

Challenges in Organizing and Accessing Video Game Development Artifacts

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Abstract. Artifacts created during the game development process are vital for understanding and appreciating the history and context of video games. However, few have explored how to organize and preserve the digital ephemera created during game development, critically endangering these media artifacts. Through interviews of various stakeholders interested in these types of artifacts, and examination of artifact collections, we explore the game development process. Participants discussed various challenges in organizing and finding game development artifacts for their work due to multiple factors: organization culture, the technical work environment, and a lack of standard vocabulary and practices. They also discussed the disconnect between game library, archive, and special collections lacking ways to note relationships among relevant materials. Based on these findings, we discuss two main implications from an organizational point of view.

Keywords: Video Games, Game Development Artifacts, Video Game Preservation.

1 Introduction

Today, digital games are deeply embedded within our social, cultural, and economic activities. The Entertainment Software Association reports that more than 164 million Americans play video games and that 75% of US households have at least one game player [4]. Numerous colleges and universities offer degrees or coursework to prepare game industry professionals, and games are used in education, science, and engineering as learning and literacy tools.

Like print publishing, film, and music, digital games are cultural products, which produce and distribute social symbolism [5]. To properly understand their history, we need to know the context and details of their creation. Draft manuscripts, research notebooks, and other related artifacts are key to garnering a deeper understanding regarding the processes of creators and their intentions.

Unfortunately, unlike many of its counterparts in the cultural industries, digital games have received relatively little attention and support from academia, museums, libraries, and other institutions concerned with the study and preservation of culture and cultural objects. Only recently have we seen academia and memory institutions

accelerate their acceptance of digital games as cultural objects. Radio, television, and film were also subject to this form of neglect in their infancy, and media historians and archivists have lost access to significant cultural works due to society's slow realization of their cultural impact.

Fortunately, an increasing number of institutions are now collecting and providing access to digital games as part of our cultural heritage, working to catalog, classify, archive, and preserve digital games. A growing number of university libraries also circulate video games for the purposes of academic inquiry. However, this new effort is often limited in scope and largely uncoordinated with other organizations involved in cultural preservation or digital game production.

Most digital games created during the industry's relatively short history are no longer easily accessible for study and play. Even when we preserve games, finished products are only part of the story. Researchers and memory institutions have given far less attention to artifacts associated with game development, such as game design documents (GDDs), technical design documents (TDDs), art bibles, style guides, musical scores, test builds, voice-over auditions, and marketing material. Many of these artifacts are born-digital themselves, making their preservation even more challenging. While few are currently aware of the challenges, all involved recognize the loss, from curious fans to students and historians of the industry, media, and culture, as well as librarians, museum professionals, and archivists at the memory institutions who serve those individuals. It is imperative that we begin to address the challenges in organizing and preserving these endangered artifacts.

This research aims to advance our understanding of how to organize and represent artifacts related to the development of video games. As the first step in this larger research effort, this paper focuses on the following research question: *What issues and challenges do stakeholders in game development artifacts (including game developers, librarians, museum curators, game researchers) currently face in organizing and accessing these materials?*

2 Related Work

To date, there have been few projects that have focused on video game development processes, organization, and preservation. The Preserving Virtual Worlds project was a joint effort by Rochester Institute of Technology, Stanford University, the University of Maryland, and the University of Illinois at Urbana-Champaign, and was supported by the Library of Congress. This project focused on preserving older video games and software and began establishing best practices and strategies for game preservation. The second phase of the project, funded by the Institute of Museum and Library Services, focused on determining significant properties for educational games [7]. While this project laid preliminary groundwork for basic metadata standards, the final report specifically calls for future work in establishing relationships and entities, and states that the project barely scraped the surface for standardized ontologies in this domain [12].

Responding to this call, a conceptual model for video games and interactive media—the Video Game Metadata Schema (VGMS)—and seven related controlled vocabularies (CVs) were created by the University of Washington Game Research (GAMER) Group and Seattle Interactive Media Museum in 2012 [9, 10]. GAMECIP, led by the University of California, Santa Cruz Library, UCSC Computer Science, and Stanford University Library, also investigated metadata needs and citation practices surrounding computer games in institutional collections, producing a schema and best practices for cataloging and classifying computer games [2, 13]. However, both projects mainly focused on the product: finished representations rather than materials created during development.

One exception is Winget’s work [15, 16], confirming the game development process does “produce significant and important documentation as traditionally conceived by collecting institutions (p.29)” but also finding that standard practices fail to adequately collect and preserve the full range of artifacts created. Our work complements prior research by addressing the organization and preservation of game-related materials that have been excluded by previous projects, analyzing the needs of creators and users of these artifacts.

3 Method

We adopted a user-centered approach, focused on identifying the needs of our target users, exploring their practices regarding game development artifacts, and mapping their conceptualization of the domain. This approach helps to ensure results will be relevant to stakeholders. We conducted in-depth, semi-structured interviews with a total of 29 users consisting of 12 game industry professionals, 6 game researchers, and 11 participants from memory institutions including museums, libraries, and archives. We asked how these different user groups perceive and express their needs for organizing and accessing game development artifacts, and how they expect to find materials they need. We also asked about current practices and challenges when dealing with these materials. Interviews were transcribed and inductively coded for analysis as prescribed by Corbin and Strauss [1]. We followed a consensus model [6] where two coders independently coded the data, discussed discrepancies, and utilized a third researcher as tie-breaker when consensus could not be reached.

4 Preliminary Findings and Discussion

This work is part of a larger ongoing two-year project, working towards a practical solution for organizing game development artifacts. Here, we discuss several key points learned from our interview data during the first phase of the project.

4.1 Challenges in Organizing and Finding Game Development Artifacts

Participants unanimously shared that they currently have challenges in organizing and finding game development artifacts for their work. They described several factors—

including organization culture, technical work environments, and a lack of standard vocabulary and practices—as the main reasons for these challenges.

Our industry participants included game developers as well as game platform developers. Platform creators—those creating technical resources that must be shared with developers using their platform—were more focused on creating and organizing development artifacts since materials needed to be shared with clients. Developers working on games were less concerned about maintaining development artifacts. Organization size is also often a factor in the quality and availability of documentation. Smaller companies often adopt *ad hoc* solutions while larger organizations have firmer policies. Little concern was expressed by game development professionals about facilitating hand-offs to memory institutions as they were primarily concerned about product development. Memory institution workers were concerned with all aspects of preserving these materials and making them available to others.

Organization Culture. Perceptions of organizational culture were mentioned as an influence on creating, storing, sharing, and organizing development artifacts. Several participants described a video game industry that does not currently encourage or incentivize documentation processes despite recognizing the value of well documented and organized game development assets and materials. The lack of documentation caused difficulties when people were searching for relevant artifacts.

“If you're in a company that's been making content for 20 years and you go try to find an art asset, it's like a needle in a stack of needles.” (P11)

However, many developers also do not see documentation as part of their main job, as using time to document is not perceived as productive or rewarding as actually working towards building a game.

“Culture is also another one. If your company doesn't have a culture around—if the developers are used to just working or running off and doing a task-- Here's another thing, documentation is not fun. That's not why a game designer came to work, to write shit down so that other people on some other team could understand what you're doing.” (P11)

P1 also stated that companies might be unwilling to share some of the game development artifacts:

“I've already noted there are some significant disadvantages for them releasing design documents, potentially, if someone put like a feature they really liked which was cut from the development of that game.” (P1)

The same participant also pointed out that people may be more likely to share certain game development artifacts than others. For instance, some companies might be more unwilling to share organization-related information than game assets. While

digital objects created during the development process evoke a desire for sharing, information related to process and budgeting are often closely guarded.

Technical Work Environment. In addition to culture, technical environments were seen to influence creation, storage, sharing, and organization development artifacts. Overwhelmingly, game studios have embraced agile development principles, a fact that is presented by our developer participants. According to the Agile Manifesto, agile developers value “Working software over comprehensive documentation” [11]. Participant 11 reported that it can be unclear what to document, especially at the beginning of game projects, since specifics change frequently and dramatically. Most industry participants disclosed that employees of their company often do not maintain early design and technical documentation as living documents. Some create official systems for supplemental work but others simply do not track these changes in a central location.

The constant need to make new products also creates gaps in the process, meaning retrospectives are few and far between.

“If your team is telling you they have the information to build what needs to get built, it can be very hard to find the justification then the additional time documenting it.” (P13)

Some companies deliberately chose less documentation because they felt it suited their design process,

“For better or worse we are kind of allergic to design documents. We tend to evolve the design and show, rather than describe.” (P17)

Participants also mentioned that documenting becomes more difficult as “living games” become more common, with updates and patches releasing frequently. In addition, P12 and P15 mentioned that open office layouts impact the documentation process.

“Yes, we're trying to keep things efficient and quick. That is the main benefit of a close open office like this is, you can just go, ‘Hey, where's the thing?’ And, ‘Yes, it's here.’ Boom and you're done.” (P15)

P12 believed this increased efficiency resulted in decreased need for describing and documenting artifacts in the short-term but admitted that personnel changes and increasing complexity diminish these perceived benefits.

Lack of Standard Vocabulary and Practices. Our participants report that there are several tools used to document various game development artifacts. These tools include specific platform tools, enterprise software (e.g., Confluence), cloud-based services (e.g., Dropbox, Google Drive), and wikis. Each of these allows developers to

name and organize assets and structure documentation. However, participants mentioned a lack of standard terminology and naming conventions for these processes and artifacts. Numerous environments, both for creating and preserving these artifacts, has led to a lack of consistency in the industry and even among concerned memory institutions. Participants were often left to their own devices without clear standards to follow.

“One thing, we have an industry of terrible at this naming conventions. Every person who writes something or comes up with something, names with themselves and-- Which makes it very difficult then to search anything because I might call something a one-page or because I think it's a one sheet document. Another person might call it a game device document. Then the naming of the features also can change multiple times over the course.” (P13)

This problem becomes compounded as the number of development artifacts increases. Participants reported that tools allowed for easy storage of assets but were less helpful for finding and retrieving them later. Standardization problems are exacerbated when the work is international in nature, as when dealing with assets created in foreign studios.

Participants from memory institutions also complained about the lack of standard vocabulary to describe games and related artifacts, resorting to homegrown CVs. Participants detailed the challenges caused by the lack of such standards.

“We've been using Argus for a while and that comes with an entire lexicon-controlled vocabulary. Most of which is not incredibly useful for my particular collection. Over time I definitely have had to add to that on a local level that basically is just in our servers.” (P25)

“No, I don't have a controlled vocabulary for that. It's just based on experience. Then there are times that I don't know what something is and I check with some of the IT folks. Recently, we got a collection and that is from [a corporate donor]. They did some early electromechanical games and shuffleboard and stuff like that. I was like, ‘I have no idea what I'm looking at.’” (P27)

Memory institutions that had created their own CVs had not shared them with other memory institutions, resulting in a highly fractured, siloed language for game development artifacts.

4.2 Disconnect between Libraries, Archives, and Special Collections

Participants from memory institutions described a disconnect among their libraries, archives, and special collections. They explained that different systems exist for each type of collection (e.g., Argus or PastPerfect for museum collections, and WorldCat for library collections). Connections between relevant objects that are scattered around these collections—a video game in the special collections, a related publica-

tion in the library collection, and related development artifacts in the archive—are not explicitly related in the organizational system. This is an obstacle for users seeking all materials relevant to a particular game even when they are all within one memory institution. Other challenges seemed to involve institution culture.

“It would be theoretically possible if one hand knew what the other hand was doing, but in practical terms, probably not. We wouldn’t be in communication enough to know that one of us had a related item.” (P6)

5 Conclusion and Future Work

By interviewing stakeholders interested in video game development artifacts, we were able to uncover several challenges regarding their organization and access. Some challenges are more difficult to address, such as the low value the game industry gives the documentation process and the pressures of fast game development cycles. However, we also observed two phenomena that could be addressed from an organizational perspective:

1) There is a need for standard vocabulary and naming conventions to better organize and represent video game development artifacts in the game industry and memory institutions. Standardized and thorough descriptions of these materials afford improved access to museum curators, archivists, and librarians who acquire, catalog, and provide reference services; users of these collections; and commercial organizations trying to organize and preserve their own development assets. We are currently in the process of developing a taxonomy of video game development artifacts which will enable information professionals to describe game related materials more accurately and thoroughly, improving the quality of metadata shared with users and organizations alike. This taxonomy will be published as a complement to and extension of prior work with the VGMS [14], the conceptual model for video games and interactive media [8], and research from GAMECIP research team [2] as well as extending and complementing archival standards.

2) It would be fruitful to explore ways to better connect relevant items in multiple collections of varying nature. We plan to more closely examine the different systems and metadata standards that are currently used in libraries and archives, aiming to generate a best practice document on how to better represent the entities and relationships in the domain of video game and interactive media development.

While we focus on video game development in our work, many other forms of electronic, born-digital, and interactive media (e.g., e-books, computer software, digital images, and smartphone applications) can benefit from research on non-book metadata. Inquiry into the differences in organizational needs for physical and digital artifacts speaks to larger questions about the transition from physical to digital materials and the implications of that transition for libraries, archives, and museums. Our work may also be applicable to other segments of the cultural industries, such as film and animation, which are also created from a complex development process where

many intermediate development artifacts are produced and are also in the throes of transition to digital materials.

The challenges for video game media and their accompanying digital artifacts are numerous. Further inquiry into how best to preserve them is necessary to provide robust documentation for the game development process, while wider acceptance and distribution of standards will greatly aid in a shared understanding of the artifacts. While this research firmly targets informing the latter, without better practices and an industry-wide drive towards documentation, much of preserving the process, history, and context of video games remains threatened.

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