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Utilizing Game-Based Learning to Promote Mental Health Advocacy in Black and Brown Communities

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Cover Page Footnote

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Utilizing Game-Based Learning to Promote Mental Health Advocacy in Black and Brown Communities

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Abstract

The aim of this project was to explore the effectiveness of video games and game-based learning as a means of mental health advocacy within POC communities. Research has shown that within black and brown communities there is a heightened stigma attached to the discussion of mental health, often preventing those who are affected from seeking treatment. This unwillingness to accept and care for mental illness within communities of color is highly detrimental, especially in the context of conditions such as Alzheimer's dementia, as African Americans and Hispanics are at a significantly higher risk of developing these conditions. Despite higher risks they face lower rates of diagnosis and a general lack of understanding of the effects of dementia and how to provide proper care can place strain on those providing care to afflicted family members. Using the concept of game-based learning, I wanted to inform audiences, particularly POC, of the ways dementia affects their community by creating a 2D demo meant to tackle the subject in an engaging and informative way. As part of the project, the demo was paired with an accompanying website and a survey that was issued to players following their completion of the game. Responses from the survey revealed that many found the chosen medium to be an effective means of relaying the struggles of mental illness and allowed them to gain a deeper understanding of the subject presented.

Keywords: Video games, game-based learning, dementia, communities of color, mental health

Introduction

Dementia is a general term that covers a wide range of specific medical conditions, including Alzheimer's disease. It is characterized by a collection of symptoms and signs manifested by difficulties with language and memory and impairment of daily living activities due to psychological and psychiatric changes (Burns and Iliffe, 2009). Disorders grouped under the general term "dementia" are caused by abnormal brain changes. These changes trigger a decline in thinking skills, also known as cognitive abilities, severe enough to impair daily life and independent function while also affecting behavior, feelings and relationships (Burns and Iliffe, 2009).

Alzheimer's disease and vascular dementia are two of the most common forms of dementia and are serious chronic mental illnesses affecting older adults. Research that considered the cross-cultural effects of dementia has shown that both vascular dementia and Alzheimer's disease are more prevalent in African-Americans within the U.S than other ethnic minority groups (Dilworth-Anderson and Gibson, 1999; Watari and Gatz, 2002). This has been speculated to be due to increased exposure to risk factors in African-American communities, such as higher rates of stroke, hypertension, and diabetes, as well as a host of institutional origins such as restricted educational opportunities, socioeconomic deprivation, and underdiagnosis of the aforementioned health conditions (Dilworth-Anderson and Gibson, 1999).

These same socioeconomic factors are speculated to be a large factor in the higher risk of dementia in Hispanic communities as well, where their levels of vascular and cerebrovascular dementia are also higher than those of white populations (Dilworth-Anderson and Gibson, 1999). Ultimately, African-Americans are approximately twice as likely than whites to have Alzheimer's disease, while Hispanics were 1.5 times more likely (Lines and Wiener, 2014) and the same communities which face higher risks also face underdiagnosis of Alzheimer's and other forms of dementia, stifling the ability to receive care that relies on early intervention. Data analyzed from the National Alzheimer's Coordinating revealed that African Americans faced lower rates of diagnosis while also facing greater cognitive impairment from Alzheimer's (Lennon et al., 2021). Positive family histories can increase the risk of Alzheimer's disease from two to four times (Watari and Gatz, 2002), while dementia's prevalence in the U.S has also been alarmingly projected to quadruple in the next fifty years (Dilworth-Anderson and Gibson, 1999). This heightens the stakes faced by POC with pre-established increased risks of Alzheimer's and other forms of dementia, making the need for intervention and education on the topic all the more pressing.

Studies have found that African-American and Hispanic communities are among the ethnic groups who provide the majority of care to older relatives with dementing illness. In both groups, cultural values, nuances, and beliefs such as family centrality, interdependence, the sharing of resources between households, and religion determine what care elders within these families receive. This leads to older dependent relatives often being cared for by family first, where several family members can help provide care under one shared roof (Dilworth-Anderson and Gibson, 1999).

However, research has also shown that proper dementia care can be stifled by other aspects of the same cultural values and beliefs surrounding illness in minority communities, as these ideals shape the meanings they assign to illnesses, such as dementia, and can be influential as to how or if these families choose to seek help (Dilworth-Anderson and Gibson, 1999). Black and brown communities stigmatize mental health and conversations around it and examinations conducted over 2787 abstracts, 29 studies and 193,418 participants found that racial minorities showed considerably more stigma towards mental disorders than racial majorities (Eylem et al., 2020).

A substantial issue arises when considering that these groups experience higher risks of dementia and are often the primary caretakers of the afflicted but are also reluctant to have conversations regarding mental care. This unwillingness to discuss what ails them contributes to mishandling of mental illnesses within POC families, which could be particularly harmful for conditions such as dementia considering the severity of its effects and complexity of its care needs. This convergence of detrimental factors leads to undue stress and tension within households.

Prior to her passing, my great aunt lived with my family for a few years, during which her behaviors changed, and her mental health and physical abilities greatly declined as she began to show clear signs of dementia. However, the aforementioned taboo atmosphere surrounding discussions of mental illness made it very difficult for my parents to accept a dementia diagnosis despite how prevalent her symptoms had become. I watched firsthand as her personality, behaviors, and physical abilities shifted, and became intimately acquainted with the amount of emotional strain such an illness places on family members as tensions became high in the house and multiple relationships were strained by the intense care needs my aunt developed with every passing day. This experience served as the primary inspiration for my project.

When determining how I wanted to deliver this information to a larger audience, I began looking into game-based learning. Researchers have explored the viability of

digital games as a teaching tool and their results have revealed that these games have the potential to transform educational practices, as the medium offers a more immersive and dynamic experience, actively involving participants in the problem-solving process (Shapiro and Squire, 2011). Not only do games appear to be a viable means of teaching, but their implication within educational environments has been shown to improve learning across multiple age groups and concepts. Concepts expressed can be as simple as reading comprehension for younger audiences or as complex as information technology certification for post-graduates (Shapiro and Squire, 2011). This diversity in range assured me that game-based learning could be a useful tool for mental health advocacy in POC communities across demographics so that they may become more aware of the development of these symptoms in themselves, their parents, or in other relatives.

Using this information in conjunction with my interests in game development, I chose to explore video games as a means of promoting dementia awareness with the goal of allowing players to gain a more intimate understanding of the struggles associated with Alzheimer's and other forms of dementia by emulating them through gameplay. Using my research as a basis, I created a short 2D game demo with mechanics and interactions that highlight symptoms and struggles faced by those with dementia such as mental confusion, memory loss, difficulty understanding language, irritability, disorientation, loneliness, paranoia, hallucinations, etc.

Methodology

Project Development

When setting out to construct this project I started by combining my research with my knowledge of game design. There are generally 7 stages involved in the game development process referred to as: planning, pre-production, production, testing, pre-launch, launch and post-launch phases. The planning stage proved to be the most important as, when combining it with my research, it would serve as the foundation of my demo. During the planning phase I asked myself a myriad of questions such as what platform the demo would be on? What genre am I going for? Should it be implemented in 2D or 3D? When and where does it take place? Who are the characters? What key aspects do I need to implement? What platform would I use to construct it as someone who doesn't code? Extensive brainstorming resulted in a lengthy document which answered these questions while also serving as an outline for the game's major designs, mechanics, and plot points.

Research on game-based learning has found that role-playing games (RPG) and puzzle games were most frequently used for skill and knowledge acquisition (Jabbar and Felicia, 2015). Ultimately, I decided to create a 2D point and click adventure/puzzle game which drew inspiration from horror games with dark atmospheres, puzzles, and themes of mental health such as *Fran Bow*, *Little Misfortune*, and *Neverending Nightmares*, as I felt this genre best reflected the heavy feelings and experiences I sought to convey to players.

The demo follows the unnamed player character as she wanders the house aimlessly at night in search of a sister who's recent passing she has forgotten. As she struggles with the effects of her dementia, the player is instructed to solve puzzles and collect a series of notes that would provide them information on dementia, its symptoms, early signs, and the ways it affects minority communities. The gameplay portion of the outline was broken into 3 acts. Each act outline contained a detailed description of what rooms would be explored, what puzzles there would be, how the player was meant to solve them, a list of assets I would need to create, what notes were hidden in each room, and what interactions and dementia symptoms I wanted to show in each area. Due to my constrictions as an artist rather than a coder, the first 2 acts were the only ones to be implemented within the demo.

I planned to incorporate many of the effects of dementia such as the difficulties with discerning one's own age that often result in dementia patients seemingly living in the past or seeing themselves as younger, which served as a core gameplay mechanic—switching between an older and younger version of the player character. A room that disappeared was planned as an expression of the disorientation and sense that things are often moving around. Garbled language, obscured or distorted faces in family photos and hallucinations of a doctor-like figure were also inserted as ways to reflect symptoms within the gameplay.



Figure 1. Experiments with silhouette and proportion lead to the final style. Inspiration was also taken from 20s to 40s era kids clothing



Figure 2. Experiments with shape and color palettes. The heart motif was implemented as reference to elevated risks of vascular dementia for African Americans.

Pre-production

In my pre-production phase, I began sketching out how I wanted my characters and environments to look. I drew stylistic inspiration from my mood board (Figure 1) constructed of images from *Fran Bow* as well as a series of paper dolls, who's textured look and bronze stud joints were striking, eerie, and evoked both childhood and old age in a way that perfectly fit with the demos intended tone. After running through a multitude of designs playing with shape language, silhouette, and numerous color palettes, the final character designs were established with both an old and young version (Figure 2). The design of the players clothing was meant to emulate sleepwear from around the 1940's, with the younger version's attire evoking more of an everyday dress combined with sleepwear, while the older versions dress was more clearly a nightgown (Figure 3).



Figure 3. After several rounds of outside feedback, the final design and color palette of the character's child form were selected and the character's older form was designed based off of it.

The environment designs included a childhood bedroom, adult bedroom, hallway, and bathroom. The two final locations not seen within the demo are the living room and kitchen areas, imagined as being included in the 3rd act of a full version of the game

if I were to have access to a development team. The childhood bedroom (Figure 4) was designed with the story of 2 sisters in mind, with its main objective being to solve a simple puzzle to “unlock” the way to the next room, requiring players to search for clues and subsequently recollect a childhood memory of the deceased sister, “Maya”. It was also designed as the most bright and homey feeling space within the demo, symbolic of the vibrance of early memories for those with dementia (Figure 5).

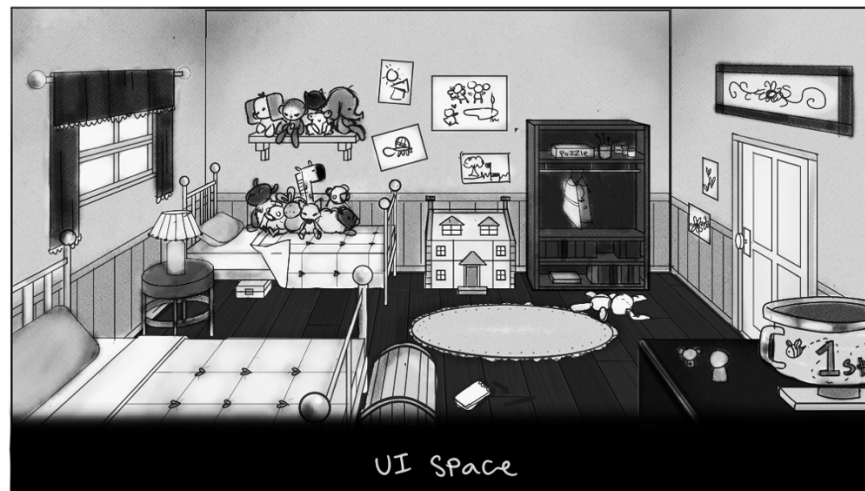


Figure 4. Initial design for the childhood bedroom, created with the goal of feeling lived in through having multiple interactable areas that players would be able to draw childhood memories from.



Figure 5. The final render of the bedroom design where each item is rendered individually and then placed together in Unity on separate layers that allow for the player to navigate between and around objects.

Production

The production phase is where I then fleshed out my designs and transformed them into full-fledged assets within Unity, a cross-platform game engine commonly used in the creation of 2D and 3D video games. Hours of rendering every asset individually led to the construction of my final scenes within the demo, with each item being grouped into foreground, background, and midground layers to create depth and a field of space the player could navigate in a realistic fashion. The rigging and animation process of the player characters was executed via the skeletal rigging features available in the Unity system. One of the largest hurdles in the production phase was coding. The game was built in Unity with the help of the *Adventure Creator* plugin available on the Unity Asset Store. As someone who does not code, this plugin was a great help as it simplified and streamlined the creation process with its wealth of pre constructed systems and its use of visual node-based coding for anything I needed to customize such as pathing, interactable areas, dialogue, player movement, menu screens, cutscenes, and the logic needed for puzzle formulation (Figure 6). Post processing added the final visual touches and ultimately concluded my production phase. The testing phase proved to be the most tedious, with hours being taken to fix simple bugs. After which, friends and I played the game numerous times to ensure that everything ran as intended and then it was ready to be released to those who would take the survey.

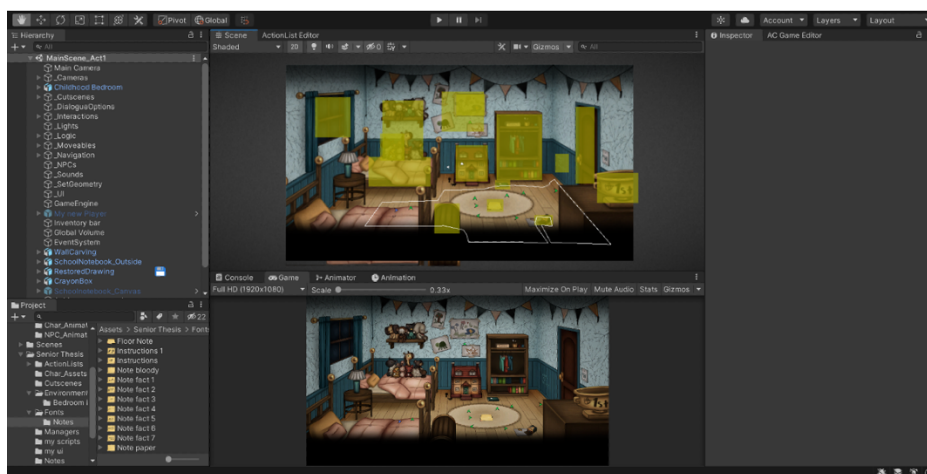


Figure 6. Hotspots, depicted by the yellow rectangles, were created for every interactable item in order to attach them to sequences of code that would allow for different dialogue options, events, cutscenes and puzzle sequences to be triggered.

Using the information gathered throughout this process, I constructed a website and a simple survey. The website's purpose was to provide additional resources and information on organizations researching dementia and advocating for better care. The site also hosted information on the game's development process, a link to the demo, and speculations on what a full version of the game would look like, introducing the idea that the 3rd act would explore the effects of dementia on a family relationships and genetic statistics using the symbolism of "the family tree" which would manifest as a kitchen and living room area overgrown by branches and thick trunks that create obstacles and present unique environmental puzzles. The survey was formulated with a series of questions meant to gauge the quality of the project, how well participants felt it was at conveying the desired information, how much the experience enhanced their knowledge on the topic, and if the medium chosen was an effective and engaging form of learning about mental health.

Results

The feedback given through the post-game survey was indicative of the viability of video games for mental health advocacy, as the responses received mirrored the findings of similar studies referenced in my research. Questions posed in the survey were meant to gauge player knowledge on the subject of dementia prior to and after playing the game demo. Other questions were also meant to surmise if participants felt that the chosen medium was a good way to convey such knowledge. The survey included questions such as "On a scale of 1 to 5, how much would you say you knew about Dementia and its effects prior to playing this game?", "After playing this game, would you say that you are more informed on how Dementia affects POC communities?", and "Would you say that this format was an engaging way for you to learn this information?" among others (Figure 7). Prior to playing the demo, most participants answered that they had general knowledge of dementia. However, all participants reported that after playing the game, they felt as though they had a better frame of reference for interacting with those with dementia, they garnered a better understanding of what it feels like for someone who suffers from it, and had a better understanding of how dementia affects POC. Importantly, the survey suggested that players believed themselves to be better equipped to recognize symptoms in themselves or others. Focusing specifically on the experience created by playing through dementia

symptoms, all participants rated the demo as being an engaging way to learn what patients experience. In summary, the conclusion of this project exemplifies the potential that video games and game-based learning have when it comes to presenting critical information on mental health to the minority groups most affected.

How effective do you think this gameplay was at conveying the struggles of Dementia?

7 responses

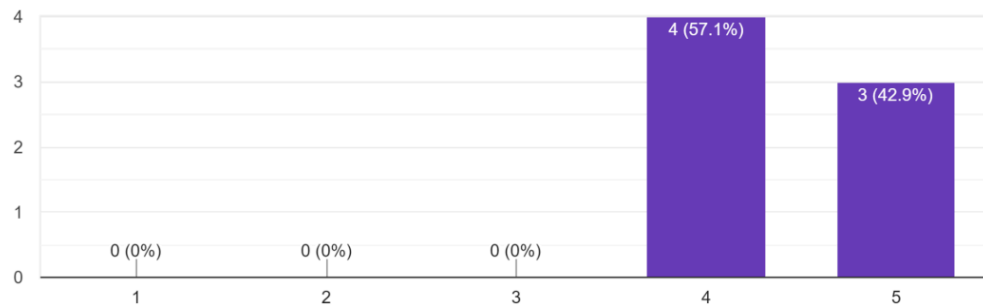


Figure 7. The majority of players who participated in the post-game survey indicated that the experience offered by the chosen format created a positive learning experience for them and was able to balance intrigue with educational properties.

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