Polity
[16] Beach, R and Bruce, B 'Using Digital tools to Foster critical Enquiry' in Alvermann, D Ed (2001) *Adolescents and Literacies in a Digital World*, Peter Lang
[17] Buckingham, D (2007) *Beyond Technology: Children's Learning in the Age of Digital Culture*, Polity

Alvermann, D Ed (2001) *Adolescents and Literacies in a Digital World*, Peter Lang
Andrews, R Ed (2004) *The Impact of ICT on Literacy Education*, Routledge-Falmer
Atkins, B (2003) *More Than A Game*, Manchester University Press
Bartle, R (2003) *Designing Virtual Worlds*, New Riders
Brindley, S 'ICT and Literacy' in Gamble, N and Easingwood, N (2000) *ICT and Literacy*, Continuum
Buckingham, D (2011) *Beyond Technology*, Polity
Egenfeldt-Nielsen, S (2007) *Educational Potential of Computer Games*, Continuum
Gee, J (2003) *What Video Games Have to Teach Us About Learning and Literacy*, Palgrave Macmillan.
Kirriemuir, J and McFarlane, A (2004) *Literature Review in Games and Learning*, NESTA Futurelab
Laurel, B (1991) *Computers as Theatre*, Addison-Wesley
Sanger, J et al (1997) *Young Children, Videos and Computer Games – Issues for Teachers and Parents*, Routledge-Falmer
Williamson, B (2003) *A Review of Gee's 'What Videogames Can Teach Us About Learning and Literacy'*, Futurelab Website.
Williamson Shaffer, D (2006) *How Computer Games Help Children Learn*, Palgrave
Wolf, JP and Perron, B (2003) *The Video Game: Theory Reader*, Routledge