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Abstract

Changes in technology and consumer buying habits created a niche for independent games. Independent game designers have created both informal and formal groups for information seeking, information sharing, and information creation. One popular activity in the game design community is the game jam, a playful activity where small groups create prototype games within a deadline. Relatively little is known about independent designers as a new group of information users. Using the Radical Change Theory as a lens, this case study sought to better understand the information behavior of adults participating in an independent design community. The research included a case study of beginners, hobbyists, and professional game designers by examining a gender and racially diverse selection of participants in the Portland Independent Game Squad (PIG Squad), a game design organization in Portland, Oregon. Narrative data was collected through individual semi-structured interviews of ten intentionally selected participants and an observation at a game jam. Independent game designers who participated in this study were highly collaborative in information seeking and used play as part of their informal learning system. While this study focused on adult participants, there are implications for the organized learning experiences of youth and children of all genders. The game design process includes experimentation, playtesting, and incorporating feedback, which are powerful skills that can be generalized to other subjects.

Keywords: Radical Change Theory, indie game designers, independent game designers, game jams, women in game design, game design, information behavior

INFORMATION BEHAVIOR OF ADULTS IN INDEPENDENT GAME DESIGN

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Chapter 1: Introduction

This study researched the information behavior of independent game designers in the Portland, Oregon area. Specifically, this qualitative study focuses on participants in the Portland Indie Game Squad (PIG Squad), a non-profit community organization designed to support hobbyists, students, and professionals interested in independent game design as the PIG Squad begins efforts to expand active interest among individuals in the Portland community. This study is an opportunity to examine the information behavior of a group of adult information users not yet included in information behavior research. Several theoretical considerations were given to how to best approach information behavior as a theoretical construct.

Case and Given (2016) posit that information behavior includes seeking, perceiving, understanding, and using information and defines information behavior as:

> Information Behavior, (hereafter, "IB") encompasses information seeking as well as the totality of other unintentional or serendipitous behaviors (such as glimpsing or encountering information), as well as purposive behaviors that do not involve seeking, such as actively avoiding information. The term also includes the broader context of how individuals "deal with" information in their lives, so accounts for situation, time, affect, culture, geography, and other contextual elements in understanding people's IB. (p. 5)

Further, both externally observable activities and the cognitive context for those activities (information needs) are included under the umbrella of information behavior. Information behavior focuses on people rather than systems. Because information behavior includes both observable activities and cognitive components, this study includes both observation and interviews. Focusing on information behavior is essential as a first step in understanding

independent game designers because it allows for a broad and contextual understanding of this group of information users and points to areas for future research.

This study focuses on independent game designers rather than professionals working for large commercial studios. Independent game designers are both more open to participating in studies and more receptive to new information from academics that may help them survive (J. Whitson, 2012). Further, independence allows designers the chance to form design groups that bypass patriarchal social norms within established game design studios by creating small, women-owned, and gender-diverse groups. It is also in the best interest of a business to remain gender diverse once established, as gender diversity is positively correlated with business performance (Hunt, Prince, Dixon-Fyle, & Yee, 2018). Independent studios are better positioned to create games for audiences that large studios neglect, and recent efforts to diversify game design have focused on developing skills in women through independent game design (Harvey & Fisher, 2015).

The Emergence of Independent Games

While independent game design seems like a recent trend, amateur and hobby game design was invented shortly after the invention of computers. However, for decades it was difficult to create a widely distributed game without a significant monetary investment. Game distribution required commercial printing equipment and space within retail stores. As was mirrored in other creative industries, commercial games focused on the preponderant purchasing demographic and avoided taking risks on creative projects that might lead to financial loss.

Changes in technology and consumer buying habits mean that while popular commercial games (known as *AAA titles*) still account for most industry sales, individuals or small groups of developers also now create, market, and sell games as independent alternatives to mainstream

commercial production companies. Independent game designers can create games on home computers and bypass retail stores and self-distribute games online or offer downloads through distribution platforms such as Steam, Google Play, or Amazon.

A similar renaissance can be seen with tabletop games, where games are often financed through Kickstarter and distributed directly to customers or sold through online markets like Amazon. Specialized printing companies have reduced the need for large production runs and storage facilities, and specialty retail stores carry independent games next to commercially successful ones such as *Dungeons & Dragons* or *Magic the Gathering.* Electronic distribution has also changed physical game distribution, allowing printed rulebooks for role-playing games to be sold as e-books, and online distribution platforms such as *DriveThruRPG* facilitate sales for even the smallest designers. Hybrid games can also combine physical objects with electronic elements, such as augmented reality games. Game designers may specialize in physical or electronic games, or they may create both. The independent game *Spaceteam*, for example, began as a mobile phone app and was later sold as a physical card game.

As production and distribution expenses decrease, the financial risks involved in game development have diminished and created the possibility of producing innovative games that take more creative risks. AAA title games require a considerable monetary investment and must be somewhat risk-averse to recover development costs and make a profit. While financial gain is indeed a motive for some game designers, others create games for other reasons, such as artistic expression, experimentation, to instigate social change, or to convey information in an engaging way (J. Wilson, 2005). These innovations in game design can be seen as both a reaction to new distribution channels and an evolution in how game designers learn new skills, which is why it is crucial to study this group of information users more extensively.

Independent game designers have created both informal and formal groups for information sharing and shared resources similar to the maker movement—a do-it-yourself community focused on technology and physical objects (Phillips, 2015). However, women independent game designers still face challenges within the game design community, some of which may be due to false assumptions about the information needs of women in game design (Fisher & Harvey, 2013).

Independent Game Design Culture in The Pacific Northwest

The Pacific Northwest has a well-developed independent game design network, consisting of several organizations for game design enthusiasts and professionals, the largest of which is the Portland Independent Game Squad, or PIG Squad. The PIG Squad is a 503(c) non-profit organization dedicated to promoting and supporting independent game design. The organization founder and president, Will Lewis, offered to assist in the facilitation of my research in any way he could. Community membership in game organizations is free and includes regular monthly meetings with opportunities to network and showcase works in progress. The group has also hosted workshops, lectures, and other educational events, usually co-sponsored with a university or public library. The PIG Squad, like many game design communities, is not exclusive to electronic or video game design.

Another common practice in the game community is the *game jam*, a short duration event (often only a weekend) where participants make a game out of making a game (Kultima, 2015). Game jam participants, either individually or in teams, are given a theme or idea for a game. The idea is to then create at least a working prototype for the game by the end of the game jam. Game jams in the Pacific Northwest are often sponsored by one or more companies who provide support such as food, collaboration space, and office supplies during the duration of the event

and may offer prizes for the best games. Some game jams may also charge a small fee for participation, typically under $30.

The Pacific Northwest has a well-organized informal and formal independent game design network with professional conferences, clubs, and youth outreach programs. Multiple large technology companies are found within the region, including Microsoft and Intel, both of whom sponsor independent game design initiatives. The Seattle area hosts the annual Penny Arcade Expo West (PAX West) conference, which features a floor of exhibit space for smaller game companies as well as the *Indie Megabooth*, where independent game designers pool their resources to rent space in the main display hall and have a chance to meet with fans, distributors, and platforms.

The Games Developer's Conference (GDC) is the largest annual industry-wide video game conference, held in San Francisco with multiple events focused exclusively around independent game design, including the Independent Games Summit, the Independent Games Pavilion, and the Independent Games Festival, designed around showcasing and awarding innovative independent game design.

This research will focus on the case of the PIG Squad, a volunteer-run, Portland, Oregon based organization created to promote game designers and enthusiasts in the Pacific Northwest region. The organization regularly hosts presentations, informal sharing nights, and game jams and has recently begun outreach activities designed to attract more diverse participants. The organization also has a sister educational nonprofit, Game Education PDX, shares the same founder and many board members. Game Education PDX is designed to promote game design for underserved communities with an emphasis on youth and teacher education programs. Game Education PDX offers specific programs to promote coding skills in girls through game design

and offers a monthly game education event at a makerspace within a local public library. A better understanding of adult information use in this community could directly influence their youth outreach efforts.

Women in Game Design

Women are less likely to currently work in the video game industry for some of the same reasons they are less likely to work in other computer engineering fields. However, the game industry also suffers from self-inflicted gender bias. After a video game market crash in 1983, Nintendo began selling games in the toy section of stores. Consequently, Nintendo had to choose a target gender for shelving purposes (Lien, 2013). Nintendo chose to market exclusively to preteen boys, and other platforms followed suit. While the target age increased over time and game titles were moved into the electronics section, the video game industry largely ignored women as both consumers and potential designers for decades (Fron, Fullerton, Morie, Ford, & Pearce, 2007). Industry survey data indicates that as of 2016, only 23% of people working in game industry professions identified as women (Entertainment Software Association, 2017; Weststar & Legault, 2016). However, in the same survey, 80% of game industry professionals felt that diversity was important to their field.

This study examines the information behavior of adults in the independent design community in the Pacific Northwest in the context of a male-dominated field and includes an intentionally gender diverse selection of participants. Despite the significance of the problem, little research has been conducted on the information behavior of women game designers, and my research also helps to fill this gap.

While it might be easy to dismiss the gender gap in game design as an entertainment industry problem, representation in entertainment affects all aspects of culture. Adolescent girls

who self-identify as gamers may be more likely to enter into STEM fields (Hosein, 2019). Furthermore, while most people think of them as entertainment, games, and game techniques are used for a variety of non-entertainment purposes, such as education, artistic expression, and medical treatment. Therefore, resources that foster game design skills have benefits beyond the entertainment industry.

Research Purpose and Central Question

The purpose of this research is to better understand the information behavior of adults in the independent game design community. The research includes beginners, hobbyists, and professional game designers by examining a diverse selection of participants in the PIG Squad, a game design community in the Pacific Northwest. The central question is: What is the information behavior of adults in independent game design?

Game design is an emerging interdisciplinary area of study with a great deal of new research into games and game players. However, relatively little academic focus has been given to independent game designers as information users. These designers must master many complicated skills, such as programming, game theory, marketing, fundraising, digital art, animation, and music design, while large studios typically have dedicated departments staffed with specialists in these disparate fields. This complexity does not necessarily mean that everyone must master all skills, as independent usually does not mean alone.

Although the games industry is generally risk-averse to support large profit margins, independent game design thrives on innovation and experimentation. This study extends our knowledge of this new group of information users using a qualitative approach based in part on Dervin's Sense-Making methodology using semi-structured interviews, observation, and surveys (2003a). The gathered data is examined through the lens of Radical Change Theory.

Theoretical Framework Overview

The conceptual framework for this research is Radical Change Theory, which is based on the work of Dresang (1999), who explained the way youth and information both changed with the digital age. Radical Change Theory was first developed in the early 1990s to explain the changes in literature for youth as children and authors reacted to the new digital age (E. T. Dresang, 1999). Radical Change Theory identifies three fundamental changes in youth literature that occurred as a reaction to the digital age, including interactivity, connectivity, and access. Radical Change Theory has further been expanded to explain changes in information behavior exhibited by youth (E. Dresang & Koh, 2009). The first youth to read those *radical* books are now adults exhibiting changes in information behavior as they navigate increasingly digital information sources. Koh (2013) examined youth using Scratch, a programming language for youth used to create games and animations. Her sampling included four girls and eight boys. This study builds on Koh's foundation by examining an adult population using a variety of tools to create games. In chapter two, my theoretical framework is thoroughly discussed, and literature about gaming is highlighted.

Chapter Summary

Independent game design emerged from innovations in the way games are sold and distributed. Game designers are a group of information users that have not been heavily studied. The game design industry is another example of where women are missing from scientific fields. This research consists of a qualitative case study of adults in independent game design as a group of new information users by using semi-structured interviews and surveys based on Dervin's Sense-Making methodology and examined through a Radical Change lens.

List of Abbreviations

PIG Squad. Portland Independent Game Squad.

Indie. Independent.

VR. Virtual Reality.

RCT. Radical Change Theory.

Definition of Terms

AAA Game. A successful mainstream commercial video game with high production values (Carreker, 2012).

Discord. A computer application for voice and text communication designed for video game players (Discord, n.d.).

Drink 'n Draw. An annual event hosted by the PIG Squad involving game demonstrations, timed drawing contests, and a cash bar. The events are open to the public and attract artists, game players, and game developers ("Drink 'n Draw — Portland Indie Game Squad," n.d.).

Game Jams. A game to design a game. Participants are given a theme at the beginning of the game jam session and the goal of designing a working prototype by the time limit (Kultima, 2015).

Independent game. A game that extrinsically possesses any one of three types of independence: financial, creative, or publishing (Garda & Grabarcyzyk, 2016).

Information behavior. An umbrella term that includes information use, seeking, creation, and needs. Information behavior includes both externally observable activities and the cognitive context for those activities (T. D. Wilson, 2000).

Modding. The act of creating a mod. Mods are user-generated content that modifies or changes a video game. For example, the *Optifine* mod adds support for higher quality graphics in the popular game *Minecraft* (Yucel, Zupko, & Seif El-Nasr, 2006). Some game designers begin learning game development skills by creating mods.

Non-binary gender identity. A person who identifies their gender as unable to be classified as either male or female. Other terms may include *gender-fluid, genderqueer,* or *agender*. People who identify as non-binary sometimes prefer the use of singular *they* pronouns. This dissertation uses the preferred pronouns of research participants following the American Psychological Association style guidelines (American Psychological Association, 2020). According to qualitative research by Savoia & Kelly (2019), non-binary identifying individuals do not always curate their appearance to present as androgynous, nor do they always identify as transgender.

PICO-8. A platform for developing and hosting retro-style video games. Games are intentionally limited to a maximum of 128x128 pixel size and 16 colors (McAloon, 2018).

Playtesting. Testing games by playing them to gather player-centered feedback (Carreker, 2012).

Platformer. A genre of video games involving climbing and jumping onto platforms and dodging obstacles such as *Super Mario Bros* (Carreker, 2012).

Slack. A communication platform with text chat and voice messaging. Slack was created for internal business communication by developers of the online video game *Glitch* ("Brief history of Slack," 2015).

Steam. An online market platform for selling and distributing video games and other digital material(Garda & Grabarcyzyk, 2016).

Tabletop. A physical game played with analog materials such as dice or cards (Atmore, 2017).

Unity. A development platform frequently used to create video games (Menard & Wagstaff, 2015).

Chapter 2: Literature Review

Existing Body of Research

A large and expanding body of academic and peer-reviewed literature exists on the topics of video game content, game design theories, educational and serious games, and game players. However, game designers are an understudied group without a large body of academic literature. I used keyword searches in Emporia State University's discovery search service and Google Scholar to find peer-reviewed and academic literature on *independent game designers, indie game designers, indie game developers, independent game developers*, and the previous combinations using Boolean AND to include *information behavior, information needs*, and *information seeking*. The first 200 results of each query were examined. Previous searches were conducted on the Web of Science through Michigan State University.

Only two relevant matches were found on the specific topic of information behavior and game designers. Even with expansive criteria, few works were found to discuss independent game designers as opposed to independent games and game players. The most relevant study identified was Makri, Hsueh, and Jones (Makri, Hsueh, & Jones, 2019), a grounded theory study of ten intentionally selected interview participants from a single game design company to examine the information-based ideation behavior (IBI) of game designers. IBI examines information use in terms of generating ideas. Participants in their research used a combination of passive and active information-seeking skills, encountering information they were seeking, stumbling upon information they were not seeking, and monitoring topics of interest. Participants also curated information for later use, such as Pinterest boards, a website for bookmarking other websites. When actively seeking information, participants would seek as much information as possible on the subject, using Google and other web tools. For ideation,

participants created novel ideas based on past experiences, previously cataloged information, and communicating with others to share information and gather feedback. Ideation by communication occurred even when the project was an individual task.

The Whitson, Simon, and Parker (2018) study included 60 interviews and 120 surveys of independent game designers to examine *relational labor* or networking practices. They found that independent designers flattened their business structure by removing the roles of *producers.* Producers include the jobs in large software and game development companies that would coordinate between teams, allocate assets, and handle project management. Instead, these tasks were added to the workload of more compacted teams consisting mainly of programmers, designers, and artists. As a result, the labor of producers was viewed unfavorably and regarded as unpaid administrative tasks. Independent had the goal of subverting the norms of large commercial game studios. However, the precarity of independent game design work meant that designers unintentionally began resembling large studios by emphasizing marketing and networking over creative innovation. Freeman, McNeese, Bardzell, and Bardzell (Freeman, McNeese, Bardzell, & Bardzell, 2020) interviewed experienced independent game developers and found the same small team structure and distributed roles. However, participants in their research felt that small teams allowed them to be more creative because ideas did not have to be diluted by compromise as they felt AAA design teams were. Participants also felt that all team members were better able to contribute and be heard with less heavy-handed leadership and team members switching roles according to need. The greatest challenge was continually learning and adapting to new technology, which might create burnout and information literacy challenges.

Srauy (2019) counters that the precarity of independent game design labor means that independent game design is not automatically in a position to overcome the white male

hegemony of the industry, especially in regards to in-game race representation. The need for sales may motivate independent designers to emulate AAA game titles, including racial/racist representation rather than experimenting. The added risks of marginalized groups working towards less gendered or racist representation include added emotional labor, the risk of being fired for advocating for changes, and the risk of being "pigeonholed as *only* makers of games *for* Othered groups" (p. 809). That said, the same precarity of labor exists in AAA game companies and independent companies. The games industry is not unionized, and labor is often temporary contract work.

A related field to also consider would be the information behavior of computer programmers. However, an empirical inquiry into academic research also found little academic research on the subject (De Souza, Valentim, & Vila, 2019). One notable study investigated the debugging behaviors of computer programmers and used the aggressive metaphor of predators hunting prey by scent (Lawrance et al., 2010). They found that debugging activity by programmers consisted of forming hypotheses and testing them, a more focused way of learning by experimentation. Lavy and Rashkovits (2019) investigated the choices novice computer programmers made when deciding to make *modular* programs instead of *spaghetti code.* Modular design is a best-practice solution where programs are designed as small units that unite to form the more extensive program. Spaghetti code is programming jargon for programs that an individual designs to quickly solve a problem with little regard to ease of upgrades or maintenance. The researchers found that novice programmers often based their choices for modular or non-modular programming on the perceived ease of the task and whether the participants knew they would also have similar tasks they would have to develop later. Perhaps most relevant, Dorn, Stankiewicz, and Roggi (2013) investigated the information foraging

behavior of information users, such as Web designers, who were not professional computer programmers but still had an information need for computer programming information. Dorn et al. found that those study participants faced multiple difficulties foraging information through Google search queries or browsing application programming interface (API) documentation.

Gorichanaz (2019b) conducted a literature review of models of information creation behavior. He noted that information creation as separate from general "information use" is a relatively new direction of study and encouraged further study of information creators, such as artists. Gorichanaz (2019a) then studied the information creating behavior of artists creating self-portraits. His model focused on individual production of art as documentation. Kosciejew (2017) also approached art as the creation of information.

In the same way, game creation could be viewed as information creation. Hemmig (2008) focused on the information-seeking behavior of artists. His literature review examined a large body of literature, most of which focused on the information needs of artists in terms of library collection-building. He argued that little focus was given to the information behavior of artist communities. Lee, Ocepek, Makri, Buchanan, and McKay (2019) examined the everyday information behavior of hobby crafters using semi-structured interviews. They found surprisingly little reliance on human sources. Participants mainly mentioned friends and craft store staff. Instead, participants were more likely to seek inspiration by browsing through stores (domain-specific information) or by self-curating on Pinterest.

The Nature of Independent Game Design

The first challenge in examining the independent (indie) game design community is operationally defining what is meant by the phrase *independent game*. Although there are individuals who create entire games alone, most independent development is done in small teams

rather than by individuals working in isolation. The term independent or *indie* may also be viewed more as an alternative to mainstream tastes as it is with other media, such as indie film and indie music movements. "Independence" as it is used here implies freedom from the control of large budgets and the accompanying outside control and adversity to experimentation that may come with mainstream *AAA titles*. This creative independence also means indie games have more freedom to market games toward audiences that AAA titles traditionally exclude, including women.

The International Festival of Independent Games' *IndieCade* conference stresses creative independence as a primary criterion for independence. The IndieCade submission guideline clarifies that independent games are, "projects that come from the heart, that follow a creative vision, rather than a marketing bottom line. Independent developers are not owned by or beholden to outside forces" (2017, para 4). IndieCade does not specify a team size or funding mechanism (including funding by a mainstream studio) so long as the creative independence is intact.

Scholars have also discussed the nature and definition of independence. Although Newman (2009) examined independent (indie) film and rock music, he argues that *indie* can be framed in terms of authenticity and opposition or alternative to the mainstream culture and a way that fans can signal their status as fans with distinct tastes. Such comparisons are also valid when examining indie game culture. Indie game aesthetics often use retro-style graphics and experimental approaches focused on a narrower target audience. As with rock music or film, mainstream games may also use indie branding for marketing an otherwise mass-market game. Game platforms such as Nintendo Switch have also specifically sought a reputation as a friendly platform for indie developers to increase Nintendo platform sales.

Wilson (2005) also highlights the implied connection between indie games and indie films—in that they can be more art film creations with lower budgets and different opportunities. Independent designers benefit from falling technology prices with rising technological literacy and new ways to distribute works. Wilson contends they also share "the ethic of DIY and cultural appropriation that have recently characterized new media cultures and new artistic movements" (p.112). Independent gamers often copy elements from older games and each other and either remix the elements into a new game or offer an homage by creating unofficial new levels to existing works.

Perhaps the more radical concept of indie is that independent games, in the idealized sense, cannot be financially or creatively controlled by commercially dominant game studios. Further, Bowen and Dueze argue that those games should be outside of mainstream culture to drive innovation (2009). However, a narrower definition such as this would exclude potential research participants who self-define as independent. For this project, I adopt the most comprehensive definition of independent game design from Garda and Grabarczyk (2016). They posit that independent games all extrinsically have any one of three types of independence: financial, creative, or publishing.

Financial independence means that the game is not dependent on investor financing. The authors argue that small labels within a commercially mainstream company could potentially fall into this category, so long as they are financially independent units. Self-financed games would also be considered financially independent. Creative independence means that development occurs without a target audience or "the developer is the audience" (heading 2.2). The developer makes the game only to satisfy their creative desire and not to appeal to a specific audience.

Publishing independence means that the game is self-published, including self-hosted, by email, or on more extensive distribution channels, such as Amazon, Steam, or the Google Play Store.

Garda and Grabarczyk further contend that although games *may* show all three types of independence, it is only necessary for a game to have one type of independence to be considered an independent game. Independent game designers are, therefore, designers working on one or more independent games, whether exclusively or in addition to any other design work. It should be noted that many games developed outside the entertainment industry, such as educational and serious, would fall under this definition of independent.

Game Jams

Game jams are part of the game design culture for both professional and indie designers (Fallica, 2014; Kultima, 2015). Researchers have also used the game jam process to create prototypes for serious games for medical or educational purposes (Balli, 2018; Barba-Guaman, Quezada-Sarmiento, & Calderon-Cordova, 2017). Game jams are also increasingly appealing to researchers because they allow easy access to designers during a miniaturized game development cycle. Independent game designers sometimes use game jams as a means to find team members with common interests for future development work (Freeman et al., 2020). Kennedy (2018) conducted feminist action research into all-women game jams. In her research, she suggests that traditional game jams mirror the problems with traditional game design, including working long hours for low wages under pressure to meet an externally imposed deadline.

The Purpose of Games

Games are often thought of as merely a form of entertainment, and while this may be true of many games, it is not the purpose of all games. Although there is some academic and industry debate on the topic, games are commonly defined as a playful activity with rules and a goal or

end-state (Caillois, 2001; Salen & Zimmerman, 2004). However, the ideas of *playing* and *fun* are not necessarily synonymous. Games may be used to entertain, to educate, to raise social awareness, or to support physical fitness. Some games are intentionally created to evoke emotions other than happiness by simulating unpleasant experiences, such as war, depression, or poverty, or creating frustrating situations that the player will be unable to resolve satisfactorily. *That Dragon Cancer*, for example, was an independent game based on the designer's experience with his son's illness and death (Brady & Francois, 2015).

Games can also be designed for therapeutic purposes. Typically, health and therapy games have positivistic research backing the efficacy of the game. *Re-Mission*, for example, was shown clinically to help cure cancer in youth by increasing medical drug compliance (Kato, Cole, Bradlyn, & Pollock, 2008). Other games may be designed to improve gross motor skills after an injury, reduce anxiety, or improve concentration skills in students with ADHD. Games may also be designed to communicate experience in a non-linear manner, such as simulations and branching digital narratives. Other games may be designed as artistic expressions or experiments left to the player's interpretation.

Academic Interest in Independent Games

In many cases, independent games may be designed by people who were not formally educated in game design theories or concepts and may not be employed as a full-time game designer. Libraries are well-positioned to bridge any information gaps for those who wish to transition into game design but lack a formal background in the subject. As mentioned earlier, non-programming users were found to have difficulty foraging for information on computer programming tasks (Dorn et al., 2013). Libraries, either through materials, tutorials, or training sessions, could supply information to beginning game designers. Clemson transformed both

teaching and practice by using playful learning, including game playing, game design, game jams, and maker space (Herro & Clark, 2016). While the university created labs outside of the academic library, it arguably could and perhaps should have been part of Clemson's game-based learning transformation. Libraries can also provide meeting space and equipment. While academic interest in ludic (game) theory began in the mid-20th Century (Caillois, 2001; Huizinga, 1955), it was not a formal topic of study at universities. Students interested in formally researching game design would major in another subject or create custom programs from electives and independent study arrangements (McGonigal, 2011). Universities have only recently begun offering formal game design degrees. Indications are good that women are interested in studying game design. As of 2014, The University of Southern California's graduate program in game design had more women enrolled in their program than men (Martens, 2016). As this is a recent development, it is unclear whether their program also faces the attrition problem of women who enroll in computer science courses.

Much of the existing literature around game studies is produced in Canada, which headquarters the major game company Ubisoft, as well as a thriving independent game development scene. Rocca (2013) asserts that an existing robust independent game scene is what attracted Ubisoft to Quebec rather than the presence of Ubisoft spawning an emerging independent game trend. This opinion is echoed by Lessard (2013), who discusses early independent games in Quebec and how the games reflect Quebecois culture and aesthetics. It makes sense that large game companies would be drawn to areas where it would be easy to recruit fresh game designers.

Game design is a relatively new academic field, and like library and information science, it is interdisciplinary, borrowing from psychology, communication, computer science, and other

fields. As discussed earlier, in examining the literature, I found few studies of independent game designers, though some research does exist (Garda & Grabarcyzyk, 2016; Lipkin, 2012; Westecott, 2012; J. Wilson, 2005). Existing literature often highlights the need for additional research. The bulk of academic focus has been on game content, game design theories, the psychological effects of games, and the behavior and perceptions of game players.

Simon (2012) has suggested that academics in game studies were "blindsided" by the independent game explosion (p.1). This lack of academic awareness may have been because they were focused more on popular titles while simultaneously ignoring technological innovations that made the distribution of independent games possible, and it may have reflected academic disinterest in the value of studying games. The rise of independent games elevated issues with economics, diversity, and cultural production that were always aspects of general game design but were not necessarily the focus of earlier academic interest.

Parker (2013), however, states that although most literature on independent games is very recent, academic interest began in 2002, shortly after digital distribution made independent publishing possible. He notes that future inquiry is needed around gender, race, sexuality, disability, and intersectional issues. Although some research has been done in subsequent years, more is needed. Wilson (2005) was one of the first to explore independent games. Independent game design has a more extended history than the large commercial industry. Independent designers benefit from falling technology prices with rising technological literacy and new ways to distribute works. Wilson contends they also benefit from "the ethic of DIY and cultural appropriation that have recently characterized new media cultures and new artistic movements" (p.112). Wilson outlines the Australian indie game scene and cites an example game *Escape from Woomera*, which involves escaping from a large immigration detention center as a criticism

of Australia's policies toward refugees. Wilson also argues that game designers may also be criticizing the commercial game industry's practices.

Whitson (2012) argues that academic focus should be given to independent game designers, who now have an increasing ability to compete with AAA titles. She states that not enough is known about independent developers or their motives or needs. Industry survey data, for example, indicates that 57% of independent game designers made less than $500 in game sales in 2013 (*Gamasutra salary survey 2014*, 2014). Aspiring game designers who have yet to release a game would not be captured in industry measures at all.

Universities may claim to intellectual property created by students, but Gouglas and Rockwell (2013) argue that the university is unlikely to miss out on a huge income source by relinquishing rights to independent game work. Instead, they argue that indie development, when done at a university, may result in diffusion of properly credited University intellectual property. The University of Southern California (USC) Games lab took the innovative approach of not only fostering independent game development but pairing groups of game students with law students to help students in both majors better understand intellectual property law.

Whitson suggests that the greatest needs for independent game designers are meeting space, computing facilities, training, mentorship, entrepreneurial advice, and professional networking. While this may be intended to describe academic spaces, both public and academic libraries are also capable of meeting those needs. Furthermore, public libraries would not make the same claim to intellectual property rights for patrons using library resources to develop games as some universities do.

Perhaps most relevant to information professionals, Miller's (2014) study examined the information behavior of game design students to create academic library resources for game

design programs within a university. This research may inform how public librarians could support independent game design through informal programming rather than academic collections. Miller examined art and inspiration information-seeking behavior, which included social information gathering, marketing, and career guidance, and information on current trends. This study used focus group interviews. Students were focused on semesters and academic calendars, which would not necessarily be an element for not-academic collections. Students desired information on specific programming tools and software. Students also expressed a need for information on product and project management to complete group assignments. Students mentioned that they sought social interactions, especially around new games, and game industry workings.

Research into independent game design benefits both public and academic libraries beyond the limited scope of best practices in collection development. Libraries do offer video and board games as part of their collections, whether for entertainment, as a means of reducing library anxiety, or for academic study (Thomas & Clyde, 2013). Michigan State University, for example, hosts the Rovi Media Collection, including 17,000 video games, many of which are available for student and faculty check-out (Press, 2015). Modern public and academic libraries have also transformed beyond collectors of material into computer centers, digital laboratories, meeting spaces, and maker spaces. Innovative libraries now seek to incubate and co-create, such as Arizona State University's *Alexandria Co-Working Network* for business incubation and Vancouver Public Library's *Inspiration Lab* for digital media production (Howley, 2016).

One area of concern and possible information need among independent game designers is *cloning* or copying a game's mechanics and general idea without crossing the line of copyright infringement. Cloning can be framed as theft or as iteration and genre building. One case study

examined discussion on *Gamasutra,* an online game developer magazine with a strong community (Katzenbach, Herweg, & Roessel, 2016). The case study examined reactions to a cloning incident between two fishing games that shared game mechanics but used different artwork.

Phillips (2015) discusses the act of cloning and the attitudes of independent game designers. Commercial game companies, as well as other indie designers, may clone a game, which is legal but widely seen in the game design community as immoral. Since cloning is not illegal, enforcement may be one of public shaming rather than other actions. It also speaks to the need for a better understanding of legal issues, such as the law student partnership program at USC Games.

A study out of Finland used a grounded theory phenomenology approach with interview sessions for emerging computer game businesses (Vanhala, Kasurinen, & Smolander, 2015). The study explores what happens as the organization goes from demonstrating the game to trying to become a full business. Eleven groups participated. The study examined how a company grows from an idea to a profitable entity and what the competencies were for each phase. The competencies identified were based on the literature review outlining business competencies. Their study identified four roles typical to most groups: developer, graphic artist, designer, and businessperson.

While Vanhala et al. examined independent games close to business viability, Kücklich (2005) examined a proto-develop behavior, *playbour*, or modding, and user-generated content within existing games. This form of playbour is usually practiced by hobbyists enhancing an existing game without commercial gain. The industry has come to rely on such playbour activity to boost product sales and extend interest in older titles, while modders and content creators may

only be compensated in social capital, depending on the game and user license. Modding, however, could also be a proto-development activity. An engaged modder may learn about game development from the existing game and later go on to develop standalone games.

Some AAA games, such as *Half-Life* and *Counter-Strike,* were initially created as licensed mods on existing game engines, and the company that developed them, Valve, also created the Steam platform that became one of the backbones of independent game distribution. However, Valve also forbids users from creating licensed mods from *Half-Life* and other Valve titles. Ruffino (2013) notes that modding and user-created content within existing titles shares similar characteristics to independent game design. Further, Wilson (2005) found that vintage games are also recreated and remixed with additional features or twists to gameplay not found in the original by independent designers. Expanded versions of vintage games are generally made for social capital, as they likely would infringe copyright if they were sold commercially.

Whitson (2012) examined the socio-economics of game development. She concluded that the fall of console games and the rise of social and mobile games have the potential to reach broader audiences and frees designers from constraints that previously made independent game development difficult. Console games are too cost-prohibitive to develop as an independent game designer. That said, mobile and other platforms face competition and are often overwhelmed to the point of invisibility in massive marketplaces. As a result, the marketplace faces consolidation:

> "The lifespan of an indie developer's career is short. Developers that release successful games (i.e., popular, financially lucrative, or critically well-received) are targeted for acquisition by large publishers. In contrast, less successful developers go bankrupt and

> thus seek more stable employment in larger companies or outside of the industry altogether" (p125-126).

Whitson further states that academics need to both study and support the independent game design community, as that is the group that is most appreciative of the help.

Van Deventer (2016) spoke with the indie developers behind *Push Me Pull You* and *Armello* about the change in game design. The designers for *Armello* work in a cooperative game development space shared with other indie developers, while *Push Me Pull You* was developed mainly in the developers' houses and bedrooms and later into a co-sharing space. Both developers saw collectives and collaboration as a considerable advantage in indie game development. Van Deventer argues for further research into the needs of game developers.

Some independent development deliberately goes against mainstream gameplay, such as games that use retro-style 8-bit graphics and illustrations "whose bodies challenge hegemonic expectations of how men and women should be represented" (p, 27). These are subversive choices meant to make statements about mainstream play. However, the people making those statements continue to be mainly white men. Retro-style gameplay may subvert commercial graphics standards, but it also appeals to sentimental views of gaming, which may include gaming as a gendered activity.

Two documentaries are of note (Brady & Francois, 2015; Pajot & Swirsky, 2012). In *Indie Game: The Movie*, the directors explored a snapshot of independent development by interviewing three teams of developers representing the past, present, and future of independent development. *Braid* had been successfully released and highly praised at the time of the documentary, but the developer, Jonathan Blow, expressed frustration that players did not understand the broader themes of his game narrative. The directors followed Edmund McMillen

and Tommy Refenes as they launched *Super Meat Boy* on the Xbox Live platform. The team had been given a short deadline to complete their game for the Xbox platform, and they spoke of the toll the development had taken on their health, family relationships, and social life as they readied for launch. Meanwhile, Phil Fish was experiencing setbacks and frustration as he tried to develop and promote his game *Fez*, which was not ready for release at the time the documentary was filmed. It should be noted that all three games were eventually commercial successes, and all featured developers were white men.

Gameloading: Rise of the Indies could be seen almost as a sequel to *Indie the Movie*. Gameloading more deliberately explored diversity and innovation within independent game design culture, including interviews with women, designers of color, and games created by members of the queer community. In so doing, the directors managed to interview key targets of Gamergate, including Zoe Quinn and Mattie Brice, as it was unfolding. Not all designers or games within *Gameloading* were commercially successful, nor was financial success, the apparent motive for all the game designers they interviewed. However, an apparent information need that was common to many designers was marketing skills. Whether seeking financial success or social capital, all gamers wanted their games to be found and played.

The innovative games within *Gameloading* included *That Dragon Cancer*, an intentionally heartbreaking journey through the game developer's experience losing his son to cancer. Another game, *Analog: A Hate Story*, is an interactive story where an investigator tries to solve the mystery of a missing but returned spaceship. The developer, Christine Love, was fascinated with the misogyny of the Joseon Dynasty in Korea, human-computer interactions, and queer representation within games. Love stated that players had personally thanked her for

representing love stories outside the heterosexual norms found in most games. This leads to addressing the matter of gender representation in games.

Gender in Games

When examining gender in video games, there are concerns about the representation of women within video games, the behavior of players, and the harassment of women designers, journalists, and commentators. Anita Sarkeesian is a feminist who made a series of videos exploring the tropes of women represented in popular video games. Sarkeesian experienced harassment, including doxxing and death threats for her video project, which was funded through Kickstarter (Sarkeesian & Cross, 2015). She describes the nature of the harassment and the consequences in some detail:

> This steady stream of misogynist harassment was startling in its variety. Some messages shared detailed examples of sexual acts harassers would like to commit against my body. Some showed images of ejaculation on a printed photograph of my face, others implicitly encouraged violence by publicly sharing and distributing my home address, or explicitly so, by sending death threats directly to me and bomb threats to organizers of events I speak at. This misogynist harassment still informs almost every aspect of my life. It informs what I can and cannot say. It informs where I can and cannot go. It keeps me and my loved ones on edge and in a constant state of fear. (Kindle Locations 1375-1380).

Representation is as relevant to video games as it is to other forms of media. Indeed, representation within video games is directly tied to other forms of media. Musgrave (2016) reinforces this point by noting that YA literature has recently focused on gaming as identity and

empowerment. Musgrave also examines Doctorow and Wang's graphic novel *In Real Life* as a potential for calling young readers into activism against gender bias.

Allen et al. (Allen, Friedman, O'Brien, & Saha, 2017) argue that sociologists should respond to the discussion of representation in media and video games. The authors contend that "research that directly connects questions of production and consumption has, to date, been underrepresented in the literature" (p. 273) Bryce and Rutter examined gender in gameplaying through game content, spaces, and activities (2002). Women characters within games are often stereotypical. The paper argues that while "female gamers do exist but are often rendered 'invisible' by male-dominated gaming communities, the games industry, and academic research" (p.244). This invisibility of players may either discourage women from engaging in game design or discourage the game design industry from soliciting the input of women in the design process.

Public gaming spaces, such as LAN parties and gaming competitions, are male-dominated and create a perception that gaming is a masculine activity. Males may also exhibit toxic behavior to drive out women from such spaces further. In her exploration of Xbox Live players, Gray found that players perceived through linguistic profiling as women faced sexual harassment (2014). Gamers are not alone in creating a hostile environment for women and other marginalized players.

Part of the problem may also be that the entry points into game design are gendered (Hayes, 2005). Women, according to Hayes, play more games but tend not to play the more complicated role-playing and other titles and stick to casual games instead. Hayes argues that casual titles (such as those found on mobile devices) do not provide the same entryways to careers in computer science through activities like modding, which are options for more complicated computer download games. Assumptions about gender differences are made from

the game preferences of women and girls but do not consider the context of those choices. It may be because of their comfort with technology, available time, or other factors. Hayes describes interviews with two female players and their activities. Another study that reflects the lack of women in public gaming spaces examined mothers who gamed (Enevold, 2016). Enevold found that players before the study thought they were unusual as mothers who gamed and did not report knowing other gamers. Enevold noted that they also seldom identified themselves as gamers, which may have increased their isolation and is consistent with other studies of women in game culture.

Assumptions about gendered roles in gameplay reinforce stereotypes rather than critically examining them (Jenson & de Castell, 2008). For example, the idea of *competition* versus c*ollaboration* holds the notion that girls and women are not competitive. The authors point at the example of competitive sports to debunk the idea that women are not capable of being competitive. The authors point out that even besting a computer's artificial intelligence is a form of competition. What differs is that girls go from helping each other familiarize themselves with the game to playing as experts. This behavior could be seen as a cooperate versus compete dynamic, but such an explanation does not accurately describe the action. The authors instead call upon researchers to reframe how they view gender differences.

Furthermore, they found that boys engaged in the same activity. Rather than cooperative vs. competitive, they were examining familiarity vs. learning. Girls were more likely to be unfamiliar with the games because they did not have equitable access to them at home.

Researchers debate the effects of gameplay on the attitudes of players. Video game consumption may be connected indirectly to hostile sexism (Fox & Potocki, 2015), while others argue that game consumers are making choices even in aggressive games like Grand Theft Auto

(Hourigan, 2008) that do not necessarily lead to real-world aggression. What is clear is that the current commercial game design environment features games both designed by and marketed toward an audience of mainly young white men. Fron et al. (2007) refer to this systemic bias as the *hegemony of play* and contrast it with historical board game design, which involved women designers and playtesters.

Consalvo (Consalvo, Consalvo, Consalvo, & Mia, 2012) addresses the toxic masculinity within gaming culture, noting that, as she was researching, someone had created a game where players could punch an image of Anita Sarkeesian's face. At the 2012 E3 expo, there was controversy over the Tomb Raider game because part of Lara Croft's narrative involved a friend's sexual assault and multiple complaints about the general misogynistic atmosphere toward female journalists. Consalvo calls for increased critical feminist research into game culture to document patterns and how things change over time.

Cross (2014) argues against the idea that anonymity causes online harassment. Instead, she argues that harassers play in online spaces as if they were a game and that the veneer of the game enables them to disassociate from the cruelty of their actions. Anonymity is not blameless, but removing it does not remove harassment. Of concern is that even when representation within an industry increases, that diversity is not necessarily represented in the cultural output.

> "Often those from outside the narrow definition of the ‘default male’ find their practice constrained by those who continue to inhabit the upper echelons of the cultural industries, who consider the productions that foreground issues of marginality or minority experience a risky investment” (Cross, 2014, p. 275).

One article (Oudshoorn, Stienstra, & Neven, 2016) provides an intersectional exploration of diversity within communication and technology design. The first study dealt with a robot

designed to both assist and serve as an interface for games, and the research was intended to explore how well the designers accounted for the diversity of age. Older adults were explicitly included as a marketing choice for this product. Oudshoorn et al. found that designers understood that elderly populations should be diverse in gender and experience when selecting participant groups, but they did not consider ethnicity or economic class and used sampling methods that further narrowed their diversity. In the end, the feedback from participants was not used to make meaningful changes to the design.

In the second case, the design target was girls. The researchers tried to define differences between girl and boy play and often overrode the feedback given to them by the children they used for user testing. The girls, for example, thought that the game should be square and dark in color, and the designers insisted on a purple, rounded device. "In summary, we can conclude that the design practice of Kidcom was shaped by reliance and reinforcement of hegemonic representations of girliness even when girls themselves rejected too-girly products" (p.178).

Fisher and Harvey (Fisher & Harvey, 2013; Harvey & Fisher, 2013) examine models for greater inclusivity within the indie game design community. In Canada, as in the USA, game players are close to gender parity, but game development is an overwhelmingly male enterprise. In the commercial game development world, this means most games are targeted toward male players. Strategies like women's workspaces and special grants help retain and recruit but do not offer enough support to beginning professionals. Authors contend that Toronto struggles with diversity and inclusion and that indie game developers are similar to mainstream commercial developers for this.

The Difference Engine Initiative (DEI) was created as a business incubator specifically to help women enter game development and support the unmet needs of women beginning their

careers in game development. It was offered twice. Despite the lofty goals of the incubator program, the first DEI session made gendered assumptions about women participants as technologically naive and lacking agency and copied a program used to introduce artists into the gaming space. Instead, women participants faced barriers of misogyny when trying to participate in the indie social network. The initial DEI responses, though well-intentioned, only served to normalize misogynistic behavior and label women complaining as irrational and emotional. Part of the problem was a view that the incubator program was a "handout" (p. 35) and that game development was a meritocracy.

While examining research into teaching game design, Dickey's (2010) case study is relevant. Dickey used a single course as a case study and outlined the unforeseen problems of power struggles between students with an art and design background and students with an engineering and programming background. Dickey suggests that educators teaching game design courses should strive to create new communities of practice through the interdisciplinary study of video game design. Dickey noted both power struggles and gender bias. The students leading the story design team deliberately chose to make the game's main character female to humiliate the male students programming the game. She determined through follow-up questions that the insult was indeed intentional and referenced existing research to explain the cultural attitudes towards gender in games.

Although this was a student project with artificial constraints, the approach to design may be similar to independent designers. Students based their game suggestions on games they had already played (cloning, imitating). Lim (2008) further argues that game design can be an effective way to engage students in materials. The act of creating a game requires comprehending the material and remixing it for deeper understanding. One related concern is

that learning in virtual spaces may create a gender-based disadvantage for women learners if they enter virtual learning spaces without previous experience in game-playing (Jenson, 2017). The study she conducted, however, found no significant gender difference.

Bonanno & Kommers (2008) examined gender differences in attitude toward gaming. Women felt games could be used for learning, but they also felt games were not a unique learning experience, while men felt that games provided a unique learning experience. Research also indicates (Teo, 2010) an enthusiasm gap between men and women for trying new technology. However, the research may be flawed if it failed to account for measurement invariance.

The video game industry suffers from a representation problem both for women and people of color. Commercial video games have long been criticized for misogynistic portrayals of women and stereotypical portrayals of other marginalized groups. An extreme example is the popular *Grand Theft Auto* series, which, in most versions of the franchise, rewards players for picking up prostitutes and allows players to murder the prostitutes to reclaim any money spent on "services." Although not all video games are misogynistic or depict violence towards women, multiple studies have found that women in games are, as one content analysis put it, "sexy, strong, and secondary " (Lynch, Tompkins, van Driel, & Fritz, 2016 p. 564).

Game players are not exclusively male. Industry estimates of game players indicate that nearly half of all video game players are women (Entertainment Software Association, 2017). However, men spend more money on video games, hardware, and related accessories. Commercial game design is also dominated by men at every level of the industry. International Game Developers Association (IGDA) survey data indicates that as of 2016, only 23% of game designers identified as female (Weststar & Legault, 2016). Designers were even more likely to

indicate that they were white, heterosexual, cisgender, and younger than 40, making game design a very homogenized industry. Women are less likely to play certain types of games, such as console games, perhaps because the games are designed and marketed toward a young male audience. Fron et al. suggest that commercial game designers are losing money by not appealing to a more extensive, diverse, and less stereotypically male audience (Fron et al., 2007).

Women in game design also face challenges from male game players and increased online harassment with potential real-world consequences. The high-profile cultural backlash, *Gamergate*, resulted in a hostile environment for women game designers, researchers, and reporters to the point that multiple women involved in the industry temporarily left their home or canceled professional appearances out of fear, and the FBI was involved in investigating specific threats (Mcclintock, 2015). This leads to discussing the real-world dangers to women challenging the hegemonic norms in the gaming industry. The threats illustrated by Gamergate could affect the information behavior of women in independent game design, such as by limiting access to conferences and other events.

Gamergate

Gamergate began in August 2014 when Eron Gjoni, the ex-boyfriend of game designer Zoë Quinn, engaged in an apparent act of revenge (Mcclintock, 2015). Gjoni uploaded a detailed document to two online communities, and after moderators removed the posts, he created a blog containing salacious accusations of infidelity against Quinn during their dating relationship. At the time, Quinn a rising star in the independent game design community, designed unusual games that challenged notions of traditional gaming. One game that had garnered industry

awards and media praise was *Depression Quest*, an interactive non-linear narrative game that tries to simulate the effects of depression on daily life.

Once the anti-Quinn blog and associated rumors spread, male, mostly anonymous posters harassed Quinn on several online platforms, including issuing death and rape threats, uploading nude photos of Quinn (both genuine and fake), and revealing publicly identifying information, such as her address and birth name. Revealing identifying information in this way is a harassment practice known online as *doxxing*. To highlight the credibility of physical danger as well as online threats, Quinn claims she was sent pictures of her mailbox stuffed with dead animals. For security reasons, Quinn was assigned a security detail for any professional appearances at video game design conferences. Quinn felt unsafe, returning to her apartment in Boston and eventually moved to Seattle. Quinn's friends and family members were also doxed and targeted for abuse, and the police seemed unable or unwilling to intervene (Quinn, 2017).

The material targeting Quinn was intended to be spread virally both with the choices of distribution points and with marketing catchphrases, such as references to the *Five Guys Burgers and Fries* restaurant. Among the accusations was the suggestion that Quinn had cheated on Gjonji with five men (Five Guys). The rumor later spread that Quinn had dated a games journalist to garner favorable reviews for *Depression Quest.* This was a baseless accusation, as the games journalist in question never reviewed Quinn's game. Nevertheless, the accusation of an unprofessional relationship with a games reviewer gave many of Quinn's accusers (Gamergaters) a justification for toxic misogyny by claiming that they were only concerned with "ethics in video game journalism" (Braithwaite, 2016 p.1). The Gamergate movement gained its name when the actor Adam Baldwin used #Gamergate as a hashtag when referring to the incident on Twitter.

The conservative provocateur and former Breitbart reporter, Milo Yiannopoulos, amplified the incident a few weeks after it had begun by both engaging in online harassment on Twitter and publishing negative pieces in the extreme-right publication, Breitbart (Yiannopoulos, 2014). Yiannopoulos positioned self-identified white male gamers as the *real* victims of Gamergate, bullied by feminists bent on changing traditional gaming culture and lied to by unethical games journalists. Quinn may have made an appealing target because she was a relatively successful and outspoken female game designer making unusual games that challenged the concept of gameplay. However, the Gamergate movement grew to target other female game designers, game critics, journalists, and academics.

Eventually, Gamergate grew and merged with a bigger culture war tied to the self-defined alt-right political movement, a form of populist conservativism often combined with white nationalism, anti-feminism, and opposition to multiculturalism. The *Gamergaters* were predominantly white male gamers fighting to maintain what they saw as a threat to their cultural dominance from *social justice warriors* bent on ruining what they saw as traditional games and game culture. As the Washington Post reported (Dewey, 2014):

> On one side are independent game-makers and critics, many of them women, who advocate for greater inclusion in gaming. On the other side of the equation are a motley alliance of vitriolic naysayers: misogynists, anti-feminists, trolls, people convinced they're being manipulated by a left-leaning and/or corrupt press, and traditionalists who just don't want their games to change. (para 6)

Games critic Anita Sarkeesian was among the initial expanded targets of Gamergate-related toxic masculinity (Sarkeesian & Cross, 2015). Some of the harassment Sarkeesian faced pre-dated that of Zoe Quinn, as someone had already created a game designed to simulate

physically abusing Sarkeesian (Consalvo et al., 2012). Sarkeesian had begun a series of educational videos on YouTube called *Tropes Vs. Women in Video Games*, which explored video games through a critical feminist theory lens, comparing both common plot devices and film and television tropes as seen within video games. Sarkeesian had launched a successful Kickstarter campaign to fund the project. Although she was careful to preface each segment with a disclaimer that it is possible to enjoy playing a game "while also being critical of its more problematic or pernicious aspects" (Sarkeesian, 2016, para. 9), Sarkeesian was heavily targeted almost immediately after Gamergaters began harassing Zoë Quinn. In Sarkeesian's case, it is even harder to claim that any of the harassment had anything to do with ethics in video games journalism. The timing of attacks on Sarkeesian, which were launched shortly before the attacks on Quinn, also indicates that Gamergate was never about Quinn or Sarkeesian. Both just happened to be available catalysts to a wave of white male resentment building in the gaming community and the broader American political landscape. Sarkeesian, like Quinn, faced threats credible enough to make her feel like she needed to leave her home. Sarkeesian also canceled planned speaking engagements out of fear for her physical safety.

Game designer Brianna Wu was also driven out of her home and forced to cancel conference appearances because of what she perceived as credible death threats. Other prominent targets of Gamergate included game designer Mattie Brice and games journalist Jenn Frank, both of whom announced at least temporarily that they were leaving the games industry. While male friends and family members of some Gamergate victims were also targeted, men were more often able to express the same ideas or support the victims of Gamergate without the same degree of vitriol (Mcclintock, 2015). Gamergate itself should not be viewed as exclusively

misogynistic. Many victims of Gamergate harassment faced intersectional issues of marginalization, such as race, sexual orientation, and gender identity (Evans & Janish, 2015).

Academic discourse also became the target of Gamergate as it began to take on anti-intellectual characteristics. At the Digital Games Research Association conference (DiGRA), one conference presentation used a *fishbowl* conversation style to have a public conversation about diversity in games. As part of the presentation, the presenters created a publicly editable Google Doc file. The file itself was co-opted after the presentation and later used by Gamergaters as "evidence of a feminist gaming conspiracy" (Chess & Shaw, 2015, p. 211). By examining the comments and edits made to the Google Doc file as well as the conversation surrounding it, Chess and Shaw were able to observe a few themes. There seemed to be a misunderstanding of academic research, including critical theory. The Gamergaters also frequently discussed *cultural Marxism*, which is a conspiracy theory that views the Frankfurt School as part of a socialist/Jewish plot to control the media to modify American culture.

Rather than untangle the conspiracies and misconceptions, Chess and Shaw argue that, at times, the language of academics, when using opaque and sometimes provocative terminology, such as “dismantling hegemonic masculinity” is inadvertently fueling the fire of resentment. “It is impossible to look at our own language sometimes without agreeing with the conspiracy theorists. Perhaps we are the nefarious plotters they think we are, rather than two tenure track academics just trying to make sense of culture” (p. 218). They caution that in the United States, right-wing politicians often suggest social science research should be defunded. Studying the controversy often invites being enveloped by it, but it does not make it any less critical. The same caution/call to action can be made for information professionals working in libraries.

Public libraries reflect the communities around them and must serve those community needs. Robins (2014) took a stance and cautioned that Gamergate controversies could spill into the library space by either making players less likely to attend gaming programs or by exhibiting misogynistic attitudes within the library space. Robins further argues that librarians should not remain neutral in this dispute, as Gamergaters are misogynistic and, in his opinion, do not represent most gamers but instead represent a vocal but persistent subgroup.

Gamergate activity was most intense in 2014-2015, and it was not the only place where angry groups of mostly white men lashed out against diversity. A similar subgroup of science fiction fans lead by three white men tried a bloc voting tactic to game the *Hugo* award nomination process in 2014 and 2015 (Wallace, 2015). Gamergate and other similar movements were absorbed into the larger wave of white populism in 2016, and threats specifically against women in game design appear to have diminished. Further, because Gamergate highlighted the paucity of women in game design, the game design industry is now more receptive to efforts at diversification.

Few studies have examined women as game designers. As previously mentioned, Fisher and Harvey studied a business incubator designed to encourage women as game designers and further reflected on the experience and implications for future intervention (2013; 2013). Fisher and Harvey (2015) note that recent trends have moved toward forming incubators and promoting independent game design efforts for women. However, many of the underlying assumptions may be incorrect, such as a focus on beginner tools and technological barriers rather than social barriers to success.

Models of Information Behavior

Savolainen (2007) notes that information behavior is a broad term without a universally understood definition, as is information practice. Information practice, according to Savolainen's review, may more broadly consider sociological factors while information behavior may focus more on individual motivation. Savolainen broadly classifies human information behavior as "an umbrella category covering all aspects of human information interactions with various forms of information" (2019, p. 519). This study focuses on individual participants rather than a broad sociology. Both information practice and information behavior could have been selected for this research. Information behavior was chosen as the term is broad enough to consider the sociological context of independent game designers while also examining the individual motivations of information users. Also relevant to this study is Savolainen's assertion (Savolainen, 2017) that information sharing and knowledge sharing are often used interchangeably and are two broadly similar modes of human activity when considered as communication activities in terms of Carey's (1989, pp. 17–18) concepts: transmission view and ritual communities.

The study of information behavior has yielded multiple models to explain some or all aspects of information behavior. Wilson (T. D. Wilson, 1999) noted that most information models are "pre-theoretical" (p. 250). Wilson is also well-known for model creation. He created a model in 1981that considered information seeking, information transfer, information use, and information need as part of the flow of information behavior (T. Wilson, 1981). He has since revised the model and suggests various theories could be used to explore it further (T. D. Wilson, 2005).

Other models focus more on information-seeking behavior. Among those, the models of Ellis, Kuhlthau, and Savolainen may be the best known (Case & Given, 2016). Ellis (1993)

investigated the academic research behavior of university students. Kuhlthau (1993) explored the cognitive and emotional states of the information seeker as it related to the specific behavior to relieve the discomfort of a perceived information gap. Savolainen investigated everyday information seeking (Wilson, 1999). The disadvantage to many of these models is that, while well-known and well-developed, many were created before the digital age.

Theoretical Framework

Radical Change Theory was first developed in the early 1990s to explain the changes in literature for youth as children and authors reacted to the new digital age (Dresang, 1999; Dresang & McClelland, 1999). Radical Change Theory identifies three fundamental changes in youth literature that occurred as a reaction to the digital age, including interactivity, connectivity, and access. Dresang defined interactivity as "dynamic, user-controlled, nonlinear, nonsequential, complex information behavior and representation" (Dresang, 2005, p. 183). Connectivity referred "to the sense of community or construction of social worlds that emerge from changing perspectives and expanded associations in the real world or in resources" (p. 186) Dresang also viewed connectivity in the concept of "knowing together" or interactive and collaborative information seeking, which was also observed in the adult participants in this study. Dresang defines access as "the breaking of long-standing information barriers, bringing entree to a wide diversity of opinion and opportunity" (p. 188).

The changes in literature for youth, in turn, is tied to changes in youth information behavior (Dresang, 2005). Youth information behavior relates to the Radical Change concept of access by allowing marginalized voices to be heard. Dresang viewed children's voices as part of that marginalization. In turn, access allows children to become part of the design process. Children's behavior reflected connectivity through social learning or "knowing together" (p. 9).

Dresang mentions that gender differences in technology use have also been examined using Radical Change. Radical Change Theory has also been used to explore how users interact with technology, including games. For example, the concept of connectivity may explain behavior within Augmented Reality games (Zak, 2014).

Radical Change Theory was also expanded with a model (Dresang & Koh, 2009) illustrating the influence between information sources and behavior. Koh (Koh, 2013a) further expands Radical Change Theory to include information creating behavior as observed in youth using and sharing information about Scratch, a youth-oriented programing language commonly used for animation and game design, which leads to questions about how information creating behavior is exhibited in adults using game design tools. Research into gender and computer use in youth (E. T. Dresang, Gross, & Holt, 2007) found that girls were equally enthusiastic about computer use as boys and suggested that further research was needed to explain why women did not go on to college-level computer courses or seek professions in technology. Dresang et al. suggested a robust theoretical base such as either feminist theory or Radical Change Theory be used for such research.

The first youth to read those *radical* books, Dresang noticed, are now adults exhibiting changes in information behavior as they navigate increasingly digital information sources. Koh (2013) further expanded Radical Change Theory. Combined with the Dresang et al. (2007) call to use Radical Change Theory to examine why women drop out of technology fields, this proposal would build upon that foundation to explore an adult population using a variety of tools to create games.

Although it is not the primary framework for this research, another theory often used to explain the social structure within professional game design is Gramsci's cultural hegemony

(Artz & Murphy, 2000; Gramsci, 1999). Cultural hegemony stems from Marxism and posits that diverse societies can be dominated by mass consent rather than violence. The dominant culture within a cultural hegemony creates the norms, values, and general weltanschauung for the rest of society. Hegemonic ideas are perceived as natural and beneficial, even if they result in the dominant culture having an outsized advantage from the status quo. For example, in an oligarchy, the oligarchs may be viewed as hard-working or necessary for job creation even as they retain an outsized proportion of wealth and prevent competition. Gramsci wrote about cultural hegemony while in prison and died before he was released, but his theories have been built upon by scholars after his death.

The culture of gameplay can also be seen as containing hegemonic masculinity and hegemonic whiteness, and Gramsci's hegemonic theory has been invoked by multiple academics to describe game culture. Fron et al. also described the gaming industry as a *hegemony of play* (Fron et al., 2007). Raber (2010) views Gramsci as an appropriate critical theory for library and information sciences, as the mission of public libraries is to provide a public good. To change the dominant culture without violence, in Raber's view, one must occupy positions of power and influence progressive change.

Chapter Summary

This review identifies and synthesizes research in independent game design, women in game design, and the role of libraries in independent game design. Independent game design is a creative process independent of mainstream commercial game development, similar to independent film or independent music development. Independent designers are ideal participants not only because they are often more willing to experiment, but because they also desire help. Libraries and other educational institutions and organizations often use game

development as a means to attract youth into careers in computer programing. Just as with computer programing, game development, whether independent or mainstream, remains dominated by primarily white, heterosexual men despite recent efforts to reverse this trend. This study uses the theoretical lens of Radical Change Theory to examine the information behavior of adults in independent game design. The possible research implications may extend outside of game design and also inform broader efforts to include women in the sciences.

Chapter 3: Methods

Research Questions

With a focus on information behavior of adults embedded in game design practices, the central question in this study is: What is the information behavior of independent game designers?

Informed by Koh's (2013b) research, sub-questions include

a. *How is the information behavior of female independent game designers different from men?*
b. *What does it mean to act independently within the context of game design?*
c. *How do independent game designers connect and socially interact with others?*
d. *How do independent game designers perceive themselves and others?*
e. *How can radical change theory be applied to and help explain adult information behavior in the digital age?*

Case Study Design

Case study has been noted by Creswell (2013) as among the five approaches for qualitative inquiry. Case studies use a defined population and period of time and deploy multiple methods of data collection, such as interviews, surveys, and observations. Creswell maintains that a single form of data collection would not be sufficient for an in-depth understanding of most phenomena. Case studies do not experiment or use controls but rather seek to understand the case within context. Yin (2006) adds that case studies are well-suited to studying situations where there are "many more variables of interest than data points" (p. 13).

Bryman (2012) clarifies that although case study is referred to as a methodology, it is more appropriately viewed as a design. Selecting a case study approach requires thoughtful

choices in data collection. Most case studies use qualitative methods. Bryman points out that using qualitative methods may be seen by some researchers as preferable for feminist research design, which supports my choice to use qualitative methods in this study.

One relevant example is provided in Harvey and Fisher's (2013; 2013) use of case study methodology. The researchers investigated women taking part in a Toronto-based business incubator, an organization designed to nurture companies in the startup stage of development. The incubator, in this case, was designed to increase the participation of women in game design startups. Their use of a case study allowed multiple methods of data collection while focusing on a single case. The information gathered in their research was quickly translated into action by changing the structure of the incubator program for future participants. As my study is likewise designed to promote change, the case study offers the best approach.

Wildemuth (2009) suggests that case studies are appropriate for study within a natural setting, for "contemporary events," answering "how and why" questions and for situations involving a "variety of factors and relationships" (p 52). This proposal seeks to research the information creating behavior of women in a nonprofit, independent game design organization in the Pacific Northwest during the fall of 2018. A natural setting is appropriate for my study because women do not exist in isolation from men and other game designers. Further, the phenomenon of interest is contemporary and seeks to answer "how" questions around the experience of women in game design.

Creswell (2016) recommends approaching a case study by first defining the case. For this dissertation, the case was people in the Pacific Northwest interested in game design and attending or following events associated with a non-profit organization created to boost widespread participation and interest in game design. While women remained the focus of this

study, they operate within a game design community and organization that is primarily dominated by men.

A case study is an especially appropriate choice for this study because it is also essential to understand the context (Cohen, Manion, & Morrison, 2011). Cases can be bound geographically, temporally, by role, or by other characteristics. By retaining the case's context, researchers can provide richer interpretive detail allowing readers to understand better the experience of the individuals or group being studied. Case studies may allow for generalizations about the group being studied; however, they do not allow for the natural control of treatments for researchers considering an experimental design, and Cohen et al. point out that case studies may be prone to observer bias. Case study research supplies a distinct advantage in that it is more readily translated into action and can be used to guide policy.

Study Participants

Study participants consisted of adults participating in an independent game design community in the Pacific Northwest, including students, hobbyists, and professional game designers. Data was gathered through both observations of a game jam and semi-structured interviews. There is some participant overlap across both data collection strategies. These participants had in common that they were creating or were highly interested in creating independent games as defined by Garda and Grabarcyzyk (2016). People highly interested in independent game design may not be currently working on a game but are interested in finding information, developing skills, or gaining employment in game design. Participants had also attended at least one event held by the PIG Squad.

Data Collection

Data was collected through semi-structured interviews and observations. The two data collection methods will be used to provide rich data collection and avoid the dangers of bias that are seen as a weakness of case study designs (Cohen et al., 2011). This study will use semi-structured interviews based on Dervin's Sense-Making methodology (2003b; Dervin et al., 2003a). Sense-Making methodology emphasizes insights gained from participants reconstructing solutions to past information problems (Case & Given, 2016). The instrument is based on interviews conducted by Koh (2013b) in her study of adolescents using Scratch. Observations provided a second means for answering the questions in this study.

Interviews

An intentional sampling of ten participants was invited to take part in interviews. Selection deliberately included participants representing marginalized groups, such as people of color and members of the LGBTQ+ community. Interview questions (Appendix A) are constructed using Dervin's (2003b) Sense-Making methodology semi-structured interview format, as was used in Koh's (Koh, 2013a) research. Semi-structured interviews allowed qualitative data collection while preventing some forms of researcher bias in the interview process. Probing questions were used to elicit further details. Interviews were conducted in-person. Participants were recorded with permission to facilitate transcription.

Observations

Data was collected using an observation protocol (Appendix C) at a game jam. The game organization (PIG Squad) holds game jams throughout the year. My observations took place during the spring of 2019. Participants were video recorded with permission and asked to talk-

through their experiences. Observations were based on a qualitative research protocol using description, interpretation, and talk-through data in chronological order (Creswell, 2013).

Data Analysis

Interview data were analyzed by the researcher with oversight of the dissertation committee chair. In this qualitative content analysis, the initial foci were not a priori codes but the initial research questions. I looked for and presented the diversity of ideas, alternative perspectives, and oppositional writings in the text following a multi-step integrated, analytic-inductive approach adapted from the work of Krathwohl (1998). All the interview responses were read to get a sense of all that was there. Then the responses were re-read, marking all direct responses to the question. Direct responses were reread while looking for patterns in the responses and organized into categories that emerged from the data. Each response was sorted into the appropriate category using respondents' actual words. The results were reviewed, looking for overlap and redundancy and refining and revising the category titles. From the interview responses, instances of the verbatim narrative were selected to illustrate categories. The interview ended with an opportunity for respondents to include additional comments and suggestions. Each comment or suggestion included in this analysis is the main point made by respondents and not the entire statement.

Validity of the study. Creswell (2013) recommends all qualitative research contain at least two of the following validation strategies: prolonged engagement and persistent observation, triangulation, peer review or debriefing, negative case analysis, clarifying researcher bias, member checking, rich thick description, or external audits. This study uses three of the suggested validation strategies: prolonged engagement and persistent observation, triangulation, and rich thick description.

Lincoln and Guba (1985) suggest similar strategies but offer three main activities in a qualitative inquiry to produce credible findings, "prolonged engagement, persistent observation, and triangulation" (p. 301.) Prolonged engagement refers to spending sufficient time with the group to be studied to understand the culture, to avoid "distorting the data" by bringing false assumptions into the data collection process, and to establish trust with the group being studied. Persistent observation is the ability to focus on what is vital to the study while sorting out irrelevancies. The two concepts are related, which is why Creswell groups them in one strategy. I have spent five years attending events hosted by the PIG Squad and have spoken openly with PIG Squad leadership and members about my research and plans. My years of experience with the PIG Squad and game jams enabled me to focus my observation protocol only on key events common to game jams.

Creswell suggests triangulating data in qualitative research by using multiple methods of data collection (Creswell, 2013). Data were triangulated in this study by using both interview and observation data. Finally, the participants, case, and setting are described in detail in a "rich thick description" (Lincoln & Guba, 1985).

Maintaining an audit trail. Data collected from this study includes observation notes, video recordings, databases, photos, and transcripts. Although no external audit is planned after the study concludes, the raw data is available on a removable storage device and stored with any physical papers in a fire-safe vault in my home for five years. After five years, the digital data will be erased, and physical papers destroyed.

Limitations

This study was limited to one geographical area due to the lack of equally distributed game design communities in other geographic regions of the US. The independent game design

community does not have a national organization such as the Humane Society or the Boy Scouts that serves to promote and encourage participation and provide a homogenized structure to organizational activities. While every effort was made to elicit participation in this study, the sample size was still relatively small. As Creswell (2014) cautions, qualified methods are not intended to generalize findings beyond the particular study.

Schedule

This study was projected to begin data collection in the fall of 2018. Data collection began in the spring of 2019. Collection strategies overlapped and were concluded by the spring of 2019. Dissertation writing concluded in the spring of 2020.

The Researcher

My interest in game design began as part of an independent game company in the 1990s that created role-playing games and continued as I was occasionally asked to design small educational games as part of my professional work. After moving to the Pacific Northwest, I was introduced to the independent game design community and became fascinated with the information practices of the group. I began attending meetings at the PIG Squad and taking part in group activities. I was open about my plans to conduct research. Community members were amenable to my research plans, and several people expressed interest in participating.

Chapter Summary

This chapter describes my rationale for design as a case study, the data collection methods, research questions, analysis, study participants, and the timeline for the investigation. The details in the chapter provide a detailed outline of the methodological steps that will be taken.

Chapter 4: Findings

The purpose of this study is to improve understanding of the information behavior of adults in independent game design. Because information behavior includes both observable behaviors and the cognitive and social context, informing those behaviors, the data for this case study was gathered from two sources: semi-structured interviews and observation. I collected narrative data from semi-structured, in-person interviews of ten game designers and collected observational data from game designers during a game jam event. This chapter serves to present and organize the collected data and findings.

The central research question of this study was: What is the information behavior of adults in independent game design? In addition to the central questions, the study also sought insight into the following sub-questions:

What is the information behavior of adults in independent game design?

Sub-questions include:

1. How is the information behavior of female independent game designers different from men?
2. What does it mean to act independently within the context of game design?
3. How do independent game designers connect and socially interact with others?
4. How do independent game designers perceive themselves and others?
5. How can Radical Change Theory be applied to and help explain adult information behavior in the digital age?

Information behavior is an umbrella concept which, for this research, includes information use, seeking, creation, and needs (Case & Given, 2016). This case study design uses both observation and interview data to understand better both the observable behavior and the

cognitive context of information behavior. The theoretical lens for this study is Radical Change Theory (E. Dresang, 1999, 2005; E. Dresang & Koh, 2009; Koh, 2015). This chapter describes the setting for the case and observation, the interview participants, and the data. Finally, this chapter will explain the themes that emerge from the data.

Context for the Case

The context for the study was the Portland Independent Game Squad (PIG Squad), which is a game design organization in Portland, Oregon. As the case for this study, every study participant was affiliated with the PIG Squad. PIG Squad does not have a formal roster or membership process, so affiliation for the case design included anyone who had attended at least one PIG Squad sponsored event within a year of their participation in the study.

The PIG Squad was chosen as the setting for this case because it is a relatively sizeable independent organization covering all types of game design, including both video and tabletop games. It offers multiple game-design related events throughout the year, and the organizers have been enthusiastic and cooperative with this study's research goals. I deliberately sought out a diverse group of volunteers to take part in semi-structured individual interviews using the questions shown in Appendix A. Participants were interviewed in community settings, such as the public library, coffee shops, restaurants, and bars. Observational data were also collected during a game jam session on March 3, 2019, using the observation protocol outline shown in Appendix B.

Description of Interview Participants

Ten total interview participants were intentionally selected to form a diverse group of participants with a wide range of viewpoints. I sent an invitation through the PIG Squad Facebook and Slack groups and received one response. The remaining participants were

contacted in person during PIG Squad events. Although there is no attendance data available for PIG Squad events, the PIG Squad Slack channel has 1,404 members, and the PIG Squad Facebook group includes 2,372 members, with likely overlap between the two.

Institutional Review Board (IRB) approved language was used for written communication. Interviews were conducted in-person between February 7, 2019, and May 9, 2019, in Portland, Oregon. I went over the consent form with each participant and answered any questions about participation. Sessions were recorded with the consent of the participants using a cell phone. After the interviews were conducted, they were transcribed into a 260-page database of narrative data. Interview questions are listed in Appendix A. For the sake of clarity, some speech disfluencies were removed from quoted participant responses, such as the filler use of "like."

The research participants included a mix of gender, race, sexual orientations, and design experience levels. Although age data were not explicitly gathered, all (10/10, 100%) participants appeared to be between the ages of 20-40. Table 1 shows the demographic data of participants (n=10) in the semi-structured interviews. The gender demographics consisted of four (4/10, 40%) participants identified as men, three as women. In addition, three (3/10, 30%) participants did not use a binary gender identification and asked to be referenced with they/their pronouns. I estimated participants' level of expertise based upon their response answers. I estimated that four (4/10, 40%) participants were professionals in independent game design because they had earned money from some aspect of game design work, even if it was not a full-time profession. Further, four (4/10, 40%) participants were hobbyists who had some experience designing games but had not earned any money from it. Additionally, two (2/10, 20%) designers were beginning to show an interest but were not yet designing games. Demographically, six (6/10, 60%) participants

were White, two (2/10, 20%) were Asian, and two (2/10, 20%) were Black. Further, six (6/10, 60%) participants were also members of the LGBTQ community.

Gender differences in information behavior. Four interview questions in the interview protocol shown in Appendix A were explicitly designed to uncover gender issues in game design. Questions 12, 25, and 26 asked participants about the experience of women, and question 30 more broadly asked participants to identify a situation they felt was only an issue because of their gender. Participants also spontaneously discussed gender-related issues and women in game design while answering other questions. When all answers were coded, 63 total responses included narrative information about gender experience in game design. Table 2 includes illustrative sample responses. Within those 63 responses, sub-categories are identified to organize further the data and highlight themes, which I will now analyze in turn.

Lack of authority. The first theme when discussing gender and information behavior was a perceived lack of authority from women. Participants of all genders felt that women designers were perceived as lacking the same authority as men. For example, one non-binary participant remarked, “I think there can be a difficulty in having your ideas or opinions heard and validated in the same way.” Similar opinions were shared by nine (9/10, 90%) participants across 19 (19/119, 16%) responses. One participant recounted multiple times where she felt that her expertise was ignored while male coworkers were asked questions she could have quickly answered: “your manager will come and ask you a question and you answer the question, but they don't take you seriously.” Importantly, one participant did not feel like her authority was undermined, “I don't feel like I'm taken un-seriously, but I feel like probably a lot of times you just don't see that unless you're on the other side of it.” She felt that her ability to program computers (code) gave her authority that she otherwise would not have:

> Being a programmer, I think, gives me some extra clout, but I don't - I think it would be maybe different if I was an artist. I don't know that because I'm not, but I feel like I'm taken more seriously because I can code.

Male participants who were not programmers did not identify their lack of coding ability as something that undermined their authority in the game design community, although programmers were crucial members of game jam teams. All men interviewed (4/4, 100%) also highlighted the idea that women were not given the same level of authority in the game design community. As one participant said, "I generally get the impression from talking to women that I know that it's sort of a little unfair you seem to have to work harder to prove that they have just as many valid points or criticisms or whatever."

Male-dominated field. Men outnumber women in game design as a profession, and the PIG Squad regularly has more men than women who attend events. Thirteen (13/63, 20%) participant responses noted male domination in the game design profession and hobby space and that the participants had all navigated spaces with very few women. Both a male and female participant spontaneously talked about separate situations when they realized there was only one woman in their group. One participant joined an online Pico-8 group project and discovered that she was the only woman. "I was like, 'Wait – Oh no. I am the only girl in here?' We really do have 23 guys." Another participant was interviewed by the local radio station, and the journalist asked the single woman in the group about her experience. He emphatically asked me to record his experience, as he thought it was an essential part of the problem:

> At the Global Game Jam, the NPR lady - You have to write down this part. The NPR lady asked the member of our group who was a woman…if we had been good, if we had

> been difficult male - I forget the exact wording of her phrase. . . I didn't even think about it, being the only woman on a team until it was actually pointed out.

One participant said the male dominance in game design affected their behavior and how information was shared, observing "where it's a very male audience, and then there's kind of this posturing of, 'I'm the nerdiest nerd, and I know the most obscure things.'" Another participant suggested that the gender dynamics can be self-perpetuating: "So if you're in those networks already you have this power over people who aren't in those networks it just all seems to be self-feeding."

Safety and harassment. Eight responses (8/63, 12%) mentioned concerns about safety and sexual harassment in both online and in-person communication. Although most of the concern was around online harassment—one participant said, "there's been a lot of scary shit to be public as a woman on the internet,"—another participant also expressed concern with in-person interactions including at the PIG Squad:

> So there have been several times at various events where a guy has kind of attached himself to me for the evening. We call them 'hover boys' because they hover around and never quite go away and don't take the hint.

While she did not fault the PIG Squad and thought it would be as she stated "silly to request the women learn a secret hand sign," she did indicate that the interaction interfered with her ability to exchange information freely when "professional interest gets misread."

Intersectional issues. Responses to 11 (11/63, 17%) questions included an aspect of intersectionality, either to express sympathy for the experiences of women, "I walk into a room myself knowing that I'm an 'other' for my own reasons, so I can relate" or to express that race,

age, and sexual orientation can amplify a perceived lack of authority. One participant, a Black woman, explained:

> My boss at my other job. She put it in a very interesting way. Say you have three points for yourself, and you get the point for being white and a man and a certain age group, and so I don't have any of those points, you know.

During our interview, she pointed at her face several times to indicate that she felt her experience, such as perceived lack of authority, was exacerbated by being a young Black woman and lacking what she called the "points."

Information needs. Questions six and nine in the interview protocol (Appendix A) were designed to prompt participants to express an information need. Participants also spontaneously expressed information needs during other portions of the interview for a total of 41 responses expressing an information need. Table 3 shows illustrative responses. Most information needs were shared among all genders. The most common information need, expressed 11 (11/41, 26%) times by 7 (7/10, 70%) of participants, was for marketing and business information. As one participant explained, "There's a whole world of business that happens once you have a game." Another participant further explained his frustration:

> I wish I had a better social media presence. I don't really know how to do social media, so I'm not very good at marketing. I wish I had more information on marketing. I wish I had maybe more of a platform to get things that I do for PIG Squad out.

The second most common information need was for improved computer programming skills with eight responses from six (6/10, 60%) of participants. Two participants (2/10, 20%) also tied programming skills to an underlying need for better math skills. As one non-binary participant said, "I'm definitely less mathematically minded, and that's part of what makes

programming I think a bit of a struggle for me." They also thought "low stress" programming would help them more easily satisfy this information need, "something that was very simple, very rudimentary like Bitsy or Twine."

Childhood play experience. Four participants (4/10, 40%) indicated an information gap related to a childhood play experience such as, "I also come to this as someone who did not play video games," so "I don't have those decades of genres." Of the participants expressing a gap in gameplay experience, only one (1/10, 10%) was a man. As discussed in the literature review, games were primarily marketed towards boys and young men following the video game crash of 1983 and have only recently been marketed towards other groups (Chess, 2011). Because of this, children who presented as girls may not have had the same video game playing experience as children who presented as boys. While one woman highlighted this as an advantage, citing "the kinds of games I think about designing are different," this can also be a real disadvantage as illustrated by one participant's frustration:

> I didn't play Nintendo stuff growing up, and… a lot of game developer people have this common pool of experiences that I frequently don't have a window into. So, people would want to talk about *Final Fantasy*, whatever or some classic thing that I've never played, and, ugh. I don't know anything about what you're saying.

Also, gender norms and expectations can influence other early computer experience (Vardi, 2018). One man credited his early childhood play with his later interest in game design, "I played games a lot as a child, and a lot of the games I turned towards were games that let you author your own content." One non-binary participant went so far as to express frustration that they lacked this experience:

> I wish that there had been some more encouragement for me to get involved in developing some of those skills sooner instead of coming to them by late 20s and early 30s because I think some of my friends from high school or and like now are getting to software companies and things because they were allowed and encouraged to play around with computers and software and those things and it didn't - I didn't feel like I had access to that same kind of play.

Information seeking behavior. Questions 14, 15, and 16 (Appendix A) were designed to elicit responses describing information-seeking behavior and information sources. Participants also spontaneously discussed information seeking while answering other questions. A total of 41 responses mentioned information seeking or sources, and illustrative examples are listed in Table 4. The most common information-seeking activity was asking another person for information, which was mentioned by 7 (7/10, 70%) participants. The only participants who did not mention asking for information from another person were men, representing three (3/4, 75%) of the male study participants. Participants mentioned asking others for help both online and in-person, and PIG Squad members were often mentioned as an in-person source for information seeking. As one participant explained, "Ask people, okay… We have a Saturday afternoon group that meets you know. If there's questions, I usually go to them." Another participant said they often sought information from multiple in-person sources, "For me at least I always want to try and ask as many different people as possible which sometimes is going to be a little bit confusing because then you got all this conflicting advice on different things."

The second most common information-seeking behavior mentioned was Googling or other means of internet searching, mentioned by six (6/10, 60%) participants. All four men who participated (4/4, 100%) mentioned Google. The four participants who did not mention using

Google (4/10, 40%) were two women and two gender non-binary participants. Google was often listed as the first step in information seeking, even when the participant later asked for information. As one participant explained, “I Google around and see if there's a helpful written tutorial. Do not like video tutorials. I will skim that then trial and error for a while, and if it doesn't work, I might ask my friends or in Slack or something.”

Four (4/10, 40%) participants mentioned specifically learning new skills by experimenting or trial and error. One participant indicated, “I have learned just by doing it.” As mentioned with Google, learning by experimenting or trial and error is often part of multiple steps in information seeking. However, one participant spoke of learning by experimenting by comparing it to a time she took apart and reassembled a cassette tape as a child: “I like to do things like that where I want to take the whole thing idea apart look at every little thing to put it back together.” However, all participants mentioned some form of experimenting, remixing, and experimenting as part of the game design process.

Remixing, iterating, and experimenting. Koh (2013) found that youth exhibited information-seeking behavior that included “remixing, tinkering, and squirreling.” Similarly, when participants were asked about their game design process (Question 4, Appendix A), all participants (10/10, 100%) listed some form of remixing, iterating, and experimenting. A total of 36 answers from participants mentioned some form of remixing, iterating, or experimenting. Table 9 lists illustrative quotes. Game design is often viewed as an iterative process, where prototypes are play tested and improved, or as one participant described, “Experimentation is the core, iterating through something and trying to figure out what works.” Another participant emphasized, “Experimentation is key” and, “I find it really hard to just sort of really theorize about things I have to - I'll make a conjecture or something and then test it.” In addition to

experimenting and iterating on designs, participants also remixed elements from existing games, reskinned them, or changed the theme. As one participant explained, "I like how things can be repurposed and re-skinned, you know just slightly changed or amended to make something very, very new, very fresh." One participant spent time "re-theming" existing games, "So take games that are already fully done make them into, you know, about *Steven Universe*. You know, just take everything and make it fit into the box." In describing their own games, participants would often allude to the remixed nature of the game, such as "my last board game which was a Smash Brothers inspired strategy game." One respondent said they liked to build a mental library for ideas, "I just really enjoy kind of building a library of mechanics and possibilities where I'll just read a bunch of wiki summaries of stories."

Acting independently of others. Questions 3-5, as well as 14-16 (Appendix A), asked self-reflective questions that could reflect independent activities. Participants were seldom fully independent of other individuals. As shown previously, participants often mentioned asking others for information. Table 5 shows illustrative responses discussing designing games alone. Although this table represents comments made by half (5/10, 50%) of participants, only eight responses discussed independently creating games, often as admiration for someone able to do so, "I am not an artist, so the game designers that I adore the most are the ones who can do it all." One participant who did work alone, however, expressed a need for help:

> But it's this thing where I can only do so much on my own, so it's definitely for me—one of my long-term goals is working with a distributor or finding other people to help me advertise, play-test with broader audiences, kind of build a wider network of folks.

While working fully independently on game design was rare, many participants had experience working on individual pieces or areas of a more considerable collaboration effort, as

shown in Table 6. One participant spoke of dividing programming tasks among designers and, unlike in a formal software development effort, programmers worked more autonomously on larger areas, “I'll build this map and then it's you just do all the stuff there that we staple together later.”

Connecting socially and acting with others. Appendix A lists 12 questions that asked participants about their social interactions. The two largest categories for social interaction were collaborative game design and interactions with the broader game community. Responses about collaborative work are in Table 6, and responses about the game design community are in Table 7. Table 6 was also grouped into sub-topics. Responses were coded 64 times, discussing collaboration or collaborative efforts, and 48 (48/64, 75%) mentioned the game design community. Twelve responses (12/64, 18%) mentioned both collaboration and community.

Communication of information. The first subcategory of collaboration is communication with 24 (24/64, 37%) responses mentioning the importance of communication in collaboration, or as one participant answered, “I think well if you're working on a team or being able to collaborate, it's important to really listen to other people.” Communication was often listed as a skill that interview participants felt was important for game designers, as listed in Appendix A, question 5. As one participant explained:

> The ability to work with the team of people teamwork are these soft skills. . . are *hard* skills I think, so I think dealing with people knowing your limitations. Communication is big with that as well…Being able to communicate a vision or having some kind of artistic process and also being able to stick up for yourself and having your voice heard again.

Other mentioned communication breakdowns during collaboration. One participant explained with mild frustration, “I think the game could have been better if we had met somewhere in the middle, but I mean just communication.”

Challenges of collaboration. Including communication breakdowns, 20 (20/64, 31%) interview responses addressed a broad range of challenges in collaboration, such as pressure on team members with key skills:

> The last meetup that would be the last Global Game Jam, I know that we had different team members doing different things and everyone was relying on the coders get everything done, and it felt like we were pressuring them too much to just push through, and coding is something that could take a long time to do.

This finding also reflects the information need for project planning and project management skills. As one participant described it, he was looking for someone to say, “no,” and felt hobby designers were too disorganized. He wanted someone to keep projects from getting so large that they were never finished: “There's a person who says ‘no,’ and it's not a bad thing; it's a good thing.” A professional designer indicated, unsurprisingly, that project management was already part of her workflow. Half (2/4, 50%) of the professional designers expressed a need for better working conditions and unionization, “So money and the idea of stability and a union would be great,” but she also expressed doubt that it would be within her lifetime. In addition to “unionization, labor rights, time off, and better working conditions,” one designer said they would like to see, “more sober events” because they felt that not only was alcohol a problem with women’s safety but also that the feedback designers gathered was less useful if the participants were drunk.

Information sharing tools. When asked how they communicate with each other, nine participants (9/10, 90%) listed electronic information-sharing tools for collaborating with other designers. "Slack is a wonderful thing. Email, Google Drive, GitHub. That's about it." Some tools, such as Slack and Discord, are intended for communication, while others are designed for asset storage or project management. One respondent, who is a professional game designer working with remote teams, listed both a communication tool, Discord, and an integrative product development framework, Scrum, as part of how she was able to share information with colleagues and work remotely:

> We're using Discord, and I want a job just making channels specifically for what you're trying to talk about. We are trying to collaborate with—sometimes, you have meetings at really weird hours. Working with a team in Belarus for one of my projects, and yes, they have a lot of midnight meetings and kept checking in Scrums. … But it is doable, and it's not so bad. It's probably one of the only reasons why I'm able to continually work in Oregon because no one's here.

Community. Table 7 lists representative samples of responses that showed participant attitudes and interactions with the community. Also, nine responses in Table 6 mentioned PIG Squad in the context of collaboration. The responses were generally positive about both PIG Squad and its role in helping participants connect and find collaborators: "I found people who want to work with me."

Participants felt the PIG Squad helped them with design-related information transfer and information seeking. One woman said, "I have learned everything from PIG Squad," and "one of the members did a lot of tutorials that helped me." Another participant who did not identify with a binary gender said, "I think the value of meetups like this, PIG Squad is that you do get

people who are like, ‘Oh yeah, I have a background in that. I'll totally show you what I know.’” One participant went so far as to cite the PIG Squad as one of the primary reasons he moved to Portland:

> I think the biggest thing that has helped me now versus in the past just a community of people to interact with that care about that same thing, talk about that thing, will test my things. PIG Squad is the first big thing that was a reason for me moving out here.

All genders felt that the PIG Squad offered an inclusive environment and that, as one woman described it, “Everyone in PIG Squad is super great. I haven't noticed that I was a woman if that makes sense.” The perceived inclusivity of the PIG Squad seems to contradict other findings of male dominance, safety issues, and perceived lack of authority. However, participants may disassociate gender-related barriers if they do not view the PIG Squad as being the cause.

Self-perception in independent design. Questions 20 and 21 (Appendix A) asked how independent designers self-defined themselves both inside and outside the game design community. Participants also gave self-reflective answers in other interview responses that showed their self-perception for a total of 46 responses reflecting some form of self-perception. Illustrative text is listed in Table 6. Responses varied from short and general to specific. One participant simply said, “I usually just say I'm an indie game developer.” Another participant was particular, “I would say I am a designer who gravitates more towards the euro-style rather than American with a strong emphasis on worker placement.” Two participating women gave self-deprecating answers. One female participant said, “I hesitate to call myself a game developer, but I guess that's what I am,” while another opined, “I appreciate the freedom that comes with it, especially as an indie developer because I know it's not it's not like I'm going to be a doctor or

something." One non-binary participant also admitted that they had only been designing for a year, so they still had "a bit of impostor syndrome."

Stereotypes and gender norms. Participants of all genders felt that stereotypes and gender norms were barriers in how they perceived themselves and others and in how others perceived them. In Table 2, 11 (11/63, 17%) answers included this difference. Gender played a role in perceived lack of authority as discussed earlier, but it also affected decisions on how to present information, how to collaborate, and whether to disclose gender in online communications. As one woman answered, "I do go back and forth about it since I'm online… revealing my gender or not." When talking about collaboration, she worried about how others in game design perceived her and said, "I'm always very hesitant to take up the administrative stuff when we're working together because I don't want to be seen as the secretary of the group." She also expressed frustration with gender norms around presenting information to other designers: "I'm pretty sure the guys don't have to think about that, and they don't have to put on makeup before they demo."

Another participant, who identifies as gender non-binary, answered the question, "How do you think being a woman in game design affects how you collaborate with others?" by saying that they (the participant) perceived themselves as undermining their authority:

> I evidently notice myself couching my opinion as a question or very softly edging things a lot, 'Maybe you could X' or 'What do you think about Y?' I'm trying to get better about not so kid gloves about suggestions.

They attributed this hesitancy to "a little bit of impostor syndrome" and felt that being bolstered by the community would help their confidence.

Men also felt that masculine expectations were harmful. One man felt that there was a male stereotype that hindered his quest for feedback: “it's sort of discouraged to ask for feedback and sort of just be receptive to criticism.” Another man confessed that he felt jealous of a developer’s group targeted towards women, “because it is titled ‘Women in Python,’ I feel that I should not go,” despite knowing that the group was not excluding men from attendance.

Observation Setting

The PIG Squad hosts game jam sessions of differing durations. Game jams are games for making games. The object of a game jam session is to create a working game prototype based on a theme announced at the start of the game jam. Both individuals and teams can participate. At the start of the game jam, the theme for the jam is announced, and all games created during the jam should relate to that theme. Some jams allow bonus parameters for stretch goals or added constraints.

I attended game jams informally for two years before the study observation. Many game jams last for 48 hours over a weekend. Longer, summer *slow jam* sessions last for one week, and shorter sessions are completed within a day. Typically, participants meet one week before the session for a speed meet session to get to know other participants and optionally form teams before the game jam session based on skills or shared interests. During multi-day game jams, participants often go home or leave the building, either for sleep or meals. Some participants may form a team and meet and design entirely off-site. During the week-long summer slow game jam sessions, all participants are allowed access to meeting space, but they often only meet for the first and final nights of the event and spend most of their time collaborating remotely or meeting in private groups. At the end of a game jam, participants show their game prototypes,

and the PIG Squad usually arranges for a follow-up showcase at a later date to give participants a chance to polish their work before showing it to a broader audience.

Observation data of 32 participants were collected using the attached observation protocol (Appendix A) during a game jam session held on March 9, 2019, in Portland, Oregon. The theme for the March 9 session was *heist* with the goal of creating a physical rather than digital game. The March 9 game jam session was intentionally selected as a case for observation in this study because it was smaller in size, making it easier to observe only consenting participants. It was also shorter in duration, making it more likely that participants would remain in the observation area for the duration of the jam rather than leaving to work from home or sleep. A week before the March 9 game jam, PIG Squad held a speed meet event. I attended the speed meet and told potential participants about my research and intentions to observe.

On the day of the session, the president of the PIG Squad, Will Lewis, introduced me to the group before beginning the game jam, and I introduced my research and offered consent forms. My observations were guided by the observation protocol in Appendix B, and I took notes, recorded videos, and took photographs using my phone. During my observation, I was able to also listen to participant descriptions of events. Table 11 lists narrative quotes collected from participants during the observation.

The setting for this game jam session was a shared office space in Northwest Portland. There is an industrial-themed communal area with long wooden benches for working. There were also two side rooms available for smaller group work. The front of the communal space has an ample countertop space that is stacked with snacks and soft drinks on one side and markers, paper, index cards, sticky notes, dice, poker chips, and similar materials on the other side for game prototyping. Facilitators are available to answer questions and keep the event

organized. Figure 1 shows the general layout of the game jam space and the rough position of the game design teams. This is what I observed during the game jam session.

Participants choose teams. In the observation protocol, one area of interest was how participants would choose teams. The week prior, there had been a speed meet event. However, I saw very few speed meet attendees take part in this game jam, although one team did form because of the speed meet. People entered the session area and sat at one of many long wooden benches. Some participants came in pairs or small groups, but most came alone and just sat at a table. At the beginning of the game jam session, the participants are invited to go through another five rounds of speed meet activities, where each participant is encouraged to talk to a new participant for five minutes and then encouraged to mingle again. Once everyone has done this, jam participants are encouraged to socialize freely for another twenty minutes, and then they are asked to form teams for the jam.

Once teams have formed, the arrangement does not look drastically different from the way the participants initially sat down as they entered the room. Some of the socializing happened before the speed meet introduction. Of seven teams observed, two came as a pre-selected team of two, two came as a pair but expanded to add participants. They knew they wanted to work with their friend or partner, but they wanted to form a larger team and work with others. Three teams were entirely selected at the event. No teams were made up entirely of women. Two teams consisted exclusively of men.

I asked several team members why they chose the way they did; one pair said, “Forced socialization.” Another pair said, “Two of us came together and then found others.” Another team told me they all “just paired up.” One woman said, “I recognized one person and then just

found the others." One team of four formed from two different two-person teams (Groups 7 and 8):

> We both came in independently and sat at opposite ends of the same table, but then we realize we were talking about the same idea, mainframes, and hacking, so we decided to get together and make the same game.

How team members decide their roles. Teams selected roles in some cases by pitching ideas and mainly suggesting skills that they already had: "I feel uncomfortable going to a jam and offering a skill I am not as good at, so I always offer sound design." Another person told me, "I know business, so any business or marketing I'll do." One programmer told me, "I like rules, so I'm writing down all the rules for our game." One woman told me she was a "producer by day" and so was handling scoping and project management. However, some participants were comfortable taking on new skills. One person told me that they were a project manager but were "comfortable stepping back and letting someone else do it." Another knew whom he was working with, so he "knew she'd be comfortable with me doing some art this time." One participant was more withdrawn during the game jam and later told me that their idea had not been selected, so they did not feel as invested in the project.

How team members select an idea. The theme for the game jam was *heist,* and from that point, participants needed to decide on an idea. Most participants used pitching and informal consensus. I watch one group as games were rapidly suggested as starting points for remixing ideas and then built upon from there. It was almost like games were used as a language. Another group took a different approach and described their process: "We thought about what a heist is and started whiteboarding what the successful elements of a heist would be, and then we're trying work out what the game mechanics from that will be." However, another

group had an idea before the game jam and just modified it for the heist theme. This group ended up making the most elaborate physical game of the session, and one team member made a wooden frame platform for a large area where people could crawl to explore.

One participant told me that in his home state, Massachusetts, game jams used a different team selection and idea pitching process. At the beginning of the game jam, individuals pitched ideas, and then participants selected the ideas they wanted to support and formed teams that way. One larger group of eight decided to create a game where an inter-dimensional monster got lost in a professor's back yard, but the group ran into difficulty scoping the idea and was still adding mechanics when it was close to the time to present.

How women behave differently from men. Women appeared to listen more, but turn-taking was common in all groups. One woman appeared to be less confident in her skills (video producer) but was reassured by her other team members that it was a valuable skill applicable in multiple fields. Women were also more likely to be first-time jam participants. All but one of the women participating was doing so for the first time. Women also used careful phrasing to introduce ideas, such as "That is just my idea, so" but the ideas were generally accepted and incorporated into the group. Participants in teams of two collaborated freely and exchanged ideas rapidly. Larger groups were more likely to have withdrawn members who seemed not to be as actively taking part. In one instance, I noticed a woman who appeared to be withdrawn, but another team member, also a woman, noticed and pulled her back into the design process.

How the game was presented to the group. As the game jam ended, each team was asked to present their prototype to the group and explain their game and what they learned from the experience. In most groups, a man did the group presentation, even if a woman had presented earlier in the evening. In one group, the women were the presenters, but all the men in

that group had left the event. One group gave everyone a card so that all team members presented a different element of the game. This gender bias did not appear to be intentional. When I asked about it, team members told me that they asked for volunteers.

Before the presentation, I asked teams how they felt about their game and their team. Responses are listed in Table 11. Many answers reflected a need for a better understanding of the scope of the project, such as, "We'll still be building a game when it's time to present, and I don't know if it will be fun." Another team told me, "I would have started with a smaller project." Participants also wished they had had more time or stopped adding mechanics earlier in the game. After the presentations, team members were offered an added week to polish their game prototypes and present them at a larger PIG Squad game showcase event. Observations were not collected at the showcase.

Chapter summary. In this chapter, the setting for the case was described as well as the interview participants and setting for the observation. Narrative data for this study came from both observations and interviews. Finally, this chapter explained the themes emerging from the data. The following chapter will answer the research questions and explain the conclusions.

Chapter 5: Conclusions, Discussion, and Future Direction

This research gathered interview and observational data to study the information behavior of adults in independent game design within the context of a male-dominated industry. As discussed in the literature review, game design is an emerging interdisciplinary area of study, borrowing from psychology, communication, computer science, and other fields (Van Eck, 2010). While there is emerging literature on game design theory, game players, and games, little academic focus has been given to independent game designers as information users or information creators. Independent game designers must cultivate skills such as computer programming, game theory, marketing, fundraising, digital art, animation, and music design. As with many technology-related fields, the game industry is mostly male-dominated, with an annual industry survey of the game industry from the Game Developers Conference showing that 75% of respondents identified as men (2020).

A case study was chosen with the defined boundary around a specific group of students, hobbyists, and professional game designers interested in independent game design. These participants had in common that they were creating or were highly interested in creating independent games as defined by Garda and Grabarcyzyk (2016). Participants had also attended at least one event held by the Portland Independent Game Squad, or PIG Squad. Narrative data was gathered through both observation and semi-structured interviews. Data analysis followed the inductive analytic process and was overseen by my dissertation committee members. The following are answers to my sub-questions, which will then be followed by my overview and central question.

Sub-Question One: Gender Differences in Information Behavior

Overall findings in this study reveal there is a perceived lack of authority for women in game design. This theme was found in the responses of nine out of ten study participants. Participants felt that women were viewed with less authority than men in the independent game design community. This perceived lack of authority was noted in professional settings and online communication but also informed behavior in interpersonal communication with other PIG Squad members and during game jams.

It has long been recognized that women have struggled to gain social capital in professional settings outside of game design (Timberlake, 2012). However, when the professional setting is combined with male dominance in the game industry, it appears that it becomes even more difficult for women to create workplace legitimacy through mentorships and networking, as Timberlake suggested. One possible solution is a greater emphasis on teaching computer programming skills to women through informal channels, as multiple participants mentioned the value of programmers in the game design community. One female participant felt that she was seen with greater authority because she was a computer programmer. It is possible that learning some programming skills would benefit other women in the PIG Squad, even if they did not intend to work as computer programmers.

Women in this study felt that their authority was undermined in online communications. One said she contemplated using a gender-neutral pseudonym or not mentioning her gender online. Men also remarked that they had heard that it was easier for women to navigate online spaces if they did not reveal their gender. Online communication was also a common vector for sexual harassment. Two women in the study said that they had been sexually harassed online, and other participants said that they knew women or had heard about women who had been

harassed online. As one participant said, “I certainly have had enough friends who are women in comics and games to know there’s been a lot of scary shit to be public as a woman on the internet.” Two participants specifically referenced GamerGate, which was an extensive harassment campaign against women detailed in the literature review.

Concerns about sexual harassment, safety, and authority also affected in-person communication, although all participants felt generally positive about the PIG Squad community. As one respondent noted, “I’ve never seen that be an issue in this community.” One woman at one point said that “Everyone in PIG Squad is super great. I haven't noticed that I was a woman if that makes sense,” but then later referred to men who attended PIG Squad events and misinterpreted professional interest as sexual interest as “hover-boys” who would “hover around and never quite go away and just not take the hint.” At the same time, another participant said they felt some events were treated as “speed dating” sessions by some male participants. This seeming conflict in views shows that participants view the treatment of women in the game community as more of a reflection of the treatment of women in society in general or that they separate the misbehavior of individuals from the character of the PIG Squad. As another woman said, “they're the ones who set the tone for how people treat each other.”.

Gender bias was also complicated by intersectional issues such as race. Intersectionality is a theory first developed by Crenshaw (1991) to explain the experiences of Black women. It has since expanded as a framework for understanding the experiences of other identities, such as race, class, and sexual orientation (Carbado, Crenshaw, Mays, & Tomlinson, 2013). The theory began as a Black feminist response to earlier feminist research that primarily focused on the experiences of white women while ignoring interconnected and complicating factors of identity that contribute to oppression. One participant, a Black woman, said, “Say you have three points

for yourself and you get the point for being White and a man and a certain age group, and so I don't have any of those points, you know." She also answered other questions by first gesturing toward her face to emphasize that she felt her appearance as a young Black woman explained why her subject matter authority was ignored.

Women may have different childhood play experiences than men insofar as they often have played fewer video games or may not have had the same access to computer-related play. Jenson (2011) contends that gendered perceptions of video game playing styles among youth are tied to gaps in game playing experience and misunderstood as gendered. Women in this study described childhood play experiences that were potentially different from men. While forty percent (4/10, 40%) of participants showed a gap in childhood play experience, only one participant who indicated a gap was male. This gap in childhood play experience related to the earlier practices of Nintendo and other game design companies to market games as toys instead of electronic goods. When Nintendo began placing video games in the toy aisles, they chose to place games in the boy's section (Fron et al., 2007). Because of this, adults who presented as girls during childhood may not have been exposed to video games as children and may experience an information gap in their mental libraries of game elements.

Sub-Question Two: Acting Independently

As discussed in my literature review, independent game design does not mean that game designers act alone. Although independent designers admired the idea of designing games independent of other designers, most designers in this study did not do so. One participant regularly designed games independent of other designers but indicated that they were trying to find help with skills like advertising and playtesting. They explained, "I can only do so much on

my own." When compared to industry surveys, 19% of survey respondents said that they worked by themselves (Game Developers Conference, 2020).

In most cases, when the designers in this study sought feedback, they sought that information from other independent game designers or at events connected to the PIG Squad, such as the Drink and Draw. One participant expressed frustration that PIG Squad allowed or encouraged drinking at many events, such as Drink and Draw, as they felt that getting playtesting feedback from sober players would be more useful. It should also be noted that issues female participants noted what one participant called "hover boys" may be worsened by the presence of alcohol. The game jam observed in this study did not provide alcohol, but the speed meet held the week before and the showcase held after both did.

Although there was a heavy reliance on community, it is important to note that participants in this study did spend time working remotely in coordinated efforts to complete collaborative projects. While working remotely, participants used a variety of tools for communication and information sharing, including Google Drive, GitHub, Discord, and Slack. Participants who worked professionally also used project management software like Monday, Calm, JIRA, and Shotgun. One participant worked as a professional with a team distributed internationally. She described her experience as "lonely" because most of her work was done in isolation. However, she also valued the ability to work remotely and remain in Oregon. She also received help from a formal framework for collaborative teamwork (Scrum).

Other participants expressed information needs for formal or informal project management strategies as well as better ways to market projects and gather qualitative feedback to improve game designs. Because the independent game design community and PIG Squad are informal channels for learning game design skills, project management came as an afterthought.

As this dissertation is being written, there is a pandemic from COVID-19, which has forced many states and cities to mandate telework and physical separation. Although these measures are most likely to be temporary, it is likely that future work structures will rely on more distributed and remote work. The PIG Squad should consider intentionally supporting and encouraging teaching frameworks and skills around independent collaboration.

Sub-Question Three: Acting Together

As previously discussed, even designers who designed games individually still did so with the help of others. Game designers in this study used playtesting and feedback from others to incrementally improve game designs. Games could be viewed as conversations between designers and players. Participants used PIG Squad events to find partners for collaboration, to learn game design skills, and to gather feedback. Game design is potentially an act that can be collaborative at every step of the process, from concept to playing the final product. The PIG Squad is a source for mentors, business networking, socializing, information sharing, playtesting, and collaboration.

Participants in this study, including all women, relied on mentors and community members during their information seeking process. Seventy percent (7/10, 70%) of all respondents reported directly asking others for information. As one participant noted, “I like learning from other people.” In addition to asking individuals and attending in-person information sharing sessions, participants reported attending in-person talks and viewing example works of other designers to deconstruct and remix. Participants also used online tools such as the PIG Squad Slack channel to exchange information remotely. One participant said, “I know the public Slack channel is very active, and they will answer questions.”

Game jams, in addition to functioning as trial runs for more prolonged collaborative game development efforts, were events that facilitated knowing by doing or what Dresang called knowing together (E. Dresang, 1999). Four (4/10, 40%) of ten interview participants mentioned learning by experimenting as part of their information-seeking process, and during observations, it was clear that game jams were clear demonstrations of information seeking by experimenting and trial and error. One participant referred to this process as learning "just by doing it."

Although participants were positive about the PIG Squad and enjoyed this collaborative process, collaboration also presented some difficulties. During both the game jam observation and during participant interviews, participants often felt that time management and project management was a struggle. As one participant described, "some things have gotten blurry that we could have done a better job of keeping track of." Another said, "I wish in this particular situation we had I made a set limit of four mechanics," meaning that the scope of the game had gone beyond what they could reasonably complete during a game jam session. Formal frameworks and project management strategies would help game jam participants as they learn by doing. The Lean Startup methodology (Ries, 2011) is designed for small software teams and includes concepts like the Minimum Viable Product that could help creative designers scale ambitious projects to an achievable goal.

Sub-Question Four: Perceiving Themselves and Others

Participants in this study often felt that their role in creating a game was to "deliver an experience" and saw themselves as experience designers. Emotions and experience could be seen as information being transmitted between creator and player. While some participants valued creating entertainment, many felt motivated by social justice or altruism. As one participant put it, he wanted to "do more good than just making a fun thing." Study participants

also thought about their personal experience and how their experience was reflected and represented in games. As one Black participant said, “I think that is a space for my experience to be shown.” Another participant said that their interest was in community building and that “games are an excellent way to have people engage with non-game rituals as the initiation.”

Stereotypes and gender norms affected how participants presented themselves and how they felt others perceived them. One participant talked about collaboration and how she was “hesitant to take up the administrative stuff when we're working together because I don't want to be seen as the secretary of the group.” Another participant, who worked professionally in game design, felt that they suffered from “a little bit of imposter syndrome” and found themselves, “couching my opinion as a question or very softly edging things,” rather than being assertive. Two women who gave answers were also self-deprecating.

Sub-Question Five: Radical Change Theory

Radical Change Theory is an effective way to explain the adult information behavior of the study participants. As discussed in the literature review, Radical Change Theory originates with Dresang (1999) and identifies three fundamental changes in youth literature: interactivity, connectivity, and access. The changes in youth literature are then tied to changes in youth information behavior, which reflected interactivity, connectivity, and access. Radical Change Theory was also expanded with Dresang adn Koh (2009) illustrating the influence between information sources and behavior. Koh (2013a) further expands Radical Change Theory to include information creating behavior as observed in youth using and sharing information about Scratch, a youth-oriented programing language commonly used for animation and game design, which leads to questions about how information creating behavior is exhibited in adults using game design tools.

Dresang defined interactivity as “dynamic, user-controlled, nonlinear, nonsequential, complex information behavior and representation” (Dresang, 2005, p. 183). Connectivity referred “to the sense of community or construction of social worlds that emerge from changing perspectives and expanded associations in the real world or in resources” (p. 186) Dresang also viewed connectivity in the concept of “knowing together” or interactive and collaborative information seeking, which was also observed in the adult participants in this study. Dresang defines access as “the breaking of long-standing information barriers, bringing entree to a wide diversity of opinion and opportunity” (p. 188).

While Dresang and Koh studied youth populations, the adult participants in this study were youth during or after Dresang’s initial research and exhibit many of the same changes in information behavior as they navigate complex and interactive information sources. The participants in this study navigate digital information, and both use and create user-controlled nonlinear information in the form of games. Participants demonstrated connectivity as they created information together as they learned by doing in game jams and engaged with information creating networks. Further, the adults in this study exhibited similar behavior to the tinkering, visualizing, and remixing noted by Koh (2013a). The similarities between artistic creation and information creation noted by Koh are further blurred when games are created to create information. Participants in this study learned by experimenting, iterating, and remixing games others had created. While Radical Change Theory examines how children are involved in the design process, the adults in this study, while designers, involved others in their design process through the form of playtesting and feedback.

The observed process of game design appears not to be an act of creating games from scratch. Instead, games during game jams were more often remixes of elements of other games.

Negotiation involved speaking the names of games as a shorthand to find shared experiences that could be combined. During the initial brainstorming process of the observed game jam, participants named games to find games they were all familiar with and negotiated elements of those games from game mechanics to themes that were then remixed into a new prototype. When interviewing another participant, they referred to part of their information seeking process as skimming a lot of material because, "I just really enjoy kind of building a library of mechanics and possibilities," which then filtered into their work.

Additional Findings

Although this research included a sub-question that focused on the experience of women in independent game design in the context of a male-dominated field, three participants did not identify as either men or women. If I had coded the gender of participants based on physical presentation and first names, I would have assumed that I had interviewed five men and five women. However, during the process of interviewing participants, it was clear that this would have been an incorrect assumption. That said, the information behavior of non-binary participants often appeared to be similar or the same as that of female participants.

The largest point of difference between female and non-binary participants was that non-binary participants were, understandably, more interested in non-binary representation within games. One participant said that they always included character pronouns in their game designs, even when those pronouns were typical "he" and "she" to normalize the process. Another participant said their role was to question assumptions such as, "Can't weird scientists also be ladies? Or non-binary people?"

Answering the Central Question

What is the information behavior of adults in independent game design? As discussed earlier, the game designers in this study did not create games from scratch. Instead, they remixed games by combining multiple elements from other games in a new way. During a game jam, this is a pragmatic way to negotiate a concept and create a prototype quickly. I observed designers naming games to each other until they found a game they had all played and then discussing how they should modify it. Even during participant interviews, games were referenced, such as one designer calling their game "a Smash Brothers inspired strategy game." Without this shared pool of experience, aspiring designers may have information gaps that interfere with participation. As one participant said, "a lot of game developer people have this common pool of experiences that I frequently don't have a window into."

Women who took part in this study were extremely collaborative in their information seeking and more likely than men to mention seeking information by asking another person. All (3/10, 100%) of women interviewed mentioned asking others for information. Seventy-five (3/4, 75%) of male participants did not mention this behavior. Women were also less likely to mention using Google as part of an information-seeking process. It is not clear if they did not remember this step or if they found asking someone else for information was a more effective strategy than starting with Google.

The most pressing information needs for all members of the game design community, according to participants in this study, were for computer programming skills, business and marketing skills, and project management frameworks and skills. Although participants in this study were familiar with tools used for collaborative programming tasks, such as GitHub, only one participant mentioned using a project management framework (Scrum) during her game

design process. In addition, although participants seemed to view game design as a conversation between the player and the designer when the primary playtesters are community members and teammates, independent game designers may be unintentionally limiting their target audience.

The participants in this study came from diverse backgrounds that were not necessarily technical. All women who were interviewed mentioned attending college, although none of them said that they had majored in computer programming, and only one female participant, whose background was in the study of art, said they started designing games as part of their formal university education.

The findings revealed that participants of all genders shared many of the same information behaviors. As mentioned in sub-questions, the female participants in this study also had to navigate issues of safety and harassment. All genders participating in this study felt that women were given less authority than men. Gender-related issues are not unique to the game design industry, but in the context of a male-dominated industry, it becomes even more challenging to overcome issues as they arise. The gender issues observed in participants are entrenched and related to male hegemony rather than gendered preferences in information behavior.

One issue unique to the game industry is the possible information gap among independent designers who presented as females during childhood. Early video games, such as Pong, were gender-neutral titles or games intended to be played by families. However, with the video game crash of 1983, when low-quality games flooded the market, Nintendo narrowed its target demographic to just boys and men to market games in the toy aisles at retail stores. Other game designers followed suit.

This change in marketing had a profound effect on the game design industry, resulting in male-dominated studios producing games targeted towards men in what Fron et al. called the hegemony of play (Fron et al., 2007). Even when the games industry recovered financially, the marketing strategy was to create gender-stereotyped games marketed towards girls rather than to pivot towards games marketed towards broader, gender-neutral audiences (Chess, 2011). One lingering effect of that hegemony that appears evident from participants in this study is that adults today may have different childhood play experiences, depending on their gender presentation as children.

Discussion

Independent game designers include individuals from differing backgrounds that may not include formal academic study of game design. Among this group of new information users, there are also librarians. One research participant was, in fact, a librarian. Many academic libraries have independently designed custom games as a more engaging way to teach information literacy skills and to familiarize students with library collections (Beck, Callison, Fudrow, & Hood, 2008; Donald, 2008; Gee, 2012). Libraries and schools have also gone beyond asking for player participation and begun to use game design as an activity to teach science, technology, engineering, and math (STEM) skills to youth (Ash, 2011; DiCerbo, n.d.; Jenson & Droumeva, 2016). Nonprofit organizations aimed at teaching coding and STEM skills to girls and disadvantaged youth are also working cooperatively with public libraries to offer youth programming that would otherwise be outside of many librarians' skillsets.

While it is indeed appropriate that libraries include AAA titles in their collections at universities with game design programs, cultivating a robust community of game *designers* plays to the strengths of modern libraries. Due to its creative, financial, or publishing independence,

independent game design offers a chance to amplify the voices of marginalized groups and democratize knowledge in the modern era. Furthermore, independent game design is an appropriate activity for a variety of ages and skill levels and could potentially be used to decrease the gender gap in STEM activities. Cultivating a game design community requires more than merely making games available. Libraries must understand the needs of game designers, especially those among underrepresented groups. In doing so, this supports both the needs of the community and the needs of many librarians.

Game jams could serve a dual purpose, as both a means to design games for libraries and to assist the community of game designers by providing access to informal learning channels and alternative paths. The PIG Squad and other independent game design communities have an ongoing role in supporting those informal channels. Game jams serve as a method to collaboratively learn by experimenting and tinkering. Since women in this study were more likely to seek information by asking others, game jams are likely to have outsized benefits to this group of information users.

Figure 2 illustrates the flow of the game jam process, as observed in this study. This model is similar to that observed by Koh (2013a) in the information creation of youth using Scratch. However, in her model, youth may return to any stage of information creation at any time until the creator is satisfied. Koh, Snead, and Lu examined youth in a makerspace environment and found that they worked in an iterative spiraling process of "brainstorming, trying things out, revising, and presenting" (2019, p. 1409). In my observation, participants were more iterative after the initial development and focused on implementing changes based on feedback from playtesting. This difference may reflect a more mature variation of the youth behavior observed by Koh and Koh et al. Game jams consist of an initial phase of ideation and

initial development followed by a loop of playtesting and tinkering until the time limit is reached. This process also illustrates the critical role time management and project management skills play in this process. If the team takes too long with the initial development, there will be no time to test and iterate, which means the game may contain serious flaws. This game jam flow is a miniature version of larger software development efforts where time constraints may also apply. To maximize the benefits, the PIG Squad may want to present a pre-learning activity prior to the start of the jam introducing a project management framework, such as Kanban, which can be done very simply using sticky notes. The Global Game Jam, a worldwide event, offers suggested schedules for participants to keep them on task, such as a suggested time for brainstorming and a time when teams should stop adding new features.

In addition to computer skills, women in game design could potentially benefit from chances to play older console games. When looking at gendered differences in play style, Jensen and de Castell assert that many stereotypes about gendered play behavior were reflecting the relative difference in experience playing each game (2008). Likewise, some behavior of women in independent design could reflect their gap in experience with older console games. Game designers in this study used the game mechanics from their past play experiences to remix into new games. Experience with older games adds to the mental library of mechanics.

Figure 3 shows the patterns of information behavior demonstrated by women in the findings contrasted with the obstacles that create barriers to that behavior. The behavior of women in this study included asking others for information, collaboration, learning by experimenting, remixing information and knowledge, and offering new perspectives. That behavior was hindered by the barriers of safety concerns, harassment, information gaps, a perceived lack of authority, and interacting in a male-dominated field. Women in this study, for

example, were much more likely to ask others for information. That behavior faces obstacles from safety concerns and harassment. Women bring new perspectives but may be blocked from presenting them by a perceived lack of authority. Each barrier may also combine to compound the effect. Collaboration, experimenting, and remixing may face barriers from information gaps and safety concerns, which is exacerbated in a male-dominated environment and, in turn, reinforces a perceived lack of authority. Although women demonstrated the Radical Change behaviors of interactivity, connectivity, and access, the barriers to this behavior are better explained by cultural hegemony.

Independent game designers could also benefit from strengthened mentorship to enhance collaborative computer programming skills and education on commonly used project management frameworks. Virtual mentorships and networks will likely be an urgent need for game designers as the COVID-19 disrupts in-person networking and may likely provoke permanent changes in offices and collaboration. Many independent game designers participating in this research were already collaborating remotely and should be encouraged to share their experiences. That said, this and previous research indicates the idea of formalized production roles may meet with some resistance (J. R. Whitson et al., 2018).

Conclusions

This study was an opportunity to examine the information behavior of a group of adult information users not yet included in information behavior research. The participants in this study showed information behaviors that demonstrated Dresang's (2009) concept of Radical Change Theory, including interactivity, connectivity, and access. Participants were likely to interact with other designers as part of their information-seeking process and were likely to experiment and tinker as part of the learning process. The participants were highly collaborative

and used play as part of their informal learning system. A game jam is ultimately a ritual geared towards learning how to create games. Game design was also an act of conversation where playtesting feedback informed improvements in future iterations of each game. Skills around computer programming and qualitative data collection (playtesting) are useful outside of the games industry, and this informal learning channel may allow women an alternative pathway into the sciences.

This research adds to the body of information behavior theory by revealing that the game jam is a form of communication activity. The research findings expose transmission and ritual as two forms of communication activities taking place within the context of game jams. As discernable, objects or content transmitted or exchanged during the game jams appear in the findings as playtesting, feedback, and iteration during the creative processes, a communication ritual loop that lasts the duration of the game jam. This finding suggests the need for further research that focuses on the playtesting, feedback, and iteration as a creative process through the lens of Savolainen's view of information sharing and knowledge sharing. According to Savolainen (2017), "information sharing and knowledge sharing exemplify forms of human communication" (Introduction, para. 3). Savolainen asserts that information sharing and knowledge sharing are often used interchangeably and are two broadly similar modes of human activity when considered as communication activities in terms of Carey's (1989, p. 17-18) concepts: transmission view and ritual communities. Savolainen (2017) asserts that information sharing from the transmission view emphasizes one-way communication from a sender to a receiver and "appears as an activity through which ideas, opinions, facts, and documents are transferred from an individual or group to other people" (Information sharing: the viewpoint of transmission, para. 1). Knowledge sharing presumes internalization by those who have

knowledge. Knowledge sharing from the ritual point of view "places the main emphasis on two-way communication in which people represent the shared beliefs in communities" (Information sharing: the viewpoint of ritual, para. 1).

While this study focused on adult participants, there are also implications for future research addressing the organized learning experiences of youth and children, particularly addressing opportunities for children and youth to ask and answer their own questions rather than follow the traditional rigid form of skill and drill education. Future studies should focus on how children and youth information behavior in the acts of playing, tinkering and experimenting with age-appropriate games and game creation tools such as Scratch and Minecraft during their organized education. Game design activities can also be done without computer technology, such as developing games using sticky notes, paper, dice, and markers. The game design process that I observed included experimentation, playtesting, and incorporating feedback, which are powerful skills that can be generalized to other subjects. Future library studies should focus on ways to incorporate playful activities at the library. Libraries already serve as a bridge to technology access, and many public and academic libraries already contain games within their collections. Libraries can further encourage access to play and experimentation.

In the wake of the COVID-19 pandemic, the information behavior of game designers will likely undergo significant changes. At the time of this writing, Oregon is under a quarantine order, and businesses have been ordered to either close or allow all workers to work from home. It is likely that this separation will last for many months and have a long-lasting change in behavior. The PIG Squad has shifted to hosting virtual game jams and streaming tutorial sessions. Given that female participants in this study were highly likely to seek information by asking other people, it is vital to establish strong virtual networks to facilitate networking and

mentorship. That said, the women participating in this study already demonstrated advanced skills in collaborating remotely in highly connected environments.

Limitations of the Study

This study is limited to one geographical area. The Portland, Oregon area has a robust independent game design community, while other cities may not. The information behavior in areas without a strong game design community may be different. The sample size of this study is relatively small, with only ten interview participants and one observation. As Creswell (2014) cautions, qualified methods are not intended to generalize findings beyond the particular study. Furthermore, this study took place during a time of unusual social change, just before the global COVID-19 pandemic. Information behavior may look different after the recovery if new methods of information transfer persist after state-mandated quarantines end. The PIG Squad has canceled all live events and switched to remote game jams and information sharing sessions over streaming services. It is unknown how long this will last.

Future Research

More research is needed in game designers in general. As discussed in my literature review, research in independent game design is still lacking. Research is also needed on other underrepresented groups within the game design community, including queer, Black, and Latinx game designers.

More research is needed to investigate the information behavior of individuals who do not identify with a binary gender, even outside of the game design context. Research still lacks a consensus on how to frame research around non-binary identity (Frohard-Dourlent, Dobson, Clark, Doull, & Saewyc, 2017). One approach may be to consider grouping all non-male genders. Some feminist groups that previously defined their membership as women have

changed their names or descriptions to be explicitly inclusive of non-binary identifying individuals. The PIG Squad has hosted women-focused events under the label *Dame Squad*, but Since 75% of game developers identify as male, it may be appropriate for independent game research to consider all non-male together.

Another approach may be to consider non-binary individuals under the umbrella of transgender. However, not all non-binary individuals consider themselves to be transgender or experience gender dysphoria (Savoia & Kelly, 2019). Some individuals who identify as non-binary may attempt to change their physical presentation, but others may not. Some may also shift between masculine and feminine presentations or combine elements of both. In preliminary research, it appears that there are multiple reasons that individuals may identify as gender non-binary, including political rejection of the construct of gender and the stereotypes of traditional gender roles (Richards et al., 2016). In addition, there are nuanced and slightly different terms for non-binary gender identities that may have different implications or cultural understandings, such as agender, bigender, genderfluid, genderqueer, third gender, pangender, and two-spirit. Scholars must develop a new framework and likely new language to position feminist research going forward.

Future research should also examine the extent to which workplace conditions contribute to gender differences in game design. The game design industry is not unionized, and most of the work is done through temporary contracts. The working conditions are often difficult, and most game design professionals have worked in the industry for less than ten years (Game Developers Conference, 2020).

Chapter Summary

This chapter held the conclusions, discussion, and future research. Women who took part in this study were more likely to seek information by asking other people. Women faced added barriers to participation, including sexual harassment and gender stereotypes that lead to a perceived loss of authority. Research participants showed Radical Change influenced information behavior showing interactivity, connectivity, and access.

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Table 1

Interview Participant Demographics

Participant	Gender	Race	LGBTQ+	Experience	Date
1	M	White	No	Hobby	2-17
2	F	White	No	Hobby	2-27
3	F	Asian	No	Begin	3-4
4	M	Asian	No	Begin	3-4
5	M	White	Yes	Hobby	3-9
6	M	Black	Yes	Pro	3-26
7	NB	White	Yes	Hobby	3-26
8	NB	White	Yes	Pro	3-26
9	F	Black	Yes	Pro	4-24
10	NB	White	Yes	Pro	5-29

Table 2

Interview answers about gender differences

Subcategory	Responses	Sample Illustration of Response Items
All	63	
Lack of authority	19	"It's mostly people second-guessing things that I know are true." "Being a programmer, I think, gives me some extra clout, but I don't - I think it would be maybe different if I was an artist. I don't know that because I'm not, but they feel like I'm taken more seriously because I can code." "I generally get the impression from talking to women that I know that it's sort of a little unfair you seem to have to work harder to prove that they have just as many valid points or criticisms or whatever" "I have heard that if I didn't use my real name or if I used a gender-neutral version of it, maybe I'd be taken more seriously, you know. I don't know. I don't feel like I'm taken un-seriously, but if you - probably a lot of times, you just don't see that unless you're on the other side of it." "I think it's really cool women we get to be game designers, and I love it, but I think that on the most part people tend to look down. They tend to think, 'Oh she must be second-tier it must be second string programmer.'"

		"I know there's a strong bias on women designers; you don't see them being as uplifted as much as male designers." "I think there can be a difficulty in having your ideas or opinions heard and validated in the same way." "This is not my first rodeo in the world, and it is very fun to be in a position where you're working on a project, and your manager will come and ask you a question, and you answer the question, but they don't take you seriously."
Male dominance	13	"I was like, 'Wait, oh no, I am the only girl in here? We really do have 23 guys.' That was kind of a shock, so after that, I tweeted out like, 'Hey, are there any other women doing Pico-8 development?' and it got picked up and spread around probably a handful of responses which was really disappointing. But for all that, all the guys I've met have been really great." "I think that happens - things that I've participated in where it's a very male audience, and then there's kind of this posturing of 'I'm the nerdiest nerd, and I know the most obscure things.'" "So, if you're in those networks already, you have this power over people who aren't in those networks; it just all seems to be self-feeding into the default class."

		"At the Global Game Jam, the NPR lady - You have to write down this part. The NPR lady asked the member of our group who was a woman…if we had been good, if we had been difficult male - I forget the exact wording of her phrase. . . And that surprised me and that it's rough. I didn't even think about it - being the only woman on a team until it was actually pointed out. I was like, 'Well, shit.' I didn't really think I acknowledged that difficulty until it was right in my face." "I think because the space is male-dominated, we've got to do more to be both from the player aspect, and I think that will affect the design space." "I think also frankly the women are more likely to want to collaborate with each other rather than deal with that which is probably understandable."
Harassment and safety	8	"So, there have been several times at various events where a guy has kind of attached himself to me for the evening; we call them hover, boys, because they hover around and never quite go away and don't take the hint." "Sexual offers. Like I said, you know people putting me down because I'm a female." "I wish I wish they had better social cues I mean yeah that's not anything on PIG Squad. . . . I think it would be

		silly to request that the women learn a secret hand sign for 'get me out of this conversation.' I wouldn't mind if we had one, but a lot of times, just professional interest gets misread." "I have countless horror stories, my friends, Jesus Christ." "I certainly have had enough friends who are women in comics and games and what not to know there's been a lot of scary shit to be public as a woman on the internet."
A desire for diversity	8	"I think more diversity and inclusion just by necessity makes a lot of other stuff happen." "I think I want to see a lot more women and non-binary and trans folks and people of color taken seriously and not tokenized or objectified because that's only going to make things better and more interesting and more fun and more inclusive ultimately." "The more diversity there is, the better because somebody might not be into playing *Ticket to Ride* or *Pandemic*, but they might be into playing you know a tabletop game where you're trying to collaboratively help a monster get back to its dimension."
Race and intersectional issues	11	"My boss at my other job. She put it in a very interesting way. Say you have three points for yourself, and you get the point for being White and a man and a certain age

		group, and so I don't have any of those points, you know." "I walk into a room myself knowing that I'm an other for my own reasons, so I can relate in a way to women walking into a space where you don't see many people that look like you and so you then have to go above and beyond to make your voice heard."
Information gap	3	"I also come to this as someone who did not play video games like I did. I played the Super Nintendo I played the original Super and then dropped off until two years ago so the kinds of games I think about designing are different because I don't have those decades of genres." "I wish that there had been some more encouragement for me to get involved in developing some of those skills sooner instead of coming to them by late 20s and early 30s because I think some of my friends from high school and now are getting to software companies and things because they were allowed and encouraged to play around with computers and software and those things and it didn't - I didn't feel like I had access to that same kind of play." "I didn't play Nintendo stuff growing up, and I didn't. I don't for the reason a lot of game developer people have this common pool of experiences that I frequently don't have a window into. So, people would want to talk about

		Final Fantasy, whatever or some classic thing that I've never played and ugh. I don't know anything about what you're saying"
Non-binary gender	7	"Sometimes people don't use my correct pronouns, but that's sort of just life, and my pronouns are 'they.'" "I think it's important for games to have more representation that is not so scary to people and heteronormative and kind of a binary system in a lot of ways." "I want a game where people can sit together have this wacky strategy game but also all the characters of pronouns clearly listed on their cards, so that was a very important thing for me just to help normalize that function as well even if the four characters don't have anything sort of strange or unusual pronouns"
Stereotypes and gender norms	11	"I do go back and forth about it since I'm online, you know revealing my gender or not, you know. I'll be skating it. I haven't decided which is the better strategy, but I'm pretty sure the guys don't have to think about that, and they don't have to put on makeup before they demo." "I think that there's generally a stereotype with male stuff that presenting as strong or capable or whatever and it's

		sort of discouraged to ask for feedback and sort of just be receptive to criticism." "I'm always very hesitant to take up the administrative stuff when we're working together because I don't want to be seen as the secretary of the group." "I think anybody can really collaborate, but I see that how women are able to support each other when they're not overly competitive from the sort of patriarchy that we live in." "I evidently notice myself couching my opinion as a question or very softly edging things a lot, 'Maybe you could X' or 'What do you think about Y?' I'm trying to get better about not so kid gloves about suggestions." "I've run into more definitely more with systems where if a female character doesn't have open cleavage or some shit, it definitely reads as male to them."
The PIG Squad	4	"Everyone in PIG Squad is super great. I haven't noticed that I was a woman if that makes sense." "I've never seen that be an issue in this community, and I haven't seen women being excluded in the same way -in fact - radically included in everything possible in the PIG Squad."

Table 3

Interview answers expressing an information need.

Subcategory	Responses	Sample Illustration of Response Items
All	41	"I don't know the first thing about music, and that's super important. I wish I was a better artist. I am not good at level design, so most of my games don't have levels." "I want to hear what it's like to be other people." "Having the skills to do a 3-d printer and that creating stuff because that would probably be the cheapest way to actually come up with a special board game." "I can also have miles of room to improve on trying to do playtesting and ask for feedback in a way that's helpful." "I mean I'm amateur, so there's a lot that I don't know. So, I guess I you know not necessarily that I wish I have it, but I can develop it, you know. And so, I like learning from other people. I my math set is not super strong. So, you know I don't know if I guess going into the nitty-gritty finding statistics and probabilities and all that stuff." "I'm kind of interested in looking into is a little bit more of game design theory. I'm forever in academia. I like reading the books of things with researching things, so I'm kind of interested in developing more of a background understanding of why certain mechanics work well."

Business and marketing	11	“I wish I could share with other people as easily as someone who's done public speaking and marketing.” “I don't have a good grasp of we’re talking about developing a prototype and maybe do your Kickstarter campaign.” “There's a whole world of business that happens once you have a game.” “it's a very weird, difficult thing to get to get games out in front of an audience. “ “I wish I had a better social media presence. I don't really know how to do social media, so it I'm not very good at marketing. I wish I had more information on marketing. I wish I had maybe more of a platform to get things that I do for PIG Squad out.”
Programming	8	“I wish I was a better coder.” “The things that I am struggling with as a designer is, I'm definitely less mathematically minded, and that's part of what makes programming I think a bit of a struggle for me. But it also can affect a balancing for a game, so a lot of the games that I've focused on have been very, very simple systems numerically, mathematically, statistically. So, it would be a thing where I would love to get a better understanding …there's a lot of really interesting systems that do have these very complex sort of algorithmic

		balancing techniques." "At least once a year I get that itch too like, oh, maybe I'll try Game Maker again and see how it goes. I think really that's the kind of thing that I would be interested in. Sort of low-stress coding something that was very simple, very rudimentary like Bitsy or Twine."
Planning and project management	6	"I'd love to do a little more premeditated architecture role planning and stuff that is not something that I do." "We could have done a better job of keeping track of, 'Okay, this is version 1. This is version 2' so that we have a little bit more concrete data to look at." "I think there's just an implicit 'leadership is bad' sort of thing, but I feel lack direction, and it's so hard."
Childhood game experience	4	"I didn't play Nintendo stuff growing up, and I didn't. I don't for the reason a lot of game developer people have this common pool of experiences that I frequently don't have a window into. So, people would want to talk about Final Fantasy, whatever or some classic thing that I've never played and ugh. I don't know anything about what you're saying" "I also come to this as someone who did not play video games like I did I played the Super Nintendo I played the original Super and then dropped off until two years ago so

	the kinds of games I think about designing are different because I don't have those decades of genres.”
	“I wish that there had been some more encouragement for me to get involved in developing some of those skills sooner instead of coming to them by late 20s and early 30s because I think some of my friends from high school and now are getting to software companies and things because they were allowed and encouraged to play around with computers and software and those things and it didn't - I didn't feel like I had access to that same kind of play.”
	“I didn't grow up with game like going to a game shop or playing Dungeons & Dragons or anything like that, so yeah and I'm missing a little bit of a certain kind of long-term so that nerdy gaming.”

Table 4

Interview answers relating to information seeking

Subcategory	Responses	Sample Illustration of Response Items
General	35	"I do a lot of Googling or research. . . I've tried to start asking people what they've done in the past, but that is a new a new thing to me... .then journals like Google and research and try to find examples...I work with the particular game engine I do because it's incredibly well documented and it has a lot of community support, and I know the public Slack channel is very active, and they will answer questions. . . I talked to people who do marketing around looks and stuff there's words, and there's just concepts that they've internalize that I don't have, so it becomes harder to talk to them and to find the community that I need." "I learned to write software in school. A lot of any of the practical game though many stuff I learned all my own - I was part of the developer's game developers Club in school and then PIG Squad. A lot of the design stuff and what makes something good versus what literally makes it work... .I have learned just by doing it." "Programming was a mixture of formal education and on-the-job training just for software development at large. Game programming, in particular, it has been from other

PIG Squad members and then just self-taught. The broader design skills I learned in seminary, which feels real funny to say. And they would probably think it was funny too."

"I Google around and see if there's a helpful written tutorial. Do not like video tutorials. I will skim that then trial and error for a while, and if it doesn't work, I might ask my friends or in Slack or something, or I might just keep beating my head against the wall to figure - but usually by then the game jam's over."

"When I was a kid I took a cassette and took the whole thing apart to see how it works I like to do things like that where I want to take the whole thing idea apart look at every little thing to put it back together ."

"Whatever I know about games is, I learned all alone. I mean just through the internet, but thankfully internet was here to teach me."

"I just really enjoy kind of building a library of mechanics and possibilities where I'll just read a bunch of wiki summaries of stories or lately it's just I've just been reading a bunch of summaries of different horror movies some of them are probably they seem pretty bad, but at least I get kind of a buildup of okay these are all the possibilities I could do if I wanted to make a horror story or if I ever

wanted to make a card game and some of those things do filter into my work.”

“I am self-taught, and a lot of that self-teaching is through online courses like Udemy. I was halfway through a certificate with O'Reilly School of Technology, which went under, and then my art skills were also self-taught.”

“Google, Stackoverflow, researching. It's mostly through Google and then trying to find the correct secret foot page where that comes from, or sometimes I'll go to read it and try to find somewhere to the relevant subreddit said I can find information focused they typically have community frequently asked questions about a specific thing yeah oh and oh PIG Squad. Ask people, okay. There's a - we have a Saturday afternoon group that meets you know. If there's questions, I usually go to them.”

“Google is my in for instance, on my game that I produced this time, I didn't know how to I didn't know if there's a resource for a printing off images and making sure that it was cut up evenly into multiple pages. It's really hard to do on your own, and there's a resource online. I just ‘how'd you do it,’ so research looking it up. YouTube is also an amazing tool for anyone looking to do something what they haven't done before someone's probably done it, and at this

point, it's probably on YouTube, so I usually search to see if someone's done it before."

"I try to get a mentor or a really solid source from you know, maybe online or something that something I can trust, and I fool around with it until I break it."

"I tend to look for a written tutorial if I can find it, and I'll watch a video if that doesn't work out but mostly online, and sometimes, I think the value of meetups like PIG Squad."

"You have to not have a big such a big ego that you can't ask for help because there's help out there. . . . I can just do myself now, like YouTube threads on Discord or whatever Unity help guides for the programming side."

"I do enjoy talking to people who have that experience, although I think it's always an interesting thing … For me, at least I always want to try and ask as many different people as possible, which sometimes is going to be a little bit confusing because then you got all this conflicting advice on different things. So, part - it's also just parsing the advice and figuring it out sort of again."

"I have learned just by doing it."

Table 5

Interview answers about designing games independently

Responses	Sample Illustration of Response Items
8	"I am not an artist, so the game designers that I adore the most are the ones who can do it all." "I go to conventions to sell games, and I do enjoy that because people get to try out the game. They really enjoy it. But it's this thing where I can only do so much on my own, so it's definitely for me - one of my long-term goals is working with a distributor or finding other people to help me advertise, play-test with broader audiences, kind of build a wider network of folks. Just so I can kind of keep finding more people to kind of make that business a more stable steady approach." "I think that because I'm sort of coming this from an artistic perspective, and I think that being an artist is a very lonely thing to do. …in the end, you're just drawing by yourself on a computer, and it's kind of lonely, and I feel like that breathes something like depression sometimes."

Table 6

Interview answers about collaboration

Subcategory	Responses	Sample Illustration of Response Items
All	63	
Communication	24	"I'm a big fan of communication, so I think they're you'd always have a little bit more communication, and I think also we've been kind of really rushing to get to today, so I think we've maybe a lot some things have gotten blurry that we could have done a better job of keeping track of." "I think that I'm a pretty kind of communicator. I think that most of the people here that I've been talking to are pretty good communicators. Nobody tries to overrun anybody and that the collaboration is pretty good. I wish in this particular situation we had I made a set limit of four mechanics, but you're like, 'Let's not introduce any more ideas at this point and just go with what we have and actually start eliminating things.'" "The ability to work with the team of people teamwork are these soft skills. . . are *hard* skills I think, so I think dealing with people knowing your limitations. Communication is big with that as well…Being able to communicate a vision or having some kind of artistic process and also being able to stick up for yourself and having your voice heard again."

"I'd say good communication and openness and actively engaging, listening to people is the best. Being able to own up to mistakes, personal ability to work with others… On the other flip side, it's not helpful when someone is so stifled into their own little bubble, they can't see outside of themselves. This is a collaborative group. You cannot just be an asshole. I mean, it's communication, overall."

"I mean everybody has different philosophies on the right way to do things. Something else I learned in seminary is how to hold those lightly and not get stuck in those arguments."

"I think the game could have been better if we had met somewhere in the middle, but I mean just communication. I think that people kind of get in their own wagon wheels, wheel wells on projects…It's a collaborative project, but if there's more communication there in the collaboration between the different music and art in programming, then I think it would be better."

"I think that having people present is the most - so if anything, that furthers that or helps that experience - and not being on a conference call."

"One of my primary partners is my partner, who …we have sort of the same design aesthetic, but he is the artist. so, it is

		the thing that I lack, but I am opinionated." "I think that is the same sort of communication that I would like to see more in the future. Their design process over time, so again, we can come together and collaborate and say, 'Oh, you guys had a problem with that. Let me come on to the team.' And if there was more sharing of the process, again, more people would come to the space." "I think well, if you're working on a team or being able to collaborate, it's important to really listen to other people." "Well, just having practice a collaboration and, you know, hearing people pitch ideas and other people sort of sorting through them - with kindness- but also like, 'Well that seems complicated,' or 'That is a great idea, but maybe that's an expansion,' you know. So yeah, that really you know collaborative working is part of it." "What can I really take ownership of, and what does it make sense for other people who have more passion or experience in certain areas - what makes sense for them to? Really, I think part of that is just getting older and having some perspective about how to work with other people."
Challenges	20	"I guess one of the biggest challenges I have is getting when you start working with other people getting people on the same page just feels impossible. We've done a bunch of

different attempts… I'm working with the group a year now and, we still have problems try to figure out. We'll spend like 30 minutes talking about one thing. You'd be like, 'Okay, okay, okay,' and then one person builds it. 'That's not at all what I meant.' It's just, it's bizarre how hard it is. We've tried writing stuff down, game dot style, and just a lot of other stuff, and it just seems weirdly challenging."

"It's easier to come up with ideas if there are more people working on it. I think it's hard to have a diplomatic solution on decisions where everybody is happy. Making a game with more people - you have more creativity, but then it's not also one person's project. No one will be completely satisfied, but it will improve."

"The last meetup, that would be the last Global Game Jam, I know that we had different team members doing different things and everyone was relying on the coders get everything done, and it felt like we were pressuring them too much to kind of just push through, and coding is something that could take a long time to do."

"I've not had this experience of the game jams, but I have seen other teams that do have too many strong captain's too many strong cooks in the kitchen. So, I think if you are closed off to other people's opinion when it comes to

collaboration … you know if you want to collaborate, you've got to be open to other people."

"It's easy to start a project it's not always easy to finish it I feel like starting in a game jam really helps because there's a push to actually have the play testable product by the end."

"Games are not a unionized industry at all. Other companies or other fields have the option somewhere, at least for a union to make sure that you're not just let go out of completely nowhere, whereas in our industry, it's just like, 'not feeling it anymore.' 'Good luck with your whole family hopes and dreams and everything,' like that. So, money and the idea of stability and a union would be great -but in my lifetime."

"Unionization, labor rights, time off, and better working conditions. More sober events."

"It's so hard because it's all volunteer, and it's all like a passion thing. I totally get people not wanting to fall in line to something, but it just feels like having someone who can say 'no' and then everyone who's participating volunteer voluntarily just can accept that. There's a person who says 'no,' and it's not a bad thing. It's a good thing."

PIG Squad	9	“I have learned everything from PIG Squad. When I joined, I had made no games and didn't know how to approach it. But, you know, one of the members did a lot of tutorials that helped me to understand the process of making a game. Also, I found people who want to work with me. We've been able to make stuff together; they're - that's been so cool.” “We're very lucky I would say that would be my biggest take away from the PIG Squad community because, in Oregon, it's such a nice collaborative group of people who are actively willing to help each other and learn. And the fact that PIG Squad has so many platforms of getting people exposure and learning the skills that it's going to take to be successful. They have a talent talk coming up soon - just how to market how to make a pitch how to talk to people things like that… I'm born in LA and grew up in San Francisco, and those are completely cutthroat, and they will slice a bitch first. Besides this board, they wouldn't even think about helping you, so I'd say the PIG Squad is - I appreciate the collaborative. This isn't anywhere else, and that goes to the credit of the owners and the runners of PIG Squad. In the first place being a nonprofit, like they are - I feel like the fact that there's such a prominent station in the

indie games world in Portland, they're the ones who set the tone for how people treat each other."

"So, they provide a lot of good steppingstones. Entry-level stuff to get you comfortable with meeting new people and doing all the *networky* stuff and just getting involved in the games community industry and, like, a very opt-in, build yourself up."

"I found the speed meets to be to be fairly helpful. If people show up at these things with a sample of what they do or what they like, that would be very helpful."

"I did do the other game like the PIG squad thing that they had, and I think it's during the winter months I believe or early spring and it people bring their drawing, any type of games that you want they bring it and then you can try it out and stuff, and people get feedback, and that's really nice."

"I - just as much as I love what PIG Squad does for the video game industry, the indie video game industry, here in Portland I really do think that there could be a support system for people to do that for board games. So more curated meetups for people, I think."

"I think the value that PIG Squad has for the community is that it brings together all these like-minded people, and it's Portland, so if people show up with big egos, they at least

		you're willing to be called out on it but… that hasn't been a problem at all, which has been really a surprise in a good way."
Working independently together	11	"I've done remote collaborations locally, and I expect that an international collaboration would work similarly. Where it's sort of just we defined a task that we need to get done and I think it ends up - deviate rather than like creating a list of tasks, we sort of create areas of responsibility if that makes sense… Like, 'You build the chord game loop, and then I'll build this map, and then it's you just do all the stuff there that we staple together later,' rather than, 'Here's the list of individual tasks. Grab stuff.' That seems to be more how we do it because everyone's much more autonomous." "I was part of a collaborative Pico 8 project in December, and that was online and worldwide. We had a Discord server where people would share their code and talk through their problems, and being able to see other people's code is just invaluable - and just see how thirteen other people have solved this problem gives you a really good idea of what kind of, what the scope of possibilities is, so it's been really cool."
Benefits of collaboration	14	"I love getting to create something with other people that again provides an interesting experience for still other

people."

"I like the creativity. I'm a musician by trade, so I get a lot of time professional things go together musically and as an ensemble performer as well how pieces fit together with a lot of people. So, I think they're very similar things, and so board game design allows me to use my creativity for something that I like and enjoy just like music."

"I like how things work together and interact to create a sort of organism, and each game is sort of an organism that creates a community for that particular time."

"This is my first game now, and so far, so good. I think that we have differing opinions but not necessarily conflicting, so it's been pretty easy to work out."

"I've been really surprised how easy it is to come together with relative strangers and actually do something that feels really collaborative and productive. It's not like those group projects you had in school."

"I guess because we're a kind of big group - there's six of us, so we've been able to meet up about once a week, which is pretty good considering that bigger group on varying schedules. But I think I've been surprised how well our motivation and momentum has kept up."

Tools for collaboration	9	"We just have a group chat which has gotten very unwieldy, and we were actually just talking today about how are we going to - what tools everybody needs to get away from that. I think we'll probably use Slack and maybe Trello. We're also using Google Drive." "So that bad Slack is super useful or any other messaging system that you have. We're using Discord, and I want a job just making channels specifically for what you're trying to talk about. We trying to collaborate with - sometimes, you have meetings at really weird hours. Working with a team in Belarus for one of my projects, and yes, they have a lot of midnight meetings and kept checking in Scrums. I think you've probably heard that phrase, yeah. A lot of Scrums checking in a life. But it is doable, and it's not so bad. It's probably one of the only reasons why I'm able to continually work in Oregon because no one's here." "Slack is a wonderful thing. Email, Google Drive, GitHub. That's about it." "With folks in London, we use Trello and slack and Google Drive." "I'd say Slack for me, at least. Monday. Monday, Calm, other apps. JIRA, another program called Shotgun. Discord, social media, that's what a one yeah there's a bunch

		of ways physically. Facebook groups." "I can talk about the software collaboration, like GitHub. It's a great big helpful for - to help to help coders collaborate. I think that having Kanban boards and having tasks… you get to solve is fantastic."
Collaborating internationally	4	"Having a Discord server where we could keep everything in one place was really useful, and it's all in English because I don't - we don't have any languages in common otherwise. And at weird times of the day, but that's all fine, and I honestly was not expecting to have as much international interaction as I have, and it's been really neat.

Table 7

Interview answers about community

Subcategory	Responses	Sample Illustration of Response Items
All	48	
		"I think the biggest thing that has helped me now versus in the past just a community of people to interact with that care about that same thing, talk about that thing, will test my things. … PIG Squad is the first big thing that was a reason for me moving out here." "I have learned everything from pig squad." "Smaller gatherings like the pig squad events are really fun, but they're also 50 people and be great if there was 12 that relate to you." "Oh, PIG Squad. Ask people. Okay there's a - we have a Saturday afternoon group that meets, you know, if there's questions, I usually go to them." "I think the value of meetups like this, like PIG Squad, is that you do get people who are 'Oh yeah, I have a background in that. I'll totally show you what I know.'" "I'd say PIG Squad is the best one. I mean one of the best options they have their Drink 'n Draw. . . and literally anything they ever do. I am a hermit, so I don't like going outside, but I'm trying to actively be better."

Table 8

Interview answers relating to their own self-perception

Subcategory	Responses	Sample Illustration of Response Items
General	46	
		"I usually just say I'm an indie game developer."
		"I game."
		"I am not an artist."
		"So, also as a musician, I am a teacher."
		"I would say hobbyist board gamer turned designer."
		"I would say I am a designer who gravitates more towards the euro-style rather than American with a strong emphasis on worker placement."
		"I fool around making games. I play, and I play games a lot. I play a game every day - at least one."
		"A part of group of people developing a collaborative board game. I hesitate to call myself a game developer, but I guess that's what I am."
		"One of the things that I do - that I get paid to do is I edit video game scripts for a company based out of London. So, I often talk about being a narrative game script editor, and I think I bring that kind of narrative background."
		"I appreciate the freedom that comes with it, especially as an indie developer because I know it's not it's not like I'm going

to be a doctor or something."

"I would say that I am an illustrator, and I make assets for the broader pipeline, and making it a whole game lets it come together. I'm just a puzzle piece of the bigger picture, making something happen, and I provide art and animation to get it there with a team."

"I make games I make comics I enjoy making lots of things, and so there's lots of different sort of tasks within that that I greatly enjoy."

"I'm not making this my livelihood I feel like I'm in a pretty privileged position to just do whatever I want."

"The feeling of personal accomplishment you finally get something done, and it's ready to go."

"I would attempt to communicate how much personal investment I have in it, and how amazing it makes me feel, and hopefully they see some of that how my enthusiasm should give them an idea of how good this the outcome of this thing that I made once."

"I've really only been involved in game dev for a little over a year. I have a bit of impostor syndrome."

Table 9

Interview answers relating to remixing, experimenting and iterating.

Subcategory	Responses	Sample Illustration of Response Items
General	36	"Experimentation is the core - iterating through something and trying to figure out what works." "I think of a game mechanic, okay and then I see if I consider if I should put more thought into it I write down my ideas and then I would prototype it okay and then I would play it with other people okay improve and go back to the play with other people's stage." "I played games a lot as a child, and a lot of the games I turned towards were games that let you author your own content so map creators or RTS games with level designers like Minecraft." "I have an idea something, and I just kind of design over in it. Is it a good iterate of the iteration? I'm starting off with something simple and then build it in the in the new, trading off of that until you get to kind of somewhere you feel comfortable with it being done." "Experimentation is key…I find it really hard to just sort of really theorize about things I have to I'll make a conjecture or something and then test it." "No two ideas are the same, and even if they copy my work,

my work will be different eventually. And if they can improve upon my work, then I'm happier. I just want better games to be made."

"When I was trying to come up with new game mechanics, I basically just looked up articles on game mechanics things that other people have written okay I guess seeing what other people have done before and either improving upon it or coming up with something that isn't on that list."

"I threw my hat in the design ring. I would re-theme games. So, take games that are already fully done make them into you know about Steven Universe. You know, just take everything and make it fit into the box. In doing that, I learned a lot of production elements for that. Getting things shifted from China, all of the detailed lists or spreadsheets that I need to make in order to organize a hundred plus cards to be printed off or artwork for all those cards and produce things. So that's just over time I've gotten really good. I'm a project manager on that way for sure."

"Iteration, coming up with a bad solution, and then refining that bad solution to a better solution until it becomes a good solution."

"I know that I like very particular types of games, so I'm always trying to recreate a battlefield."

	“It's unique to board game design because technically speaking you cannot copyright a mechanic, so there are lots of games that are, ‘Oh, that's my hand, but someone put a you know another theme on top of it.’ They're able to resell my game, so it is a bit of a different space then say video game design.”
	“I like how things can be repurposed and re-skinned, you know just slightly changed or amended to make something very new very fresh.”
	“So, with my last board game which was a Smash Brothers inspired strategy game and that went through several iterations before I kind of settled on that style.

Table 10

Interview answers relating to self-expression

Subcategory	Responses	Sample Illustration of Response Items
General	63	"I definitely do want to get more into narrative expression than trying to I was saying before find a way to do more good than just making a fun thing." "One thing that I always enter into the game design space thinking is how was my personal experience shown in this game. People of color …barely making a splash in the video game world, it's definitely not being found in mass in deeper gaming, right, so I think that is a space for my experience to be shown." "My personal, I guess focus and life right is community building, so anything that sort of facilitates that is important to me, and games are an excellent way to have people engage with non-game rituals as the initiation." "I'm a high concept person, so generally I get an idea that I think is funny, okay. For example, I had an idea the other day of, what if there was a game where you played as 'the cool S?' You know, the S that people would draw notebooks in elementary school?... Okay, so S is the player character, and that made me laugh. So, then I was like, 'Okay, well, what kind of game is that?' It's funny. It's light-hearted. It's

		a game about meme propagation because that's what S is, and then it's a matter of, 'Okay, what can I realistically build?' What tools do I want to use? What kind of time do I have? Do I want to work with other people? And then it's all just implementation details." "You can express yourself . . . through a game where there's games where you know you have to be this alter. . . personality that you normally don't ever get to be." "I feel like I have something unique, and games allow me to show that to other people." "I really like the world-building process, yeah, what I think the games are an opportunity to reimagine a better world or a more interesting world." "I figured since I was never really interested in games, I just want to find a way to do whatever I wanted for a semester and just draw dogs. So, I made my game. . . You know the story got thirty thousand downloads, and I was after a whole semester of this finding out how fun the game world can be." "I personally really want to like make games that feel like reach a broader audience than sort of very hyper-masculine."
Experience Design	14	"Every time you see someone go, 'Aha!' while playing a game, it's pretty cool... .you feel a little clever when you're making the puzzles....that it's just like you're creating an

experience. . . trying to create emotions for the person playing your game and the puzzle game. I think, 'Aha!' sort of the emotion that instills... .I can come to creating something out of nothing, so that's pretty cool."

"So I have an interest in community building, and I also have a lot of interest in, for instance, bacteria in our internal communities, and so I think it's a cool way to express and bring to understanding how these things are related because I guess I should take you through an experience."

"I actually have a background in... liturgical design. I have programmed worship services, and yeah, it only recently occurred to me that oh yeah, this kind of thing is happening here; there is an experience you want people to have."

"I really enjoy where I can put it in front of people and kind of instantly react to how people are asking questions about the game and I can kind of tweak that system to kind of see you know what kinds of reactions I want the people to have the kinds of experiences that I want people to have finding what good ways to sort of guide the experience."

"You want to be able to put yourself in the players head and also see how the whole system fits together how the pieces fit into the whole and how it delivers the experience that you want to have."

	“I like that it's about making fun experiences for people to enjoy and connect with each other; it's about puzzles where the end result is happiness.”

Table 11

Selected quotes during game jam observation

Category	Participant quotes
What is the information behavior of women designers?	"What if we do something here's a house, and we have a house in the air. What if the player and the professor share a backyard? So, you have to make your way through the backyard."
How do participants choose teams? Why did you choose the way you did?	"Forced socialization." "Two of us came together and then found others." "We knew each other from the speed meet the week before." "We all just paired up." "I recognized one person and then just found the others." "We both came in independently and sat at opposite ends of the same table, but then we realize we were talking about the same idea, mainframes, and hacking, so we decided to get together and make the same game."
How do team members decide roles?	"Normally, I'm a programmer. I like rules, so I'm writing down all the rules for our game." "I know business, so any business or marketing I'll do." "I'm the only one here who knows how to draw, so I will do the art." "Everyone should do what they want to do." "I feel uncomfortable going to a jam and offering a skill I am not as good at, so I always offer sound design."

	"In this case, I knew [participant], so I knew she'd be comfortable with me doing some art this time." "Day job as producer, naturally took on role of scoping and project management. " "Project manager by day, was comfortable stepping back and letting someone else do." "This was totally organic."
How do team members select idea?	"Ok, here's my pitch" "We thought about what a heist is and started whiteboarding what the successful elements of a heist would be, and then we're trying work out what the game mechanics from that will be."
How is the game or prototype presented to the group?	"Volunteers" "We're still trying to decide."
What did you learn? What would you have done differently?	"Scope – too long adding mechanics. We'll still be building a game when it's time to present, and I don't know if it will be fun." "Are we almost done? Do you mean is the time is almost up?" "Our team was really organic. It felt easy. Everyone fell into a roll." "I don't know whether or not this will be fun." "Scope – didn't know how to make games at all. " "Yes, I'm super proud of my game. I think we're going to work

	on the mechanics after this."
	"I would have started with a smaller project. I think we were too busy adding mechanics too late in the game. I wish we had more time to play test."
	"We need to polish this more. "
	"I feel really proud of what we did."
	"I wish we would have better-understood game mechanics when we started. I wish we had more time to playtest."

Appendix A

Informed Consent

The School of Library and Information Management at Emporia State University supports the practice of protection for human subjects participating in research and related activities. This interview is part of a research study, and your participation is voluntary. You may choose not to participate or end your participation at any time without reproach.

The purpose of this study is to examine how women independent game designers find, use, and share information. Your participation will take an hour or longer, depending on how much you choose to share.

You will be asked a series of pre-written interview questions and may also be asked follow-up questions for more detail. If you do not wish to answer a question, you may choose to skip that question.

If you consent to participate, you will also be recorded so your answers may more accurately be reflected in the study. However, your identity and privacy will be protected. Personally, identifying information will be removed from the final research.

No injury is anticipated by participating in this study. Participants will receive a $5 Starbucks gift card.

Email outreach to potential participants:

Hello,

My name is Marziah Karch, and I am conducting research for my doctoral dissertation. I am researching how indie game designers, especially women, find, use, and share information. I would like to talk to you about your experiences in game design and the game design community. Do you have some time to sit down with me for an interview?

Social media outreach:

Hello – my name is Marziah Karch, and I'm conducting research for my doctoral dissertation. I'm researching how indie game designers, especially women, find, use, and share information. I'm looking

for a diverse group of game design community members of any gender and any skill level, whether you are just getting started or have been designing indie games for years. I'm hoping to sit down with you for about an hour (no more than two) for an interview. If you're willing to participate or know someone who may be, please reach out to me. Thank you!

Semi-structured interview questions

(Part A)

The following questions relate to game design

1. What made you become involved in game design?
2. What do you most like about game design?
3. What is your primary purpose in designing games?
4. Can you describe your game design process?
5. What skills do you think are important for game designers?
6. What skills do you lack, but wish you had?
7. What challenges do you face that you wish other people knew about?
8. What did you learn most from your experiences with PIG Squad or the game design community in general?
9. What resources do you lack, but wish you had?
10. What is the most rewarding part of working on games?
11. What is the most difficult part to develop and maintain games?
12. What do you think is different about the experience of designing games as a woman?
13. Did you have any issues concerning copyright, when you share your music, sound, or other assets with other game designers? If so, how would you handle the copyright

issue in the game design community?

14. Where did you learn all the skills, for example, programming, technical skills, or other production skills? Did you learn them at school, or are you self-taught?
15. How do you approach coding and programming tasks?
16. How do you approach tasks that are completely new to you?
17. Were you originally interested in creative projects using digital media or programming before you started creating games?
18. How does game design help you express yourself?
19. Have you encountered any conflicting information while working on a game design, such as a during a game jam? (e.g., different facts, contradictory opinions, arguments, or points of views)? I'd like to hear what it was and what you did.

(Part B)

The following questions relate to your social interactions

20. How would you describe what you do to someone outside the game community?
21. How would you describe what you do to someone inside the game community?
22. How do you work with other indie designers who live in different parts of the world?
23. How do you socialize with other game designers?
24. How do you communicate with each other?
25. How do you think being a woman in game design affects how you collaborate with others?
26. How do you think being a woman in game design affects how others perceive you?
27. What features or what aspects of game design most help you collaborate? What does not help? What would you wish for to facilitate more effective collaboration?

28. What would you like to improve concerning the game design community?
29. Where do you think the game design community should go in the future?
30. Have you encountered a situation you felt was only a problem because of your gender? I would like to hear any details you are comfortable offering and what you did.

Probing Question List: Sense-Making Methodology Questions

What happened?

What did you do?

What made you do it?

What made it difficult to complete the task(s)?

How were you helped or not helped?

How did you feel when you did it?

Is there anything you wished for that would have helped you?

Is there anything else you want to add?

Appendix B

Observation protocol

The School of Library and Information Management at Emporia State University supports the practice of protection for human subjects participating in research and related activities. You will be observed as part of a research study, and your participation is voluntary. You may choose not to participate or end your participation at any time without reproach.

The purpose of this study is to examine how women independent game designers find, use, and share information. Your participation will last for the duration of the game jam.

You will be observed and video recorded/photographed at times during the event. At times, you may be asked questions or to talk aloud as you complete tasks. If you do not wish to participate, wish to end participation, or wish to take a temporary break, please let me know. There is no consequence for withdrawing consent.

Your identity and privacy will be protected. Video recordings and photographs will only be used for data collection. Personally identifying information will be removed from the final research.

No injury is anticipated by participating in this study.

Descriptive notes	Reflective notes	Talk-throughs
General: What is the information behavior of game designers?		
What is the information behavior of women designers?		
How do participants choose teams?		Why did you choose the way you did?
How do team members decide roles?		Why did you choose the way you did? Did anyone choose a new role or decide to try something different?
How do team members select idea?		Why did you choose the way you did? If there was more than one idea presented, how did you select among them?
How do women behave differently than men?		

How is the game or prototype presented to the group		How did you choose a presenter?
		How do you feel about your game? How do you feel about your team? What did you learn? What would you have done differently?

Figure 1

Layout of setting for observation

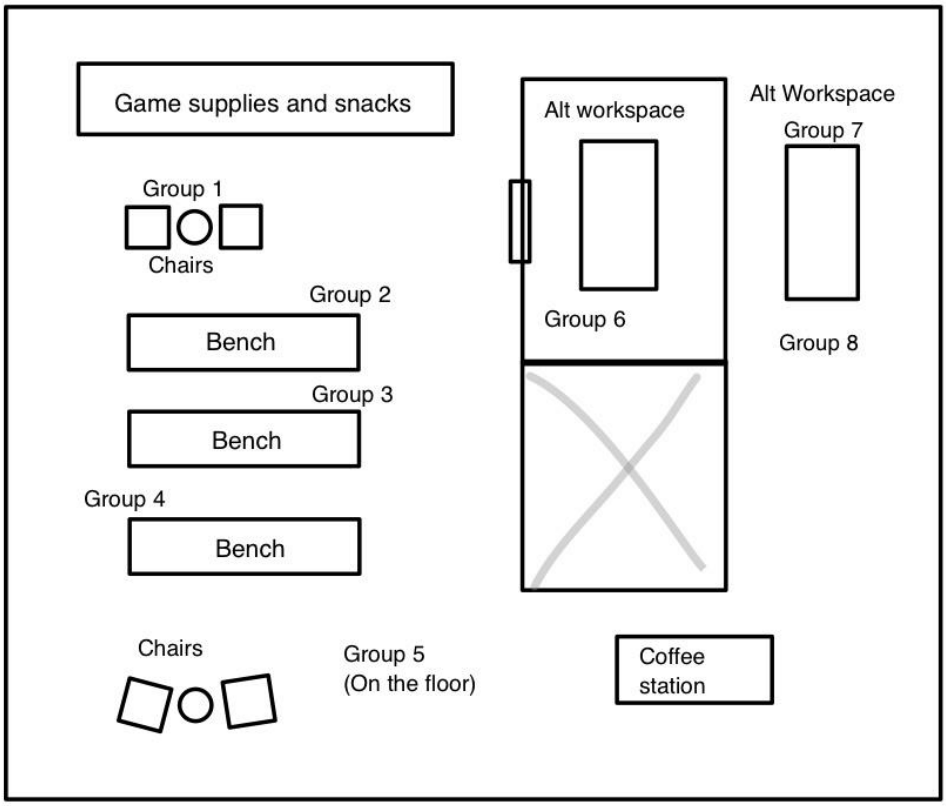


Figure 2

The activity flow observed during a game jam

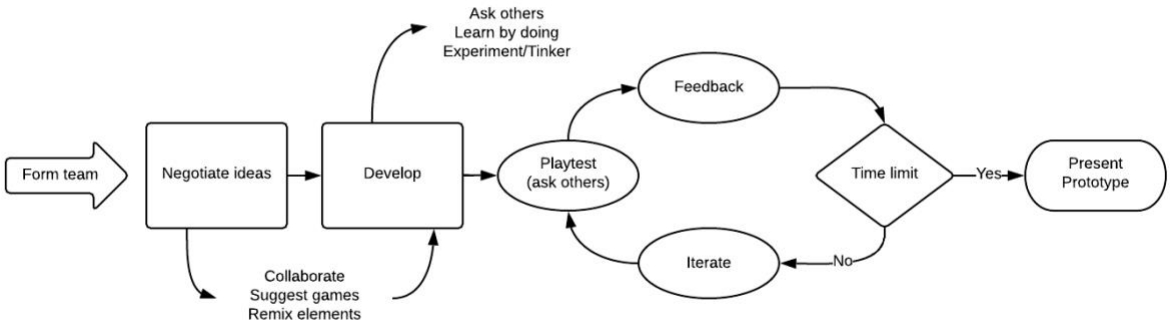
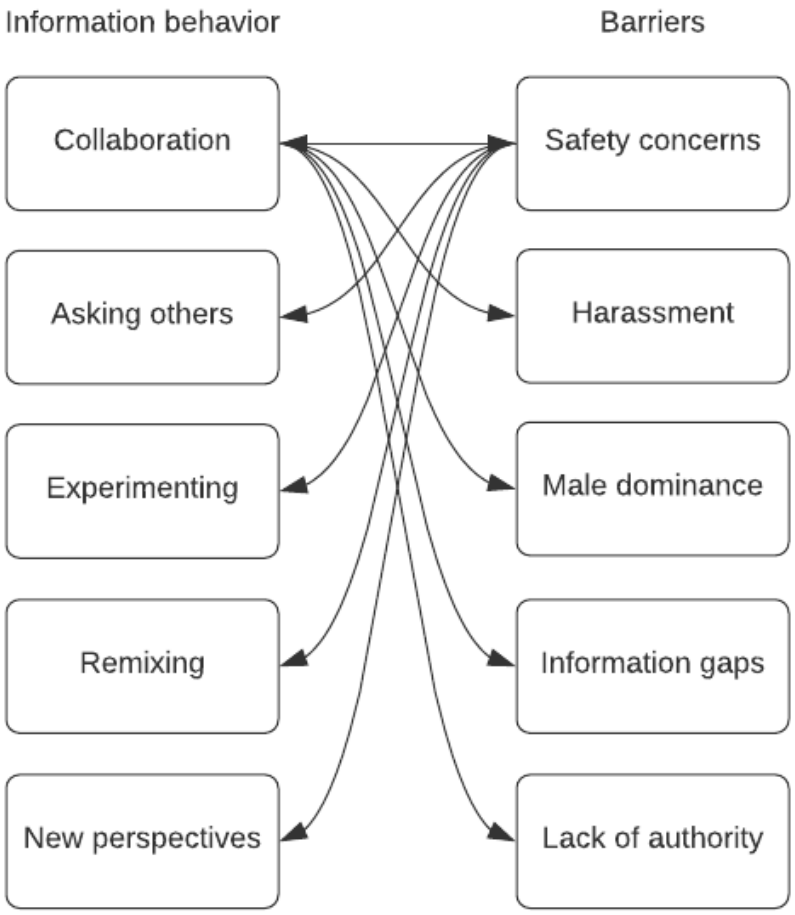


Figure 3

The information behavior and obstacles for women in game design



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7/10/2020
Date

Information Behavior of Adults in Independent Game Design
Title of Thesis