Navigating Equity Diversity & Inclusion in the Psychiatric ER through a Narrative Video Game

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1.0 - KEYWORDS

Equity, diversity, inclusion, bias, discrimination, social determinants of health, marginalized groups, empathy, healthcare, medical students, healthcare providers, video game, game-based learning, serious games, interactive learning

2.0 - ABSTRACT

For our master's research project, we plan on creating a 2D visual narrative game targeted at medical students and healthcare professionals that serves as a supplementary educational tool on topics of equity, diversity, and inclusion. During the immersive game experience, the user will be placed in the shoes of both a physician providing care as well as the corresponding patient, who is a marginalized individual seeking care in the emergency room (ER) of a hospital. The game aims to build empathy and provide an inside look at how unconscious discrimination and bias can affect patient-caregiver relationships and health outcomes.

3.0 - INTRODUCTION

Globalization and social media have placed a spotlight on the inequities faced by marginalized communities in the healthcare system and how these ultimately impact health outcomes in these communities (Morrison et al., 2021). Large bodies of evidence have shown that minority groups in North America receive a lower quality of care in comparison to their white counterparts as a result of unequal treatment from stereotyping, discrimination, and bias (Smedley et al. 2003). Growing recognition of the detrimental effects of bias and racism has fueled an urgency for the promotion of equity, diversity, and inclusion (EDI) in healthcare establishments. Many studies have pointed to clear benefits to the integration and promotion of

EDI in the healthcare field. In one study, Gilliam et al. (2020) found that pediatric residents who received a curriculum on EDI were able to provide more informed care to diverse populations and showed a greater awareness of health inequities. Additionally, a study of various healthcare establishments found that institutes that nurtured a culture of EDI experienced decreased health disparities and provided better patient care (Morrison et al., 2021). Despite mounting evidence highlighting the benefits of empathetic care, there is a lack of education exploring practical applications of these topics and a need for creative teaching approaches focused on developing these skills amongst healthcare practitioners (Moudatsou et al., 2020).

Through the application of game-based learning (GBL) to educational tools, learning goals are framed in a way that promotes increased engagement with the content and motivates the user to learn (Jan et al., 2015). Games that employ GBL have great potential for education within the healthcare field for numerous reasons including minimizing medical student burnout as well as providing a safe environment to learn and practice clinical skills (Yunyongying et al., 2014). GBL can be applied to address the current need for more engaging educational tools on topics of EDI and empathy in the context of healthcare. For this reason, the following background section will explore the importance of empathy and EDI in healthcare, current methods of instruction on these topics, example applications of GBL in healthcare education, and relevant design principles for educational game development.

4.0 - BACKGROUND

4.1 - EDI and Empathy in Healthcare

Social determinants of health such as race, ethnicity, gender, sexual orientation, age,

disability status, socioeconomic status, and geographic location are intimately connected to patient satisfaction and health outcomes within the healthcare system (Derksen et al., 2018; Moreno et al., 2020). This can be explained by the fact that sociocultural differences that exist between patients and providers impact clinical communication and decision-making (Smedley et al., 2003). They influence how health information is received, what is considered a health problem, how symptoms are expressed, and what treatments should or should not be offered (Smedley et al., 2003). Many studies have shown that healthcare providers interact less effectively with minority group patients who ultimately face disproportionate rates of certain health conditions (Burgess et al., 2007; Morrison et al., 2021). These health disparities can be measured by differences in incidence, prevalence, mortality, and burden of disease (Weinstein et al., 2017) For example, indigenous women have an infant mortality rate that is 60 percent higher than that of their white counterparts and African American men are twice as likely as white men to die prematurely from stroke (Weinstein et al., 2017). Strategic interventions by healthcare organizations to address these issues have the potential to significantly reduce poor health outcomes within these communities (Morrison et al., 2021). When designing interventions, measures should be taken to work with community members of the target group to identify their unique needs and assets (Weinstein et al., 2017). For example, when addressing health disparities among people with disabilities, interventions could include approaches such as universal design and maximizing opportunities offered by technological innovations (Weinstein et al., 2017).

Despite increasing efforts to represent marginalized groups, bias and discrimination are issues that continue to persist within the healthcare system. Widely acknowledged barriers such as a lack of institutional support and a limited understanding of effective teaching approaches could explain why progress in correcting these inequities remains elusive (Burgess et al., 2007;

Smedley et al., 2003). Insight into the ethical considerations of clinical problem solving requires empathy, which is critical for recognizing and mitigating conscious and unconscious bias, and reducing any unease healthcare professionals experience when interacting with individuals from backgrounds or cultures unfamiliar to them (Jeffrey, 2016; Marcelin et al., 2019). For healthcare professionals, empathy is defined as the ability to understand the personal experiences of a patient (such as their feelings, concerns, perspectives, etc.) without having bonded with them (Moudatsou et al., 2020). It is multidimensional, consisting of affective (emotional), cognitive, and behavioural (practical) aspects that altogether contribute to the level and effectiveness of patient care (Moudatsou et al., 2020). In this way, empathy is vital to understanding, acknowledging, and addressing patients' needs and constructing a feasible therapeutic plan that takes into consideration the patients' individual beliefs and context (Bernardo et al., 2013). Many studies show that an empathetic caregiver-patient relationship greatly improves health outcomes and patient satisfaction (Moudatsou et al., 2020).

Unfortunately, more often than not, there is a disconnect between patient and caregiver perspectives (Bernardo et al., 2013). A study by Bernardo et al. (2013) found that in-training physicians' self-assessments of empathy differed greatly from corresponding patient assessments and that both patients and practitioners recognize a gap between what they wish for and what they actually encounter in the clinical setting. While most practitioners wish to demonstrate empathy, they feel that there are many obstacles that limit their ability to do so (Derksen et al., 2018). Empathy in caregivers is greatly limited by factors such as stress, burnout, emotional fatigue, time pressures, lack of self-awareness, fears of boundary violations, and lack of institutional support and training (Moudatsou et al., 2020). Furthermore, in multiple studies, healthcare workers scored perception of organizational support (i.e. the extent to which an

organization takes measures to protect their employees' physical and psychological well-being) as poor and lacking (Chatzittofis et al., 2021; Robaee et al., 2018; Sodeify et al., 2013). Institutions should place an emphasis on training in empathy, unconscious bias, and cultural sensitivity in healthcare environments as these interventions can lead to improved outcomes for both caregivers and patients. Mutual benefits are experienced as the patient's emotional state directly impacts the caregiver's emotional state, which is why physicians who have higher levels of empathy experience less burnout and depression (Moudatsou et al., 2020). Additionally, the implementation of EDI curricula can result in increased awareness and improved skills amongst residents when providing care to diverse populations (Gilliam et al., 2020).

4.2 - Current Curricula for EDI and Empathy Training

When creating educational interventions designed to address bias in the healthcare system, it is important to target medical students and professionals who must ultimately take responsibility when it comes practicing empathetic communication/behaviours towards patients. Additionally, studies have found that interactive, experiential, practical, case-based educational approaches to EDI that address cognitive, affective, and behavioural aspects of empathy are the most effective (Smedley et al., 2003). This is likely due to the fact that interactivity creates opportunities for students to revisit and explore content, both individually as well as collaboratively, which promotes active engagement and deep learning (Domagk et al., 2010).

Globally, creative educational methods have gained popularity in the health and social care fields due to improvements in students' acquisition of knowledge and skills related to empathy (Moudatsu et al., 2020). Despite this, the integration of cross-cultural curricula into standard undergraduate and graduate healthcare education is limited (Smedley et al., 2003). At

undergraduate and graduate levels, didactics (e.g. lectures), videos, case studies, and case-based discussions are most commonly used in cross-cultural education (Smedley et al., 2003). The efficacy of such didactic-based teaching strategies is sometimes put under question with studies showing that empathic skills developed through didactic-based writing assignments (e.g. point-of-view writing) do not always translate to appropriate real-world behaviours (Batt-Rawden et al., 2013). Currently, there is a lack of and need for more creative and interactive solutions for teaching of empathy amongst healthcare practitioners (Moudatsou et al., 2020).

The implementation of cross-cultural curriculum is met by its own set of barriers. These include difficulties in evaluation, retention, and application of gained knowledge in real-life healthcare settings (Smedley et al., 2003). Theoretical knowledge is much easier to assess due to the existence of standardized tests whereas changes in clinical attitudes and skills are much more difficult to measure due to the requirement for encounter-based assessments and the potential for social desirability bias (Smedley et al., 2003). Additionally, content centered around learning empathy is often met with resistance from care providers who are not accustomed to learning materials that are not strictly categorical and practical (Smedley et al., 2003).

To combat these hurdles, researchers have articulated a number of effective strategies for teaching empathy and EDI in healthcare. Boscardin (2015) proposes the following four recommendations for improving current curriculum and supporting the successful integration of curricular interventions targeting implicit bias: 1) increasing self-awareness, 2) creating an inclusive learning environment, 3) increasing opportunities for positive interaction, and 4) providing opportunities for developing empathy skills. Similarly, Burgess et al. (2007) recommend the following evidence-based intervention strategies when it comes to combating unintentional

bias among health care providers: 1) enhancing internal motivation while avoiding external pressures by creating a safe and non-threatening environment in which students may practice new skills without fear of consequences and 2) increasing perspective-taking and affective empathy skills through role-playing as the patient. These strategies along with the findings from Bearman et al. (2015), suggest the use of simulations as an effective and appropriate method for teaching empathy to healthcare students.

4.3 - Game-Based Learning and Serious/Persuasive Game Design

Game-based learning (GBL) is defined as learning through the use of a game designed to achieve certain learning goals within an educational context (Laamarti et al., 2014). More specifically, it is the design of a game so that game principles are embedded within the learning activities themselves as opposed to integrating game elements into non-game-related activities which is another concept known as gamification (Yunyongying et al., 2014). Games that apply GBL can either be physical or digital and are often referred to as serious or persuasive games (Laamarti et al., 2014). In most cases, serious games are not intended to entirely replace other teaching methods. Rather, it is suggested that they are used to assist educators in maximizing student engagement and learning outcomes (Bado et al., 2019). Although there is debate on what exactly is considered a game, psychologists have historically recognized the importance of play, an essential element of games, in human development; specifically cognitive development and learning (Vygotsky et al., 1978).

According to Jan et al. (2015), there are many arguments that support GBL. For one, the motivational nature of games is unique in that it encourages learners to remain engaged through unlockable achievements, interesting game mechanics, etc. (Jan et al., 2015). Through games,

there is a wide variety of ways to engage a learner depending on the learning goals, design of

the game, and the context in which it is deployed (Jan et al., 2015). Another argument for GBL is

that the adaptiveness of a game allows it to engage learners in a way that reflects their specific

situation by taking into account prior knowledge or skills, current emotions, etc. (Jan et al., 2015).

Adaptive game design relies on an integrated system in the game that measures a defined

variable (e.g. time taken to respond correctly) and then responds to this information accordingly;

incorporating it into subsequent gameplay (Charles et al., 2005). For example, a game may

present a varying complexity of problems and adjust the degree of guidance provided to the

player based on their performance with presented tasks. In addition, GBL facilitates the creation

of a low-pressure learning environment due to minimal real-world consequences if the player

makes mistakes; this encourages deeper exploration of the material presented (Jan et al., 2015).

In games, failure is often an integral part of the gameplay and integrated into the learning

experience and game design through multiple possible attempts in-game and feedback loops.

In their paper, Jan et al. (2015) also present three ways in which games can facilitate

cognitive processing and learning. Firstly, games allow for the deliberate delivery of learning

material in an appropriate context when and where it is most useful to the learner (Jan et al.,

2015). Secondly, the replication of real-life contexts within the game can aid in the conversion of

knowledge to real-world applications (Jan et al., 2015). This is crucial as the ultimate goal of

medical education is to improve actual care provided in the workplace. Lastly, this medium has

the ability to not only teach new skills but also give players the opportunity to practice these skills

and reinforce their existing knowledge (Jan et al., 2015). Well-designed games can inspire

situational interest in their players that can eventually transfer to individual interest in the

educational content presented in-game (Jan et al., 2015). Situational interest is defined as a

temporary interest due to environmental influences, such as being instructed to play a serious game for homework (Rotgans & Schmidt, 2011). In essence, students are more likely to engage in activities that they themselves view as interesting or relevant (Jan et al., 2015).

Although interest in the use of GBL in different contexts has been on the rise, further studies are needed as there are many variables that influence the effectiveness of a game and its application in a learning environment. Specifically, there is a need for more research related to inducing positive social interactions through game-based learning and incorporating social and immersion-oriented affordances in the game design (Majuri et al., 2018).

4.4 - Empathy Development through Role-Playing and Simulations

Research has shown that empathy is a developable skill that can be improved through practice and experience (Batt-Rawden et al., 2013). By focusing educational interventions on training empathy, patient care outcomes show increases in effectiveness and overall improvements (Batt-Rawden et al., 2013). In addition, evidence points to many physiological benefits of empathic relationships between physicians and patients, including better immune function, shorter post-surgery hospital stays, fewer asthma attacks, stronger placebo responses, and shorter durations for colds (Reiss, 2010).

Many studies suggest that the use of simulation-based games, especially ones that simulate the patient experience, improves empathy learning (Bearman et al., 2015). A literature review evaluating empathy training interventions in undergraduate medical school found that creative interventions and the inclusion of patient perspectives resulted in significant increases in empathy scores (Batt-Rawden et al., 2013). Furthermore, simulations are an effective educational

strategy for combating unconscious bias in healthcare as they provide students with a safe learning environment to practice empathic behaviours (Bearman et al., 2015; Bayne et al., 2011).

There are many examples of serious games aimed at developing empathy through simulations/role-playing. For example, in a paper by De Arujo Luz Junior (2021), a 3D narrative game based on real-world stories aimed at connecting people emotionally with breast cancer journeys was evaluated for its ability to build empathy. Key features of this simulation game include a realistic medical clinic environment, branching storyline, and showing the outcome of different choices posed to the player as the player's choices are reflected in the narrative and non-playable character animations. A carefully chosen soundtrack was also utilized to match the story and emotions conveyed. When subjects played the game, an empathetic and emotional response (e.g. tears welling up in their eyes) was evoked in the players as a result of the game experience and narrative conveyed (De Arujo Luz Junior, 2021).


(a)   (b)

(c)   (d)
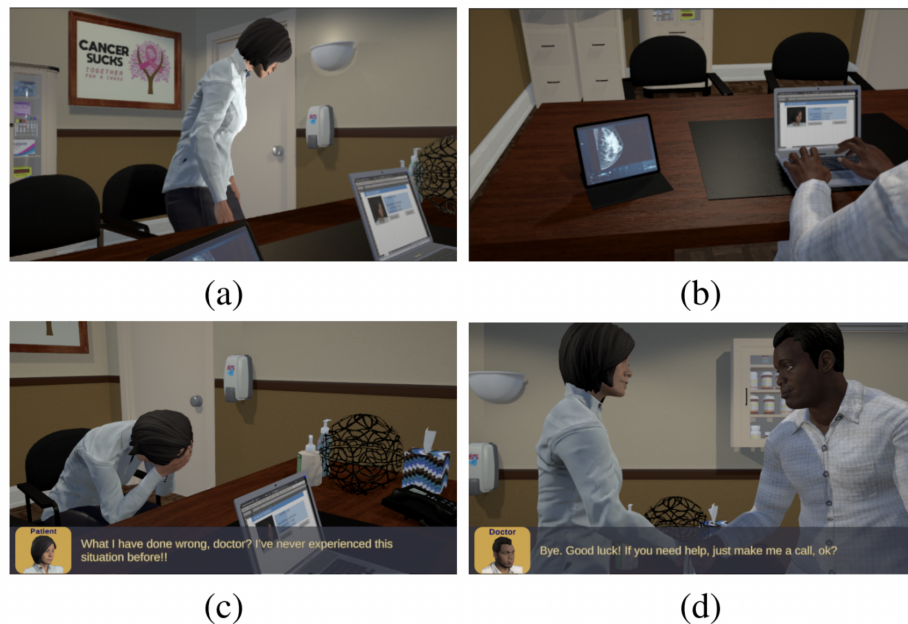
Figure 1: Screenshots from the game *Cancer Sucks*: (a) Patient enters the doctor's office, (b) Doctor is reading the patient's medical record, (c) Patient is desperate when the doctor tells the

medical imaging results shown on the mammogram are inconclusive, and (d) Doctor is offering

the patient support and encouragement.

In another paper, Holliday (2021) evaluated the effectiveness of a simulation game aimed

at encouraging empathy towards healthcare staff during the pandemic through a better

understanding of how external factors (e.g., understaffing) affect their ability to provide care. Key

features of this game include timed sound effects that were used to elicit certain emotions during

the game and opportunities for players to reflect on their own behaviour in the real world as their

responses were reflected in subsequent gameplay. After players role-played a nurse working in

the Intensive Care Unit during the COVID pandemic in-game, a positive increase in attitude

scores, that aligned with the game's goal of inspiring empathy towards staff, was recorded

(Holliday, 2021).

Figure 2: A screenshot of the simulation game showing an overwhelmed ward with two deaths

and several other patients alerting low health.
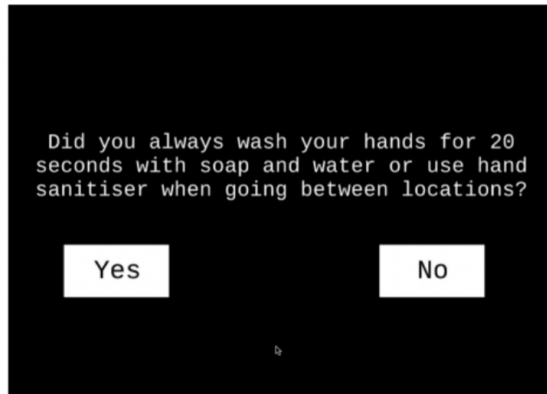
Figure 3: A screenshot of the game showing an example self-reflection question between waves within the game.

Lastly, Chen et al. (2015) evaluated the impacts of a 3-hour role-playing aging simulation game on nursing students' empathy and attitudes toward older adults. In this role-play game, students were put into the shoes of geriatric patients and expected to perform certain tasks while navigating a simulated healthcare system. Following completion of the game, participants showed significantly greater empathy towards aging adults and felt they better understood challenges faced by geriatric patients within the healthcare system (Chen et al., 2015).

It should be noted that the aforementioned studies referenced had their own limitations including varying methods of evaluating empathy (e.g. the Jefferson Scale of Empathy) different applications of game-based learning frameworks, varying game design principles, etc. There is still a need for continued research on the use and effectiveness of simulations and role-playing in empathy training.

4.5 - GBL-Oriented Game Design as Applied to Education on EDI

Jan et al. (2015) proposes an integrated design framework for GBL. This framework presents design elements that can be incorporated to encourage different forms of engagement between the user and the learning material (Jan et al., 2015). These types of engagement include affective (emotional processing), cognitive (engagement with the learning mechanic), behavioural (gestures and embodied actions), and sociocultural engagement (social interactions within a cultural context) (Jan et al., 2015). By optimizing the degree of focus on each type of engagement, a game is able to facilitate learning to specific audiences in a variety of contexts (Jan et al., 2015).
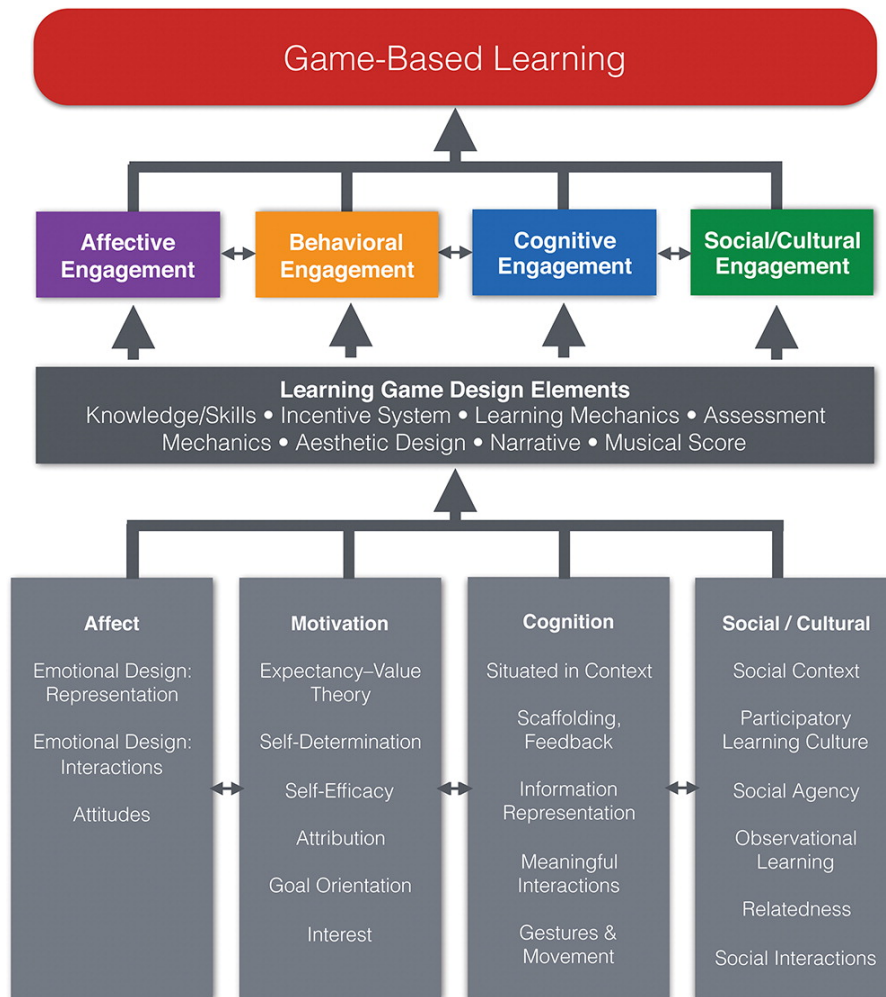
Figure 4: The proposed integrated design framework of game-based and playful learning presented by Jan et al. (2015).

Efforts will be made to implement the elements highlighted in Figure 4. For example, to promote affective engagement, Don Norman's (2004) three levels of emotional design should be considered. The visual design of the learning materials, through choices of style and colour, can be adjusted to strategically influence the user's initial perception and emotional state at the visceral level (Norman, 2004). To encourage cognitive engagement, the storyline of a game can be scaffolded (Jan et al., 2015). This can be accomplished by incorporating an integrated guided tutorial at the beginning of the game that familiarizes the user with the game's controls and mechanics. The story content can also be built upon itself by starting with basic definitions and examples of the material that then proceed to grow in complexity and involvement. This idea is supported by Bayne et al. (2011) who found that hosting training sessions that incrementally increased in difficulty of patient interactions, provided students with opportunities to successfully build upon skills progressively. Additionally, this idea incorporates abstraction; simplifying real-world scenarios into a series of challenges that allows players to concentrate on learning specific skills that sequentially build-up and increase in complexity (Yunyongying et al., 2014).

Another GBL design model proposed by Shi & Shih (2015) is presented in Figure 5. This model, derived from a literature review and analysis, recommends key factors in educational game design and how these might be integrated (Shi & Shih, 2015). A key takeaway message from this model is that the proposed challenge of the game should be integrated into the narrative with a direct impact on the game mechanism (Shi & Shih, 2015).
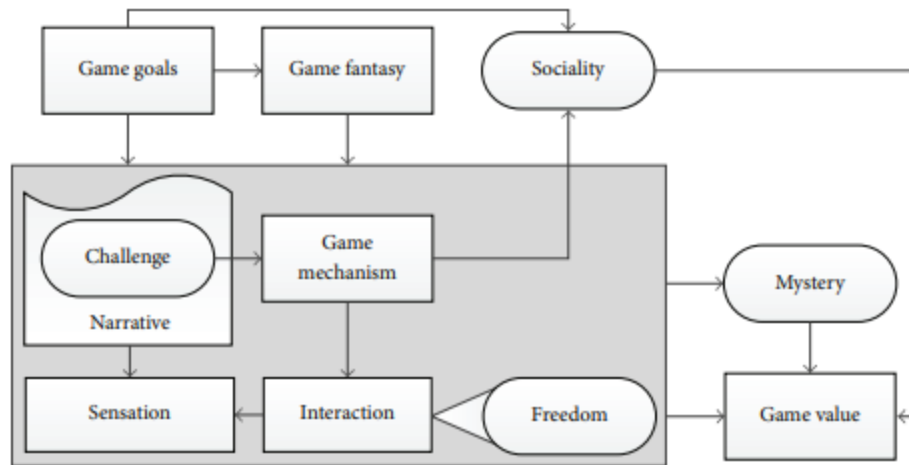
Figure 5: The proposed model for GBL presented by Shi & Shih (2015).

According to Yunyongying et al. (2014), game-based elements have great potential in retaining patient safety in medical training, limiting burnout in learners, and working towards more competency-based medical education. This supports the relevance of gamified learning to our target audience which consists of medical students and healthcare professionals who are often overloaded with learning materials and susceptible to burnout (Moudatsou et al., 2020).

5.0 - OBJECTIVES

5.1 - Main Goal

To address the continued bias and discrimination faced by marginalized groups in the healthcare system by creating an interactive educational game designed to inspire clinical empathy and educate medical students on topics of equity, diversity, and inclusion.

5.1 - Primary Objectives

1. Build user awareness on how cross-cultural differences create barriers to health for patients through perspective-taking and affective empathy

2. Provide the user with practical tips on how to best advocate for improved care for marginalized individuals in the clinical setting

3. Create an engaging and memorable gamified learning experience through effective storytelling, as well as immersive game and sound design

5.2 - Secondary Objectives

1. Identify gaps in the current curriculum and teaching methods for medical students regarding topics of equity, diversity, and inclusion

2. Identify key barriers faced by students and educators in the field related to teaching EDI and developing empathy

3. Evaluate current applications of persuasive/serious games in healthcare-related education and identify effective game-based learning principles/strategies

6.0 - METHODS

6.1 - Target Audience

Who is the project designed for?

The intended target audience is medical students and healthcare professionals. The initial users of the game will be 2nd-year medical students on psychiatry rotation at the Centre for Addiction and Mental Health (CAMH) in Toronto. These students will have either limited to no

prior clinical experience at this point in their education. It is our intention that the game will also be free and publicly available to anyone interested through *Steam* and *Itch.io*.

6.2 - Materials & Visual Treatment

6.2.1 - Research for the Development of the Game

A set of EDI-centered learning objectives for medical students will guide the development of the game. These learning objectives are: 1) understand and identify systematic and cultural barriers that exist for marginalized individuals to receive proper health care and 2) acquire practical tips to try to advocate safely to care for marginalized individuals in the ER setting. These objectives were developed based on faculty input from the department of psychiatry at the University of Toronto (UofT). Additionally, we hope to organize small focus group meetings with current UofT medical students to gain insight into students perspectives on EDI to identify current gaps in knowledge and possible pain points when learning this material. For these sessions, a UofT Human Ethics Protocol will be submitted for review.

To develop an accurate, empathetic and realistic narrative storytelling experience, research (through papers, videos, documentaries and etc.) will be done alongside qualitative interviews with individuals with previous ER experiences. Interviews with people with lived experiences will help us identify prevalent themes and common experiences of individuals who face bias and discrimination in the healthcare system. The information collected during the interviews will be adapted into the game during the development of the storyline and dialogue. For these interviews, a UofT Human Ethics Protocol will be submitted for review.

6.2.2 - Core Game Design

According to Jan et al. (2015), key elements of game design to consider for GBL include: game mechanics, visual aesthetic design, narrative design, incentive system, musical score, content, skills, etc. Following the GBL design model proposed by Shi & Shih (2015) in Figure 5, we plan on integrating the proposed challenge directly into the game mechanics by showcasing the bias and discrimination experienced by individuals through the storyline the user plays through. The primary game mechanism is then linked to this idea through branching dialogue options based upon these experiences.

6.2.3 - General Game Framework and Key Immersive Features

In the proposed game, the user will play through a storyline centered around a single patient-physician relationship. The playthrough of this game will involve one story that can be explored through two different perspectives. The first perspective is that of a physician providing care at the ER (chapter 1 of the game) and the second perspective is from the patient receiving care from the aforementioned physician (chapter 2 of the game). Bernardo et al., (2019) highlight the importance of including patient perspectives to foster empathy in physicians and to improve actual care in the workplace. The in-game world will be explored through first-person perspective, meaning that the player will see through the eyes of the person whose story they are experiencing. When playing through each chapter, in-game text will include inner thoughts from the user's avatar to help provide insight into their feelings. The goal of this feature is to build empathy and provide emotional guidance to the user.

The game will feature branching dialogue choices that will ultimately affect the outcome of the narrative. Branching narratives integrated with user input give players a sense of agency

and control, contributing to a sense of immersion within the game. When in conversation with key characters, the user may choose between multiple (3-5) dialogue choices. Dialogue choices will be designed to have meaningful consequences to the storyline and provide opportunities to test the user's empathy and application of EDI knowledge. The choices the player makes during chapter 1 will influence the progression of chapter 2, in which the patient perspective is used to build empathy in the user towards the feelings, thoughts, and experiences of the marginalized patient they are playing as in the virtual world of the game. According to Holliday (2021), asking players to involve their real-world actions in gameplay was effective in encouraging self-reflection and invoking an emotional response.

Custom illustrations for the backgrounds and individuals will be incorporated into the visual design of the game. A visual audit of successful narrative games will be used to determine a suitable and aesthetic color palette and illustration style. In general, these illustrations will reflect how the healthcare space looks like in the real world. Players will also have the ability to interact with and explore their environment as they progress through the storyline, which contributes to the users sense of immersion. Players can navigate the virtual space of the ER by switching between rooms, panning the camera around in the environment, and interacting with specific objects and non-player characters (NPCs). Emotive facial expressions and body language will be a major design focus for each character. Also, empathy training can be encoded into gameplay by requiring the user to accurately interpret and respond to the emotions of NPCs in the game (Kral et al., 2018). Regarding sound design, the soundscape within the game will reflect the user's location & interactions with the environment. More specifically, typical ER sounds (e.g. monitor beeping and background talking) will be integrated into the game and change as the character moves through the virtual landscape of the game. Additional sound effects will be

triggered when interacting with certain objects or characters to add to the immersiveness of the game. During the game, users will have the ability to pause the game at any point and revisit save-points within the storyline, which provides them with flexibility and agency over their learning experience.

At the end of the game, a summary of EDI topics will be provided that are based around specific storyline moments experienced by the user. These scenarios will be introduced as teachable moments and presented alongside of practical tips on how the user can advocate for the care of marginalized individuals. The goal of this summary section is to help students translate their learning experience to improved practical skills by equipping them with a toolkit of knowledge and language on how to recognize and address any witnessed displays of inequity in the healthcare setting (Bearman et al., 2015). The EDI topics covered in the storyline will be chosen based on the learning objectives determined through UofT psychiatry faculty and medical student input. Ideally, the content covered in the game will connect to content covered in class curricula to maximize student engagement and learning outcomes.

6.3 - Procedure

6.3.1 - What is the final deliverable?

The final deliverable will be a 2D illustrated narrative-based video game. The game will be developed using the Unity game engine and Fungus plug-in. To make the game accessible, it will be available for free download from *Steam* and *itch.io.* both of which are reputable video game distribution platforms. The game will ideally be compatible with both Windows and Mac OS systems and have minimal storage and graphics card requirements.

6.3.2 - What is the project timeline?

Our current anticipated timeline is as follows:

Spring 2022	Research proposal is reviewed & accepted
Summer 2022	Content research & interviews
Summer / Fall 2022	Game framework & storylines finalized
Fall 2022	1st round of beta testing (dialogue/storylines)
Fall / Winter 2022	Production & visual development
Spring 2023	2nd round of beta testing (game mechanics and UI/UX)
Summer 2023	Final touches & refining
July 2023	Final game due

Due to scope limitations and time constraints, there are currently no plans to assess the impacts of the game on empathy levels within the timeline of the project.

7.0 - LIMITATIONS

It is critical that any representations of marginalized communities and their experiences in the ER within the game are accurate. To address this, we plan on conducting interviews with individuals with lived experiences who identify as members of these communities. Beta-testing of the storyline and game will also involve these individuals, the main target audience (medical students), content expert, and any others interested. We recognize that there may be differences

in experiences due to geographic location and varying healthcare protocols as municipality-dependent regulations may exist. To address this, a disclaimer presented at the beginning of game will explain how the experiences in-game may not be representative of all healthcare systems within Canada. Lastly, due to time constraints, the effectiveness of the proposed interactive game will not be evaluated within the current project timeline.

8.0 - SIGNIFICANCE

We are developing a serious game that aims to educate medical students and healthcare workers on issues of equity and diversity in healthcare and provide practical tips on how to combat discrimination and bias in the clinical setting. We hope that the implementation of this game alongside of current curricula on EDI will improve student engagement on these topics and lead to actionable change in the healthcare space. Through a game-based learning approach, we will address the need for more engaging teaching materials on topics of EDI and empathy for medical students. Furthermore, this project will support ongoing efforts in the medical profession to increase the representation of marginalized individuals and bring awareness to some of the barriers they face in the healthcare system. Finally, in addition to the game, a comprehensive document of the design process for this project will be recorded and made available on the official BMC wiki for BMC UofT students. This document will include resources and frameworks used in the development of the game that we hope may guide future related student projects.

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