

Miami Six-O: Lessons Learned From an Intergenerational Game Design Workshop

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Abstract This chapter reports on the Miami Six-O project, a creative intergenerational workshop aimed at developing a meaningful play experience for and with older adults. During the project, 5 older adults and 4 undergraduate game design students participated in a 4-step creative process, which resulted in 6 playable paper prototypes. Their collaboration was observed by a team of 2 professors and 3 graduate assistants. The resulting notes and audio recordings were analyzed through open, selective and theoretical coding. The project found that it is possible to successfully co-create game designs that are meaningful for both the older adults and the students, though how these teams worked together influenced the outcomes. Furthermore, we discovered that shared popular culture references and design themes such as competition, creativity, diversion, and social connectedness were helpful in moving the creative process forward and overcoming generational differences.

Keywords Game design • Intergenerational • Older adults • College students • Creative methods

Digital games have become a popular pastime for many older adults (Entertainment Software Association [ESA] 2015), and this popularity will arguably increase when the first generation that played digital games during their formative years heads towards their retirement. Furthermore, digital game technology has been demonstrated to hold a wide range of benefits for older adults. For example, they have been used for cognitive training (Anguera et al. 2013), to facilitate intergenerational

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interaction (Khoo et al. 2008), and to support social engagement among Alzheimer's patients (Alm et al. 2009).

While the academic study of digital games in later life has been around since the 1980s (Weisman 1983), it has recently taken a significant growth spurt. For example, through a quick online search for articles on games, using Medline/PubMed, Web of Science, Google Scholar, and article reference lists in November 2014, De Schutter found that 3.6 times more papers were published after 2009 than during all the years before (De Schutter, *in press*). While many advances have been made over the past 35 years with regard to the study of the accessibility constraints and health outcomes of digital games for older adults, a number of key questions still remain.

One question is perhaps the extent to which the efforts into studying and designing games for older audiences have been successful. For example, Mosberg Iversen (2014) suggests that the underlying discourse in the field of games and aging is one that regularly identifies older adults as a problem to society. With the increasing longevity of older adults globally, this view of older adults as an inconvenience to society is troubling. Nevertheless, this perspective of remediating the problems associated with aging through the potential benefits of digital games does embody an inherently positive cause (i.e., to improve the cognitive, physical, or social health, as well as general well-being of older adults). Yet, it also carries the potential to drive the field into less than optimal waters. More specifically, it is reminiscent of a debate that has been held before, as the field of serious gaming and digital game-based learning (DGBL) has a history of tension regarding the balance between the inherent non-purposeful nature of digital games and the pressure to demonstrate extrinsic outcomes.

One commonly cited example of work that considers this research question is the research of Malone and Lepper (1987) that differentiates between endogenous and exogenous fantasies. The former term is used to denote games whose stories and themes are closely intertwined with their educational outcomes, while the latter term refers to games whose thematic aspects are disconnected to the learning goals of the game. Habgood (2007) and Habgood et al. (2005) provided an extension to and reframing of the work of Malone and Lepper, by balancing intrinsic and extrinsic elements across all aspects of the game, from its fantasy to its game mechanics, flow, and representations.

As the digital game-based learning and serious gaming community seem to prefer an equally weighted distribution of both the learning outcomes and entertainment goals, it could be argued that the same approach could be transferable to the games and aging community. For example, in their analysis of the motivational pull of digital games through a cost-benefit model, McLaughlin et al. (2012) conclude that it does not suffice to only reduce the cognitive and financial barriers that older adults have to overcome to play games. In addition to addressing these barriers, game designers should also increase the perceived benefits that older adults experience as a result of their gameplay experiences. Even a game that has perfect accessibility, usability, and playability will not appeal to older adults unless it offers a fun, valued, or meaningful experience.

In light of these recommendations, De Schutter and Vanden Abeele (2015) recently expanded on the work of McLaughlin et al. (2012) and provided a manifesto for game design aimed at older players. Because later life is a time of personal growth as well as decline, games for older adults should incorporate good gameplay qualities as well as appropriate usability. However, the authors also support the idea that designers and researchers should provide recommendations to effectively create a clear division between the two purposes of game play in later life (the inherent meaningfulness of play versus play for the purpose of a predetermined outcome), with the potential benefits of digital games for older adults. Furthermore, the manifesto argues that game design for older adults should always prioritize the inherent playfulness of a game first, so that it will not lose its inherent qualities and motivational pull.

“While serious games ... might be useful for certain afflictions that are associated with older age, we argue that an exclusive emphasis on the external purpose ... is detrimental to the very nature of play.” —De Schutter and Vanden Abeele (2015, p. 115).

In the spirit of bringing renewed attention to the interests and motivational pull of digital games to older adults, this chapter will share on the process and findings of “Miami Six-O,” a game design research project that was unencumbered by the restrictions of external funding or intended health outcomes for older adult gamers. Instead, it challenged a group of older adults to design a “meaningful play” experience for people between 50 and 70 years of age.

Design of the Workshop and Research Project

Meaningful play is a term that was coined by Salen and Zimmerman (2003) to describe the manifestation of successful game design, based on the relationship between the player and the game, and their actions and outcomes. While meaningful play is an appropriate concept to incorporate the inherent value of play into a design exercise, it also provided Miami Six-O with an additional goal as achieving meaningful play requires that a game reaches a perfect balance with the characteristics and intentions of its player:

“Players bring in a great deal of the outside world, their expectations, their likes and dislikes, social relationships and so on... In this sense, it is impossible to ignore the fact that games are open, a reflection of who play them” (Salen and Zimmerman 2003, p. 171).

For the Miami Six-O project, this meant that the project would start with the recruitment of a group of older adults who were interested in designing their own digital games and who would serve as the reflection of “the older player.” While it would be difficult to find local game developers for the project—industry reports indicate that only 1% of game developers is over the age of 50 (Edwards et al. 2014)—we decided to recruit for older adults who had an interest in digital games. The resulting group was then augmented with a team of undergraduate game design students (who had a demonstrable experience in creating digital games).

Correspondingly, the project set out to explore digital games as a creative medium for intergenerational collaboration and to address the following four research questions:

- What differences and commonalities exist between the older adult and college participants with regards to digital games?
- How do the college students and older adults collaborate and learn from each other during the creative process of the workshop?
- What kind of meaningful themes and game designs emerge from the workshop, and how do they appeal to both age groups?
- What kind of games would an intergenerational design team with no constraints design?

The project was arranged as a creative workshop in collaboration with the Institute for Learning in Retirement (ILR) at Miami University. The ILR's mission is to promote "opportunities for individuals 50 and older to enrich their lives as they explore areas within science, the arts, society, technology, literature, languages, business, economics, and other subjects of interest." This digital game workshop was advertised to members of the ILR through their newsletter that described a diverse array of brief 5-week, continuing education courses. The goal of the workshop, as communicated to the older adult participants, was to work together with college students to create a meaningful digital game design for older adults. The promotional text read:

Digital Game Design—Explore the world of digital games! In this hands-on course, you will learn about digital technology and collaborate with game design students from Miami to conceptualize and design a new game.

The five older adults who participated in this project were Caucasian men who lived in a small college town in a Midwestern state in the United States. Beyond these basic descriptors, the older adults were retired, highly educated, valued life-long learning, and had previously enjoyed successful professional careers. Four college-age digital game design students were invited to participate in this workshop to learn about the interests of older adults. The college students anticipated that older adults will become a large consumer market for digital games in the near future, and they agreed in advance to prioritize the wishes and creative ideas of the older adults during the game design process.

While similar player-centered design projects for older adults (e.g., Romero et al. 2010; Vanden Abeele and De Schutter 2010) typically have certain educational or health-oriented deliverables and intended outcomes, Miami Six-O had none of the constraints. As a result, our participants were able to come up with any design they liked, without any practical or creative limitations. While the participants were asked to create an experience that would be meaningful to 50+-year-old players, they were free to define for themselves what this would actually mean.

The workshop used a 4-step creative process that was spread across five sessions of 90 min (see Fig. 1). The process was a custom design for the workshop. However, it followed a setup that was similar to preexisting models. For example, its four stages are similar to the analysis, generation, evaluation, and implementation phases



Fig. 1 The creative process of the workshop

that are described in Howard, Culley, and Dekoninck’s (2008, p. 165) literature review of creative design processes. Throughout the five sessions, the intergenerational teams were guided through a structured process to generate ideas (weeks 1 and 2), develop concepts (week 3 and 4), translate these into game designs (weeks 3 and 4), and finally, create a playable prototype (week 5).

Phase 1: Ideas

The first phase was designed to analyze the problem statement and to come up with some initial game ideas. It was spread across the first two sessions. During the first session, the instructor introduced the research team and explained the setup and overall vision of the workshop to the participants. The participants had a discussion about the state of the art of digital games, and what digital games for older adults they already knew about. They were given the opportunity to discuss the role that games played in their lives, and what their goals for the workshops were. The participants were also given the opportunity to play a few indie games, and they were introduced to web sites that curate contemporary digital games (such as Gamejolt.com and Kill Screen).

At the start of the second session, the participants were reintroduced to the challenge of the workshop, i.e., “*to become the author of a game.*” The term “author” was used to introduce the idea that games are a creative medium that can be used for meaningful self-expression. Next, the participants were given a brief primer on how creativity works (i.e., there are no “bad” ideas, adopt a playful attitude, fail fast and fail often, take breaks when you need them). The primer also provided them with a social contract as it emphasized that the session should be a positive and pleasant experience for everyone involved. Next, the participants performed a free associa-

tion exercise aimed at priming their minds for a creative assignment. After going through a number of free associations, the participants were asked to come up with a number of meaningful topics, and to write them on blank playing cards. This assignment was done individually, and after each participant had created some “idea cards,” the entire group was shown a slide that contained a list of inspirational words, such as passions, people, places, events, stories, careers, accomplishments, change, love, perspectives, views, and family. They were also reminded that games are often characterized by procedures, resources, rules, conflicts, skills, and objectives, and that it would be easier to make games that would relate to these concepts. Once every participant was satisfied with the amount of idea cards that they had made, they were collected and shuffled.

Phase 2: Concepts

The next phase aimed to use ideas to come up with a number of game concepts. In this context, a concept is defined as a brief description for a game. For example, a concept could be as short as the following: *“A trivia game in which grandparents and grandchildren learn about each other’s culture by asking each other questions.”*

During the third session, intergenerational groups consisting of at least one college student and one older adult received an array of random idea cards per group. Each intergenerational team was asked to order the cards in clusters that made sense and to make personal notes about the ideas that they liked. The participants then summarized each cluster onto a blank playing card and were asked to reflect on whether or not there was a game in the ideas in front of them. Next, they moved around the table to the clusters that were organized by a different group. The participants were allowed to make a copy of a “summary card” and take it with them to the next table if they wanted to do so. Next, they were invited to rearrange the concepts (that originally came from a different team) and/or to combine them with their summary cards to further expand upon their own digital game design concepts.

Phase 3: Designs

In this phase, the goal was to provide more depth to the concepts by coming up with a more detailed overview for a game. For the trivia game example above, this could mean that a participant would start to think about high-level details such as the presentation of the trivia game, its structure and fantasy, the kind of questions or challenges it would present to the player, etc.

During the third and fourth session, the teams were tasked with creating an illustrative poster that outlined their favorite game concepts using large flipchart post-it

sheets. Every team had the flexibility to either determine which ideas or concepts would be carried forward from earlier sessions, or to run with a new idea. Once the posters were done, the teams finalized and presented their game designs to the group.

Phase 4: Prototype

The final phase asks the participants to create a paper prototype for their game design. In other words, they have to try to create a playful experience that delivers the gameplay that their digital game aims to facilitate, without actually programming it.

During the fourth and final session, the participants moved to this part of the exercise and created a paper prototype of their concept. Before working on the prototypes, they were provided a brief primer on how to create a paper prototype for a digital game, and shown paper prototypes of well-known commercial digital games including as Tony Hawk's Pro Skater 2 (2000), Asteroids (1979), and Spore (2008). Finally, the prototypes were shown and discussed, after which a focus group session was held.

The project was analyzed by a research team consisting of 2 professors and 3 graduate assistants. Data was collected by means of participatory observation (Delamont 2004) and was subsequently analyzed using open, selective, and finally theoretical coding (Charmaz 2006). The workshop was led by a moderator (i.e., one of the professors) who had previous experience with organizing similar workshops. While the moderator introduced the assignments, answered questions and provided game design guidelines, he did not engage into any discussions between the members of each intergenerational design team.

Findings

In this section, we will share our observations and interpretations regarding the 5-week workshop focused on designing digital games. First, we will discuss some of the differences and commonalities in gaming experience and expectations for the workshop between these two age groups. Next, we will consider the interpersonal aspects of our design workshop and describe the diversity between intergenerational game design teams as they sought to work together through the process to eventually create a prototype. While strong collaborations were observed, some groups struggled to manage creative decision-making authority and function as a team. Lastly, we will present the promising design concepts that emerged from the workshop.

Commonalities and Differences Between Older Adults and College Students

During the first session, we recognized that the older adults and the college students shared a strong interest in playing games in a variety of forms and expressed joy in the creative process. The idea of engaging in the process of creating new games or modifying the rules of existing games added more excitement and entertainment value to the project. All of the college students expressed that they enjoyed designing and developing digital games. At the beginning of the first session, they were briefly given the opportunity to share the kind of games that they had made in the past and what kind of games they liked to make. More specifically, one student specialized in interactive novels (using the Ren'Py engine), one specialized in critical games (using the Game Maker Studio engine) and the final two students were most experienced with making 3D exploration games (using Unity3D).

It is also important to note that two of the older adults had already designed their own digital games, as well, for themselves and their young grandchildren. In the large group, particularly among those who did not have the experience of designing digital games, many of the older adults reminisced about games from their childhood and the fun they had as a kid playing a game with a friend or sibling. One of the older adults shared:

I've never been a big gamer, but for some reason it, it reminded me of an incident as a kid. I was probably 8 or 10 and my brother's 3 years older than me.... We used to play Clue, but got bored with the game so we made a second story to it. And we'd build out our own room, actually a lowered floor, because we had a dungeon and new murder weapons from robots, and stuff like that. So, it was kind of fun to create a game. I really loved that.

Despite the shared interest that brought older adults and college students together to participate in this workshop, we also found differences in the level of experience with digital games and beliefs about computers and gaming. The different generations had varied interests, and different options about the purpose of digital games (for entertainment, learning something new about yourself, social interactions, or improving health). Older adults explained that digital games were fun, but viewed them (at least partially) as a waste of time. Their enjoyment of digital games stemmed from gaming as a form of competition that may keep your brain young. However, they occasionally seemed to struggle with the complexity of the software or equipment. In contrast, the college students saw games as a creative medium for self-expression and strived for complex story lines and character development. Over the course of the workshop, more of the older adults embraced the story-driven, experiential concepts. In fact, some of the final designs were intricately tied to their former professional careers.

Finally, the older adults and college students came to the workshop with different expectations. College students were accustomed to creating digital games in a short period of time. From their previous experience and familiarity with coding, they were confident that the workshop should be able to produce a digital game within the 5-week timeframe. On the other hand, the older adults were concerned that the

workshop was making too many demands on college students that may interfere with their classes and other commitments. Still, at least one of the college students insisted that he would create a digital game within the timeframe. The college students approached this co-design process with curiosity, openness, and a desire to share digital games with others. At the same time, some of the older adults were concerned about protecting their “intellectual property” if a multi-million dollar digital game was produced within the workshop. Nonetheless, the older adults were very eager to participate and brought a lot of questions about games to the workshop. In particular, they asked for more information about game addiction, programming languages, costs of buying and creating games, and what it actually means for something to be a game.

Building Collaborative Intergenerational Teams

Among our intergenerational teams comprise at least one older adult and at least one college student, group dynamics differed. In each team, we analyzed communication patterns to gain more information about the process of intergenerational game design. The core category of analysis was how the balance of power was negotiated in every group to eventually arrive at the final game prototype. We analyzed the interactions qualitatively and noted when an older adult or student either dominated the group’s creative process, followed the group, disconnected from the group, or remained actively engaged in collaboration. We considered collaboration as the ideal scenario, when both the older adult and the student created a high functioning team, mutually supporting one another to achieve the group’s outcome of a digital game.

In approximately half of our groups, the conversations were dominated by either the older adult or the college student. The other half of our groups displayed a collaborative approach in which there was no dominant participant. One of the teams struggled to collaborate (due to creative differences and an uneven understanding of the medium), and eventually they agreed to pursue each individual’s design independently. Over the course of the workshop, there were times when both generations were involved in dominating the creative process, as well as following the others in the group. While some of older adults would disconnect if the student’s input became too large, none of our college students ever disconnected from the game design process. It is possible that college students were less likely to disconnect because they were motivated to participate in the workshop to learn more about the perspective and interests of older adults. Surprisingly, the college students at times showed more respect to an older adult they disagreed with creatively than the older adult showed to the college student.

During the course of the workshop, a creative strategy that seemed to work for both parties was to “explore the familiar.” By discussing references from well-known popular culture, both generations seemed to be able to understand each other better. For example, the participants used Rube Goldberg machines (art installation), Avalon games (board games), Angry Birds (video game), War Games (movie), Avatar (movie),

I Am Legend (book), Groundhog Day (movie), MacGuyver (television show), and Life (board game) to describe and illustrate their ideas to each other. The students also used YouTube gameplay clips from Limbo, Don't Shit Your Pants, McPixel, and Passage to help illustrate their ideas when the older adults were unfamiliar with them.

Meaningful Digital Game Themes

A number of meaningful themes emerged from the workshop. In the transcripts of the first and second session, we found seven common themes: competition, personal growth, diversion, nostalgia, creativity, and social connectedness. Among these themes, nostalgia and creativity were the most consistent. The digital game prototypes that were created encompassed problem-solving, social interaction, and learning as core mechanics. In many cases, the meaningfulness of these games for older adults was closely tied to their family relationships and professional skills and accomplishments. After reviewing the final prototypes, it is clear that the initial view of digital games for competitive purposes only changed significantly over the workshop to tie digital games to more personal experiences and storylines.

In general, the themes that resulted from the workshop appealed to both audiences. Competition, creativity, diversion, and social connectedness have been common aesthetic outcomes for digital games, regardless of the age of the player. The nostalgic stories of the older adults seemed to provide a rich source of inspiration to the college students. Personal growth was typically framed within the context of money management and career planning, a theme that the older adults were experienced about and the college students were interested in.

The Games

At the end of the workshop, the ideas and concepts were turned into playable but non-digital paper prototypes. Three categories could be identified among the prototypes, (i.e., problem-solving games, relationship games, and learning games).

Two of the groups placed the player in the position of decision-making in complex situations. The first game, "Escape the Room," challenged the player to find different paths to escape a room filled with booby traps and dangerous contraptions. Winning the game requires multiple attempts to use different strategies to evacuate and survive (Fig. 2). In the second game, "Facing Fears," players enter a world of fantasy where they are placed in high stress situations. Eventually, the player has to learn how to trust him or herself in order to adapt and survive.

Two games drew their ideas from social relationships within families or romantic relationships. As the only prototype developed specifically with an older adult role, "Dreamtime" is a two-player game that involves a grandparent and a young grandchild being transported into a fantasy world to play games together while they are asleep (Fig. 3). In this intergenerational game, the grandparent and the grandchild

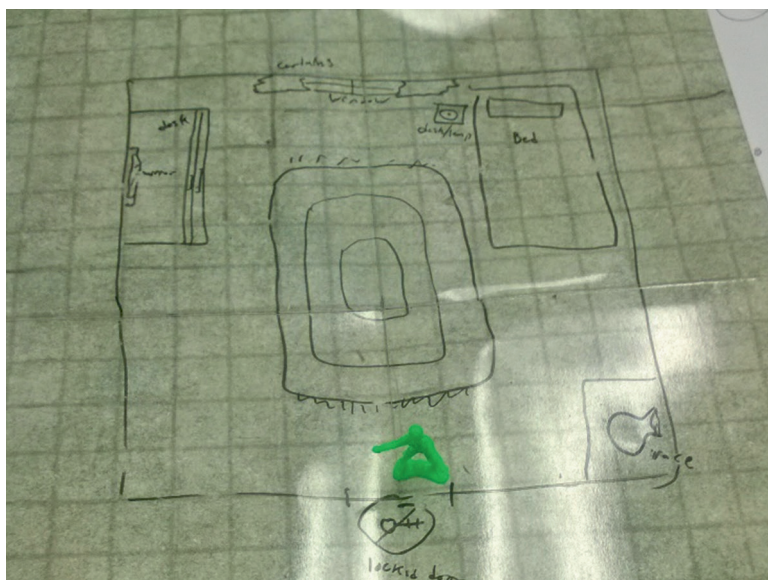


Fig. 2 Prototype for “Escape the Room”

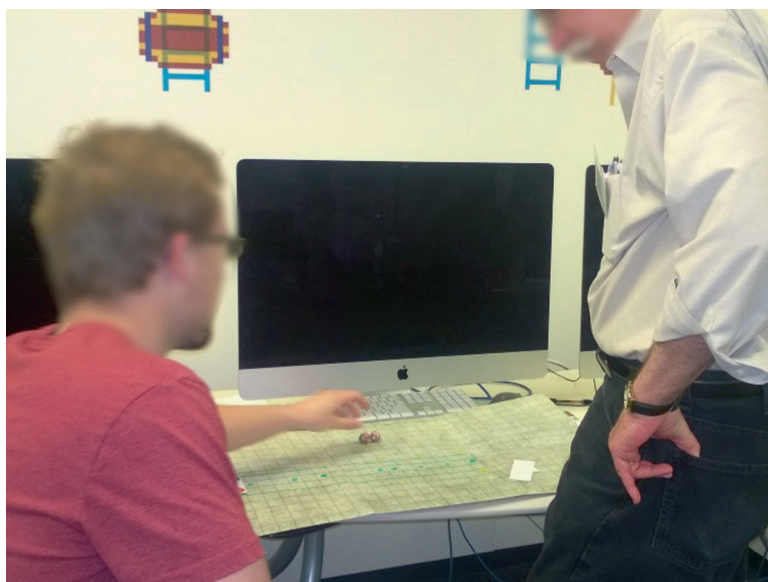


Fig. 3 Working on the Dreamtime prototype

each have their own strengths and abilities but work collaboratively to complete tasks and advance through the game’s challenges. Elements of dating were also included in a different group’s prototype, “The Dating Assassin,” where the critical issue is trust in a dating relationship. In this game, the player’s goal is to attempt to date the unsuspecting victim and get close enough to him or her to complete the

assassination. “The Dating Assassin” was one of the two games in which the collaboration between the college student and older adult stopped at some point and each worked on their own game in a more independent manner. In the case of this game, it was the college student’s idea and the older adult disconnected.

The last two game prototypes were intended to teach players about the rewards of strategic choices and apply historical knowledge to solve problems. In “The Game of Life,” players can make different life decisions (e.g., go to college, select a major, get married) and the players learn about the consequences of those decisions to try out different options. This game, in particular, has a strong connection with the older adult’s former profession. While the game is not overtly intergenerational, it does communicate the process of imparting wisdom to younger generations. The group saw the game as a teaching tool to help younger people better shape their destiny by making better choices early in life that lead to a desirable outcome. In the last game, “Battlefield Simulator,” the group re-creates historical battles in wars to teach players what happened and rewards players as they figure out new and creative approaches to winning battles. “Battlefield Simulator” was the second game in which the collaboration between the college student and older adults was not ideal. In this case, the older adult dominated the creative process. The game idea, derived from the older adult’s interest in military games, clashed with the college students’ interest. Although the college student was hoping for a more complex, innovative approach, he did not fully disengage from the process (Fig. 4).

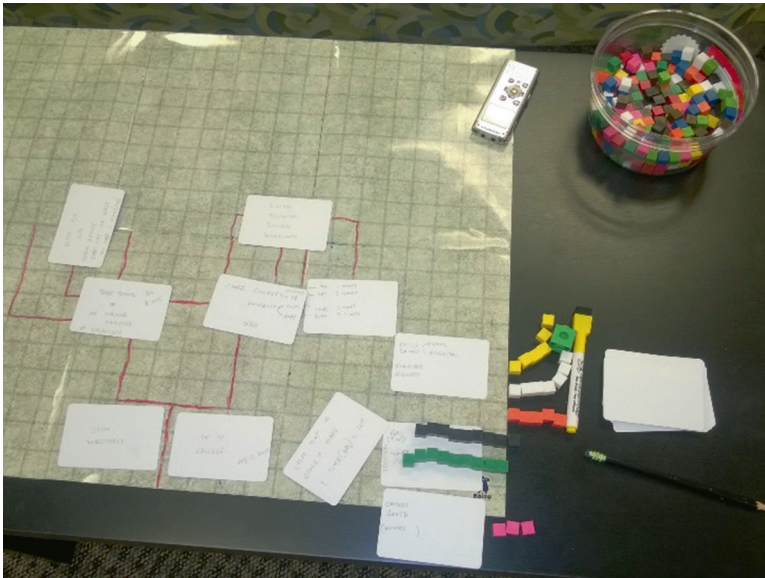


Fig. 4 Prototype for the Game of Life

Discussion

In our intergenerational game design workshop, participants embarked on a creative journey of game design that would ultimately lead to a meaningful play (Salen and Zimmerman 2003) experience for older adults. However, the largest constraint for the project was fitting everything within the limited timeframe of five sessions of 90 min each. While we managed to finish everything that we prepared for, it should be noted that the prototypes were in a very early state.

Going forward, we recommend this game design workshop for a diverse array of participants to gain a better understanding of the range of meaningfulness in game design concepts to the individual gamer. The findings reported here are limited by our voluntary sample of older adults who were exclusively well-educated men and younger male college students. We speculate that when women participate in this workshop (either older adults or college students), additional game design ideas will emerge. While the ILR and the games program at Miami University have an equal mix of genders, female participants were not motivated to sign up for it, and this has more than likely added bias to the team dynamics. Future work should attempt to evaluate to what extent a workshop such as this leads to different outcomes when the design teams demonstrate greater diversity.

Considering the concepts, it should be noted that only “Dreamtime” was a truly intergenerational game, in the sense that it included a strong intergenerational collaboration. Furthermore, this concept included meaningful roles for players belonging to an older and a younger generation. This is consistent with the findings of McLaughlin and colleagues (2012), which found that video games provide a mechanism for social interaction between older and young players, by allowing players of varying abilities to play together through different levels of play and by testing each player according to their skill level. While “Escape the Room,” “Facing Fears,” and “The Game of Life” were not intergenerational in the same sense that Dreamtime was, they could be defined as semi-intergenerational in the sense that their themes and mechanics appealed to both the older adults and college student. Finally, the “Dating Assassin” and “Battlefield Simulator” games were created primarily by one team member while the other sat by and observed or even chatted with other groups while their own partner continued working alone. In this regard, some of the game designs did not emerge through the intended highly collaborative group effort, and certain games appealed more to certain age groups, with the dating game specifically being more relevant to college students.

This project lead to a number of games that were meaningful to their authors. Correspondingly, the results of the workshop fit well within the current emergence of “personal” games. As the costs to develop games have decreased, highly personal games such as the ones on display at the Different Games Conference, Gamejolt.com, or IndieCade have become more and more prevalent. Thus, we believe that the games designed in this workshop have more in common with independently published games than with mainstream games.

Finally, it is interesting to note that we found the games from this workshop to be very different from the typical outcomes of design research projects that aim to market games for older adults for the goal of improving physique or cognitive health. Even though the older adults initially indicated that they are interested in games that would provide certain benefits, the resulting concepts have no ties to brain training or fitness games. In fact, the only game that would come close to having demonstrable benefits (i.e., “The Game of Life”) deals with smart life choices, wisdom, and crystallized skills, as opposed to training fluid skills or improving physical health.

Correspondingly, we would argue that results fit some of the theoretical points that were made at the beginning of this chapter. All four concepts that were developed in intergenerational unison could potentially lead to positive intellectual and health outcomes. For example, “Dreamtime” could foster social interaction, “Escape the Room” and “The Game of Life” could train crystallized intelligence and problem-solving skills, and “Facing Fears” could become a form of anxiety training or stress management. Nonetheless, they all demonstrate a sense of integrated game design (Habgood 2007), and their content has no direct connections to age-related stereotypes. In this regard, the project outcomes seem to fit within the design manifesto by De Schutter and Vanden Abeele (2015) that argues that digital games for older adults should emphasize personal growth over usefulness or age-related decline.

While this chapter does not attempt to provide empirical evidence for such claims, as both the challenge to create a meaningful game and the input of the college students certainly had some influence on the outcomes of the project, it does demonstrate that older adults can have great fun in designing meaningful games when provided with a creative setting to do so.

References

- Alm N, Astell A, Gowans G, Dye R, Ellis M, Vaughan P, Riley P (2009) Engaging multimedia leisure for people with dementia. *Gerontechnology* 8(4):236–246. doi:10.4017/gt.2009.08.04.006.00
- Anguera JA, Boccanfuso J, Rintoul JL, Al-Hashimi O, Faraji F, Janowich J et al (2013) Video game training enhances cognitive control in older adults. *Nature* 501(7465):97–101. doi:10.1038/nature12486
- Charmaz K (2014) *Constructing grounded theory*. Sage
- De Schutter B, Vanden Abeele V (2015) Towards a gerontoludic manifesto. *Anthropol Aging* 36(2):112–120
- De Schutter B (in press) Gerontoludic Design: Extending the MDA Framework to Facilitate Meaningful Play for Older Adults. *International Journal of Games and Computer-Mediated Simulations*
- Delamont S (2004) Ethnography and participant observation. In: Seale C, Gobo G, Gubrium J, Silverman D (eds) *Qualitative research practice*. Sage, London, pp 217–229

- Edwards K, Weststar J, Meloni W, Pearce C, Legault M-J (2014) Results from the IGDA's game developers satisfaction survey. IGDA. http://c.ymcdn.com/sites/www.igda.org/resource/collection/9215B88F-2AA3-4471-B44D-B5D58FF25DC7/igda_surveyresults2014_v7.pdf.
- ESA (2015) 2015 Essential facts about the computer and video game industry. ESA. <http://www.theesa.com/wp-content/uploads/2015/04/ESA-Essential-Facts-2015.pdf>.
- Habgood MPJ (2007, January 1). The effective integration of digital games and learning content (Thesis). <http://etheses.nottingham.ac.uk/archive/00000385/>.
- Habgood MPJ, Ainsworth SE, Benford S (2005) Endogenous fantasy and learning in digital games. *Simul Gaming* 36(4):483–498
- Howard TJ, Culley SJ, Dekoninck E (2008) Describing the creative design process by the integration of engineering design and cognitive psychology literature. *Des Stud* 29(2):160–180. doi:10.1016/j.destud.2008.01.001
- Khoo ET, Cheok AD, Nguyen THD, Pan Z (2008) Age invaders: social and physical intergenerational mixed reality family entertainment. *Virtual Real* 12(1):3–16
- Malone TW, Lepper MR (1987) Making learning fun: a taxonomy of intrinsic motivations for learning. *Aptitude Learn Instruct* 3:223–253
- McLaughlin AC, Gandy M, Allaire J, Whitlock L (2012) Putting fun into video games for older adults. *Ergon Des* 20(2):13–22. doi:10.1177/1064804611435654
- Mosberg Iversen S (2014) Play and productivity: the constitution of ageing adults in research on digital games. *Games Cult* 11(1–2):7–27. doi:10.1177/1555412014557541
- Romero N, Sturm J, Bekker T, de Valk L, Kruitwagen S (2010) Playful persuasion to support older adults' social and physical activities. *Interact Comput* 22(6):485–495. doi:10.1016/j.intcom.2010.08.006
- Salen K, Zimmerman E (2003) *Rules of play: game design fundamentals*. MIT Press, Cambridge
- Vanden Abeele V, De Schutter B (2010) Designing intergenerational play via enactive interaction, competition and acceleration. *Pers Ubiquit Comput* 14(5):425–433. doi:10.1007/s00779-009-0262-3
- Weisman S (1983) Computer games for the frail elderly. *Gerontologist* 23(4):361–363

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