

Facet Analysis of Video Game Genres

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Abstract

Genre is an important feature for organizing and accessing video games. However, current descriptors of video game genres are unstandardized, undefined, and embedded with multiple information dimensions. This paper describes the development of a more complex and sophisticated scheme consisting of 12 facets and 358 foci for describing and representing video game genre information. Using facet analysis, the authors analyzed existing genre labels from scholarly, commercial, and popular sources, and then synthesized them into discrete categories of indexing terms. This new, more robust scheme provides a framework for improved intellectual access to video games along multiple dimensions.

Keywords: genre, facet analysis, video game, interactive media

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1 Introduction

As video games increase in popularity, users expect efficient and intelligent access to them, similar to their access to other media. Game designers, manufacturers, scholars, educators, players and parents of young gamers all need meaningful ways of finding, accessing, and interpreting video games. As a first step in providing robust access to video games for diverse stakeholders, we need to understand the information provided to users through current video game access.

Previous literature identifies genre as one of the most important features for accessing video games (Winget, 2011). As part of a larger research effort intending to improve access to video games, this paper explores the following two research questions:

- I. What are the different types of information that are represented in the genre labels that are currently used in available game organization systems?
- II. What are the facets and foci that can systematically describe the different types of information currently embedded in video game genre labels?

In order to understand genre access offered by current systems, the authors identified multiple information dimensions represented in video game genres through facet analysis. Facet analysis is the process of examining a subject field and dividing it into fundamental categories, each of which represents an essential characteristic of division of the subject field (Spiteri, 1997). In this paper, we present a faceted classification scheme for video game genre based on our analysis of hundreds of pre-existing genre labels collected from existing video game organization systems. We provide definitions and explanations for each facet as well as examples of foci (i.e., indexing terms) along with a discussion on issues and challenges in representing video game genres.

2 Background and Related Work

2.1 Research Question

Currently available video game organization systems stem from two sources: the field of library and information science (LIS); and commercial systems on the Web, such as game sales or review websites (industry and fan-based). Both sources illuminate problems in helping users access video games.

Non-book materials in libraries often end up described by form rather than content (Leigh, 2002). Items are organized and accessed according to physical format (e.g., VHS, DVD, cassette.) rather than grouped conceptually (such as collocating book and movie versions of *Pride & Prejudice*). Shoehorning non-book objects into a bibliographic description creates sub-optimal descriptions (Hagler, 1980), making it hard for people to find what they seek. Indexers also face challenges in describing games with bibliographic standards. For example, video games do not come with title pages, so rules stipulating transcription of information from title pages are unusable for video games.

Other bibliographic models attempt to address this problem, such as Functional Requirements for Bibliographic Records (FRBR) (IFLA, 2009), but fundamental problems arise when applying these ideas to video games (McDonough et al., 2010). Descriptions based on the context of an object, such as a user's reaction (e.g., mood), or similarity-based relationships (i.e., similar games)--which can be significant in the context of video games--are not represented in FRBR (Lee, 2010). Despite a focus on improving particular user tasks, FRBR is limited because it is derived solely from descriptions of information objects rather than on studies of users' desired descriptive information.

Library of Congress Subject Headings, designed to describe all materials held by libraries, contains only 219 headings (out of about 337,000) for describing video games mostly by name (e.g., *Halo*, *Legend of Zelda*). Consequently, many notable series are missing (e.g., *Final Fantasy*, *Mass Effect*) and these subject headings cannot be used for collocating similar games outside of a particular series. In addition, there are only five genre headings for video games: Computer adventure games, Computer baseball games, Computer flight games, Computer war games, and Computer word games. Such genre headings are limited at best, and hamper both searchability and browsability.

A small number of LIS studies on metadata for video games exist (e.g., McDonough et al., 2010; Winget, 2011), but they tend to focus on older games due to an interest in preservation. These studies, however, consider game information from a data- or creator-centric point of view, rather than that of an end user.

Alternatively, the web contains massive information about video games, scattered across many sources. Such a wealth of information, however, creates a poverty of certainty in determining authority and trustworthiness. Websites like Amazon.com, Mobygames, GameSpot, etc. are generally geared toward purchasing decisions and provide mostly basic descriptive elements like title, platform, genre, release date, and publisher. Websites like Wikipedia provide large amounts of descriptive information, but it is unsubstantiated, unstructured, and cumbersome to navigate. As a result, users leverage multiple sources to find and cross-check information across sites.

These limitations of current organization systems motivated us to explore innovative ways to provide subject access to video games beyond basic descriptive elements -- information that can better inform users about the content or "aboutness" of the game. Doing so can assist future systems to better collocate similar games and make more intelligent recommendations.

2.2 Video Game Genres

In the interdisciplinary field of Game Studies, video game genres are simultaneously well-understood (for example, something like "*SW:TOR* is my favorite *MMORPG*") and completely opaque ("It's almost like a mix of *Call Of Duty*, *Bejeweled*, and *Kirby's Epic Yarn* -- but different!"). Such confusion may stem from

debates about the nature of video games. Narratologists argue games are texts with narrative structures and devices (like films), while ludologists argue that games are interactive experiences focused on gameplay and game mechanics. The complexity of video game genres suggests games are both.

One of the earliest scholars to tackle game genre, Wolf (2001) modeled his system after the *Library of Congress Moving Imagery Genre-Form Guide*. He created 42 categories of games based largely on gameplay and interactivity (e.g., *Abstract, Gambling, Racing*, etc.). He deliberately excluded other elements, like mood or theme, as his system was intended to be used alongside an imagery- or style-based system (such as film genres). However, Wolf's system is commonly critiqued for over-reliance on early-era examples (e.g., *Space Invaders, Frogger*, etc.) to build definitions, and for failing to accommodate modern genres, such as *MMORPG* or *First Person Shooter* (Clearwater, 2011; Whalen, 2004).

King and Krzywinska (2002) describe a 4-tiered hierarchy which emphasizes interactivity rather than narrative: *Platform* referred to the gaming hardware; *Genre* referred to "broad categories such as 'action-adventure', 'driving', or 'strategy'," (p.26); *Mode* referred to players' experiences of the gameworld; and *Milieu* referred to "location and atmospheric or stylistic conventions" (p. 27). Whalen (2004) argues that this hierarchy fails to create a common language by ignoring game websites, and that, concurring with Clearwater (2011), these terms describe game elements occurring simultaneously, rather than hierarchically. Whalen instead suggests that most games can be divided into three categories: *Massive* games that are networked (thereby enabling massive numbers of players); *mobile* games designed for smaller screens and shorter play times; and *real* games "requir[ing] players to physically relocate themselves as an act of playing the game" (p.301). Whalen's terms challenge the notion of genre, forcing new consideration of the constitutive elements of many games.

Apperley (2006) proposed a detailed view on four common terms describing video game genres. *Simulation* games mimic physical world activities – but only to the extent that such mimesis does not interfere with entertainment. *Strategy* games require collecting, processing, interpreting, and accessing information via the game interface. *Action* games rely on the performativity of the player. *Role-playing* games are marked by changes in and valuations of players' avatar characteristics (e.g., changes in level, power, armor, etc.). These definitions offer a critical view of genre often missing from larger discussions about the relationships among genres and players.

Elverdam and Aarseth (2007) present their typology as an iteration on an earlier version (see Aarseth, Smedstad & Sunnanå, 2003). Their goal is to provide a tool enabling game designers to communicate with academics, game journalists, and players. The revised typology presents eight metacategories (e.g., *Player Relation, External Time*). Each metacategory has two to three unique dimensions (e.g., *Teleology, Mutability, Synchronicity*). Each dimension has two to three elements (e.g., *Mimetic/Arbitrary, Finite/Infinite*). The typology can then be used to compare games to find similarities and differences. The authors highlight the importance of "a knowledge base of classified games that is accessible to a broader field of researchers and developers" (p.20), which supports our goal.

None of the systems reviewed above offer sufficient tools for categorization. Like the library-, industry-, and fan-based systems described earlier, game studies scholars find many dimensions of information embedded in video game genre descriptions. While some demonstrate attempts to tease out these different dimensions, most of these authors rely heavily on literary genre theory or film genre theory, revealing the narratological bias of these early works. Only Elverdam & Aarseth (2007) crafted a system based solely on games themselves. However, even their typology suffers from the challenge of complexity, and is best viewed as a 'meta-tool' to begin thinking about classification.

Classification theory seems to be alien in game studies, so we bring a fresh approach to a long-standing problem in this area. As game studies shifts towards a more ludological perspective rather than a strictly narratological view, discussions of genre face an impasse. We believe our work can provide forward momentum.

3 Study Design

3.1 Method

We employed the method of facet analysis to tease out the different types of information that are represented in current video genre labels. Facet analysis is based upon two processes (Ranganathan, 1967; Spiteri, 1997):

- a) *Analysis*, whereby a subject field is divided into fundamental categories, each of which represents an essential characteristic of division of the subject field;
- b) *Synthesis*, whereby individual concepts from these categories may be combined to express compound subjects (Spiteri, 1997 p.21)

Broughton (2008) asserts that “facet analysis is the only means of organizing the concepts in a subject domain that has a logical and intellectual basis (p.193).” Many systems are built after facet analysis has been conducted, but the analysis method itself is rarely discussed in detail.

Broughton and Slavic (2007) outline their application of facet analysis for the creation of a faceted classification for humanities resources. They looked at extant schemes and pulled terms from them to name and organize the facets to be used in their system. Using Ranganathan’s fundamental categories as a starting point, they then modified them substantially to reflect the particularities of the humanities (e.g., abstract concepts, philosophical concepts, etc.). Gnoli and Hong (2006) discuss their application of facet analysis in their description of developing the Integrative Level Classification. Building on the fundamental categories of the Classification Research Group, they refined the categories on the basis of increasing complexity. This experimental work involved the classification of small corpuses of documents to test their system and to undertake research into appropriate user interfaces.

Each of these studies shows that working from an existing controlled vocabulary or set of indexing terms is a useful approach when undertaking a facet analysis. By employing facet analysis, we attempted to create a conceptual map of a subject field: video game genres. Our process of facet analysis is summarized in Figure 1.

3.1.1 Process of Developing Facets and Foci: Analysis

For the *Analysis* part, we started by conducting a domain analysis of how genre labels are currently being used in the video game community. This process consisted of two parts: 1) literature review on video game genres (described above), and 2) collection of empirical genre data, i.e., the actual genre labels used in existing video game organization systems as well as game-related literature.

We ended up with 804 instances of genre labels from multiple game-related websites and online directories/ encyclopedias (e.g., Allgame, Gamefaqs, Gamespot, Mobygames, IGN, Giantbomb, dmoz, ranker, Wikipedia, Amazon) as well as previous literature related to game genres (e.g., Apperley, 2006; Djaouti et al., 2007; Djaouti et al., 2008; King, Delfabbro & Griffiths, 2010; Foster & Misha, 2011; Wolf, 2001). After eliminating duplicates, areas of conceptual overlap, and labels that were not applicable (e.g., labels describing interactive media such as word processors or image editing software), we used card sorting to organize and elicit categories describing different types of genre labels. Card sorting can be used as an exploratory technique as part of the piloting work without any preliminary elicitation using other techniques (Rugg & McGeorge, 2002). Here, it enabled us to create a conceptual framework to organize hundreds of genre labels. The terms were printed on paper strips and organized into homogenous, mutually exclusive categories representing specific characteristics of division of video game genres. This information was later digitized into a spreadsheet where labels found on new sources were continually added.

After identifying major categories, we identified and named the facets to reasonably describe the specific characteristics of division (e.g., *Gameplay*, *Artistic style*, *Theme*, *Mood/Affect*). The final list of facets was chosen based on the seven guiding principles for selecting facets by Spiteri (1998):

- *Differentiation*: Facets should distinguish clearly among the component parts.
- *Relevance*: Facets should be chosen for their relevance to the purpose, subject, and scope of the classification
- *Ascertainability*: Facets should represent characteristics of division that can be measured.
- *Permanence*: Facets should represent permanent qualities of the item being divided.
- *Homogeneity*: Facets must represent only one characteristic of division.
- *Mutual exclusivity*: Two facets cannot overlap.
- *Fundamental categories*: Categories should be derived based on the nature of the subject being classified.

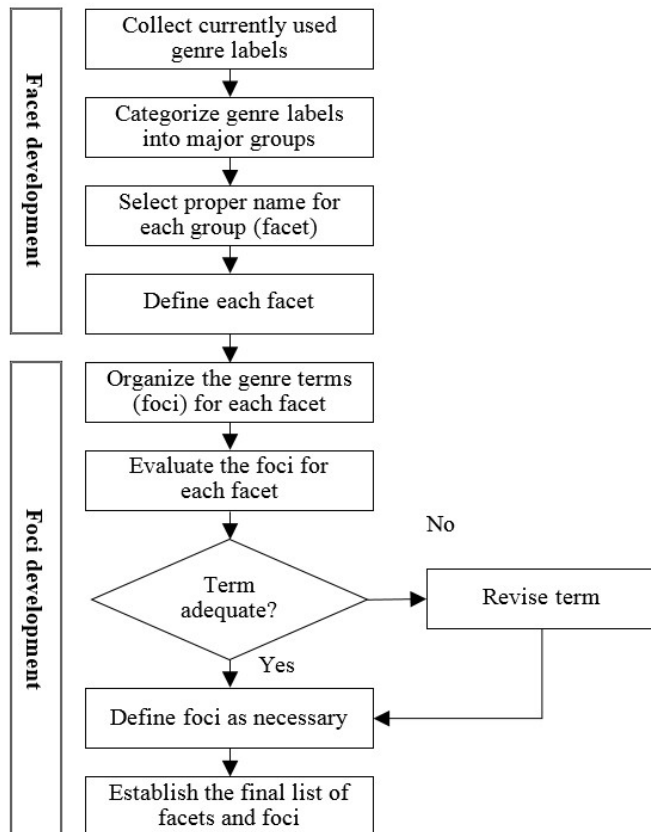


Figure 1: Steps Involved in Facet Analysis

them by adding, deleting, or modifying the indexing terms. Through this iterative process, we continued to evaluate and refine the indexing terms.

This term control process also involved evaluating the specificity of the terms, controlling homographs, maintaining term consistency and word forms, semantic factoring, and so on (Aitchison, Gilchrist & Bawden, 1997). Afterwards, we defined the foci in order to clearly convey the meanings of the terms and thus established the final set of facets and foci.

3.2 Limitations

We acknowledge the inevitable “incompleteness” of the scheme. There will always be some game-related websites excluded from our sampling, and certain types of games not included in the sample games used to

Next, we clearly defined each of these facets. This critical component differentiates our scheme from many current game genres, as a major problem during our analysis was that genre labels lacked definition. Then we organized the foci for each facet based on the genre labels collected. The term “foci” is commonly used to refer to indexing terms in facet analysis (Spiteri, 1998). Then we evaluated each term based on potential end-user warrant, considering the term’s popularity and potential user familiarity. We sought domain expertise from the creators of SIMM (Seattle Interactive Media Museum) to make this judgment.

3.1.2 Process of Developing Facets and Foci: Synthesis

In the *Synthesis* phase, we reduced the size and complexity of the foci in the genre scheme. By combining separate indexing terms, it is possible to represent complex and compound subjects without the need for enumerating all those concepts. Like Gnoli and Hong’s (2006) test, we described a variety of sample games representing diverse gameplays and platforms to identify any problems with the scheme and remedy

evaluate the terms. Additionally, even domain experts and enthusiasts are challenged by understanding the meanings of all the indexing terms (e.g., What is the difference between “Shmup” and “Light gun” games?; What does “Exergaming” mean?) as well as the domain itself (e.g., Do “Meditation” games really exist?; How has “RPG (Role-Playing Game)” evolved over time and what are the differences between “JRPG” and “Western RPG”?).

We plan to mitigate these issues by systematically evaluating the scheme via soliciting feedback from gamers, and continuing to evaluate video games against the scheme, especially newer games such as digitally downloadable games and apps. Creating any controlled vocabulary requires continuous attention and ongoing maintenance. However, because faceted classification offers increased flexibility and extensibility over other systems like hierarchical taxonomies or keyword lists (Kwasnik, 1999), this scheme is designed to be easier to update and revise. As the video game domain evolves, we plan to continually revise our scheme with help from domain experts and enthusiasts.

4 Data and Discussion

4.1 Facets and Foci

Twelve facets were identified, each representing a different characteristic of division related to video game genres. The first column of Table 1 lists the facets. The number of foci (i.e., indexing terms) identified under each facet is provided in the second column. The third column illustrates a small number of foci examples for each facet¹. Certain facets and foci were structured hierarchically: for instance, the facet *Gameplay* has the sub-facet *Style* describing more specific kinds of gameplay; *Theme* has 22 parent terms that are divided into 127 child terms; and *Setting* was divided into two sub-types “Spatial” and “Temporal.” The following subsections provide more detailed information on each facet and challenges faced when defining them.

Determining the characteristics of division in video game genres was not clear-cut and required much discussion. Many questions arose, some of which we could not answer in a satisfying manner. However, this faceted scheme provides a flexible framework that can represent multiple foci under any facet, thus allowing a more thorough representation of the subject of a video game. The scheme is easily extendable and therefore accommodating of an unlimited number of new foci as games evolve. Note that for some facets that emerged during our work, we were able to identify only one or two instances of the genre labels representing those facets (e.g., *Forms of expression* – textual or graphical, *Number of players* – MMORPG, MMOFPS), thus they were excluded in our final scheme.

Facet	Number of Foci	Examples of Foci
Gameplay	10	Action, Fighting, RPG, Strategy
Style	100	Under gameplay “Action” (Beat’em up, Platformer, Rhythm) Under gameplay “Shooter” (Shmup, Light Gun, Run & Gun)
Purpose	7	Education, Entertainment, Party
Target Audience	18	Everyone (ESRB), 12+ (iTunes), MA-17 (VRC), Low maturity (Android)
Presentation	10	2D, 3D, Grid-based, Side scrolling
Artistic style	9	Abstract, Cel-shaded, Retro
Temporal Aspect	7	Real-time, Turn-based, Multiple game clocks, Timed action

¹ Space limitations prevent a full list of foci for certain facets such as *Style* or *Theme*. The full scheme will be accessible on <http://gamer.ischool.uw.edu/>.

Point-of-view	4	First person, Third person, Overhead, Multiple perspectives
Theme	22 (parent) 127 (child)	Nature: Animals, Dinosaurs Food: Restaurant, Bakery Fantasy: Princess, Knights Sports: Baseball, Basketball
Setting	16 (spatial) 8 (temporal)	Spatial: Casino, Spaceship, Western, Urban Temporal: Medieval, Modern, Futuristic, Steampunk
Mood/Affect	15	Horror, Humorous, Dark, Peaceful
Type of ending	5	Finite, Branching, Circuitous, Infinite, Post-game

Table 1: Video Game Genre Facets with Examples of Genre Labels Representing Each Facet

4.1.1 Gameplay

In this scheme, *Gameplay* is defined as “the overall nature of the experience defined by a pattern of interactions and game rules.” The foci listed under the facet *Gameplay* are the terms used most commonly as genre terms in typical video game organization systems. This particular facet is also considered the most fundamental category of all facets in our scheme. Discussions among researchers and SIMM staff led to ten chosen foci: *Action*, *Action/Adventure*, *Driving/Racing*, *Fighting*, *Puzzle*, *RPG*, *Shooter*, *Simulation*, *Sports*, and *Strategy*. Our definitions of these foci along with game examples are provided below:

- *Action*: Games with a heavy emphasis on a series of actions performed by the player in order to meet a certain set of objectives (e.g., *Super Mario Bros.*, *Patapon*)
- *Action/Adventure*: Games which are set in a world for the player to explore and complete a certain set of objectives through a series of actions (e.g., *The Legend of Zelda*, *Prince of Persia*)
- *Driving/Racing*: Games involving driving various types of vehicles as the main action, sometimes with an objective of winning a race against an opponent (e.g., *Mario Kart*, *Gran Turismo*)
- *Fighting*: Games involving the player to control a game character to engage in a combat against an opponent (e.g., *Street Fighter*, *Mortal Kombat*)
- *Puzzle*: Games with an objective of figuring out the solution by solving enigmas, navigating, and manipulating and reconfiguring objects (modified from Wolf, 2001) (e.g., *Tetris*, *Minesweeper*)
- *RPG*: Games with an emphasis on the player’s character development and narrative components (e.g., *Final Fantasy*, *Mass Effect*)
- *Shooter*: Games involving shooting at, and often destroying, a series of opponents or objects (Wolf, 2001) (e.g., *Doom*, *Duck Hunt*)
- *Simulation*: Games intending to recreate an experience of a real world activity in the game world (e.g., *SimCity*, *Trauma Center*)
- *Sports*: Games featuring a simulation of particular sports in the game world (e.g., *FIFA series*, *Wii Sports*)
- *Strategy*: Games characterized by players’ strategic decisions and interventions to bring the desired outcome (modified from Apperley, 2006) (e.g., *StarCraft*, *Total War series*)

One key challenge in developing these foci was mutual exclusivity. Some categories seem to have unclear boundaries and overlap conceptually. Many questions emerged, such as: how different are *Action* and *Action/Adventure* games? How about games employing multiple gameplay components such as *Action/Adventure*, *RPG*, and *Puzzle*? Are all games essentially *Action* games since they all require some actions performed by the player? The category *Action* in particular seemed akin to the music genre “*Pop*” or movie genre “*Action*” which work to specify a particular type of cultural object as well as a “catch-all” category. A first attempt at resolution focused on providing simple and clear definitions with example games

for each of the categories. In future work, we plan to further test and evaluate these foci by cataloging a larger number of sample video games and investigating whether gamers are reasonably able to comprehend and distinguish among these different labels of gameplay.

4.1.2 Style

Style is defined as “a particular distinctive characteristic, mode of action, or manner of a gameplay.” This facet functions as a *Gameplay* sub-facet. The foci from both facets are combined to create a compound indexing term (e.g., *Action – Platformer*; *Action/Adventure – Stealth*; *RPG – MMORPG*; *Strategy – Tower defense*). This facet allows for a more intelligent collocation of similar games under a particular *Gameplay* such as the sub-categories of *Beat’em up* vs. *Platformer*, which are both types of *Action* gameplay.

4.1.3 Purpose

Purpose is defined as “the reason for why the game exists as intended by the game designer(s)/developer(s).” *Purpose* emphasizes the intention(s) of game designers and developers rather than that of end users; how users ultimately use the game is contextual and subjective. Our final list is comprised of six purposes:

- *Education*: Games in which the goal is to support learning. There are a broad range of educational games, from those teaching spelling to computer programming to animal facts, etc. (e.g., *Big Brain Academy: Wii Degree*, *Carmen Sandiego* series)
- *Entertainment*: Games in which the goal is to allow the player to have fun. A large majority of games have entertainment as their purpose. (e.g., *Mass Effect*, *Kingdom Hearts*, *Super Mario Bros.*)
- *Exercise*: Games in which the goal is to get players to move their physical bodies and burn calories or participate in some type of athletic pursuit. (e.g., *Wii Fit* series, *Dance Dance Revolution*)
- *Meditation*: Games which help support players’ engagement in meditation and mindfulness activities. (e.g., *Leela*, *Meditation Balance Game* on *Wii Fit*)
- *Party*: Games designed to be played in the setting of a social gathering. These games are designed for relatively short-duration play, allow for multiple players and quick turn-taking, and may also be designed to be spectator-friendly for the enjoyment of those who are not currently playing. (e.g., *Mario Party*, *Rayman Raving Rabbids*, *WarioWare*)
- *Social*: Games designed to involve around heavy social interaction rather than playing in solitude. The players engage in group activities such as making friends, chatting, sending daily gifts, teaming up for tasks, etc. (e.g., *Farmville*, *CityVille*, *Gaia Online*)

4.1.4 Target Audience

Target audience is defined as “a group of people for whom the resource is intended or useful, determined by the creator or the publisher of the game.” Rather than creating another scheme to represent this information, we decided to incorporate existing rating information from organizations such as the Entertainment Software Rating Board (i.e., Early Childhood, Everyone, Everyone 10+, Teen, Mature, Adults Only, Rating Pending) or Videogame Rating Council (i.e., General Audiences, Mature Audiences-13, Mature Audiences-17, Not Yet Rated). Apple and Android also have their own rating systems for game apps based on the age of the player (i.e., 4+, 9+, 12+, 17+) and the level of maturity in the game content (i.e., Everyone, Low maturity, Medium maturity, High maturity), respectively.

4.1.5 Presentation

Presentation is defined as “the manner or style of game display” containing the following ten foci:

- *2D*: Representation of space in two dimensions. (e.g., *A Boy and His Blob*, *Odin Sphere*)
- *3D*: Representation of space in three dimensions. (e.g., *God of War*, *Uncharted*)
- *Isometric*: Games that use isometric projection to render three-dimensional objects in two dimensions. (e.g., *Final Fantasy Tactics*, *Age of Empires*)

- *Static background*: Games with a background display that does not move or change. (e.g., *Peggle*, *Princess Maker*)
- *Vertical scrolling*: Games with a display that scrolls vertically where characters typically move from bottom to top. (e.g., *1942*, *Raiden*)
- *Side scrolling*: Games with a display that scrolls horizontally where characters typically move from left to right. (e.g., *Muramasa*, *Castlevania: Symphony of the Night*)
- *Grid-based*: Games featuring a display that is made up of a series of intersecting vertical and horizontal axes. (e.g., *Bejeweled*, *Tetris*)
- *Video backdrop*: Games based on interacting with a motion-video backdrop, either as scenery or an enemy (modified from mobygames.com). (e.g., *Area 51*, *EyeToy Groove*)
- *Text-based*: Games that use text as the main display method.
- *Perspective manipulation*: Games where characters are able to switch between multiple display methods (e.g., 2D to 3D or vice versa). (e.g., *Super Paper Mario*, *Perspective*)

Defining this facet presented another challenge: what is the nature of the relationship between the *Presentation* and *Artistic style* (see below) facets? After lengthy discussion and examination of extant terms and screenshots of game displays, we determined that it would be useful to separate the technical aspects from the artistic or aesthetic aspects of game display. Thus two different facets in our scheme describe the visual aspects of video games.

4.1.6 Artistic style

Artistic style is defined as “a cohesive and unifying visual aesthetic.” A total of nine foci were identified:

- *Cartoon*: A style that incorporates elements typical in Western comic books and animations. (e.g., *Batman: The Scarecrow’s Revenge*, *Plants vs. Zombies*)
- *Anime/Manga*: A style that incorporates elements typical in Japanese comic books and animations. (e.g., *Shin Megami Tensei: Persona 4*, *Tales* series)
- *Retro*: A style that incorporates pixilated looks of objects, characters, or environments that were common in older games. (e.g., *3D Dot Game Heroes*, *Hotline Miami*)
- *Realistic*: A style portraying objects, characters, or environments in a realistic manner. (e.g., *Final Fantasy XIII*, *Halo 4*)
- *Abstract*: A style that uses simple forms, colors, and lines. (e.g., *Lumines*, *Dyad*)
- *Handicraft*: A style where objects, characters, or environments look like they are hand-made. (e.g., *Little Big Planet*, *Platypus*)
- *Watercolor*: A style where objects, characters, or environments look like they are painted in watercolor. (e.g., *Okami*, *Braid*)
- *Cel-shaded*: A style that renders light and shadow to enhance the illusion of a 3D surface. (e.g., *The Legend of Zelda: The Wind Waker*, *Catherine*)
- *Wireframe*: A style of revealing the design structure of 3D objects with lines and curves (e.g., *Battlezone*, *Stellar 7*).

This facet focuses on the “look” of a game from an artistic or aesthetic point of view. Extant terms describing the artistic style of games were poorly described and rarely defined. Additional complications arose, such as how to deal with games that were intended to look “realistic” yet now look “retro” because of technical limitations at the time of the game’s creation (e.g., *Final Fantasy VII*). Do we represent the intention of the creators or the actual display? If the actual display is represented, then how might this information change over time? It is easily possible that games we currently perceive as *Realistic* will be perceived as *Retro* after 20 years.

4.1.7 Temporal aspect

Temporal aspect is defined as “the methods by which time passes in the game and/or manner in which events take place.” We identified the following seven foci:

- *Real-time*: The game time progresses continuously and actions are performed in real-time. In battles and combat, all the units act simultaneously and the player is expected to act quickly to eliminate the enemies. (e.g., *Star Ocean*, *Kingdom Hearts*)
- *Turn-based*: The game time is divided into turns and actions are performed by the players taking turns. This allows players to take time to make strategic decisions. (e.g., *Final Fantasy X*, *Valkyrie Profile*)
- *Time manipulation*: Players are able to manipulate time by taking certain actions (e.g., changing day to night by playing a song) or change the time flow in the game (e.g., *The Legend of Zelda: Ocarina of Time*, *Prince of Persia*)
- *Time travel*: Players are able to move between different points of time in the same timeline. (e.g., *Chrono Trigger*, *GrimGrimoire*)
- *Multiple game clocks*: Players are able to move between different points of time in multiple timelines that might converge or stay independent. (e.g., *Final Fantasy XIII-2*, *Radiant Historia*)
- *Calendar-based game clock*: The game time progresses based on a calendar, sometimes regardless of players participating in game actions. (e.g., *Shin Megami Tensei: Persona 3*, *Animal Crossing*)
- *Timed action*: Players must complete certain action in a given amount of time in order to successfully progress in the game. (e.g., *Trauma Center*, *Time Crisis*)

Certain foci will be more relevant for games employing particular types of gameplays: for instance, timed action may appear more often in *Simulation* or *Shooter* games, time manipulation in *RPGs* or *Action/Adventure* games, and so on. Multiple foci may be applicable for certain games (e.g., *Real-time*, *Time travel*, and *Time manipulation* in *The Legend of Zelda: Ocarina of Time*).

4.1.8 Theme

Theme is defined as “the common thread or ideas that recur in the game.” *Theme* can help represent the “aboutness” of the game regardless of the *Gameplay* or *Style*, allowing the collocation of games by theme despite these other facets. Some examples of foci include abstract concepts such as *Death*, *Friendship*, or *Coming-of-age*, entities such as *Superheroes*, *Zombies*, *Robots*, and *Pirates*, or subjects like *Art*, *Music*, *Management*, and so on. We have organized a total of 127 different themes under 22 main categories (i.e., *Art & Design*, *Business*, *Children*, *Concept*, *Crime*, *End of the world*, *Fantasy*, *Food*, *History*, *Holidays*, *Law*, *Medicine*, *Nature*, *Politics*, *Religion*, *Science*, *Sci-fi*, *Sex*, *Sports*, *Supernatural*, *Travel & Transportation*, and *War & Fighting*) and we anticipate this list will grow as we test larger numbers of games.

Categorizing these themes was not trivial, especially given definitional criteria such as mutual exclusivity and comprehensiveness. ‘User warrant’ will help keep this scheme relevant. Therefore we evaluated themes based on the likeliness that users would seek games featuring a given theme. In order to empirically ground this list of foci, we plan to conduct additional studies involving real users in our future work.

4.1.9 Setting

Setting is defined as “the surroundings or environment (spatial or temporal) in which the game takes place.” Currently the foci under setting are divided into two sub-categories: “spatial” (i.e., *Asian*, *Casino*, *Castle*, *Desert*, *Game show*, *Hospital*, *Nature*, *Ocean*, *Rural*, *School*, *Space*, *Spaceship*, *Tundra*, *Urban*, *Virtual worlds*, and *Western*) and “temporal” (i.e., *Cyberpunk*, *Futuristic*, *Gothic*, *Historic*, *Medieval*, *Modern*, *Renaissance*, and *Steampunk*).

Our discussion evoked the following questions: how do we describe games such as *Mario Kart* where the environment of the game changes in each stage of the game? How about puzzle games such as *Peggle* that may feature a display of a particular setting such as *Space* or *Desert* in the background, but it does not significantly affect the gameplay or story? Again, user warrant could be helpful in determining when and how to apply this facet: in other words, would describing setting information in such games be potentially useful for users? For example, when searching for games featuring a *Setting* in *Space*, would users expect to see games like *Mario Kart* or *Peggle* in their results? *Setting* may not be relevant to all existing games, but rather only applicable to games with more complex environments. Future planned interviews with real gamers will help reveal useful applications of *Setting*.

4.1.10 Mood/Affect

Mood/Affect is defined as “the pervading atmosphere or tone of the video game which evokes or recalls a certain emotion or state of mind.” The role of emotions (e.g., pleasure, arousal, dominance) in playful consumption of games has been well-documented (Holbrook et al., 1984). As games feature increasingly complicated narratives, the relevance of this facet will increase. We identified fifteen common moods in games including *Adventurous*, *Aggressive*, *Cute*, *Dark*, *Horror*, *Humorous*, *Inspirational*, *Intense*, *Light-hearted*, *Mysterious*, *Peaceful*, *Sarcastic*, *Sensual*, *Solitary* and *Quirky*. Mood taxonomies established for other media, like music moods from allmusic.com, may prove to be useful for expanding this list in future work.

4.1.11 Type of Ending

Type of ending is defined as “the method by which the player is lead to gameplay culmination.” While this information is often sought on video game web forums such as Gamefaqs, it is not typically found in many commercial websites. There are five foci for this facet:

- *Branching*: A game with multiple endings (e.g., *Bioshock 2*; *Shadow Hearts*).
- *Circuitous*: A game with a “new game plus” feature that allows players to start a new game after completing the game once, while retaining some of the experience, status, or items in the newly started game (e.g., *The Walking Dead: The Game*; *Tales of Graces F*).
- *Finite*: A game with a single terminal ending (e.g., *Portal 2*; *Final Fantasy VII*).
- *Infinite*: A game with no definite ending, such as one that is set in an open world (e.g., *World of Warcraft*, *Tiny Tower*).
- *Post-Game*: A game with bonus content that can be unlocked after completing the game once, such as post-game dungeons (e.g., *Batman: Arkham Asylum*, *Valkyrie Profile 2: Silmeria*).

4.2 Application of the Scheme

As explained previously, we attempted to describe the subject of several sample games using the proposed genre scheme. Notable examples are provided in Table 2. In this scheme it is possible to apply multiple foci for each facet as necessary. For certain types of games, some facets may not be applicable, thus they were left blank in the table. For instance, a tile-matching puzzle game such as *Bejeweled 2* does not have a coherent theme, notable setting, or mood. Also, some older games do not have rating information, like *Super Mario Bros.* which was published in 1985.

	Shin Megami Tensei: Persona 3 Portable	Ōkamiden	Plants vs. Zombies	Trauma Center: Under the Knife	Super Mario Bros.	Mortal Kombat 3	Bejeweled 2
Gameplay	RPG	Action-Adventure	Strategy	Simulation	Action	Fighting	Puzzle
Style	JRPG	-	Tower defense	Surgery	Platformer	Versus	Tile-matching
Purpose	Entertainment	Entertainment	Entertainment	Entertainment	Entertainment	Entertainment	Entertainment
Target Audience	Mature 17+ (ESRB)	Everyone 10+ (ESRB)	Everyone 10+ (ESRB)	Teen (ESRB)	-	Mature 17+ (ESRB)	Everyone (Android)
Presentation	2D, 3D	3D	2D	2D	2D, Side-scrolling	2D, Isometric	2D, Static background, Grid-based
Temporal Aspect	Turn-based, Calendar-based	Real-time, Time manipulation	Timed action	Timed action	Real-time	Real-time	Turn-based
Artistic style	Anime/Manga	Anime/Manga Cel-shaded	Cartoon	Anime/Manga	Retro	Retro	Abstract
Point-of-view	Third person	Third person	Top down	Multiple perspectives	Third person	Third person	Top down
Theme	Supernatural – Demons	Supernatural – Demons, Supernatural – Gods	Supernatural – Zombies, Nature-Plants	Medicine – Health	Fantasy – Princess	War and Fighting – Combat, Sci-Fi, End of the world– Post-apocalypse	-
Setting	Spatial–School/Asian, Temporal–Modern	Spatial–Nature, Temporal–Historic	Spatial–Nature	Spatial-Hospital, Temporal–Modern	Spatial–Virtual world, Spatial–Nature	Spatial–Virtual world, Temporal – Futuristic	-
Mood/Affect	Dark	Cute, Humor, Dark	Humor, Quirky	Intense	Quirky	Aggressive	-
Type of ending	Circuitous, Branching	Circuitous	Finite	Finite	Finite	Finite	Infinite

Table 2. Facets of Video Game Genres with Examples of Genre Labels Representing Each Facet

5 Conclusion and Future Work

This paper reports on a first step in understanding the complexity of video game genre in order to devise a more robust scheme for representing this information. An analysis of game labels used in game-related websites and catalogs revealed that the metadata element “genre” was heavily overloaded with multiple dimensions of information. Through the method of facet analysis, it is possible to ascertain and represent the different types of information embedded in current video game genre labels in a flexible and extensible way.

Future work includes complete definitions for all the indexing terms under each facet (e.g., what is the definition of a *Stealth* style game?; what counts as a *Cyberpunk* setting?); the creation of additional metadata records to test the scheme; and usability studies involving real users of video games. Such studies will not only shed light on how gamers understand genre and the clarity of the terms and definitions developed here but also evaluate the usefulness of a faceted, multi-dimensional genre classification for locating and accessing games.

This project is part of a larger research agenda to develop a metadata schema specifying important information features, their definitions, and attributes for video games. This schema will include the genre scheme described here as well as other types of metadata elements that are useful for a wide variety of users interested in video games. We have established a core schema containing the 16 metadata elements crucial in describing video games in any context (Lee et al., 2013) and we are currently in the process of developing a larger recommended set. We hope to augment existing standards in the LIS field, such as FRBR and related standards, as well as assisting organizations such as SIMM and Common Sense Media by providing a more formal metadata schema and encoding schemes that can be used across multiple game-related websites and other resources. Eventually, the scheme will be used to describe the video game collection owned by SIMM, from which a working catalog will be created, enabling users to search and browse games.

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