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# A Qualitative Investigation of Users' Video Game Information Needs and Behaviors

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## ABSTRACT

Video games are popular consumer products as well as research subjects, yet little exists about how players and other stakeholders find video games and what information they need to select, acquire, and play video games. With the aim of better understanding people's game-related information needs and behaviors, we conducted 56 semi-structured interviews with users who find, play, purchase, collect, and recommend video games. Participants included casual and avid gamers, parents, collectors, industry professionals, librarians, and scholars. From this user data, we derive and discuss key design implications for video game information systems: designing for target user populations, enabling recommendations on appeals, offering multiple automatic organization options, and providing relationship-based, user-generated, subject and visual metadata. We anticipate this work will contribute to building future video game information systems with new and improved access to games.

## KEYWORDS

Video games, Interactive media, user needs, user behavior, metadata.

## INTRODUCTION

Video games are an increasingly important part of culture and society. The global video game marketplace, including consoles and online, mobile, and PC video games, is forecast to reach \$111 billion by 2015.<sup>1</sup> In addition to the 59% of Americans who play video games themselves,<sup>2</sup> other stakeholders need to find video games and information related to them, such as parents interested in children's game content, librarians and curators of game collections, video game industry employees, and academic scholars. Furthermore, video games are the subject of a wide variety of research, from understanding player experiences to honing game design. As commercial sales and cultural interest increase, it is critical to design information systems that provide useful and efficient access to video games from a user-centered perspective. However, little research exists on how players and other stakeholders find video games and what information needs they have regarding selection, acquisition, and play. This study seeks to address this gap and improve our overall understanding of people's game-related information needs and behaviors. Consequently, this will help identify design requirements for a user-centered video game information system. We specifically seek to answer the following research questions:

RQ1. What kinds of information needs and behaviors do video game players and related stakeholders exhibit?

RQ2. What are the implications of these needs and behaviors for designing user-centered video game information systems?

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<sup>1</sup> <http://www.gartner.com/newsroom/id/2614915>

## RELEVANT WORK

### Information Needs and Behavior

Information needs and behaviors have been objects of investigation in library and information science (LIS) for more than 30 years. During this time, scholars have suggested a variety of models and theories to explain what kinds of information various groups of users need, and the multiplicity of ways in which they seek it. Many of these attempts (such as Wilson (1981, 1999), Ellis (1989), and Kuhlthau (1991), just to name a few) reflect a basic research attempt to understand information needs and behaviors in general; that is, they are intended to apply across multiple domains and contexts.

While these efforts offer a broad view of information needs and behaviors at large, the large body of research in this area also shows that information needs and behaviors are affected in various ways depending on context. The following factors all affect information behaviors and the ways in which we understand them:

- task/activity, such as career seeking (Julien 1998, 1999) or voting (Popkin, 1993; Bowler, Donovan & Snipp, 1993; Kitchens, Powell & Williams, 2003)
- subject or discipline, such as history (Steig 1981; Case 1991; Dalton & Charnigo 2004; Rhee 2010) or music (Brown 2001, 2002)
- occupations, such as scientists (Ellis, Cox & Hall 1993; Murphy 2003), physicians (Dee 1993; Gorman 1995, 1999), or lawyers (Sutton 1994; Cole and Kuhlthau 2000)
- demographics, such as age (Cooper 2002; Shenton & Dixon 2003, 2004; Wicks 2004) or gender (Dunne, 2002; Hamer 2003)
- role, such as consumer (Hauser, Urban & Weinberg 1993; Lehmann 1999), patient (Holmes & Lenz 2002; Hogan & Palmer 2005), or student (Whitmire 2003; Head & Eisenberg 2009)
- material/media, such as ebooks (Hughes & Buchanan 2001; Levine-Clark 2007), or other electronic information resources (Ge 2010; Narayan & Spink 2008; Tahir et. al. 2010)
- setting/environment, such as specific geographical area (Anwar & Supaat 1998; Ikoja-Odongo 2002), or online environments (Hwang et. al. 2007).

The list above is purely illustrative of examples and far from comprehensive. In addition to hundreds (if not more) studies examining the above factors, many studies look at information behavior at the juxtaposition of two or more of these aspects, such as “mature undergraduates” (Given 2002); women seeking health-related information (Warner & Procaccino 2004); African-American cancer patients (Matthews et. al. 2002); or doctors in Nigeria (Ocheibi & Buba 2003), just to list a few examples.

Despite the massive amount of information behavior research conducted in such a large variety of contexts, little exists regarding information-seeking behavior specifically targeting users of video games. As a result, we do not have enough empirical information on the kinds of information needs game users have, where they go to see game-related information, how they seek new games, and how they organize their collections, that can help us understand how we can design effective game information systems. What does exist often discusses information behavior within a game, such as Adams’ (2005; 2009) and Karlova and Lee’s (2012) analyses of information

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<sup>2</sup> [http://www.theesa.com/facts/pdfs/esa\\_ef\\_2014.pdf](http://www.theesa.com/facts/pdfs/esa_ef_2014.pdf)

<sup>3</sup> *ibid.*

behaviors in massively multiplayer online role-playing games (MMORPGS). Both address information needed by players and the related actions they take to solve problems, make decisions, and overcome obstacles. However, these studies only reflect information needs and behaviors that occur during gameplay, and not any information needs and behaviors that might occur around information about video games, such as selection for play or purchase. These studies are also limited solely to game players, but video game information may also be sought by others. For instance, a small study of the information needs and behaviors of art students studying video game design and development revealed specific instructional needs and use of particular web sources and personal social connections (Miller 2014). Game collectors, industry employees, parents of young gamers, educators, scholars conducting game-related research, and curators or librarians managing collections that include video games may all exhibit video game-related information needs and behaviors (Lee, Tennis, Clarke & Carpenter 2013). Our study is intended investigate this relatively unexplored area so that we can have an improved understanding on how various game users find game information. Our goal is to gather empirical user data that can help inform researchers on how to establish various frameworks for describing, organizing, and accessing video games, and build game information systems based on such frameworks, rather than developing a generalized theory or model of user information behavior.

### Game-related Studies in Information Science

Previous research in domains including human-computer interaction (HCI), game and media studies, and psychology has explored various aspects of video games and people's interactions with them. In particular, previous HCI work around video games can be grouped into five categories:

- 1) Design of games, including hardware and software (e.g., Cornett, 2004; Zaranek et al., 2014)
- 2) Understanding players, player interactions, motivations, and experiences (e.g., strategies or behaviors within the game) (e.g., Cheung and Huang, 2011; Csikszentmihalyi, 1975; Mekler et al., 2014)
- 3) Evaluation of the usability/playability of particular interfaces, features, or controls for games (e.g., Birk and Mandyk, 2013, Paavilainen et al., 2014),
- 4) Gamification and using games for specific purposes (e.g., education, music, health and exercise, assistive technology) or target user groups (e.g., children, elderly) (e.g., Gerling et al., 2012, Hernandez et al., 2013; Kam et al., 2009))
- 5) Relevant methods for game user research (e.g., how to collect user data or evaluate usability) (e.g., Mirza-Babaei et al., 2013, Pinelle et al., 2008).

Notably, articles dealing with player personalities and motivations are of particular relevance to our work: Different game player types discussed in Bartle (1999?) and Bateman (2005), flow theory by Csikszentmihalyi (1975), and motivations of MMORPG users investigated in Yee (2006). These studies explore the internal motivations and experiences that create the impetus for gaming, helping us understand why players choose to interact with certain games. Various factors affecting player enjoyment and motivations have been well-studied in prior literature. Mekler et al. (2014) conducted a review of 87 quantitative studies in order to develop a systematic understanding of how to measure player enjoyment. In addition to more traditional measures of fun and enjoyment, Rigby, Ryan, and Przybylski (2006; 2011) developed the Player Experience of Need Satisfaction (PENS) measure to study video game player motivations, developed based on the applied self-determination theory (SDT). They suggest that people's basic psychological needs such as competence, autonomy, and relatedness can predict game enjoyment and future game play. Johnson & Gardner (2010) also applied PENS measure in an online survey to further explore the relationships between game genre, personality, and gaming experience. These studies do provide insights into *why* users select specific games of interest and *what* makes it

enjoyable, they do not tell us *how* users are able to find these games and what kinds of information may be necessary to connect users to games that align with their reasons for playing.

Several articles from the fourth category are also closely related to our work. For instance, Gerling et al. (2012) explored the use of full-body motion games to help keep the elderly physically active and mentally engaged. Hernandez et al. (2013) and Kam et al. (2009) dealt with using games for specific user groups: disabled children and children in the developing world, respectively; analyzing design implications and offering design strategies to reach these user groups. These are relevant to our discussion of the user needs of additional video game stakeholders, specifically parents and librarians.

Finally, while information systems within games (e.g., inventory systems) have seen some investigation (Karlova and Lee, 2012; Lee and Jones, 2011), there is little work on how users search/browse video games or how to design information systems for video games. This is due to the fact that video games have traditionally not been considered objects of academic studies and scholarly materials, and therefore little research has been done on how to organize, describe, and provide access to such materials. Only recently, there have been several research initiatives such as “Preserving Virtual Worlds” (McDonough, 2010) Video Game Metadata Schema<sup>4</sup> (Lee et al., 2013), and GAME CIP (Game Metadata and Citation Project)<sup>5</sup> that focus specifically on describing and preserving video games and interactive media. We expect that our work will be able to augment such research efforts by providing some useful insights informing the design of descriptive framework for video games.

## **STUDY DESIGN AND METHOD**

Fifty-six semi-structured interviews were conducted over two phases. Participants were people over 18 years old who find, play, purchase, collect, and recommend video games. In the first phase, we interviewed 24 gamers. Some of these interviewees identified themselves with another role, such as a parent, in addition to being a gamer. Analysis revealed that these multi-role participants expressed different and sometimes unique information needs, and thus we broadened our scope to a stratified sample to reach a wider range of personas interested in video games. Therefore in the second phase, we interviewed 32 additional participants involving casual and avid gamers as well as parents, collectors, industry professionals, librarians, and scholars.

We recruited interviewees by snowball sampling. Invitations were shared on a mix of physical and digital venues. Some examples include: various student, faculty, and staff mailing lists at the University of Washington, game-related mailing lists and forums such as Reddit or Extra Credits, researchers’ social media networks on Facebook, Twitter, and Google+. Users representing specific personas were targeted via appropriate routes such as librarians via the American Library Association (ALA)’s annual conference and the Young Adult Library Services Association listserv, scholars via emailing authors from game studies journals, and game industry professionals via researchers’ personal connections and references.

The interview protocol included questions about 1) users’ game-related tastes, motivations and experiences; 2) attitudes toward physical and digital formats of games; 3) collection and organization behaviors; 4) game-related information needs and search behaviors; 5) feedback on current metadata; and 6) demographic information (Full protocol in Appendix). Interviews for specific personas included additional questions (e.g., asking librarians about the library game collection, parents about how they select games for their children). The full interview protocol can be found in the Appendix. All interviews were conducted in person, via telephone, or Skype. Each interview

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<sup>4</sup> [http://gamer.ischool.uw.edu/official\\_release/](http://gamer.ischool.uw.edu/official_release/)

<sup>5</sup> <https://gamecip.soe.ucsc.edu/>

lasted approximately 45 minutes to one hour. Participants in the earlier phase agreed to do so without compensation. In the latter phase, we compensated each interviewee with a \$20 Amazon gift card, as it was more difficult to attract users representing personas other than gamers.

Group	Code
Experience	Description of games Game playing behavior Gaming history
Collection and organization	Game collection Game organization Physical-digital format discussion
Needs and behavior	Game resources Information needs Information seeking behavior
Metadata type	43 metadata types derived from the Video Game Metadata Schema <sup>6</sup> plus the “other” category
Appeal factors	17 appeal factors
User characteristics	Age Gender User Type Profession Race/Ethnicity Other relevant user characteristics
Other	Other potentially interesting information

**Table 1. Summary of Codebook**

All interviews were fully transcribed and analyzed to obtain a detailed qualitative description of needs and behaviors surrounding video game preference, use, purchase, recommendation, organizational and collection-related needs, as well as game and game information seeking. The codebook was created through an iterative coding process by multiple coders. Initially, we selected a subset of 26 interview transcripts representing different types of user groups and collectively analyzed them as a class exercise in a video game metadata course taught by the first author. Based on this analysis and discussion, a preliminary codebook was developed with a grounded theory approach (Corbin & Strauss, 2008). In order to ensure that we were consistently apply the codes, we followed a consensus model (Harry et al., 2005; Saldaña, 2009) involving three coders/reviewers. Using this codebook, two coders independently coded all the transcripts once. This was followed by a series of meetings discussing code revisions. Several codes were added, modified, or removed based on the initial coding experience. Afterward, the two coders revised their previous coding work to match the newly revised codebook. Once the coding task was finished, a third party reviewed the coding work and identified any issues and/or inconsistencies in code application. Any questionable instances were discussed among all three coders (i.e., two coders and the third party reviewer) until consensus was reached. The final version of the codebook resulting

<sup>6</sup> Developed by the GAMER (Game Metadata Research) Group at the University of Washington Information School and Seattle Interactive Media Museum. Accessible at: [http://gamer.ischool.uw.edu/official\\_release/](http://gamer.ischool.uw.edu/official_release/)

from this process contains categories related to six different aspects (summarized in Table 1) plus the other category to catch potentially interesting information that does not fit into any of the other categories. The full codebook is included in the Appendix.

## FINDINGS AND DISCUSSION

In this section, we present key findings from analyzing the transcripts as well as design implications for game information systems derived from the user data.

### Designing for Target User Groups

Personas—archetypes representing the needs, behaviors, and goals of a particular group of users (Cooper, 1999)—are a common technique used when designing information systems. Personas have also been used to understand video game players and their interactions and experiences while gaming (Cheung and Huang, 2011). Previous work on metadata for information systems describing video games identified six user personas, each representing different user groups: Player (Jeffrey, a Junior High Student), Parent (Marcia, a Classroom Assistant and a mother of three), Collector (Sam, a Copywriter for Amazon.com), Academic (Dr. Russell, an Economics professor), Game Developer/Designer (Debra, a Game Designer), and Curator/Librarian (Nancy, an Academic Librarian) (Lee et al., 2013). New user groups were subsequently expanded to consider avid and casual gamers as well as a broader range of game industry employees (Lee et al., in press). Our interviews represented this spectrum of user groups.

Designing a universal information system that satisfies the needs of multiple user groups is challenging in and of itself. Additionally, interviews revealed the restricted nature of initial persona definitions. Distinctions between personas were not definite; many participants considered themselves representative of multiple personas (e.g., “there were the kinds of two parts of me: the collector side and then the game designer side.” (P8)).

Distinctions among types of gamers were particularly problematic. Many interviewees identified themselves as both “avid” and “casual” gamers. A corresponding online survey asking similar questions (n=1257) corroborates this as the second most common combination of personas, following by avid gamer and collector (Lee, under preparation). People’s identification with these personas is temporal and situational rather than representative of intrinsic personal characteristics; for instance, playing an RPG at home vs. playing a puzzle game on their phone when riding a bus. This fluid persona-switching implies that users of video game information systems will have different information needs at different times, depending on which persona they currently embody. Juul (2010) also discusses this fluidity between hardcore (avid) and casual gamers as many game players experience changes in their work and lifestyle which affects their game playing behavior (e.g., “ex-hardcore-now-parent” player (p.12)). He argues that people can individually switch between being casual gamers and hardcore gamers which is consistent with what we observed in our data set.

Many participants embodied both a *direct* player persona (avid, casual, or both) as well as a *proxy* persona—a persona seeking information about games for the use of the game by another party. Proxy personas—in this case, parents, librarians, and industry employees—have significantly different information needs than users seeking game information for themselves. While proxy personas are interested in extrinsic game information such as cost and ESRB rating, direct personas desire a variety of information about game content. Proxy personas are also interested in content, but for very specific needs. For instance, parents were concerned with information like levels of violence, gore, and profanity:

“[My child] likes watching me play things. I’ll play Skyrim and **try to avoid violence at all costs.**” (P24)

“Looking up **whether they are appropriate for my aged kids.** And looking up content...if there’s cuss

words, if there's inappropriate attire..." (P50)

Such detailed information is often not included in general game information sources, and participants needed to consult multiple sources, as information was not conveniently supplied in a single location. Several participants mentioned websites specifically designed for parental use, like Common Sense Media and Plugged In; while parents appreciated the tailored reviews, they also desired some way of filtering for these characteristics.

Librarians had similar content interests, as well as a game's popularity, platform availability, and number of players. Unlike direct players, librarians need to purchase games that can accommodate multiple concurrent players during events. Video games often circulate for use by patrons, making digitally distributed games a challenge. Games also need to fit the library's collection policy and support its mission:

"We looked at popularity nation-wide, local requests, we looked at whether we could use it in a program, or does it somehow fulfill some other collection goal, like when we bought a bunch of educational DS games that taught you how to do Spanish or Japanese." (P39)

In addition to temporally and situationally fluid personas, information seekers are also affected by demographics such as age, gender, race/ethnicity, and sexual orientation. Several mentioned feeling alienated or excluded when trying to find information from existing sources:

"I don't frequent mainstream game sites because quite frankly they aren't geared towards me, they don't care about me...here's a perfect example...look at the titles of these segments. "Broverload"? Are you fucking kidding me? ...Did you know that something like 48% of people who play games are women? Half the people who play games aren't even men and yet they act like we don't exist, not to mention queer people, trans people, people who aren't straight. It's disgusting." (P20)

Other participants also commented on issues with current information sources, such as authority, reliability, and bias. The design of any video game information system needs to consider the complex roles of users. Such a system must consider not just individual personal characteristics, such as those afforded by a personalized login or user profile, but that the same user may have different information needs depending on the time and contextual situation. The system needs to accommodate not only different user profiles but different user modes, such as seeking information for oneself versus seeking information on games for use by others. As video game stakeholders become increasingly diverse, game information systems should also strive to be safe spaces for all players, and not discriminate or alienate based on user demographics.

**Design Implication 1.** Design in flexibility for target game user populations because their needs vary significantly.

### **Desired Game-related Information and Metadata**

A system designed to support such a wide variety of information needs from varying personas requires robust and diverse metadata. Information needs across personas ranged from highly objective information, such as price and platform, to subjective metadata like game reviews, genres, and visual information.

#### *Descriptive Metadata*

While a large number of objective metadata elements are useful to users across the board (Lee et al., in press), several have significant implications for inclusion in game information systems. First, information related to technical aspects was important to participants across all persona types, e.g.:

"Things that I like to see in games are on the technical aspects, things like frames per second, digital fidelity, like the resolution, like 1080p." (P6)



Games requiring special hardware need appropriate metadata, as users preferred specific consoles and generally disliked the necessity of peripherals. This applied to proxy personas as well, such as librarians, who made decisions about purchasing games based on the ability (or inability) to accommodate circulation and the use of such hardware:

“We didn’t circulate DJ Hero because the **only way to play DJ Hero was with the turn table thing** that came with the game. So we were like, **no one would want to check this out** because no one would be able to play this unless they already owned the equipment, which they wouldn’t own unless they bought the game.” (P39)

Information about functionality and performance (e.g., “whether or not there are bugs in it or glitches” (P15)) was frequently mentioned as a useful and desirable inclusion in an information system. While users indicate interest in this metadata, much of this information, such as frames per second and bugs, may be challenging to provide, and requires a high level of familiarity with the game.

Participants also expressed interest in game company information as they relied on company name and brand recognition when searching for games:

“I think **name brand, or company brand, recognition** is a big thing. If it’s from Atlus it would probably catch my attention more than if it was from somebody I didn’t know...company recognition is first and foremost for catching my attention.” (P9)

Even if they weren’t familiar with a specific company, users at least wanted to know if it was AAA or indie, traditional or non-traditional. Certain companies inspired fidelity in gamers, who were more likely to show interest in an upcoming game associated with a familiar company:

“[[I]f I have \$60 for a game and Bethesda has made a game and so has some other company I’ve never heard of, chances are I’m going to get the one made by Bethesda because I’m already **familiar with their work and what they do.**” (P12)

Clearly any video game information system, at minimum, needs to include metadata about technical composition and function as well as the responsible corporate body.

**Design Implication 2.** Provide metadata on technical composition/function and responsible corporate body, at minimum.

### *Level of Engagement*

Information related to game engagement, investment, and attention was of particular interest to all participants, especially casual gamers. Participants preferred games that could conveniently fit into their busy schedules:

“With Fruit Ninja, I like it because it is something fast I can do, like if I’m waiting at a dentist appointment or something, it is fun, but **I don’t have to invest all this time in it**, I can just **do it real fast** and see what my score is.” (P2)

“I usually **play pretty heavily, like several hours at a time** instead of just here and there. But I also like portable games which are more **pick up and play.**” (P13)

For these participants, games can ideally be played during down time throughout the day, in between meetings or during the daily commute. One casual gamer noted that s/he had consciously limited the types of games that were played, as RPGs were deemed addictive:

“When I was in college, I really liked the RPG game after World of Warcraft—it’s my favorite genre. At a certain time, I just stopped playing the game to study and I just cut off these game habits...now I only play the

puzzle game and I'm not sure if I can play MMORPGs normally because **I will be addicted if I play RPG, so that's why I don't play it at all.** Now I only play pause-it game, so that I can cut off or I can stop playing game whenever I want." (P4)

In this case, going from RPGs to casual "pause-it" games was considered a necessity, as it allowed the gamer to gain control over his/her own behavior and personal time. This suggests that information about game session length and ability to save can be useful for such users. Engagement level is also important for parents, as the inability to pause is seen as an inconvenience ("We'll be like, 'pause your game' and [my child] will react like 'I can't pause this game,' and I'm like, there has to be a pause feature on every single game, it's really hard to believe if there's not." (P47)).

**Design Implication 3.** Including length of game sessions and saving options benefits the increasing number of users who prefer to "pick up and play."

### *Relationship-based Metadata*

Relationships among video games and related media are complex and difficult to disentangle (Lee et al., 2014; Clarke et al., 2014). Franchise, series, universe, and sequel information was of interest to the participants, in some cases because they were already familiar with this information:

"So the thing I probably look for most would be the franchise, universe and the series...I'm more inclined to buy a sequel than a brand new game." (P22)

Other game relationships mentioned by participants included games that recreate, influence, or were inspired by other games, as well as the relationship of a game to any additional content such as modifications ("mods"). Charting the impact of game titles on one another over time was especially interesting to designers, collectors, and scholars:

"One thing that games don't have that books have and movies kinda don't really have is **bibliographies**. We don't really have people in games who cite their inspirations that much...I think that's very important in games, because to a certain extent **a lot of games are pretty derivative of each other**, and that's ok. That's how things become refined and tracing the different paths of these strains of influence, tracing the directions they go is really great, but we need more people to write down, or in some ways record, where they're getting their influences from." (P20)

Relationships among games are diverse and complex: port, remake, reboot, side story, spinoff, crossover, spiritual successor, imitation, and so on (Lee, et al., 2014). Participants acknowledged the challenges inherent in representing relationship information:

"Mods for Half Life 2, are those considered games of Half Life 2, or are they considered games of another format?... So there's **a lot to consider for games that are sort of built on other games.**" (P5)

Yet many also offered potential ways of understanding and describing such information in a system, such as one gamer who suggested a trifold description based on mechanics, themes, and culture:

"I would say in no particular order, but **mechanical influence**, side-scrolling, you know, various mechanics, maybe like, computer concealing knowledge from the player which can create kind of an unreliable narrator kind of thing...**thematic influence**, for instance, maybe things like Doom, influencing an entire genre of men shooting things in the face. [And] maybe [a game's] **reception in the gaming landscape, and its effect on our culture**. Like, for instance, Super Mario becoming a really huge thing in all over the world and sparking like Mario mania...And that leads into Mario's influence on other kinds of, on books for instance, things like Ready Player One, or things like that...**So that would be mechanical, thematic or subject**

**matter, and cultural.” (P20)**

In addition to relationships among games, many video games also connect to other media, such as music, books, and art. Participants indicated a need for these relationships to be represented in a game information system as well. While some of these media objects are published and easily accessible (e.g., strategy guides, soundtracks), others may not be (e.g., products from the game creation process such as concept art).

“The music is something that is often neglected, especially in RPGs where it makes a huge difference.” (P7)

“If there were design documentation, or concept artwork, or sketches, like things that actually show the development process, I think that would be really interesting.” (P52)

Relationships between games and game-related media are complex, but highly desirable information that would allow understanding of how media objects influence one another. Additionally, preserving contextual information about the creation and reception of video games may be as important as preserving the games themselves:

“I just thought of something that might be really useful...an interesting thing that can be done now, that might be impossible 100-200 years from now, is asking people who make the games what their influences were...And you can trace this making of games via influence...That’s sort of thing would be fascinating...there’s tons of this information that is still out there that could be in this museum, and 200 years from now you can actually map it out.” (P38)

**Design Implication 4.** Information on relationships among games and additional content is highly desirable.

#### *The Four R’s*

Metadata related to game reviews, ratings, rankings, and recommendations were mentioned by numerous interviewees. Reviews were of particular importance across all persona types, but especially for proxies:

“I’ll usually look at the reviews in the iTunes store and see what people are saying about and its rating. And also to see if it’s kid-friendly through the reviews. If the reviews and the rating don’t seem to match, then I’ll take a closer look at what the maturity level might be for the game.” (P46)

Participants were divided as to whether professionally contributed journalistic-style reviews or user-contributed reviews were preferable. User reviews were valued for personal experience and interaction with a game, but not without limitations:

“I like to see what normal people who aren’t getting paid to be journalists have to say about the game, what their opinion is on it.” (P6)

“You have to take [the reviews] with a grain of salt because no matter how good a game it is, there will always be a handful of really bad reviews by X number of people. I tend to check several different websites to try and get a broad, a bigger sample size of the reviews on a game.” (P7)

The effect of genre preference to reviews was also noted. One participant responded that users should “not be able to post a review unless it [was] a review of a game in a genre that [they] love, because [that way], you’re going to get the most honest opinion” (P12). For instance, someone who never plays fighting games may not like the genre, and thus leave a poor review and also may not know which elements make a good fighting game. When user-contributed reviews lacked authority, participants sought information from professional sources. However, the line between users and professionals was not always clear and some participants expressed concerns with bias not only from users but also from professional reviewers:

“I go to IGN. They’re probably the biggest website that I go to. I have a love/hate relationship with them

because their journalism is terrible. The stuff is absolutely awful and it just has this mere appearance, like they're being paid by developers and publishers to give things good reviews." (P6)

While parents and some scholars relied on reviews from sites like Common Sense Media that specifically tailored to their needs, librarians felt a distinct lack of availability for reliable, professional reviews:

"It would be really handy if in the professional magazines there were regular game reviews. I know there's irregular game reviews at this time in, I think, Library Journal but...[I wish] that would talk about things like DRM and privacy issues and all these other things in relation to libraries and gaming." (P43)

Additionally, participants indicated they would be interested in having aggregate review information such as provided by Metacritic, but rather than having to go to the aggregate site, they expressed desire to see such information on the websites they already regularly visit:

"So maybe there could be something...where it would aggregate reviews from a bunch of other places so that maybe if these people hadn't reviewed the game yet, someone at Game Spot did or someone from somewhere else did so it would pull in another critic's review, so you would be able to see things that maybe they don't get around to, cause they're only like one magazine." (P13)

In contrast, some participants noted that reviews were less important to them, especially for the ones who were regular game players themselves). This was partly due to the trust/reliability issues (e.g., "As far as reviews go, I don't put any stock in them." (P12)) but also the fact that less popular titles tend to get neglected (e.g., "say an independent gaming studio puts out a game versus Nintendo putting out a game. The game put out by the independent studio might not get reviewed and they wait months and they still haven't reviewed it." (P13)).

In addition, participants mentioned the value of having metadata related to game ratings, ranking, and recommendations. For many participants, only one type of such information was not enough to lead them to obtain a game (e.g., "Crysis was recommended to me, but I think I didn't buy it until I started playing someone else's copy of it." (P31)). Several proxy participants mentioned how they use a combination of these different types of information to make final purchase decisions:

"I found those [games] because of the recommendations in Amazon. I read the description, as well as some of the review to try and get an accurate-ish picture of what the game would involve first." (P49)

"There's also what I would call general geek interest websites. I know it sometimes does video game reviews. I rely on listservs, the YAAC programming one where people will put if they did a video game program. A lot of it really is a combination of word of mouth and patron requests and Amazon rankings. Those are the three things that weight the heaviest." (P39)

Some participants noted the importance of the source of recommendations and expressed that they will not always trust the recommendations they get, often due to the age of the recommender or their level of background knowledge on video games:

"I'm not willing to trust [all recommendations]. Especially game recommendations that come from the kid's friends - I'm not willing to take their advice without some further research." (P46)

"The reviews, I'm looking for other parent suggestions. If it's just a kid recommendation I just skip right past that and look for more detail-oriented 'this is what's helpful about this game' or 'this isn't helpful'." (P49)

"...mostly I'm looking for the review of the game from the person who posted to the website and customer reviews, comments -- which you have to take with a grain of salt because no matter how good a game it is, there

will always be a handful of really bad reviews... I tend to check several different websites to try and get a broad, a bigger sample size of the reviews on a game.” (P33)

**Design Implication 5.** 4R’s (i.e., reviews, ratings, rankings, and recommendations) are important, and often used in conjunction, especially for proxy users.

### *Subject and Content Metadata*

In the concurrent survey, genre was identified as the third most useful information when people seek new video games, after price and platform (Lee et al., in press). The importance of genre was also evident in interviewees’ comments (e.g., “If it’s a new game I know nothing about, genre is the most important thing that makes or breaks my purchasing of it.” (P6)). Yet gamers seem to have difficulty describing game genres and often conflate genres together:

“And as far as...**action adventure** games...they’re kinda like **a combination of both of those types of games**. So, you know, you have the story of a role-playing game, you have a vast open world, but it’s also more action-oriented, more like a fighting game, in most cases.” (P10)

Additionally, genre preferences vary widely. While some participants preferred specific genres (e.g., “I prefer the old-school RPG. Of course I also like Dungeon Crawler and what I don’t like that much are strategy RPGs.” (P7)), another participant advocates a more egalitarian approach to genre preferences:

“I think it’s really **important to like different genres**. I sort of think of it as similar to movies—you like the story telling movie that can engage the audience and sort of teach them something and you like the sort of balls-out action movies that are pure entertainment. I don’t think I’d be able to say I have a specific favorite genre. I think it’d be kind of **an empty experience without more than one**.” (P30)

While genre is often used as a guide to determine interest level in a game, some participants find it to be a limiting designation. This may be due to inadequate understanding of specific genre labels or the fact that not all video games can be easily fit into a specific genre type:

“I **don’t really understand** a lot of times when like a game is a platform game and a game is an RPG game and I’m like, I kinda think that is RPG, so **if there was a different way to categorize them...**” (P2)

“There’s some genres of games, you know, different plots or themes or settings that would be very...it’s **very hard to categorize** and to really narrow it down.” (P8)

One difficulty with genre is that it is often confused or conflated with the subject or theme of a game. Representing different themes and tropes in addition to genre may offer increased subject access to games. Violence, in particular, was mentioned as a theme that would be avoided by certain participants across personas. Additional themes and tropes mentioned by participants included cyberpunk, female protagonists, gender, race, and sexual orientation preferences. Information related to region and cultural traditions was also of interest. However, these kinds of themes can be difficult to represent effectively. For instance, what exactly are users referring to when they say “cyberpunk” or “hacking” games? When including theme information, it is important to ensure that it is understandable to the majority of users by providing definitions and sample games. Additionally, specifying synonyms and near-synonyms, as well as hierarchical relationships among subject terms would be helpful:

“The theme sort of goes back to what I was saying about how sometimes they **categorize games using words that I don’t really know what they mean...**” (P2)

Other important content information concerned the educational content and value of games, especially for proxy personas like parents. Parents wanted to find games for their children that were both educational and entertaining

(e.g. “I’ll definitely look for announcements of things that are both educational and fun, and if it hits the mark, I’m super excited.” (P47)). However, the entertainment value of games often takes precedence over the perceived educational value:

“Some type of game...even though it might be an RPG, it might help them with some deductive reasoning or whatnot. I know the active educational ones, well, I only remember the ones from my youth, and those ones are pretty bland and boring.” (P48)

Similarly, many of the proxy persona interviewees noted educational value as an important component, but not necessarily the most essential need when determining game choices for others. Additionally, educational value is of lesser importance to general gamers, without proxy needs to fulfill:

“The purpose, as long as it is entertaining I don’t care. It could be started as an education tool and turned over to something else.” (P22)

Taken together, these comments suggest that rather than simply categorizing games for education versus entertainment in an information system, it may be useful to identify more nuanced and indirect educational values a game may have. Additionally, several users wanted information indicating the intended audience level for a particular game’s content. This was especially true for participants with proxy needs. Used in conjunction with ratings like ESRB, this information allows participants to better determine the viability of media for younger gamers. Related to this, knowing the difficulty level or estimated time of completion was also important for proxy personas (e.g., “you can put a 19 year old versus an 8 year old and if the 8 year old can keep up with him then the 19 year old is happy” (P39)). Similarly, target audience information is important for librarians because they need to represent a wide range of ages in their collections:

“Our collection right now is around five hundred items total, between all of those different platforms...we tried to mix it up and make sure there was enough variety in the age groups and the ratings for each platform, so that somebody would always find something...Our client base for videogames are mostly adults. And so we can’t leave them out by dropping, by not offering mature games. So what we do is, I make sure there’s a balance.” (P40)

**Design Implication 6.** Genre alone is insufficient; themes and tropes may help bridge that gap.

### *Visual Metadata*

Providing visual metadata about games is crucial for game information systems. When users discussed their experience with existing game-related information sources and what they liked or disliked about them, it was clear that the aesthetics of the website and presentation of information played an important role in their site selection. Visual information including screenshots, gameplay videos, and trailers was highly desirable. Interviewees mentioned that this visual information immediately helps them make their decision to purchase or play certain games, and often much more accurately than reading a description of the game.

“You see an ad, you see the design elements, the visual designs and you kind of get a feeling of the characters, their setting and the time period as well, whether it’s western, sci-fi, modern day.” (P9)

“Definitely the gameplay video. That is going to sway me one way or the other...There were so many times in the past where I’ve bought a game based on something else and I thought this was not something I thought it would be. But this way you get to test drive a game.” (P22)

“If it looks dorky, kids, you know, they’re not going to check it out... like even looking at your examples, you have Super Mario Bros. where they’re like pixelated, my younger kids are going to look at that and go “Oh the graphics, gross” but the patrons my age that grew up with this are going to say “Oh my gosh, flashback to

childhood, I want this!" So people have a **very strong response to the visual look of the game.**" (P42)

Different types of visual information had different values to users. Screenshots were perceived to be useful for learning the difference between multiple versions of the same games. Interviewees also clearly noted the difference between trailers and gameplay videos: trailers may help catch their attention and get them excited about the game, but looking at the gameplay videos—or spectating the actual gameplay itself—provided more accurate information about the game.

"I actually look at the trailer which is **entertaining** but it is usually just the CG animated thing that is **not even related to the game.**" (P22)

"I definitely think gameplay videos are really useful..if I want to see also [if the game is] too simple and **you can only get that from seeing someone actually play** and that would also get at possibly how difficult controls are and how difficult it is to actually play the game." (P2)

For obtaining this kind of information, participants preferred non-game-specific sources like YouTube ("Definitely YouTube. You gotta see the actual game play." (P17)). Services like Twitch are also becoming increasingly important as spectating becomes more common.

**Design Implication 7.** Visual metadata (e.g., trailers, gameplay videos) is crucial for quick purchase/play decision making.

#### *Recommendation of Similar Games based on Appeals*

When asked how they generally search for video games, participants responded that game title was the key information necessary to begin an active search. When participants already knew a game's title, searching for information about it online was easy. However, when participants did not know or could not remember the title, the difficulty of finding information increased significantly as they often relied on broad genre labels:

"[If I don't know the title] I would probably Google "role-playing games" which is actually probably **not specific enough** because then it will come up with a bunch of Japanese role-playing games that I'm not as into at all." (P19)

"When I type in a genre like 'card game', there are like hundreds of card games. I always have **trouble sorting through all the results** out of the things that I'm looking at...." (P16)

Relationships among games became important in such cases. One common technique when the title of a game was unknown was to search for other games with similar characteristics in the hopes that it would lead users to the game they sought, either a specific game, or just a new game of interest.

"I go through and I will comb the different—find **a game that's close to it**, usually I already know a game that's close to it, and then I'll go and I'll look at games that are said to be related to it." (P17)

This suggests that recommending similar games based on previous games of interest would be useful, especially considering the specific characteristics of importance to users. For instance, the look of the game may be highly important to some gamers whereas the narrative of the game may be the key attraction for others. Previous literature discusses the reasons certain people are attracted to certain types of games as "motivation/motive" (Johnson and Gardner, 2010; Malone, 1981; Yee, 2006), "gratifications" (Sherry et al., 2006), "aesthetics" (Hunicke et al., 2004), or "appeals" (Gao, 2004). In our interviews, we asked about the core reasons people were attracted to playing their favorite video games and received a variety of responses:

**Character/Narrative:** "I think a lot of it for me is the **character** and the **storyline**. It has to be a **character I like in order to grab me**. And the **storyline has to be somewhat inventive**. Like, for

instance, on *Assassin's Creed*, the first one, I couldn't get into because I hated the character that you're playing." (P14)

Fellowship: "I played *World of Warcraft* when I was in college. I was so addicted for this game and I really enjoyed it because I could play with my friend, make a team and do the adventure and solve the quests and that was really fun doing with my friends." (P4)

**Sensation/Presentation:** "Graphics are key. I don't like cartoon games, I don't like cartoon-y looking games. If I'm playing an RPG, if I'm wearing metal armor, I want it to look like metal...the more realistic, the better, which is why I play a lot of simulation games. Like *Formula One*, the graphics are astounding." (P12)

**Accomplishment:** "For some reason I've always just had this obsession with beating games, and it always just bothered me, you know, when I don't beat games... I've always liked ranking stuff." (P8)

**Challenge:** "Difficulties levels are important, I like to feel challenged and I like to be able to advance and have a sense of completion." (P22)

**Abnegation/Submission:** "It's one of the ways I unwind for work and sort of de-stress and things like that. If I play a game and I get overly frustrated or it's overly difficult, then I'm not interested." (P16)

**Fantasy:** "I mean, come on, I was able to build hundred floor skyscrapers when I was eight years old and no one's going to trust me with the money to ever do that in real life. Probably even nowadays." (P31)

While most responded with multiple reasons for liking certain games, they were still able to pinpoint the most important factor for them. Therefore, it seems that rather than a simple indication of "recommend everything in genre X" or "give me something similar to game X," allowing users to issue more sophisticated queries for recommendations such as "games that have a similar visual style to X," "games that have networked features like Y," or "games with stories like Z" would be more useful. In addition, allowing users to specify the most important appeal factor for them and using that as a basis for filtering recommendations for new games may be desirable.

**Design Implication 8.** Similarity and appeals/motivations may work well for successful game recommendations.

### More Options for Automatic Organization of Games

Understanding how people organize their own collections provides strong insights into how information systems should be designed (e.g., useful metadata, features supporting particular organizational behavior). In addition, many systems which provide game information to users increasingly also allow users to purchase, download, and access games themselves (e.g., Steam), blurring the boundaries between 'information system' and 'access system.' The abundance of digitally distributed games only makes this more critical and applicable, as now the system often has to help users organize and navigate the digital games they acquire and own.

Analyzing users' responses about organization of their game collections revealed the importance of providing different automatic organization methods for games. Many interviewees actually stated that they do not organize their physical game collections; they simply rely on rough categorization or have a designated physical place to store all the games. This may be due to several reasons, including relatively small collection size as players trade-in, resell, or delete games (e.g., "If I don't like anymore, I just delete it." (P4)); infrequent need for re-accessing a game already played (e.g., "once I am finished with a game, yeah, it goes in that cabinet." (P14)) or ability to search digital games (e.g., "As far as organization and accessing, I think I mostly use search." (P18)).

For digitally distributed games, interviewees did express organizational issues. With regular sales of digital games (e.g., Steam sales, Humble Bundle) and the abundance of free games, some ended up with a "messy" collection that included games in which they were not truly interested in playing. The fact that there was no easy way to



resell already played digital games meant that some users ended up with a large collection of digital games over time.

**“I definitely feel overwhelmed** sometimes because of my digital collection especially, because there are **so many games that I haven’t played and a lot of them, I don’t ever want to play...**most of the physical games I buy are really games I want, but most of the digital games I get are either they’re on some crazy sale and so I didn’t really...you know, **they’re more impulse buys.**” (P8)

**“[I have] way more digital games because you can’t trade them in;** once they are there they are there.” (P22)

This suggests that it would be helpful to provide an option to users to sort their games into multiple subsets (e.g., games already played, games to play, games they might play). For digital games, users often resort to letting the system do the organization for them, because they do not have an option to personalize their organization (e.g., “The system allows me to do two types of organization for it. By title, alphabetically, [or] I could sort it by recent activity on it.” (P6)). One interviewee mentioned how organizing digitally distributed games was complicated because the games can be acquired from different sources (e.g., EA Origin, Steam, Amazon) which resulted in the games going into multiple different folders (P10). To address this issue, a game information system should be able to track different games downloaded through multiple services and create an automatic aggregated index.

Providing more options for sorting games was also desired, as a lack of control over sorting methods resulted in user frustration. Automatic alphabetical sorting without an overriding permission means that games that are semantically related (e.g., series, franchise, crossovers) will be scattered around and not collocated in the list:

**“Sometimes there’s multiple games in a series. They don’t have the same title alphabetically, so they’re kind of all over the place in the general alphabetical list.** Like, you know, one and two will be here but the third game will be way down the list, and I don’t like that, so I just want to, so **I just wish I could drag it over and put it next to it so it’s all nice and neat.**” (P6)

Understanding how users organize their physical game collections helps identify desirable organizational criteria. For users who do organize their games (i.e., most collectors, librarians, and some avid gamers or game industry professionals), platform was definitely the most commonly used criterion, followed by game titles (alphabetically sorted). Frequency of use, region, genre, series, and publisher were also mentioned as criteria for organizing part of the collection, but less frequently.

**“My collection is organized by platform...and I also organize them into region,** so I’ll keep the American PlayStation games in their own section, next to the Japanese PlayStation games, so that I can kind of get to them easier...” (P20)

**“Yeah, they’re organized by the console that they’re on, and the manufacturer of the game, like the studio that makes it, and then they’re in alphabetical order from there.”** (P10)

**“I tried to organize it by genre, but for the most part it’s just by system. With the ones that I’m usually playing usually towards the top or the front.”** (P13)

Naturally, collectors seemed to have more complex methods for sorting games, using multiple criteria (e.g., “I sort them according to how they look...in a specific group, I usually sort them by favorites, also genre, series, and publisher.” (P7), “I have basically three levels of how much I want them, per each console and then I also have all upcoming games that I might be interested in...” (P8)). For some users, not all games were treated equally. Games belonging to favorite series/franchises, or games published by particular companies would be organized in a different way than the rest of the collection. Also, games that they had previously played were often placed in a

different “pile” or “box.” Users who spent more time organizing and curating their collections did save certain games as “favorites” or “block” them so they would not show up and clutter the list in order to further facilitate search/browse activities (e.g., “I have my games saved in the Favorites...then I decide I don’t like them, I block them and get rid of them.” (P1)). Providing such features in addition to allowing multiple criteria for automatic sorting would help meet the needs of these users.

**Design Implication 9.** Allow users to select among multiple automatic organization options for improved access to their game collection.

## CONCLUSION AND FUTURE WORK

We investigated the information needs and behaviors of people who interact with and/or purchase video games by interviewing 56 users interested in games for various reasons. From empirical user data, we derived and discussed nine design implications for video game information systems. These findings should be considered when designing a video game information system, lest designers risk reducing the ability to connect users with games and game information. This can have serious impacts on scholarly research, cultural heritage, and the economic market for video games, since it will hamper users’ ability to study, preserve, or purchase video games.

Due to the wide variety and sheer volume of video games as well as the background knowledge required to describe such complex metadata, some sort of user involvement will be necessary for developing such metadata. We plan to continue working toward establishing a standard set of terms and definitions to assist this process, allowing for more consistent description of video games which will lead to better search and retrieval. Additionally, to further improve our understanding on how we should design video game information systems, we are currently analyzing responses to questions from the concurrent survey asking about users’ favorite game-related websites, how they use them, and what they like or dislike about them. Ideally this work will lead to future prototypes for new and improved video game information retrieval systems.

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## APPENDIX

### INTERVIEW PROTOCOL

Hi, I'm [name]. Thanks for agreeing to participate in our study. Today I'm going to ask you some questions about your video game preferences and habits. We want to know what you think about video games! Just to be clear, when we talk about video games, we mean everything from PC games, console games, online games, even games that you play on your smartphone or tablet. Our definition is very wide, and we don't want to leave anything out. If you're not sure if something you're thinking about is a "video game," feel free to ask. I'm going to be audio recording this interview just so we can remember what you said. The recording will be transcribed for analysis, but your name and any other identifying information will be removed.

Any questions before we begin?

Before we dive into the questions about games, I'd like to ask you a few basic questions:

- In what year were you born?
- What is your profession?
- Do you identify with any particular ethnicity?

Now I'd like to ask you some questions about playing video games:

- What are your all-time favorite video games?
- Why are these games your favorite?
- What game-playing devices do you currently own?
- What systems/consoles/devices have you used in the past that you no longer use?
- Approximately how long have you been playing video games?
- How often do you play video games?
- How long do you usually play games in a single session?
- Of the time you spend playing video games, what percentage is spent playing alone versus playing with other people?
- Where do you usually play games?
- Why do you play video games?
- What percentage of your video game collection consists of physical games versus digital games?
- Between physical and digital games, which do you prefer and why?
- What percentage of your video game collection do you actively use?

[If applicable] Now I'd like to ask you some questions about physical video games:

- How many different physical video games do you play in an average week?
- Approximately how many physical video games do you currently own?
- Where do you usually acquire physical video games?

- What percentage of your physical video games did you acquire new vs. used?
- How often do you acquire physical video games?
- How do you learn about physical video games?
- How do you usually organize your physical video game collection?
- What do you do when you are no longer interested in a physical video game?

[If applicable] Now I'd like to ask you some questions about physical video games:

- How many different digital video games do you play in an average week?
- How many digital video games have you downloaded, streamed or accessed in the last month?
- From which sources do you usually acquire digital video games?
- How do you learn about new digital video games?
- How do you organize your digital video game collection?
- What do you do when you are no longer interested in a digital video game?
- What percentage of your digital collection is only available digitally (meaning the game was never physically published in cartridges, disc, etc.)?

Finally, I'd like to ask you some questions about how you find information about video games:

- Which websites or related resources do you visit to find more information about video games?
- What do you use these websites or related resources for?
- Which of the websites you mentioned do you find most useful when looking for information about games?
- Please tell us why you find that website most useful:
- What information about games is most useful to you for games that you are currently playing and when you are looking for new games to play?
- Is there any other game-related information that is useful to you?
- Looking over the metadata elements, which of those elements do you think would be useful to you in an information system for video games (such as a database or website)?
- Are there any that you think would be not useful or problematic?

That's all the questions I have for you. Is there anything else you'd like to add?

## CODEBOOK

This codebook is designed to help you code the interview transcripts. The definitions for codes along with examples are provided below. Please code only according to these instructions.



## GENERAL INSTRUCTIONS:

The objective of this study is to better understand gamers' information needs and behaviors. In particular, we are interested in learning more about their gaming experience, the appeal factors (i.e., the core reasons why someone wants to play particular games), their game-related metadata needs, their search/browse behaviors related to games, how they organize their game collection, and their opinions about physical vs. digital (i.e., digitally distributed) games. Your task is to identify any quotes that are specifically related to these aspects we are interested in.

Please familiarize yourself with all the codes by reading the definitions and examples carefully, and ask any questions if you are uncertain about anything.

Once you have a clear understanding of all the codes, you are ready to code the transcripts. Please read each interview transcript completely once, and then start coding the transcript in your second read.

## CODE DEFINITIONS AND EXAMPLES:

Each code starts with two digit capital letters denoting the group (referred to as "family" in ATLAS.TI) to which the code belongs.

### *Codes Related to Appeal Factors*

Please note that these appeal factors should be the "core" reasons why the user plays particular game(s), in other words, the very reason why he/she plays the game(s) not just peripheral reasons.

#### **AP: Abnegation**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to pass time and/or turn off one's brain and unwind/relax.

Example: "It's not a very high level of complex thought, it's just something to distract you. Yeah, I have a lot of those types of games."

#### **AP: Accomplishment**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to feel the satisfaction of achieving, acquiring, and/or accomplishing something, often motivated by rewards, status, scores, and/or completion of all possible options.

Example: "It just feels great to have 100% on the game achievements. I feel like I *really* played the game, like how it was supposed to be played."

#### **AP: Challenge**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to feel the joy of overcoming obstacles or challenges.

Example: "I love that feeling when you finally are able to beat that super-hard optional boss."

#### **AP: Competition**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to feel the satisfaction of competing and/or winning against other individual(s), or group(s) of individuals, or AI.

Example: “My friends and I love playing against each other.”

### **AP: Creativity**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to appreciate the innovative, novel, or experimental aspect of a game.

Example: “I love playing games that are unique, something different from popular mainstream games.”

### **AP: Emotion**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to experience and/or appreciate particular emotion such as happiness, excitement, etc.

Example: “I mostly go for humorous games.”

### **AP: Exploration**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to explore and/or discover something new.

Example: “I love wandering around in the open world to see what’s out there, finding new things, meeting new people, etc.”

### **AP: Expression**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to express who the user is by customizing characters or settings, and/or creating things in the game world.

Example: “I like games where I can create my character the way I want, do and say the things I want to.” “I would spend hours and hours in *Minecraft* building stuff.”

### **AP: External**

Definition: The core reason for playing game(s) that is an external, practical reason that is not intrinsic to games.

Example: “I only play free games!”

### **AP: Fantasy**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to immerse oneself in a fantasy world and do things that are not possible in real life.

Example: "I love playing this uber-cool high school kid who is also an awesome fighter and gets all the girls."

### **AP: Fellowship**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to enjoy playing with other individual(s) or group(s) of individuals.

Example: "I love playing with my friends and family."

### **AP: Learning**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to learn something new such as new knowledge on a topic or new skill (e.g., typing, math).

Example: "I really like games that have some kind of educational value."

### **AP: Mastery**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to feel the satisfaction from perfecting one's skills in a game.

Example: "It is so satisfying when you can clear the DDR session with 100% score. All the practice finally pays off."

### **AP: Narrative**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to experience and appreciate the story told by the game.

Example: "It's all about the story."

### **AP: Nostalgia**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to have a chance to revisit or rethink the past experience.

Example: "It reminds me of the good time I had when I was a kid."

### **AP: Sensation**

Family: APPEAL FACTOR (AP)

Definition: When the core reason for playing game(s) is to appreciate the visual, auditory, and/or physical stimulation.

Example: “Playing Wii games is fun. That’s probably the only time I would do any kind of exercise.” “I love that game because it is just so beautiful.”

### **AP: Other**

Definition: The core reason for playing game(s) that is not represented by any of the categories above.

Example: “I really like games that are just super funny.”

### **Codes Related to Metadata**

#### **M: Additional content**

Family: METADATA (M)

Definition: The user specifically mentions the value of information on additional content. Additional content refers to “the type and the name of the additional content including DLC, mods, patches, etc.”

Example: “I’ve been playing *CivV* a lot and often search for mods for that game.”

#### **M: Award**

Family: METADATA (M)

Definition: The user specifically mentions the value of award information. Award refers to “the name(s) of any awards the game has won and the granting body that awarded them.”

Example: “It is useful to know if the game won any awards so we can justify our purchase to the administrators.”

#### **M: Connectivity**

Family: METADATA (M)

Definition: The user specifically mentions the value of connectivity information. Connectivity refers to “the technology through which the online features are realized.”

Example: “I need to know if the game requires a broadband access because I have really crappy Internet connection at home.”

#### **M: Customization options**

Family: METADATA (M)

Definition: The user specifically mentions the value of information on customization options. Customization options refer to “the in-game options for difficulty level and characters which can be modified by the player for personalized experience.”

Example: “I loved *Mass Effect* because I was able to customize my character.”

#### **M: Developer**

Family: METADATA (M)

Definition: The user specifically mentions the value of developer information. Developer is defined as “an individual, organization, or group of individuals or organizations responsible for creation and realization of a game.”

Example: “I would buy anything that is made by Team ICO.”

### **M: Dimension**

Family: METADATA (M)

Definition: The user specifically mentions the value of dimension information. Dimension is defined as “the intended perception of the depth of the represented entities inside the game.”

Example: “I really like the real 3D experience on Nintendo 3DS.”

### **M: Distributor**

Family: METADATA (M)

Definition: The user specifically mentions the value of distributor information. Distributor is defined as “an individual, organization, or group of individuals or organizations responsible for marketing and/or distribution of a game.”

Example: “I only play games on Steam these days.”

### **M: DRM**

Family: METADATA (M)

Definition: The user specifically mentions the value of DRM (Digital Rights Management) information. DRM is defined as “digital rights management technologies intended to control the use of the game.”

Example: “I am not going to buy any games that require me to connect to the Internet every 24 hours.”

### **M: Edition**

Family: METADATA (M)

Definition: The user specifically mentions the value of edition information. Edition is defined as “a word or phrase appearing in the game being described that indicates a difference in either content or form between it and a related game (e.g., second edition, greatest hits, collector’s edition, limited edition).”

Example: “There are multiple editions of that game, and they are all different in some ways so if you have that information, it would be useful.”

### **M: Educational value**

Family: METADATA (M)

Definition: The user specifically mentions the value of information on the educational value of the game. Educational value refers to “the game’s potential ability to help players learn new things, improve their understanding of things, and/or practice specific educational skills.”

Example: “Will this game help my kids improve their math skills? I need to know.”

### **M: Estimated time of completion**

Family: METADATA (M)

Definition: The user specifically mentions the value of information on estimated time of completion or length of game. Estimated time of completion refers to “the estimated average time to complete the game.”

Example: “I need to know how long it takes to play the game if I am going to use it in a classroom.”

### **M: Format**

Family: METADATA (M)

Definition: The user specifically mentions the value of format information. Format is defined as “the distribution medium or method that provides the executable code of a video game.”

Example: “These days, I only have time to play games that I can download on my phone.”

### **M: Franchise**

Family: METADATA (M)

Definition: The user specifically mentions the value of franchise information. Franchise is defined as “a commonly used name referring to the intellectual property, related data, and content shared among a group of cultural objects to which the game being described belongs.”

Example: “I like everything about Final Fantasy -- games, artwork, music, figures, everything related to Final Fantasy.”

### **M: Gameplay videos**

Family: METADATA (M)

Definition: The user specifically mentions the value of gameplay videos. Gameplay videos refer to “video footage of the gameplay excluding such things as introductions, cutscenes, or trailers.”

Example: “Looking at gameplay videos help because you know exactly how it will be like to play that game.”

### **M: Genre**

Family: METADATA (M)

Definition: The user specifically mentions the value of genre information. Genre is defined as “the overall nature of a game based on its objectives, types of rules, distinctive characteristics, modes of action, manners of gameplay, and how a player interacts with it.”

Example: “I only play JRPGs, and maybe some puzzle games on my phone.”

### **M: Language**

Family: METADATA (M)

Definition: The user specifically mentions the value of language information. Language is defined as “the classification code for the language(s) in which the game conveys information.”

Example: “I do know Japanese, so I will buy it if it is in Japanese.”

### **M: Mood**

Family: METADATA (M)

Definition: The user specifically mentions the value of mood information. Mood is defined as “the pervading atmosphere or tone of the video game which evokes or recalls a certain emotion or state of mind.”

Example: “I really like dark and intense games, but not the scary kind.”

### **M: Networked features**

Family: METADATA (M)

Definition: The user specifically mentions the value of information on networked features. Networked features are defined as “the ways in which the game can be experienced through connection(s) to other entities, such as game companies, third-party organizations, and other players.”

Example: “I like playing with my friends, I always check if co-op mode is available.”

### **M: Number of players**

Family: METADATA (M)

Definition: The user specifically mentions the value of information on number of players. Number of players is defined as “the number or range of the number of players the game can accommodate either separately or concurrently.”

Example: “I need to know how many people can play the game at the same time because we often use the games for social events at the library.”

### **M: Official website**

Family: METADATA (M)

Definition: The user specifically mentions the value of information on official website. Official website is defined as “a URL of the website for the game from the companies officially associated with the game.”

Example: “I go to the game website to read about it and get desktop backgrounds, etc.”

### **M: Pacing**

Family: METADATA (M)

Definition: The user specifically mentions the value of pacing information. Pacing is defined as “the methods by which time passes in the game and/or manner in which events take place.”

Example: “I like the oldskool turn-based RPGs.” “*Prince of Persia* was great because you could basically rewind the time and redo your action instead of just dying.”

### **M: Packaging**

Family: METADATA (M)

Definition: The user specifically mentions the value of packaging information. Packaging refers to “all items included in the original packaging of the game.”

Example: “I love the little figures that sometimes come in the limited editions of the game, so I always check that information on Amazon.com.”

### **M: Platform**

Family: METADATA (M)

Definition: The user specifically mentions the value of platform information. Platform is defined as “the hardware and operating system on which the game was designed to be played.”

Example: “I only have Xbox 360 and Nintendo 3DS, so that’s what I usually check when I am browsing.”

### **M: Plot**

Family: METADATA (M)

Definition: The user specifically mentions the value of plot information. Plot is defined as “the underlying events that make up the story of the game.” This may be indicated when people talk about story, narrative, plot, or what the game is about.

Example: “The story is really important to me. I will play a game even if the gameplay sucks if the story is good.”

### **M: Point of view**

Family: METADATA (M)

Definition: The user specifically mentions the value of information on the point of view. Point of view refers to the “perspective from which the player experiences the gameplay.”

Example: “I can’t play first person shooters because it makes me feel nauseous.”

### **M: Price/MSRP**

Family: METADATA (M)

Definition: The user specifically mentions the value of price/MSRP information. Price is defined as “the manufacturer’s suggested retail price (MSRP) at time of initial release in the region where the game was released.” People may also talk about price that is not specifically MSRP.

Example: “Price is the most important factor when I buy the games. Recent console games are expensive, so I can only buy maybe one game every two or three months.”

### **M: Publisher**

Family: METADATA (M)

Definition: The user specifically mentions the value of publisher information. Publisher is defined as “an individual, organization, or group of individuals or organizations responsible for manufacture and marketing and/or distribution of a game.”

Example: “Square Enix tends to publish the kinds of games I like, so I would consider buying the game if it is published by them.”

### **M: Rating**

Family: METADATA (M)

Definition: The user specifically mentions the value of rating information. Rating is defined as “the classification of the content in the video game for informed decision making about the game, provided by organizations such as professional associations, game distributors, or creators.”

Example: “I look at the ESRB rating before I decide to buy the game for my kid or not.”

### **M: Region code**

Family: METADATA (M)

Definition: The user specifically mentions the value of information on region code. Region code is defined as “the classification code that indicates the video encoding and regional hardware necessary to realize the game.”

Example: “My kid plays game with people in other parts of the world whom she met online. It is important to know that they can play the same game.”



### **M: Representative art**

Family: METADATA (M)

Definition: The user specifically mentions the value of representative art. Representative art is defined as “the officially released image that is representative of the game, prominently featured in a physical or digital distribution package.”

Example: “The box has a lot of information about the games. There are websites where you can go see the scan of the game box which is pretty useful.”

### **M: Retail release date**

Family: METADATA (M)

Definition: The user specifically mentions the value of retail release date information. Retail release date is defined as “the date of the public/commercial release of the game.”

Example: “For my research, I specifically look at games from the 80s.”

### **M: Review**

Family: METADATA (M)

Definition: The user specifically mentions the value of review information. Review is defined as “an evaluation and/or examination of a video game provided by general users or game experts.”

Example: “Reading reviews helps decide if I should get a game or not.”

### **M: Screenshots**

Family: METADATA (M)

Definition: The user specifically mentions the value of screenshots. Screenshots are referring to “still images taken during the gameplay.”

Example: “I always go check out the screenshot to figure out if I want the game or not.”

### **M: Series**

Family: METADATA (M)

Definition: The user specifically mentions the value of series information. Series is defined as “proper name(s) of a set of related games, often indicated by consecutive numbering, continuing narrative, or similarities in game play and themes, to which the game being described belongs.”

Example: “I usually go find games that are from the same series when I look for new games to play.”

### **M: Setting**

Family: METADATA (M)

Definition: The user specifically mentions the value of setting information. Setting is defined as “the location, time frame, and/or cultural context in which the game takes place.”

Example: “I like playing games that have interesting settings like steampunk, or futuristic games set in space.”

### **M: Special hardware**

Family: METADATA (M)

Definition: The user specifically mentions the value of information on special hardware. Special hardware is defined as “a hardware that is required or recommended for playing the game in addition to the main platform (e.g. motion controller; gaming headset).”

Example: “We have to consider if the game requires any special hardware because the budget for purchasing video games and consoles in our library is limited.”

### **M: Summary**

Family: METADATA (M)

Definition: The user specifically mentions the value of summary information. Summary refers to “a brief statement or account of the main points of the game.”

Example: “I like knowing what the game is actually about, more than just a simple genre label or theme.”

### **M: System requirements**

Family: METADATA (M)

Definition: The user specifically mentions the value of system requirements information. System requirements are defined as “hardware, firmware, and/or software components that are prerequisites for running the game on a particular platform.”

Example: “I play a lot of PC games, so knowing all the specs necessary to run the game smoothly is important.”

### **M: Theme**

Family: METADATA (M)

Definition: The user specifically mentions the value of theme information. Theme is defined as “a common thread, motif, subject, or idea that recurs in the game.”

Example: “I love zombie games. I will play anything with zombies.”

### **M: Title**

Family: METADATA (M)

Definition: The user specifically mentions the value of title information. Title is defined as “proper names that are used to refer to a video game, assigned by the creator.”

Example: “Knowing the exact title can help find the game you want among all the different releases.”

### **M: Trailers**

Family: METADATA (M)

Definition: The user specifically mentions the value of trailers. Trailer is defined as “video footage released and/or endorsed by the developer/publisher of the game for promotional purposes.”

Example: “I also like watching trailers although many of them don’t tell you much about how it is like to actually play the game.”

## **M: Type of ending**

Family: METADATA (M)

Definition: The user specifically mentions the value of information related to the game's ending. Type of ending refers to "the characteristics describing how the game ends and/or post-game content."

Example: "I really like games with multiple endings." "The new game plus feature is good because I tend to play the game multiple times."

## **M: Visual style**

Family: METADATA (M)

Definition: The user specifically mentions the value of visual style information. Visual style is defined as "the predominant and recognizable visual appearance of a video game as originally intended by its creator, and/or determined in the context of creation."

Example: "I love games like *Okami* or *Journey* that are so visually striking."

## **M: Other**

Definition: Any other game-related metadata that user specifically mentions as useful.

Example: "Reviews are always really helpful."

## ***Codes Related to Collection and Organization***

### **CO: Game collection**

Family: COLLECTION-ORGANIZATION (CO)

Definition: Information related to how user purchases, collects, and/or discard video games.

Example: "I have about 10 physical games and maybe 30 or so digital games."

### **CO: Game organization**

Family: COLLECTION-ORGANIZATION (CO)

Definition: Information related to how user organizes and/or accesses their video games.

Example: "My games are organized by platform, and then alphabetically."

### **CO: Physical-Digital**

Family: COLLECTION-ORGANIZATION (CO)

Definition: Information related to user's opinion and/or preference on physical vs. digitally distributed video games.

Example: "I prefer digital because of convenience."

## ***Codes Related to Gaming Experience***

### **E: Gaming history**

Family: EXPERIENCE (E)

Definition: Information on user's past gaming experience such as when and how they started playing video games.

Example: "I first started playing games when I was four with my older brother."

### **E: Game playing behavior**

Family: EXPERIENCE (E)

Definition: Information on user's current video game playing behaviors.

Example: "I play about 2-3 hours on the weekend with my friends."

### **E: Description of games**

Family: EXPERIENCE (E)

Definition: User's description of particular games as examples.

Example: "In *Final Fantasy XIII-2*, you can jump to multiple points in different timelines."

## ***Codes Related to Information Needs and Behavior***

### **NB: Game resources**

Family: NEED-BEHAVIOR (NB)

Definition: Online and offline information resources that the participant uses for obtaining game-related information.

Example: "I usually go to Gamefaqs for walkthroughs."

### **NB: Information needs**

Family: NEED-BEHAVIOR (NB)

Definition: User's expressed game-related information needs.

Example: "I need to be able to find games that are relatively cheap so that I can still build a substantial collection with a tight budget."

### **NB: Information behavior**

Family: NEED-BEHAVIOR (NB)

Definition: Information about user's game-related information behaviors such as searching for specific games, looking for new games to play, seeking more information about games, who they ask for information, etc.

Example: "My friends tell me about new cool games we should play together."

## ***Codes Related to Users***

### **U: Age**

Family: USER (U)

Definition: User's age.

Example: "I am 37 years old."

### **U: Gender**

Family: USER (U)

Definition: User's gender.

Example: “I am a transsexual.”

### **U: Profession**

Family: USER (U)

Definition: Information about the user’s profession.

Example: “I work at a public library. We have a small game collection.”

### **U: Race/Ethnicity**

Family: USER (U)

Definition: User’s race/ethnicity information.

Example: “I am Asian American.”

### **U: User Type**

Family: USER (U)

Definition: Information that is helpful for determining what this user type might be.

Example: “I have two kids who play video games all the time.”

### **U: Other**

Family: USER (U)

Definition: Other information about users’ needs, behaviors, experience that may provide insights into one or more of the aspects we are interested in.

Example: “When I was in high school, I used to make these really simple games with my friends using Scratch.”  
“I love watching other people play.”

### ***Other Code***

#### **O: Other**

Definition: Any text offering insights on various aspects we are interested in but do not fit into the codes provided above.

Example: “I feel like there is a real generation gap when I look at my kids pick up the tablet and play games – it seems so natural to them.”