Institution: Institute of Education
Unit of Assessment: 25
Title of case study: Making Games: empowering pupils to design their own digital games
1. Summary of the impact (indicative maximum 100 words)

MissionMaker is an innovative tool developed by IOE researchers in partnership with a software publisher which allows children and young people to make sophisticated 3D computer games without having programming knowledge. It has expanded thinking about games as an art form and children's ability to make and understand their structures, and has challenged stereotypes about games as 'gendered' toys. It is endorsed by examination boards and used in hundreds of schools and centres throughout the UK and internationally. Designed in consultation with pupils and teachers, it encourages creative and strategic thinking in the English and Media curriculum in respect of games, which have received scant attention in school curricula.

2. Underpinning research (indicative maximum 500 words)

Context*:* Making Games, the focus of this case study, and the project which created *MissionMaker*, is part of a continuum of IOE research, starting with Gunther Kress's ground-breaking work in the 1980s and 1990s on social semiotics, and building on internationally significant work on media education by David Buckingham (see research reference **R2**), on adventure and role-playing games by Carr et al (2006) and on multimodal media texts made by and for young people. The Centre for the Study of Children, Youth and Media, in which the researchers were based, specialised in media education and young people's engagement with media cultures and their media production.

MissionMaker*:* The Making Games researchers identified a need for software that would enable young people to design and produce computer games (**R1**). They also recognised the educational potential of such a tool. Together with industry partner Immersive Education, they spent three years developing software that would allow young people to make 3D adventure and puzzle games that are as satisfying to play as the ones they buy. The research focused on game design as an extension of literacy, specifically 'media literacy'. The underlying argument is that while we teach through educational media, we also teach about the media in young people's lives; gaming is as valid a study area as other cultural forms such as film and television (**R2**, **R3**).

Key achievements: The software broke new ground by simplifying the design of complex adventure games in two ways. It contained a 'rule editor', which allowed young people to specify the conditions under which any event in their game would happen as a simple sequence, such as "if the key is clicked, the door opens". The 3D environments, objects and characters were pre-designed so children could select characters, sets and objects from 'libraries'. But they also had to ensure that their rules worked in concert, and needed to understand game structure. Users could also import their own graphics, dialogue, music and videos. The researchers defined the areas of knowledge that pupils need to acquire, such as the conceptual understanding of the conventions of game design, the way games target different audiences in specific ways and the commercial and regulatory aspects of game design. Their model of game-literacy was then used to create materials to accompany the software. *Gender:* Researchers explored whether boys and girls used games in stereotypical 'gendered' ways. Their findings overturned prior beliefs about the relationship between gender and game play.

Research methods: The three years' funding (2003-6) enabled the researchers to work with developers at Immersive Education to create successive prototypes, which were evaluated with pupils and media teachers at UK schools. This ensured that the software reflected the interests and purposes of its intended market. The project also developed methods for working with end-users – specifically children – in the development of software, and demonstrated its benefits. Such methods included videotaped observation, semi-structured interviews, design workshops and analysis of the games produced by the students. Immersive Education contributed the software engineering, visual design and animation expertise, working to the research priorities of the IOE team.

Researchers: Professor David Buckingham (left IOE 12/2011), Professor Andrew Burn and Dr Caroline Pelletier.

Earlier projects: A 2001-3 IOE study, *Textuality and video games: Interactivity, narrative space and role play* (**R4**), was one of the inspirations for Making Games. Researchers examined the rules systems, narrative elements, and imaginary worlds that role-play games establish. They also studied their visual characteristics and the forms of engagement they invite from players. The project's co-directors, Buckingham and Burn, and researcher Diane Carr, interviewed players, recorded play sessions, and spoke with game producers. They analysed a wide range of secondary texts, mostly from the games world's fan communities. Theoretical underpinning for Making Games comes from Buckingham's theories of media literacy (**R2**, arguing that media studies should focus not only on analysing media texts but also creating them), developed further during the project (see **R1**); and theories of multimodal communication, building on the work of Kress and others, and applied here to games (**R5**). Kress's much-cited co-authored book, *Multimodal discourse: the modes and media of contemporary communication* (2001), outlines a theory of communication for the age of interactive multimedia and multi-skilling.

3. References to the research (indicative maximum of six references)

R1: Buckingham, D. & Burn, A. (2007) 'Game-literacy in theory and practice', *Journal of Educational Multimedia and Hypermedia*, 16(3), 323-349.

R2: Buckingham, D. (2003) *Media Education: Literacy, Learning and Contemporary Culture*. Cambridge: Polity Press.

R3: Pelletier, C. (2008) 'Producing difference in studying and making computer games: how students construct games as gendered in order to construct themselves as gendered', in Kafai, Y., Heeter, C., Denner, J. & Sun, J. (Eds) *Beyond Barbie and Mortal Kombat: new perspectives on gender, games and computing,.* Cambridge MA: MIT Press, 145-160.

R4: Carr, D., Buckingham, D., Burn, A. & Schott, G. (2006) *Computer Games: Text, Narrative and Play,* Cambridge: Polity Press.

R5: Burn, A. (2007) 'The case of *Rebellion*: researching multimodal texts', in Lankshear, C., Knobel, M., Leu, D. & Coiro, J., *The Handbook of Research in New Literacies*, New York: Laurence Erlbaum, 149-177.

Grants:

G1. Making Games (2003-6) underwritten by ESRC (£211,605) through People at the Centre of Communication and IT (PACCIT), DTI (£242,293) and Immersive Education Ltd (£389,889). Grantholder: Buckingham.

G2: Textuality and Videogames: Interactivity, Narrative Space and Role Play (2001-2003), AHRB (£87,043). Grantholder: Buckingham.

Indicators of quality can be seen in the range of internationally significant publications generated, in international journals (e.g. **R1**) and in influential international collections (e.g. **R3**, **R5**). A further indicator can be seen in the wide range of international keynote addresses given by project members, on games and learning, and on the outcomes of Making Games, in countries including Germany, Finland, Denmark, Australia, New Zealand and the UK.

4. Details of the impact (indicative maximum 750 words)

Reach and significance: *MissionMaker* represents a new model of educational software, in which young people learn *about* digital media, not just through it. It is enhancing digital and cultural literacy in hundreds of schools on four continents. The Making Games research has also helped to influence policy-makers, who took a keen interest in its design, and has pioneered a more collaborative method of games design.

Beneficiaries: young people in schools and out-of-school contexts, video games industry, education and technology policy-makers, cultural institutions.

Dates of impact: 2008-13, with the software's launch and build-up of sales.

Impact on policy and national thinking: Becta (the former IT quango) was closely involved with Making Games, playing a role on its advisory committee. As a result, Becta revised its policy for ICT in schools, allowing the purchase of higher-specification PCs that can handle the demands of gaming environments – see ESRC evaluation, impact source (**S1**). The researchers have

participated in policy-related workshops and conferences, and liaised with communications regulator Ofcom. In 2009, Futurelab commended *MissionMaker* in its influential report, *Digital Participation, Digital Literacy and School Subjects*, and cited Burn's work. *MissionMaker* is endorsed in Scotland's *Curriculum for Excellence* (**S2**). Consolarium, a national centre for games and learning, supports teachers in its use.

Commercial impact: By 2013, *MissionMaker* had been licensed to some 1000 users, mainly schools and city learning centres, and by 2013 its sales amounted to an estimated £700,000 (based on figures provided by Immersive).

Product development: Making Games also provided a new model of industrial design for the games and educational software sector: a partnership between software publisher and academics, with students and teachers serving, in effect, as co-designers, a process commended in the ESRC's evaluation. This model continued into a partnership with Shakespeare's Globe, extending the design to *MissionMaker* to allow pupils to make games based on Macbeth (2012). In late 2012, the IOE purchased Immersive Education's four educational software products, *Kar2ouche*, *Krucible*, *Mediastage* and *MissionMaker*. This has enabled researchers to embark on a new phase of R&D. By the end of the REF period they had begun developing new versions of its software through funded research, and were preparing to bring subsequent products to market under the name Magical Projects.

Engagement with industry: Researchers have been asked to take on a number of consultancy and advisory roles since Making Games ended. Burn was adviser to the Interactive Software Federation of Europe (the games industry's European association) from 2006-10, and gave keynotes at two of their annual conferences.

Gender: Making Games contributed to a change in thinking in the games industry that saw a rise in games for families in place of 'girly' products. Pelletier took part in a 2006 US National Science Foundation conference bringing together academics and industry representatives, titled *Beyond Barbie and Mortal Kombat*. Along with a subsequent book (**R3**) it helped dispel myths about gender and games.

Impact on practice: In a document reviewing game-based learning published in March 2010, Becta said *MissionMaker* allows pupils "to learn about the literacy of games design (e.g. narrative structure, rules systems, designing for audience) whilst developing their problem-solving, value judgment, negotiating and decision-making skills" (**S3).**

Use in schools: By 2013, nearly 1000 schools were using *MissionMaker*. Ready-made classroom activities mapped to England's national curriculum and exam syllabuses have included: Media Studies KS3; Teacher Notes for the Gifted and Talented *MissionMaker* Developing Cognitive Skills course (KS2) plus Gifted and Talented Workbook; and Fairy Tale Detective games. Teachers have created their own packages, such as Focus on Games KS3; written by Bedfordshire middle school teachers, it provides suggestions for 10 weeks' work. Many teachers have used social-networking sites such as YouTube to share – or pick up – suggestions on how the tool can be applied in the classroom. One YouTube video, with some 2,500 views by the end of July 2013, shows how *MissionMaker* can be used to teach children about health and safety (**S4**). Teachers have also found out about *MissionMaker's* usefulness through the education press (**S5**) and Teachers TV – it featured in two programmes, along with commentary by international experts on games and literacy. English teachers have learnt about *MissionMaker*'s support of wider literacy on the National Association for the Teaching of English website. In 2011-12, the ICT coordinator of Burnt Oak Primary School in Sidcup reported that using *MissionMaker* with Year 6 improved relationships and that the need for precision and logic had a knock-on effect on thinking and writing skills (**S6**). 'Kimberley' and 'Nathalie', Y6, reported: "The best thing about *MissionMaker* is it allows us to use our imagination. You have to think hard about who the game is for and work out rules". Out of school, it features in activity centre programmes (**S7**).

Endorsement by examination boards: A teaching programme built around *MissionMaker*, Games, Game Engines and Design, has been endorsed by the OCR examination board for use towards its Certificate/Diploma in iMedia. *MissionMaker* has also been included in the Moderators' Toolkit for the EdXcel Diploma in Digital Applications course as an appropriate tool to use in the game-making modules.

Work with young offenders: In 2009 Sheffield Youth Offending Service developed a programme using *MissionMaker* to re-engage truants and students in pupil referral units through educational gaming sessions. The Service subsequently reported that young people remained focused and

"progressed to the point where they took ownership of their games-making and tried out their own ideas". The organisers of this programme ran training sessions for teachers and argued that it has "powerful" potential to address issues relating to actions and their consequences (**S8**).
Career development: The Computer Games Skills Forum has said that projects such as *MissionMaker* should be supported wherever possible (**S9**). It believes that games-authoring software encourages more young people to consider careers in its industry. The Scottish Government has reached a similar conclusion, explicitly linking its ICT curriculum and the use of software such as *MissionMaker* with the future of the games industry (**S2**).
International impact: The Making Games project has been featured in keynote addresses at international conferences, media literacy seminars and teachers' conferences in Europe, the US, Australia and New Zealand. *MissionMaker* is being used in the US, Australia, Hong Kong, Finland, Germany, New Zealand and Denmark. Pelletier has advised the OECD and the Norwegian government on gender, equity and the IT industry. In 2009, Singapore established a National 3D Game Building Competition for schools, using the IOE tool, to raise awareness that computer games can be engaging learning tools. This competition, now called the National 3D Serious Play Competition, is also seen as supporting the country's efforts to become a regional hub for interactive games development. More than 100 teams participate each year (**S10**). The use of *MissionMaker* in Singapore, which is in the vanguard of ICT-in-education developments, is a particularly clear demonstration of the Making Games project's international impact.

5. Sources to corroborate the impact[1] (indicative maximum of 10 references)

S1: ESRC (2009) Impact Evaluation of PACCIT Programme http://www.esrc.ac.uk/_images/paccit_impact_evaluation_report_tcm8-3821.pdf
S2: "Games go on the curriculum", Scottish Government news release, April 14, 2008. http://www.scotland.gov.uk/News/Releases/2008/04/14082648
S3: BECTA (2010) *Games-based Learning*. https://www.wlv.ac.uk/default.aspx?page=25083
S4: *MissionMake*r health & safety sim: http://www.youtube.com/watch?v=qES6WyizoqM
S5: http://www.tes.co.uk/teaching-resource/Mission-Maker-Y9-Project-Part-1-6225446/
S6: http://www.immersiveeducation.eu/pdf/casestudies/PrimaryBurntOak.pdf
S7: http://www.kingswood.co.uk/programmes/modules/computing/mission-maker
S8: Sheffield Youth Offending Service report on Mission Maker project https://www.ntu.ac.uk/cels/he_projects/projects/other_projects/interactive_technologies/94062.pdf
S9: http://www.creativeskillset.org/games/at_school/article_4404_1.asp
S10: http://www.verticalmiles.com/component/content/article/17-events/30-n3dspc2012

[1] All web links accessed 09/11/13