POCOS 3: Gaming Environments & Virtual Worlds

Cardiff, Wales, 26-27 January 2012

About the event

From 26 to 27 January 2012 the third in a series of symposia on the Preservation of Complex Objects (POCOS) took place in Cardiff, Wales. Funded by the JISC Information Environment Programme 2009-11 and organised by the British Library; Joguin SAS; HATII, University of Glasgow; King's Visualisation Lab, King's College, London; and the School of Creative Technologies, University of Portsmouth this event focused on issues of the preservation of gaming environments and virtual worlds. The slides and recordings of the presentations and a companion book will be published in due course. You can find the programme at http://www.pocos.org/index.php/pocos-symposia/videogame-environments-a-virtual-worlds

Angela Dappert represented the DPC; a multitude of DPC members from the British Library, JISC, Kings College London, HATII and the University of Portsmouth were present in their own right.

These notes are intended to provide an informal briefing for members of the DPC not able to attend the event. For an authoritative and comprehensive repost readers are encouraged to contact the organisers of the event and the speakers directly.

Presentations and discussion

Day 1:

Welcome and Introduction

David Anderson, The University of Portsmouth, gave an introduction to the POCOS series and previous POCOS events, announced the imminent publication of the book accompanying the first event on the preservation of visualisations and simulation, and announced a planned 4th event in the series to be held at the University of Portsmouth.

Neil Grindley, JISC, UK, who is the funder for the series, situated the work in the larger framework of JISC activity, gave a personal reaction for what preserving computer games means for him, and reflected on value and motivations for why we think about preserving games. He noted that the 3 POCOS topics have been unusual for the normal JISC research activities. Some of the motivations are the facts that the gaming industry has a huge economic impact, games shape society, as in the example of American Army, which is the number one recruiting tool for the American army, and that games are a vibrant cultural phenomenon. They have an impact on people's response to art, science, their future career choices, etc. but the full value of their preservation can at this point not be fully assed. He compared the investment in games preservation to car manufacturers' investing in Formula 1, where the lessons from the most technologically advanced products feed into mainstream production. Gaming experience might be extracted for application in the educational environment.

Opening Keynote Address: Dan Pinchbeck, The Chinese Room, UK: Standing on the shoulders of heavily armed giants: Why history matters for Game Development

Dan Pinchbeck, game designer and developer and lecturer at the University of Portsmouth who looks at the design spaces of gaming that are not exploited in industry. He presented an overview of the history starting with the earliest computer games.

He discussed the nature of first person shooter games with their inherent wireframe maze, the player's moving on the horizontal maze, the emotional impact of the immediacy of the shooting game story and the suspense caused by the fact that the player cannot see what is ahead in the game. Early games, such as Maze War have nearly identical game play as later games in the genre, but the latter used technological advances developed in academic research. In later first person shooters, game characters talk to you if you want to engage in the story which may contain detailed settings and high-culture reference points. This is partially a product of sophistication of technology but also of design.

The 1980s brought on role playing games that are slow and static in comparison and don't have the same emotional immediacy of the Avatars of first person shooter games. Instead they work with interesting vistas in which the player moves. More modern work adds scale and depth to the world, not innovative game play. Violence is muted, but the player has a huge world to explore.

He noted that gamers are more media literate than literature or film buffs by comparison. They understand the hardware and software behind the game unlike how literature buffs, for example, understand writing and printing. In order to teach computer game development it is important to understand the gaming history. But access to the early history of games is hard since there is no legal form of computer game preservation. This is a barrier for an educator who wants to teach students about historical development. Equally old computer magazines are hard to find and it is not legal to scan them and make them available online. Dan emphasized that we need community lead activity to legalisation. He said that game preservation is not a question about cultural worth or whether it needs to be preserved. Computer games are there and play a massive part of culture.

Keynote Address: Jerome McDonough, The iSchool Illinois, USA: A Tangled Web: Metadata and Problems in Game Preservation

Jerry McDonough reported on the Preserving Virtual Worlds Project, an on-going initiative on preserving games and interactive fiction. The 2 research components are:

- What are the problems preserving games?
- What are the significant properties of computer games?

They encountered many problems with capturing metadata for computer games:

- **Messy boundary issues**. For example, the source code of Space Wars was meant to show off the vector display of the PDP. Therefore, you need to preserve this hardware with the game. There is reliance on libraries and pieces of hardware and hardware is hard to preserve.
- **Social complexity of a game**: client and server preservation does not tell the story line; what needs to be preserved is also how the game is used and appropriated by the player.

- **Copyright law**: Orphan works problems with respect to books equally apply in the gaming market where game companies disappear quickly and technological protection measures cannot be broken without rights holder consent. For example in Second Life there are very many rights holders (every creator) and you cannot preserve an island without every rights holder's consent. The team managed to hack a copy-bot so that they could identify all relevant rights holders, but even then, the best case response of consent was only 10%.
- **Bibliographic control**: As specified in the OAIS reference model, you need representation information to make sense of preservation objects, e.g. the Fortran IV specification. It is often hard to get this information. Even though libraries collect standards, they are not catalogued because the standards copies would be stolen because of their high value or damaged because of their lose-leave nature. But you cannot preserve games without the applicable standards.
- **Versions**: There is no agreement of what a version or variant is. Which variant do you include in your archive? All of them? Is there an official version? A Fortran IV file refers to a Fortran IV library which is on a specific operating system (Tenex) which would also have to be preserved, and so on. There are also version issues on the level of files (not just of the level of the game). This implies that one might need versions of the individual components. The team used FRBR to capture work, version, variant and implementation information in trees and the relationships between these components.
- **Representation information**: It is hard to determine which representation information needs to be preserved, when numerous standards and specifications feed into a file format, for example. This is a knowledge management problem, not a standards preservation problem.

They used OWL to relate the 2 data models of FRBR and OAIS, created an ontology, and used METS to package up the information. The goal of the ontology is to be able to collect enough information so you could write an emulator if you have none. The data model is huge in RDF. Legible visualization of one package of Star Raiders (one ROM file) is not possible. It is not a scalable solution to create this representation from scratch for each game. Instead, there needs to be a shared way of representing representation information networks – similar to file formats registry efforts (PRONOM etc.) we need to share descriptions of computing environments.

They are now working on more involvement with the gamer and game community to understand what is significant about games. There is too much information, not insufficient; librarians cannot do this job of selecting the significant bits.

Angela Dappert, The Digital Preservation Coalition (DPC) and TIMBUS project, UK: Metadata for Preserving Computing Environments

Angela's presentation looked

- at the TIMBUS projects' approach to preserving whole business processes and their computing environments and
- the underlying metadata definition work that has been done to define preservation metadata for increasingly complex computational components, such as bit streams, files, representations of intellectual entities consisting of several files, research data, software and

hardware, third-party hosted interdependent computing services, and complete business processes.

The EU co-funded TIMBUS project has a 3-phase approach of

- identifying what parts of a business process need to be preserved and determining their preservation feasibility and cost,
- performing the preservation of a complete business process including interdependent remote services, and
- exhuming the process on a future (simulated) platform.

 Interesting tasks in the first phase are

- Intelligent Enterprise Risk Management,
- determining service, software and hardware dependencies relevant to the preservation task,
- identifying and capturing the relevant process components for preservation, and
- determining the legalities life-cycle management for current access, preservation access and future access at the time of exhumation.

Angela illustrated the TIMBUS approach on the case study of a typical file format migration workflow in an archive.

In the second half of the presentation she introduced how the PREMIS data dictionary handles the description of computing environments and what considerations motivate the current re-thinking of this in the PREMIS Environment Working Group. She also introduced preservation metadata specifications for software preservation proposed by STFC and the Software Sustainability Institute, and VRDF (the Virtual Resources Description Framework), a metadata specifications for the software, machine and network layers in a cloud computing environment. All of these approaches can be applied to the preservation of computing games and virtual worlds.

Janet Delve, The University of Portsmouth, UK: Preserving Gaming Environments: The TOTEM Database (developed in the KEEP project)

Janet discussed relevant work for preserving gaming environments. She pointed out that the Blue Ribbon Task Force 'Sustainable Economics for a Digital Planet' had emphasized that economic and cultural forces provided a motivation for preserving computer games. She described the KEEP initiatives that use emulation as preservation methodology. Both, the German Games Museum and the European Games Developers Federation are part of the initiatives. The TOTEM database was developed at the University of Portsmouth and provides a register describing technical environment metadata of the underlying computing environments (http://keep-totem.co.uk/). She introduced the KEEP Emulation Framework, which selects the correct emulation path from the emulator and software archives for a given game file, and the KEEP Virtual Machine.

Janet discussed metadata specifications that have focussed specifically on computer game preservation, such as Karsten Huth's metadata set and the metadata sets used by Moby Games and other websites. Difficulties to overcome are the complexity of the model, the overhead of ingest, cross-dependencies and object-extensions/alterations (in the form of patches, commercial extension

packs, cracks and mods). She illustrated the topic with the TOTEM database, which contains PC, Commodore 64 and console game data. We find dependencies on games controllers, software libraries, mods, etc..

An alternative or complementary to emulation is hardware preservation as found in the Computer History Museum at Bletchley Park.

The POCOS companion book to POCOS Symposium 1, which is ready now, contains articles on software preservation that are also relevant for games preservation.

Break-out sessions:

After lunch the audience broke out into sessions on the following topics:

- The role of the developer in curating and preserving games and virtual worlds
- The role of cultural institutions: technical registries, software, hardware and online issues
- The role of cultural institutions: Interpretation and Documentation (metadata)
- The role of the community: abandon-ware, orphan works, grey-ware, Preserving second life - content owners' permission issues

Day 2:

Keynote Address: Prof. Richard Bartle, University of Essex, UK: Archaeology versus Anthropology: What can truly be preserved?

Richard motivated his presentation with the observation that we preserve things for future generations for three reasons:

- so they can learn who we were (history),
- so they can learn who they are (literature),
- so they can learn why important things are important (art).

Historians try to understand the old meaning of old artefacts of people of the past. Preservation gives them a basis for information. This enables them to explain it to people of today and these explanations are used as source of information for future people about us.

We can only preserve the artefact but not the effect it had on people of the past. You have to role-play a person of the past to understand what effect it might have had. Yesterday's graphics would have been amazing, a train coming towards you on a screen frightening. You had to invest coins to play and beat the arcade game. Language, meanings, symbols, nuances change and are open to interpretation and the effect on current people is different. The game designer has no control on future interpretations. MMOs are places, they are not just games. You need to consider the context, the people who are playing them. If you separate them you cannot understand them. To understand them in the future you would have to have a simulation of massive numbers of people who can imagine themselves back in time.

Preserving just the software is like archaeology. It is missing the people and preserves just the empty spaces. The purpose of the preservation depends on second guessing what people of the future may want to use it for.

Anthropology is about studying communities. If we cannot preserve people we can preserve studies of them – an ethnology fills the preservation hole. In contrast, sociology studies societies of the present. This turf war on games preservation gives different perspectives which are valuable. In both, you have to preserve the playing experience while the game is running and the people are alive.

But does it matter if the experience / the fun changes if you want to learn about today's people? This is the literature interpretation of preservation.

Alternatively, you can look at it as an expression of artistic intend (art approach). The creator is trying to say something. By experiencing the work you interpret what the artist means. They cannot say it in words, but rather chose a different medium that cannot be expressed in another way. Some things are forced on you: e.g. you cannot have time travel in a multi player game. A games expert gets insight into the creator's mind, understands how ideas develop over time, can place a game in time, and identify a creator. You learn something about your own game by doing this. Your response will be in terms of games as the medium of expression.

Practicalities:

- You have to preserve the text since it contains the content – this is why you keep the original. Sometimes the content and the medium are too bound up with each other and you cannot get at the content. Therefore, one should extract the text.
- Alternatively, when you use an emulator to run a game, this gives the bound-up experience.
- You can keep the original hardware to test and validate the emulator, but otherwise you should use emulators to protect original valves, etc. from burning out.
- Expense aside, there are other practical problems. The MMO worlds change over time World of Warcraft of 2004 is different from 2011. There are even differences between different servers, such as going left instead of right at an intersection at different servers.
- Anthropological studies take time and one would want to take 10 years rather than weeks or months.
- In interviews with the players it is important to capture information about the people who are playing because their motivations will be different. This includes interviews with designers and developers.

Conclusion: If something is worth saving it is worth saving for a reason – instead of just hording. For MMOs this would ideally include an ethnology, players, and design notes in addition to software and hardware (which are the starting point). You could do things similar to the director's commentary on a DVD. Raw data is not as good as commented data. Therefore, instead of just recording everything game players say, it is better to partition the recordings into logical categories.

Tom Woolley, Curator of New Media, National Media Museum, UK: Curatorial Issues in Preserving Games for Museum Collections and Public Display

Tom Woolley spoke about practical aspects of engaging audiences at the National Media Museum, which consists of several museums focusing on different media types. The National Media Museum's infrastructure is based on the Science Museum in London. The National Video Game Collection was formed in 2008. They are collecting world-wide materials. The collection comes mostly from public donations and some industry donations. They are also collecting game arcade collections and ephemera surrounding games and would like to collect more fan-generated ephemera and online created maps. But they don't have a digital repository. 2/3 of their items are from the early 80s. They catalogue the software and hardware. The environmental conditions must be museum quality and consistent. Plastics are particularly biodegradable and, therefore, they are doing plastics and rubber preservation research.

The National Video Game Collection opened a games lounge in the museum in 2010 which was an instant hit. The handling collection consists of duplicates from the collections. This enables them to see in which cases active use helps in the preservation or causes more deterioration. So far it is the coin mechanism, control part switch or the CRT screens that cause problems.

They have displays on the history of gaming and an emulation games lounge, with publisher's permission. Publishers have donated additional display items together with copyright permission. They will now try out new games and research the audience response.

They have moved from archiving to curation. They originally had a bigger collection of games out for users, but it is hard to let the audience get something out of games for which it takes hours to develop the game line. For example, they tried 'Elite' originally but removed it. The museum has a 'TV Heaven', where you can book in and watch TV for hours. They feel it would be good to have a 'Games Heaven' as well.

- The video game festival 'Game City' at Nottingham University is doing games director's commentary. They use video to document game play at various levels, especially for MMOs.
- Games On, Barbican, is a touring exhibit of computer games: http://bit.ly/aSgdpC that is very expensive to run since games have to be fixed all the time. It is a very encyclopaedic collection.
- Video Game Nation is an encyclopaedia of British games
- Computerspiele Museum, Berlin has explored all the ins and out of the game Pong.
- Robbie Cooper did a project called Alter Ego comparing players with their virtual alter egos.
- Immersion, a twin project by Robbie Cooper, shows people playing from a camera through inside the screen as they consume games or other media.

Paul Wheatley, Digital Preservation Team, The British Library, UK: A National Library perspective on the preservation of games

Paul gave a background of Digital Preservation at the British Library, which holds a brought range of born-digital and digitised items to preserve. Additionally they have outward-focused activities, such as collaborations on external projects. The British Library has a very small games collection, collected

alongside non-digital items. Their legal status is not clear. It consists of mainly cover CDs from magazines.

The question of what a national library should preserve has not been answered. Research on social impact, health, education, business, advertising, games studies, etc. might wish to find games or information on games preserved. But in order to be preserve games one need to have a strong business case, such as skilling up staff for the games industry.

How much should one preserve? The answer is probably that one should preserve significant games rather than everything. Legal issues are the number one problem. Emulation is an option.

Legal Deposit for print is existent. 2003 brought voluntary legal deposit for digital materials, but legislation for compulsory legal deposit has not happened. It is expected to cover online content, but is not likely to cover the deposit of games. Some European countries have compulsory legal deposit even including games.

The National Video Game Archive and memory institutions have longevity as institutions and have expertise in preserving digital items and are suited for preserving games. However, do libraries have a mandate? Hardware and data are archived in museums and archives, respectively. But software is not preserved. In contrast, preservation through enthusiast entails greater legal and practical concerns, but they are a powerful force.

Engagement with publishers and developers is important for memory institutions. One can get past the IP laws, even if currently big publishers block it, but compromise might be possible.

What does success look like? This needs to be answered by curators.

The British Library are starting a special games collection as part of the web-archiving initiative. Additionally, an independent UK videogame preservation study, sponsored by the BL and delivered by the Digital Preservation Coalition looks into audience needs and value. A games preservation summit is to follow the completion of the study.

Keynote Address: Ian Livingstone OBE, Co-founder, The Games Workshop, UK

Ian gave an entertaining history of The Games Workshop. In 1975 the group of Ian Livingstone, Steve Jackson and John Peake originally crafted and sold traditional games. They then created the White Dwarf predecessor magazine, 'Owl and Weasel', which they sold through mail-order and which, amongst other subscribers, went to the Dungeons and Dragons inventors, Gygax and Arneson. Gygax got back to them and they ended up getting an exclusive distribution license for Europe. Their first office was Steve's van parked outside a squash club, in which they were able to shower. They originally sold through other shops, but it was clear that those shops did not appreciate the game's appeal and did not want to stock it. In consequence they opened their first own shop in 1978. Owl and Weasel was followed by White Dwarf. Citadel miniatures followed with Warhammer to replace D&D since they did not have the IP for D&D, just a limited time license. Ian's lesson for life is that you need to create your own IP and not depend on others.

It still was relatively niche and they wanted to broaden the user base. They expanded to 'Fighting and Fantasy'. Penguin books asked them to write a book on role playing. Instead they wrote an

interactive book 'The Warlock of Firetop Mountain' in 1982. Penguin did not promote it much. But some customer pockets sprung up through word of mouth. There were 11 reprints before they were asked to develop new books. The business grew so much that they eventually had to hire ghost writers.

A New British Company asked them to write a computer game. The company evolved and eventually became Eidos which creates Tomb Raider, Lara Croft, now acquired by Square Enix.

This history was followed by an overview of the gaming history in general and its economic significance. The gaming industry is now bigger than DVDs, music or books. 'Call of Duty' is beating Harry Potter at the box office. The fact that it is anticipated that this year we will see more sales over the network than through retail may indicate that we will see a societal shift in the market place. It is a fantastic opportunity for small, agile outfits. Preservation is difficult in a world in which products are forever beta since the finished product never happens. Social mobile games playing with friends across platforms and getting invitations from friends provides more powerful marketing than just the narrow iStore shop front.

What about the UK? With MUD, Elite etc. , the UK was right there from the beginning. The early heritage in computing is, however, being lost. Ian Livingston and Alex Hope wrote a Next Gen report about the problems of recruiting software professionals. Computer scientist, artist and animators are needed by the industry, but the schools' ICT teaching is not helping the software industry. Their number one recommendation is to bring computer science as a discipline in schools. Next gen.skills's call was largely ignored by the DfE/ government. Eric Schmidt, Google, made reference to the report last year and finally got a lot of attention, even from the government. Ian notes that access to the government special advisors makes all the difference in influencing societal change.

Ian finished his presentation with a discussion about the cultural significance of Lara Croft.

Break-out sessions:

After lunch the audience broke out into groups to discuss the following topic:

- Define a Preservation Strategy for Dsigital Games and Virtual Worlds

About this document

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