Constructing Digital Game Exhibitions: Objects, Experiences, and Context

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Abstract: A large number of exhibitions worldwide deal with digital games, but curators lack a coherent understanding of the different aspects of games that can be exhibited or a clear vocabulary for talking about them. Based on a literature review on game preservation and visitor behavior in exhibitions, the paper makes an argument for understanding digital games on display as made up of *object*, *experience*, and *context* aspects. The study further presents a matrix model for understanding and working with games in exhibitions. The model makes for a more nuanced understanding of the different ways digital games can be exhibited. Additionally, it clarifies the position of games in exhibitions as socioculturally constructed through inherently ideological curatorial choices.

Keywords: exhibition planning; museum work practices; game preservation; cultural heritage; digital game; original experience; context; construct

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1. Introduction

Several museums dedicated to exhibiting digital games[1] have opened around the world lately. Although their exhibitions have many things in common, it is striking how different they are in the strategies they employ toward exhibiting and preserving games. The Game On 2.0 exhibition, produced by Barbican International Enterprises, focuses on playable games in the form of "original experiences" on original hardware (Prax et al. 2016), the Nexon Computer Museum (2014) in Korea exhibits international game history, the Finnish Museum of Games tells the story of game development in Finland (Heinonen 2017) and the Play Beyond Play exhibition at the Swedish National Museum of Science and Technology deals also with the problematic aspects of games (Du Rietz 2018). Why are game museums and exhibitions working towards so different goals?

In an attempt to answer the question, this article deals with digital games on display in museums, galleries, trade fairs, and similar public places. Based on a literature review of studies dealing with games as interactive exhibits and on case examples from the Finnish Museum of Games, the paper aims to build a theoretical argument about understanding games on display and to provide a comprehensive model and vocabulary for understanding them. The hypothesis is whether games on display should be understood as being constructed out of three different aspects: *object*, *experience*, and *context*. The three aspects have been proposed in earlier research (e.g., Newman and Simons 2018; Sköld 2018), but this study is a first effort to understand them as a whole. In addition, the study provides a matrix for using them to theoretically inform the exhibiting of games.

This paper deals with games on display. Game preservation research has to a large extent been dealing with preserving playability and with the long-term game preservation issues it entails (Newman and Simons 2018). Although recently criticism has been raised at the technical approach to

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[1] The term digital game is used throughout. It is understood as a concept covering all games played on digital devices, e.g., mobile games, computer games, console games, and online games.

game preservation (e.g., Newman 2012a, Guins 2014), not that many concrete options to it have been presented. This article looks into the theoretical issues of displaying games in public environments, and at the different aspects by which this can be achieved. The study draws from different traditions and approaches while it aims at building bridges between game studies and museology, museum pedagogy, heritage studies, and the study of exhibitions. It contributes to building a critical vocabulary for talking about and understanding games on display, which can be used in analyzing, planning, and criticizing game exhibitions. It contributes to game preservation research by dealing explicitly with exhibitions and providing connections to existing museum and heritage research.

For this paper, all 70 digital games on display at the Finnish Museum of Games went through a preliminary evaluation. Based on the preliminary evaluation, four games were selected for the study, based on their exhibitable affordances (Gibson 2011) and the resulting exhibiting techniques. As online games with servers are dependent on the companies or communities that run them, entire game genres (e.g., MMORPGs) cannot be experienced in an exhibition visit timeframe, and other games might be difficult to experience alone or without prior knowledge of the genre, exhibiting playable games is dependent on the game and its properties. Similarly, exhibiting games is also dependent on the hardware used. Games with specialized hardware requirements or unique controllers might not be exhibitable. These issues inform the selection and curation process in exhibitions, as well as the selection criteria for the games selected for analysis in this paper.

Four games were selected for closer analysis. The games were chosen from a set of 70 digital games on display at the Finnish Museum of Games. The selection criteria was to show many varied approaches to exhibiting games in order to highlight the existence of the three different aspects of *object*, *experience*, and *context*. The framework of museum practices research informs the analysis, as the author has worked at the Finnish Museum of Games, and has inside knowledge to the workings of the museum. Other exhibitions were chosen to provide context to the discussion and provide examples of divergent approaches to the matter of displaying games in public.

In the literature review, research dealing with interactivity and learning complements the game preservation research and allows for a more nuanced understanding of what constitutes the game exhibition experience. The article does not present an exhaustive literature review of game preservation related research (for such a presentation, see Sköld 2018). Instead, it includes the central themes of game preservation research relevant for dealing with the research question.

The systematic thematic analysis identifies artifact categories relevant for the analyzed games. It looks at the four games on display at the Finnish Museum of Games and arranges the various artifacts on display into five overarching categories. The findings, informed by the author's knowledge of museum work practices and artifact categories are presented in a table. The analysis and resultant table help in building the preservation model presented in the article, and provide insight into how the various parts of games on display interact with each other.

The paper starts by covering multiple theoretical issues. First, the role of games as artifacts is discussed. Then, interactive experiences and the interplay between visitor and exhibition content is highlighted. Finally, the paper goes on to discuss the context of games. After the literature review, a synthesis of the literature and a model for understanding games on display is presented. The application of the model is demonstrated using case examples from the Finnish Museum of Games. The discussion touches on the way different kinds of exhibitions and stakeholders might benefit from the presented model it uses in long-term preservation, as well as the ideological issues of exhibiting and preserving games.

2. Results

2.1. Game Artifacts in Exhibitions

Digital heritage, and digital games in particular, challenge the ways heritage institutions have been working in the past (Guins 2014, p. 79). Museums have traditionally been interested in physical

objects, relying on them to communicate information about cultural heritage to museum visitors. Digital games pose many questions and difficulties for the traditional museum approach, ranging from what game exhibitions should display and on to how the "museum object" should be understood. The ambiguities include the position of digital games as both physical *objects* and interactive *experiences*.

　　　Game research deals with similar ontological issues. "Videogames are a mess" (Bogost 2009) in the ontological sense, since the term videogame or digital game can mean anything from source code, retail boxes, circuit boards, game design, intellectual properties, collector items, and on to playable games. All of these things are part of digital games, and exhibitions have found different ways to deal with them, not just the physical objects. Similarly, research on playable games as texts is increasingly "de-centered" by research focusing on the paratexts surrounding them, like walkthroughs, game guides, and Let's Play videos (Consalvo 2017).

　　　Because of these ambiguities, there is a need for a more nuanced understanding of what games in exhibitions are. Following Sotamaa (2014, p. 3), this article assumes that digital games in exhibitions take the form of either *material* or *software artifacts*, i.e., they express either the physicality of games (consoles, controllers, and storage media) or the interactivity of them (playable games). Games are also *cultural artifacts* in that they "carry embedded meanings and ideas and are socially shaped in production and use" (ibid.).

　　　Software artifacts are meant to be played. They are enjoyed in certain situations and by certain people, as fleeting interactive experiences that do not come to life before the act of playing (Stenros and Waern 2011). Players play and experience games in their own various ways (Sicart 2014), and their "distinct playing performances problematize discussions of games as static texts", which has consequences for game preservation and the art of exhibiting them (Newman 2012b, p. 136). If game preservation and game exhibitions are interested in providing visitors opportunities for play or in displaying footage of others playing, the heterogeneous nature of play must in some way be taken into account. Displaying examples of play contains an inherently ideological choice of what to present.

　　　Moreover, including games in collections and exhibitions shapes them as cultural artifacts, which creates "meanings different from those of other uses and contexts" (Siefkes 2012, p. 89). When *Max Payne* (2001) is playable in the Finnish Museum of Games on a modern LCD monitor, alongside a retail box and an interview with screenwriter Sami Järvi, it is a different experience from playing the game at home with a CRT (Cathode Ray Tube) monitor when it came out. The exhibiting process also changes the game, giving it new meanings as a cultural heritage artifact.

　　　This study understands games in exhibitions as *objects* or *experiences*, that is, as either material artifacts (i.e., physical things) or as interactive software artifacts (i.e., games playable on screens). In addition, many hobbyists and collectors propagate a way of understanding games as *both* objects and experiences at the same time. Following Swalwell (2013) critical reading[2], this study calls these particular interactive experiences "original experiences", which can for the purposes of this paper be defined as game experiences played on original game hardware and controllers (Figure 1).

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[2]　Swalwell (2013, p. 11) presents a critical reading of the disparate problems the "original experiences" approach advances and juxtaposes "original experiences" with a "critical historical and scholarly understanding". According to Swalwell (ibid., 4), the "original experiences" approach is "popular writing about games history, in journalistic pieces or enthusiasts' forums, rather than in the writing of scholars or critical game historians".
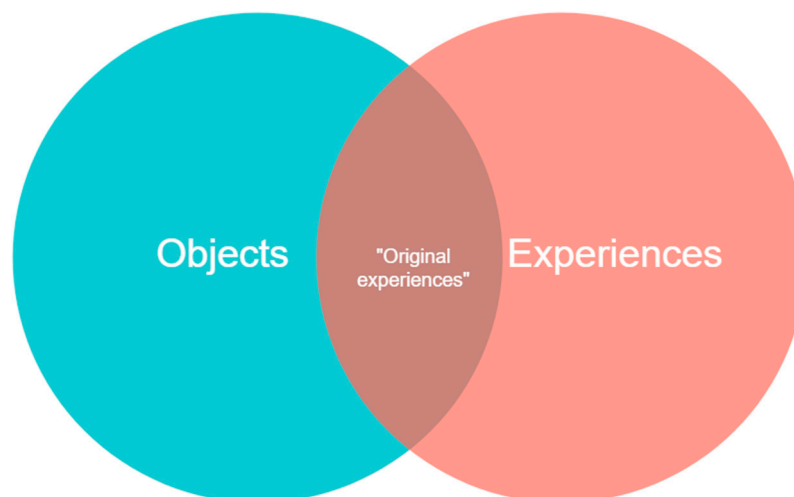
Figure 1. Games as both objects and experiences.

By way of conclusion, games in exhibitions have traditionally been understood as either objects or experiences. Another way to approach exhibited games is to think of them as "original experiences", combining the qualities of both the object and experience aspect of them. Regardless of how playable games are presented, they possess many similarities with what museums have traditionally called interactive experiences, which have a long history in the philosophy of pedagogy and in museum and science center exhibitions. These different ways of conceptualizing games on display are not just theoretical. In the context of exhibition planning, the process of displaying games can lead to considerably different outcomes, which also has consequences for game heritage formation (cf. Smith 2006, p. 54).

2.2. Exhibited Games as Interactive Experiences

The notion of interactive experiences[3] can be traced back to at least to progressive pedagogist John Dewey, and his ideas of learning-by-doing, which have been influential in both education and social reform (Haggbloom et al. 2002). Dewey propagated the usefulness of interactivity in learning, stating that knowledge ultimately rises from "impressions made upon us by natural objects", and how it is "impossible to procure knowledge without the use of objects which impress the mind" (Dewey 1916, pp. 217–18).

Since then, interactivity has acquired many advocates, not least in museums and other places of learning, where interactive "hands-on" experiences have become one tool in the toolset available for exhibition designers. Exhibition hands-on was first propagated in science centers, with the Exploratorium of Frank Oppenheimer being among the first to embrace the concept. Oppenheimer, a particle physicist, insisted that hands-on experiences had great potential for teaching and that visitors gain "understanding [of science and technology] by controlling and watching the behavior of laboratory apparatus and machinery" (Oppenheimer 1968, p. 207).

Hands-on and interactive experiences have gained widespread support in exhibitions, with many studies able to show the positive results of interactivity. Hands-on promotes engagement and recall of exhibits and their content (Schneider and Cheslock 2003, p. 71) and "[v]isitors greatly prefer interactive elements" in exhibitions (Hein and Alexander 1998, p. 16). Interactive exhibits also have the advantage

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[3] There are many different degrees of interactive experiences. A TV set can be switched on or off and the content can be changed with a remote controller, but it is only when the TV is connected to a game console or similar piece of interactive technology that the user can interact with the content. In addition, digital interactivity and physical hands-on have differences that this study will not deal with in more detail (Fornäs 1998).

of being memorable and many visitors able to describe the thoughts and feelings they had at the exhibits over six months after a visit (Stevenson 1991).

The reliance on interactivity has also seen critics. In the museum tradition, playable games can be understood as interactive experiences. Although game exhibitions have been praised for their interactivity and the amount of playable games they have on display, the playing of games does not equal understanding them and their cultural, historical, and social dimensions. Instead, the focus on experiences has informed a development where game museums and exhibitions are increasingly seen as a type of "theme park" or amusement center, where the main aim is to *entertain* visitors. In this context, playable games can be seen as "promotional gimmicks" for museums (Naskali et al. 2013, p. 233).

In the theme park approach, often propagated by non-professional museums and other privately-owned exhibitions and arcades, playable games are presented as the only content visitors are interested in. If playable games become an end instead of a means to some sort of contextualizing understanding, it might be difficult to defend their role as museum objects. The theme park approach does not take into account the notion of museal understanding and communication with visitors. Excitement and amusement as such are not a part of how the International Council of Museums (ICOM) defines museums:

> A museum is a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment. (International Committee of Museums ICOM)

To conclude, interactive experiences have a long history with museum exhibitions, and they have been shown to have positive effects in helping museums engage with visitors. Critics of hands-on, on the other hand, are worried about how interactive experiences do not incite any deeper understanding of the subjects they are dealing with, and how they do not support the core values of museums. The "original experiences" of playing with original hardware do not automatically translate into a deeper understanding of what games and game heritage are about.

2.3. Beyond Original Experiences

Instead of relying on the nostalgic proposition of "original experiences" as a guideline for building game museums, it might be beneficial to look in other directions to help understand the museum experience. There is a definitive need to move on from the "cult of the original" when exhibiting games. This need includes problematizing the notion of original experiences and understanding the exhibition–visitor interface in a more nuanced way. One of the models used for visitor experience understanding is called the "contextual model of learning", propagated by Falk and Dierking (2013), which defines learning in museums as happening in three different contexts: the *personal*, the *sociocultural*, and the *physical*.

The personal context "includes differences in individual interests, attitudes, and motivations for visiting" (Falk and Dierking 2013, p. 27). How visitors perceive and experience museums is tied to the sociocultural context, to "one's cultural background (race-ethnicity, socioeconomic status, country of origin)", and depends "on whether one walks through a museum with an eight-year-old or with an eighty-year-old in tow, whether one is a parent with two small children, or whether or not one's companion is knowledgeable about the exhibits" (ibid., pp. 27–28). Games, whether they are played at home or in an exhibition framework, always happen in a sociocultural context, and are not understandable without it. Visitors are not passive vessels that take in the museum exhibition in the way the curator intended. Instead, visitors have an active role in meaning-making:

> Visitors come to museums with their own agendas and construct their own meanings within museums. Regardless of what the museum staff intend, visitors' different expectations,

previous museum experiences, and levels of perceptual skills mean that museum experiences
is often personal and individual rather than standard and generic. (Chang 2006, p. 170)

The physical exhibition space is understood as the third factor in the learning process. According
to Falk and Dierking (2013, p. 29) learning is "constructed over time as the individual moves through
his sociocultural and physical world". In the contextual model of learning, the interplay between
visitor and exhibition is always "filtered through the personal context, mediated by the sociocultural
context, and embedded within the physical context" (ibid., p. 30).

Schmitt (2007, p. 587) writes about how the "explanatory power of (the Barbican produced Game
On exhibition) seemed to be at its strongest in those sections that were not interactive". Neither
objects or interactive experiences can communicate the full meaning of what playing games in various
time periods has meant. Material artifacts in their physical context in vitrines do not automatically
convey their meaning to exhibition goers. Instead, visitors approach them from their own personal and
sociocultural contexts. The same is true for interactive game experiences, which are not automatically
understandable for visitors with no prior experience of the games exhibited.

The authenticity of "original experiences" is always constructed, since it entails choosing whose
experiences are defined as "authentic" and deciding if developers, players or other sources are the
foremost authority on it. "Original experiences" are an ideal impossible to reach because visitors do
not re-experience "original experiences", but rather approach re-constructions of the sociocultural
values of an exhibited game in a physical exhibition context, shaped by their own prior personal
(game) experiences. The question of "which differences matter" (Lowood 2014) is in the center of
"original experiences", but also game preservation in general. Playing *Super Mario Bros.* on a Nintendo
Entertainment System in 2018 does not take one back to 1985 or 1987, even if the game is presented
in an "interactive interior room" from the period[4] or a virtual reality (VR) experience like EmuVR[5],
although it might raise pleasant and nostalgic memories of playing the game thirty years earlier.

Prax et al. (2016, p. 14) challenge the notion of "original experiences" by stating that "games
by themselves (might not) always be able to allow for reflection but might need added information,
guiding, or narration to make good on the requirements of a museum exhibition". The original
experience does not equal understanding or reflection, and it might be outright incoherent for players
without prior knowledge of said system, controller or games. As game cultures mature and new
gaming generations experience historical games for the first time in museums, the need to explain and
communicate grows:

> (W)hile it is desirable to present playable original games in an exhibition it cannot be expected
> that visitors will have the same experience as players had with the game in its historical
> context and it is questionable whether providing playable games on original hardware is
> enough to achieve the objects of game preservation and exhibition. (Prax et al. 2016, p. 6)

As we have seen, while original hardware helps formulate the sociocultural context of play,
playing a game on a particular console can never reach an "original experience". According to the
contextual model of learning, exhibition visitors approach re-constructions of the sociocultural values
of exhibited games in physical exhibition contexts, shaped by their prior personal experiences. Rather
than understand "original experiences" as enabling visitors to re-experience play experiences from
their past, they actually experience constructions of gameplay that do not sit "easily alongside more
critical and scholarly perspectives" (Swalwell 2013, p. 11). To be clear, "original experiences" do not
enable visitors to "relive past experiences", as "the player is not the same player who confronted this
game in decades gone by" (ibid., 6).

4　As seen in e.g., Computerspielemuseum, the Finnish Museum of Games or the National Videogame Museum.
5　EmuVR is a "VR simulation of those good old nostalgic days just playing video games in your room" which features
　authentic models of period rooms and game emulation embedded into a VR experience (EmuVR 2018).

2.4. Context in Game Exhibitions

As games and their interfaces have changed over the years, especially older game genres[6] might be difficult to understand by just playing them. Preserving just playable games without the larger scope of how they should be played, makes for a one-sided or even inadequate preservation. When Game on 2.0 displays playable original hardware, with limited or no context information, it "runs the risk of presenting a limited view of digital games" (Prax et al. 2016, p. 4), instead of helping visitors understand the "wider contexts that gaming occurs in" (ibid., 13).

Experiences have their limits, and they do not help to understand past ways of production and play. Playing without context, in other words, can be confusing and lead to misunderstandings, even if it is done on original hardware.

Moving beyond experiences requires various forms of context. Visitors from non-gamer sociocultural backgrounds cannot understand the idiosyncrasies of games without the context of game culture, and how game users, developers, and reviewers have understood and talked about them. Guins (2014, p. 88) writes about how games are best preserved by looking at the contexts where they have existed: the websites, forums, and screenshots of them, or in the voices of their players and developers. The aspect of context can consist of both material and digital artifacts. All games rely on cultural know-how and silent knowledge, both in the form of the context of development and the context of use.

Context can take many forms, which in this study are called (a) the context of play, (b) the context of game development or (c) the context of public reception. The context of play can be exhibited by e.g., photos and videos showing how people play, interviews, and reminiscences like oral histories (Newman and Simons 2018, p. 31), Let's Play videos and other forms rising from game communities are just some examples of how the context of play can be presented. The context of development can be exhibited by, e.g., game developer interviews (Nylund 2017) or design and development documentation (Newman and Simons 2018, p. 20). The context of public reception of games can be exhibited by, e.g., newspaper articles and reviews in different media (cf. Kirkpatrick 2012).

Context information can be useful when exhibitions for various reasons want to deal with games that cannot be dealt with via objects or experiences. Concept art for the *Supernauts* (2013) game on display at the Finnish Museum of Games makes parts of the development process of games visible, while a fan made crochet figure of the character Captain Fabulous that is displayed next to it displays the aspect of reception and play. Exhibitions and the institutions behind them might also for various opt to not make the games they exhibit playable. This is the case of a freeware "bullying game" called *Inva-Taxi* (1994), which makes fun of people with disabilities. The game is not playable in the Finnish Museum of Games for fear it would continue the circle of abuse started when it was first published. Still, the museum has decided to exhibit the game as a sign of its times and as commentary on 1990s indie game development. Exhibiting a documentary showing disability rights activist Amu Urhonen and game educator Mikko Meriläinen talking about their reactions to the game makes the game present, but not in playable form.

Both *Supernauts* and *Inva-Taxi* are present only through their context. In the case of *Inva-Taxi*, the context did not exist before the exhibition was realized but was produced by curators as a response to the game's problematic nature. The aim was to have the documentary deal with the problematic aspects of the game, and to help visitors understand ableist culture, both in the 1990s and in the present. Museums and their exhibitions might opt to not make games playable, but instead produce external context material framing them. The way *Inva-Taxi* is exhibited, is a useful example of what museums

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6　　*Raharuhtinas* (1984), one of the oldest published digital games from Finland, is a maze exploration game that assumes the player is drawing a map of her progress (Nylund 2015, p. 61). *Where in Time is Carmen Sandiego?* (1989) requires the use of a printed encyclopedia "as a source of historical, geographical, and cultural information for players seeking to solve the game's virtual scavenger hunt puzzles" (Newman and Simons 2018, p. 16). Without the map or the encyclopedia, the games are nigh impossible to complete.

can do when they discard the focus on the originality of play and instead use games to explore the human condition and help us understand the present through the past.

As seen in the discussion and examples, games on display should be understood as more than objects or experiences. Exhibited games should instead be approached as constructed of three different aspects: objects, experiences, and context. The dual model of games in exhibitions as objects or experiences needs to be complemented with a third aspect, which is that of context (Figure 2).
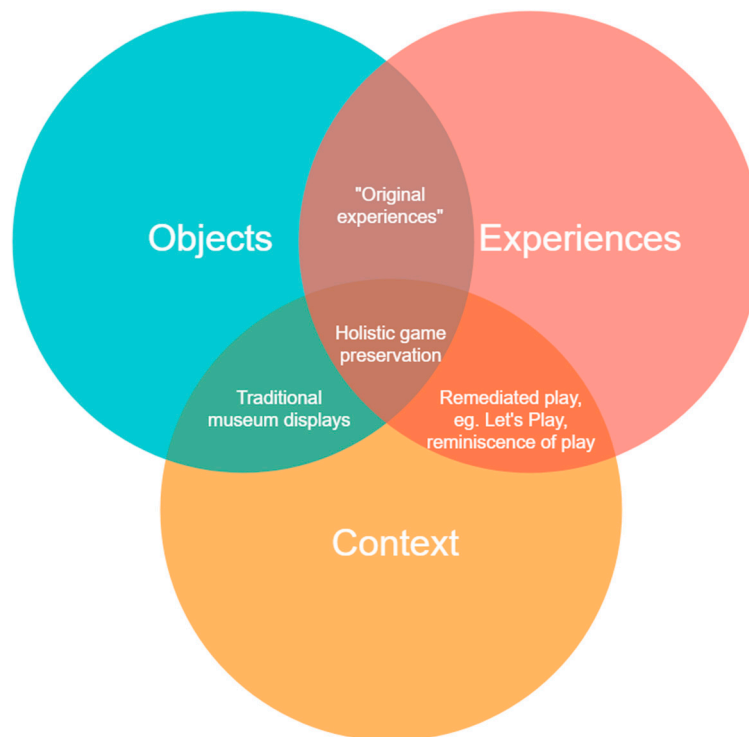

Figure 2. Games as objects, experiences, and context.

To sum up, games in exhibitions are made up of objects (i.e., retail boxes, storage media, consoles), experiences (i.e., playing games with original hardware or in emulated form), and context (i.e., how games have been made, played, and received). The ways games are exhibited depends on the games, but also on the institutions or stakeholders exhibiting them. Some want to exhibit games through objects, while others might focus on the play experience or different ways to understand games and their context. Exhibited games usually stand somewhere in between, combining different ways to deal with games.

2.5. Understanding Games on Display

There is no single way for exhibitions to deal with digital games, no "single approach to game preservation that can take precedence" (Newman and Simons 2018, p. 27). As Bettivia (2016, p. 29) observes, games are "composed of a number of complex boundary objects in the sense that different participants define [...] games in different ways" and different stakeholders are interested in preserving different things. For some, game retail boxes might be the most interesting, while others are more interested in executable code. Thus, the needs of the institutions and stakeholders defines what the preserved and exhibited objects are, but those approaches are not mutually exclusive (Reino 2017, p. 28). This means that different museums should be able come up with ways of displaying games on a case-by-case basis, allowing the history of games to "be built up from a range of sources" (Swalwell 2013, p. 12).

Because games are part of sociocultural realities of production, maintenance, reception, and play, not all of them can be exhibited in the same way. Digitally distributed games have no retail boxes

and virtual worlds with closed servers have no gameplay to display. Thus, exhibitions need to take a case-sensitive approach when displaying games. While it is impossible to make *Supernauts* playable for visitors because the servers have been decommissioned, the game can be dealt with by exhibiting various forms of context information. Similarly, while the Finnish Museum of Games does not want to make *Inva-Taxi* playable to visitors, it can still talk about it and its problematic aspects by showing gameplay videos and talking about the ways the game was perceived when it came out.

While other games at the Finnish Museum of Games are playable, context information can broaden the ways visitors interact with them. An interview with *Max Payne's* writer Sami Järvi can shed light on the production climate in the early 2000s and his views on why the game was successful help understand the game in a sociocultural framework. Similarly, the game's retail box help frame the ways games used to be distributed. While ice fishing game *Propilkki* (1999) has no retail box to display, as it was never commercially published, it is in other regards a game that is exhibited in a relatively comprehensive manner. The game's developers Mikko Happo and Janne Olkkonen decided to donate numerous artifacts from their personal collection for the Finnish Museum of Games, making it possible to address object, experience, and context aspects. This "holistic" display is by no means perfect, but it provides visitors multiple perspectives to it.

This article has worked on the hypothesis that digital games in exhibitions should be understood through their object, experience and context aspects. Games on display can rely on varied methods to display them, but none of those methods is necessary to exhibit them. Physical objects, context, and playable experience thus become "part of an object–information package" in which all parts are "but one element in a molecule of interconnecting equally important pieces of information" (Dudley 2010, p. 6). Just showing a retail box conveys some kind of understanding of a game, but taking into account the object, experience, and context aspects makes for a more comprehensive account. This way, games in exhibitions can be understood to be constructed from the various exhibiting and preservation methods available (Table 1).

Table 1. Aspects of digital games in exhibitions.

Game/Aspect	Experience	Object	Context of Play	Context of Development	Context of Public Reception
Inva-Taxi (1994)	No/Content deemed unethical by exhibition curators	No	Gameplay footage shown in documentary	No/Game developers refused to speak publicly	Conversation between game educator Mikko Meriläinen and disability rights activist Amu Urhonen
Propilkki (1999)	Playable game/Propilkki 2 1.1.5 on original hardware with a unique map made for the exhibition	PC used for making the graphics of the first version	Cardware cards from around the world	Developer interview with graphic and level designer Mikko Happo	No
Max Payne (2001)	Playable game/Original hardware	Retail boxes of *Max Payne* (2001) and *Max Payne 2* (2003)	No	Developer interview with writer Sami Järvi	No
Supernauts (2013)	No/Closed servers	Yes/Fan made crochet character	No	Yes/Concept art	No
Example of content	Playable game (original hardware, emulation)	Retail box, original console	Let's Play video, video or photograph of play	Developer interview, design document	Review, forum discussion

Different games have disparate "needs" for contextualization, but also diverse opportunities for experiencing the game. Some games might not be playable anymore, due to abandoned servers,

hardware obsolescence, ethical perspectives or similar issues. Others might not have any physical component to them, due to them being made available by digital distribution. In these cases, different forms of context might be the only possibilities of exhibiting the games, either by talking about how the games were made, how they were played or what their public reception was like. As the forms games take in exhibitions depends on both the games themselves and the ideological choices curators have made for exhibiting them, this study attests that the most productive way to approach games on display is to understand them as being constructed by the exhibiting process itself.

The hypothesis of this study has been whether games on display should be understood as being constructed out of three different aspects: *object*, *experience*, and *context*. Based on the theoretical discussion and the individual game examples, it is clear that the hypothesis opens up a more nuanced understanding of what games in exhibitions are. At the same time, it has its shortcomings.

The role of exhibition curators in making additional artifacts for exhibitions is absent. Exhibiting artifacts (i.e., games in their various guises) can in some cases produce additional artifacts, like interview videos, replicas, game versions custom made for the exhibition, etc. Museums and exhibitions do not only display existing artifacts but are instead active participants in the transition of artifacts into museum objects and in making cultural heritage (cf. Desvallées and Mairesse 2010).

The model also fails to deal with issues related to tangible versus intangible components, especially in the understanding of context. Intangible artifacts indicate "the practices, representations, expressions, knowledge, skills" that communities recognize as part of their cultural heritage (United Nations Educational, Scientific and Cultural Organization , 2003). Objects and archive material are examples of tangible context while intangible context includes, e.g., oral histories and "silent knowledge" related to play cultures (Nylund 2015, p. 62). Both the tangible and intangible elements of context could be better dealt with in the model.

Additionally, different kinds of experiences and objects need closer scrutiny and possibly a division into various subcategories. The model generates questions about overlap of the various aspects and there is need for a clearer definition of them. The contextual model of learning would suggest taking a closer look into visitor behavior and the societal context when dealing with interactive experiences in exhibitions.

Even with its shortcomings, the aspect model is a valid starting point to a more nuanced understanding of games on display. It has immediate value as a toolset for people planning, building or critiquing game exhibitions. Additionally, it makes their ideological and constructed nature clearer to hobbyists, curators, and museum professionals alike. As such, the hypothesis is a legitimate starting point for more in-depth research on the subject.

3. Discussion

Digital games, as we have seen, are complex things, and their ontological position in museum collections and exhibitions is riddled with questions and ambiguities. They require new ways of thinking and speaking about museum exhibitions and the various forms of "exhibition technologies" that are at their disposal. We need to understand game exhibitions in more intricate terms, not just view them in the light of authenticity or "original experiences". The matrix model for understanding game exhibitions presented in this paper hopefully clears some issues related to game preservation, notably related to the displaying of digital games in exhibitions.

The main argument of this article has been that games in exhibitions can take many different forms, of which the playable "original experience" is not always the most fruitful or desirable. There is a need to provide possibilities for learning by doing, but also learning by understanding. Context information is a central part of the "object-information package" (Dudley 2010, p. 6) of museums. Old games have a hard time conveying their historical, sociocultural or ideological dimensions, but providing various types of contextual information can shed light on topics like that.

The proposed preservation model allows a more nuanced understanding of the value of different preservation techniques and their role in exhibitions. It can be used when dealing with individual

games, as a sort of checklist to make sure that different aspects of the game are dealt with in a satisfying manner. Because exhibitions usually include many different games in close proximity to each other, one game does not need to include all aspects, if the games around it make other aspects visible. It might thus be fruitful to also use the matrix as a checklist for exhibitions as a whole, in order to make sure that the different aspects are included in one way or another in the exhibition as an entity. The model also helps with the day-to-day work of planning and building game exhibitions, helping increase awareness of what aspects exhibitions are dealing with.

The issues related to exhibiting games to some extent apply to issues of long-term game preservation, but additional research is needed to fully understand the implications. If exhibitions (and by extension collections) only contain retail boxes or playable games, it influences and ultimately constructs an understanding of those games for posterity. By using the model, museums can get a better picture of what kinds of game-related artifacts they have been including in their collections, and make needed changes in their collection policy. Long-term preservation might be even more dependent on various forms of context than game exhibitions dealing with recent game history, since older games get increasingly difficult to understand with the loss of cultural know-how needed for playing them. This needs to be verified by research, however.

The model can also help different preservation stakeholders, both hobbyists and institutions, in realizing that not all aspects, not even the ones keeping games playable, are required in order to preserve game heritage. This can help de-emphasize views on how there is a need for keeping games playable, which has dominated game preservation discourse until recently. Swalwell (2013) and Lowood (2014) provide accounts of the importance ascribed to playable games in hobbyist and collector circles. Academic research has approached games from this angle, as well (e.g., Guttenbrunner et al. 2010). Additionally, understanding the width of game preservation and exhibiting efforts as optional building blocks, helps initiate a discussion on what kind of game heritage collectors, hobbyists, and institutions are constructing. Because games can be exhibited in many different ways, exhibitions are riddled with ideological decisions made by their curators.

Not all museums want to use exhibition elements related to all aspects of the matrix model. They might instead want to focus on one or more aspects of game exhibiting or preservation. An art museum might want to show games in a "reverential setting", trying to achieve an unobstructed dialogue between game experience and visitor, where the playable game as an art work takes center stage and where other elements such as developer interviews, original controllers and hardware and similar contextual information are seen as unwanted distractions. Cultural history museums, on the other hand, might want to focus on context of different sorts, in order to help also visitors without firsthand knowledge of games understand games, by for example providing information on different contexts for the game. Historical arcades might not want to provide anything else than the original hardware, not even labels describing the games.

Exhibitions might also want to produce context information of their own. The case of *Inva-Taxi* shows how curators did not want to exhibit a playable game due to its problematic nature. Instead, they opted to present new context material in order for the exhibit to better comply to the ideological values of the museum as a whole. As Smith (2006) reminds us, game museums and their exhibitions are active meaning makers, constructing a view of historical games through their decisions on what to exhibit. Museums and other stakeholders exhibiting games can construct artifacts, and by extension cultural heritage, in a dialogue with the original artifact.

Museums and their exhibitions face many challenges related to their accessibility. Even visitors who do not have any special needs pose challenges for game exhibitions. An exhibition environment cannot exhaustively take into account the different body types and ergonomic requirements of visitors, and displayed playable games are by necessity tailored for the average visitor. As games have not traditionally been designed to be inclusive to special needs of players with various disabilities, the way game exhibitions are designed in most cases (e.g., reliance on "original hardware") simply does not make them accessible to visitors with special needs. In the Finnish Museum of Games, games

were installed into special exhibition structures that can to some extent help visitors with physical impairments, but no effort was made to deal with hearing or visual impairments. Accessibility issues in game exhibitions is a field where further research would be welcome.

Like Naskali et al. (2013) prophesied, game exhibitions are becoming more and more specialized. Generalizing and international exhibitions like the one on display in Computerspielemuseum, Nexon Computer Museum, or in the Game On 2.0 traveling exhibition give way to, e.g., national stories like the one on display at the Finnish Museum of Games, or player stories and context like in Play Beyond Play. The context of the design of Magnavox Odyssey with Ralph Bauer's original notes and objects in the eGameRevolution exhibition at the Strong National Museum of Play is very different from the context of play presented by the "themed rooms [...] recreating a specific historical era" at the Computerspielemuseum (Newman and Simons 2018). Game exhibitions are varied because of the varied motives of the institution or stakeholder organizing them. Exhibitions further might be built out of different sections, some with minimal context (e.g., historical arcades at many museums) and others providing much more context.

To conclude, exhibitions are active meaning makers. Cultural heritage is not a "mechanical and neutral transmission of information from one generation to another", but rather always constructed through active agency by the people managing collections and setting up exhibitions (Smith 2006, p. 54). Game exhibitions and their curators are active participants in the construction of cultural artifacts and game-related cultural heritage. Deciding on the types of games, but also on what kinds of aspects to include from those games, is one of the ways that curators exert the inherently ideological influence they possess. This paper hopefully helps game exhibitions and their curators be more aware of the choices they are making when displaying games and constructing game-related heritage.

Conflicts of Interest: The author declares no conflict of interest.

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Ludography

Inva-Taxi (1994), Åkesoft.
Max Payne (2001), Remedy Entertainment.
Propilkki (1999), Procyon Productions.
Raharuhtinas (1984), Amersoft.
Super Mario Bros. (1985), Nintendo.
Supernauts (2013), Grand Cru.
Where in Time is Carmen Sandiego? (1989), Broderbund.

Exhibitions Mentioned

Applied Design/The Museum of Modern Art (MoMa). New York, NY. 2013–14
Computerspielemuseum. Berlin, Germany. 2011–
eGameRevolution/Strong National Museum of Play. Rochester, NY, 2010–
Game On/Travelling exhibition produced by Barbican International Enterprises, 2002–
Game On 2.0/Travelling exhibition produced by Barbican International Enterprises, 2010–
National Videogame Museum. Frisco, TX. 2016–
Nexon Computer Museum. Jeju Island, South Korea. 2013–
Play Beyond Play/Tekniska Museet. Stockholm, Sweden. 2018–
The Finnish Museum of Games. Tampere, Finland. 2017–

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