A Case Review for the Design of VR-based Training for Enhancing Empathy and Cultural Competency of Public Librarians

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ABSTRACT

The importance of cultural diversity and competency in library services has been gradually increasing along with rapid growth of international residents (3.3% of total population) in South Korea. Along with a multi-cultural population, marginalized communities including disabled persons, financially disadvantaged persons, and seniors over 65 years old are growing. To fulfill the South Korean government's goal of becoming an Innovative Inclusive Nation, public libraries and librarians need to better prepare for these significant changes and work to become more socially inclusive. While librarians need to continuously promote cultural competence, empathy, communication and other critical skills through their professional development training, studies show that little of such training exists in South Korea. In this study, we review related literature and analyze three example cases of Virtual Reality (VR) simulations developed for service-oriented professions, nurses, dentists, and teachers, for the purposes of providing core foundations and best practices to guide the design and development of training programs for pre- and in-service librarians. Amid an ongoing pandemic, and the advent of the metaverse and Fourth Industrial Revolution, VR-based, online, and mixed face-to-face professional development are likely to become more in demand and will help librarians to become future ready and socially inclusive.

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1. Introduction

According to Statistics Korea, as of November 2020, the number of foreign residents in South Korea is 1.7 million (3.3% of total population, 51.83 million) and the number of multicultural population (families of Korean and international marriage and their children) is 1.09 million (2.1% of total population). Diversity in the South Korean population has been continuously increased and is expected to constantly grow. Since the South Korean Government declared its goal to become an "Innovative Inclusive Nation" as part of the New Visions for Korea in 2017, various government policies and strategies to unite and promote growth across multiple communities have been established (Policy Briefing, 2021). In particular, the Ministry of Culture and Travel and the National Library of Korea have paid close attention to marginalized communities, such as disabled persons, financially disadvantaged persons, seniors over 65 years old, and multicultural and international populations, multicultural families, to decrease the information and digital divide and provide access to equal opportunities of education, economy, and culture. The 3rd Comprehensive Library Advancement Plan specified a strategy for building socially inclusive libraries with foci on realizing active information welfare, expanding the openness of the library space, and enhancing information services linked with other public services for information poor communities (Library Information Policy Committee, 2019).

To better serve the growing population of multicultural communities, including marriage immigrants and foreign laborers in Korea, public libraries have continuously built and provided various educational and cultural user programs (Kim & Cho, 2011; Lee & Bae, 2008; Kim & Oh, 2014; Chang & Lee, 2017; Kang & Bae, 2020). Public libraries serve as anchor institutions that provide important resources and services to their communities, especially those who are marginalized or less privileged than others. In a global survey, Koehler, et al. (2000) found that service, equality of access, intellectual freedom, preservation of the record, information literacy, and traditional literacy were the most shared values of librarians around the world. While still valued by many librarians, Koehler, et al. (2000) found that confidentiality, cultural diversity, copyright, and intellectual property were the lowest ranked shared values. Roberts and Noble (2016) argue that LIS education needs to take a more (pro)active role in helping both students and faculty to understand the importance of diversity and social justice and to encourage them to address inequality and injustice through their professional practices as librarians and educators. To partially address these issues and needs, librarians can work to develop their communication, empathy, and cultural competency skills. Developing one's cultural competence across the areas of culture, language, and ethnicity takes time and effort, but can be developed through multiple means, including meaningful reflection on one's own cultures and those of others, professional development, and education, experiencing diverse cultures, reading, and travel (Montiel-Overall, 2009).

However, the National Library of Korea (2021), which is partly tasked with providing professional development to librarians, does not currently provide many educational programs regarding cultural diversity and social inclusion for librarians' professional development and there are few other profession al development options for libraries to develop their cultural competencies and empathy skills. To enhance their role as socially inclusive libraries, the National Library of Korea (2021) emphasizes

that librarians at all types of libraries need to continuously obtain professional development training to improve their general competencies of empathy-based communication and inclusive customer services. Additionally, the National Library of Korea (2021) plans to establish systematic educational programs to train pre-service and practicing librarians through using immersive media such as Virtual Reality (VR), Augmented Reality (AR), and Metaverse based educational platforms. While many disciplines and industries (e.g., Medicine, Nursing, Psychiatry, Engineering, Computer Science, Archite cture, Archeology, Art, Journalism, etc.) have actively adopted VR technologies for the purpose of learning and training (Grayburn, et al., 2019), Library and Information Science (LIS) researchers and practitioners in South Korea have just recently become interested in VR technologies (Park, et al., 2018; Kwon, 2019; National Library for Children and Young Adults, 2020; Kwon & Koo, 2020; Lee & Chung, 2020; Kim, et al., 2021).

Early work suggests that VR technologies may be effective training tools to promote empathy and reduce biases in a variety of professional contexts (Castello et al., 2021; Bankou et al., 2016; Bertrand et al., 2018; Liu, 2020; Peck et al., 2013; Schutte & Stilinović, 2017; Stavroulia & Lanitis, 2019; Young et al., 2021). VR and other extended reality technologies are poised to play a key role in the Fourth Industrial Revolution and librarians and libraries should be aware of these technologies and how they can be used to support their communities (Kim, 2020). Smith (2019) argues that VR technologies can be used for a variety of library programs and explains how an interactive information literacy instruction session can leverage the immersive and engaging aspects of the technology. Castello et al. (2021) describe two empathy-based VR programs, one in which users experience vision and hearing loss and homelessness in the other, that resulted through collaborations between Temple University Libraries and other academic departments on campus.

The purpose of this study is to analyze VR simulations potentially applicable to the training of public librarians. Then, this study will present the prototype for the outline of VR simulation training environment. We propose some elements of VR application delineated from the case studies. The VR solution prototype may offer librarians and libraries new ways to engage their communities and to develop critical skills for both social inclusion and readiness for the digital era. As such, this study reviews related literature and introduces and analyzes example cases of VR-based professional development training from other disciplines and provides recommendations for designing VR-based training programs for public librarians that could be used to develop their empathy, communication, or cultural competency skills. The prototype shows what scenario structure can be used and how the job environment can be transformed into virtual environments for VR simulation. Finally, we discuss some challenges and consideration to enhance the quality of learner experience.

2. Literature Review

This selected literature review below provides a brief introduction and summary to the definition of inclusive libraries, multicultural library services, librarians' desired competencies, current status of professional development programs, and VR-based educational programs for improving empathy and communication competencies.

2.1 Inclusiveness of Libraries and Librarians' Cultural Competencies

Public Library Manifesto (1994) that IFLA (the International Federation of Library Association and Institutions) and UNESCO (United Nations Education, Scientific, and Cultural Organization) proclaimed clearly addressed that:

"The public library is the local centre of information, making all kinds of knowledge and information readily available to its users. The services of the public library are provided on the basis of equality of access for all, regardless of age, race, sex, religion, nationality, language or social status. Specific services and materials must be provided for those users who cannot, for whatever reason, use the regular services and materials, for example linguistic minorities, people with disabilities or people in hospital or prison." (p. 1).

As a response to global increase of multicultural communities, IFLA/UNESCO additionally declared Multicultural Library Manifesto (2012) stating:

"In addressing cultural and linguistic diversity, libraries should serve all members of the community without discrimination based on cultural and linguistic heritage; provide information in appropriate languages and scripts; give access to a broad range of materials and services reflecting all communities and needs; employ staff to reflect the diversity of the community, who are trained to work with and serve diverse communities." (para. 5)

With this mission in mind, libraries and librarians have been committed in identifying underrepresente d patron groups with physical and mental disabilities, financial difficulties, and cultural diversities and providing them with equal access to collections, programs, technologies, and spaces. For more accessible and inclusive libraries, a recent study identified key elements and created an Inclusive Library Model composed of 6 elements: Collection, Programs, Training, Partnerships, Marketing, and Physical Barrier (space and equipment) along with overall supportive management in relation to funding and staff time (Kaeding et al., 2017).

Previous research has shown that factors affecting in libraries' access and inclusion include resources of time, finance, staff, decisions by external parties, library users' awareness of library resources and services (Small et al., 2015), as well as librarians' knowledge, skills, and attitude and training opportunities in access and inclusion (Small et al., 2015; Cope, 2011; Adkins & Bushman, 2015). Montiel-Overall (2009, p. 189-190) defines cultural competence for Library and Information Science as "the ability to recognize the significance of culture in one's own life and in the lives of others; and to come to know and respect diverse cultural backgrounds and characteristics through interactions with individuals from diverse linguistic, cultural, and socioeconomic groups; and to fully integrate the culture of diverse groups into services, work, and institutions in order to enhance the lives of both those being served by the library profession and those engaged in service."

Studies on investigating multicultural library services in South Korea show that librarians played a central role as a guide and educator that could help multicultural users to adjust themselves to local communities and therefore major library services were built to provide legal and social welfare related information such as employment, visa, and insurance and provide literacy programs such as Korean language, history, and culture programs, reading programs, and computer programs

(Han et al., 2009; Cho, 2011; Lee & Lee, 2013; Kim & Oh, 2014). Kim and Oh (2014) particularly pointed out that multicultural library services in South Korea emphasized functions of unification and assimilation by providing programs for multicultural users only and relatively neglected the role of expanding cultural diversities and competencies for all users in the communities to understand each other across the boundaries of nations and cultures. Han et al. (2009) found that multicultural users did not have sufficient time to visit libraries, their Korean was not fluent enough to use library services, library collection was not supported in their own languages, and they felt un-welcomed by librarians and/or other South Korean users.

For more inclusive libraries, researchers commonly recommended that libraries should develop more systematic multicultural service policy including multi-lingual collection development and organiz ation (classification and cataloging), user programs to increase the awareness of cultural diversity and literacy, outreach services including book mobile and package-based checkout service, ICT equipment and digital literacy program development, networking and collaboration, and librarians need to take professional development programs on cultural diversity and foreign languages to improve their expertise on multicultural services (Cho, 2007; Han et al., 2009; Kim & Cho, 2011; Lee & Lee, 2013; Kim & Oh, 2014; Chang & Lee, 2017). Chang and Lee (2017) reported that librarians' awareness, background knowledge, and skills were not ready for stable multicultural services and Kang and Bae (2020) argued that librarians' low level of cultural competencies (understanding, awareness, and interests in multicultural communities) and attitude was still one of major barriers that immigrant users perceived. Therefore, librarians need to constantly evaluate their competency level for expanding access and inclusion for all types of users and regularly obtain training in access and inclusion to proactively respond to increasing demands for socially inclusive libraries (Lee & Lee, 2013; Kang & Bae, 2020; Koo et al., 2020).

2.2. Librarians' Professional Development Programs on Multicultural Services

Research studying multicultural library services in South Korea commonly pointed out the lack of practicing librarians with language skills and cultural competencies as well as the necessity of professional development programs to build those skills (Lee & Lee, 2013; Chang & Lee, 2017; Kang & Bae, 2020; Koo et al., 2020). Since multicultural services are emerging demands in South Korea, librarians have limited knowledge and information about multicultural communities and skills for multicultural services (Chang & Lee, 2017). To update librarians' current knowledge and skill sets, librarians must regularly take professional development programs from the National Library of Korea and other designated educational institutes (Library Act, 2020). Since 1983, the National Library of Korea established professional education programs for practicing librarians and has had leadership in designing and operating programs (Chang, Ku, & Yoon, 2015). The Library Information Policy Committee (2014) provided specific action plans regarding multicultural library services in the 2nd Comprehensive Library Advancement Plan: 1) expand multicultural programs for both South Korean residents and multicultural residents, 2) build and distribute multicultural service policy and manual, 3) develop professional development training on multicultural services for in-service librarians, and two other actions. Yoon and Joung (2015) also recommended that the National Library

of Korea should establish a separate national institute for librarians' professional development to better serve growing groups of less privileged users including multicultural users and disabled users.

Currently, the National Library of Korea (2021) provides 103 programs in three sections (basic programs, specialized task-based programs, and others) in three different formats (face to face, online, and combination of face to face and online). However, there is only one program that specifically covers multicultural services in libraries (National Library of Korea, 2021). Woo et al. (2021) showed that the National Library of Korea provided only 4 times of multicultural service training from 2012 to 2019. While other educational institutes (such as Library Policy Division, Korea Library Association, and Seoul Library) also provided programs for supporting multicultural services in libraries from 2008 to 2019, the topics covered in the programs were limited (mainly in the area of sharing case studies, learning multicultural policies, designing reading programs) and the number of programs (61) were quite small (Koo et al., 2020).

As a response to the growing demands of professional development programs for multicultural services, Koo et al. (2020) conducted environmental analyses, laws and policies analyses, and informatio n needs analyses from multicultural users and librarians and provided a series of programs for designing and operating multicultural services in libraries. Librarians' needs for professional developme nt include programs on cultural competencies, foreign languages, multi-lingual collection development, internal and external collaboration, exemplar of multicultural services, and use of innovative pedagogies in programs beyond simple lecture (Koo et al., 2020). They provided a total list of 16 programs with titles and descriptions in three categories of Knowledge, Skill, and Attitude. For full information on the specific programs, see Koo et al. (2020). Woo et al. (2021) also offered specific strategies of operating 17 programs for multicultural service librarians and of evaluating programs and instructors. Regarding training programs for improving librarians' attitude and perception, particular emphasis should be placed on fostering librarians' cultural competencies based on understanding and emphasizing multicultural users' language and cultural diversity.

2.3. Professional Development and Training for Librarians in Virtual Worlds and VR

Virtual worlds are not new spaces for libraries and librarians. Librarians, educators, and volunteers have created libraries within various virtual worlds, such as Second Life, and have provided and continue to provide access to digital collections, programs, and services (Chow et al., 2012; Dey, 2012; Grassian & Trueman, 2007; Hill et al., 2017; Mon, 2012; Webber & Nahl, 2011). Virtual worlds can also be used to provide professional development training for librarians as well as education for LIS students and pre-service librarians. Condic (2009) describes how virtual worlds can help academic librarians to develop reference interviewing skills through role-playing exercises in Second Life as well as to become comfortable with virtual worlds and other Web 2.0 technologies. Condic (2009) also suggests that Second Life could be used for diversity training and mentoring between senior and new librarians. While some participants noted difficulties using the virtual environment, Bertini and Budassi (2010) found that virtual learning can be used for emergency planning training for librarians and archivists.

Webber and Nahl (2011) describe their efforts teaching and training LIS students in Second

Life. Within Second Life, their students conducted reference interviews, gave presentations, created exhibits, planned and executed events, programs, and conferences, and led virtual tours with Second Life residents (actual users) and other students. Webber and Nahl (2011) found that students in Second Life developed a variety of professional librarian skills, such as event planning, collaboration and communication, networking, reference interviewing skills, digital content creation, marketing and community engagement, experience with new information technologies and information environme nts, among other useful skills and knowledge. They argue that virtual worlds are important for sustainable LIS education because of the increasing number of virtual learners (both LIS students and library users); the need for sustainable and dynamic libraries that can develop and provide digital services; international opportunities for learning, collaboration, and professional development; and opportunities to develop digital tools, content, and virtual learning spaces that can be freely shared with virtual world users around the world. Webber and Nahl (2011, p. 13) conclude that virtual world librarianship offers "significant benefits in distance learning, reaching nonusers, communic ating and collaborating with international communities, recruiting students, and greater accessibility for disabled users."

While librarians and libraries have been active in virtual worlds, there appears to be little, if any, work published on using virtual reality to train librarians, whether practicing or pre-service. In contrast, libraries, particularly academic libraries, are using virtual, augmented, and other extended reality technologies to support library services and instruction as well as collaboration and training across disciplines and professions. Lund and Wang (2019) found that using VR in library instruction may improve both students' academic performance and engagement. Hahn (2018) describes a case where librarians collaborated with computer science undergraduate students to create a multiple user VR experience that allowed libraries to view and use digital content from the HathiTrust Digital Library. This experience also incorporated communication tools to enable librarians to perform reference services within VR (Hahn, 2018).

Lessick and Kraft (2017) and Moore et al. (2018) discuss how VR and related technologies are being used in health sciences and academic libraries to train doctors, physicians, public health workers, and other medical professionals on how to plan and prepare for surgeries, visualize data, improve information searching, practice interacting with patients, among other important skills. Napa, Moore, and Bardyn (2019) found that academic librarians can collaborate with and support medical professionals by providing and facilitating VR technology and adequate spaces to use them as well creating digital repositories of VR content that can be used for training. Of particular interest to this study, Castello et al. (2021) describes two empathy-based VR projects at Temple University Libraries: one to help nursing students better understand patients' perspectives and another to help social work students to understand the difficulties of those facing homelessness (Castello et al., 2021).

3. Methodology

3.1. Selection Process

We conducted a case study method to analyze the design features of VR simulation for the public librarian training. For the case study, it was crucial to determine the scope of selecting simulations, which should be a head-mounted-display (HMD) based virtual reality training system. Three criteria were applied for the selection process. First, it should be designed to train professional development. Mainly, the program aimed to provide situational cases to communicate with virtual avatars. This criterion is related to the purpose of this study to delineate the outline of public librarian training solutions. The primary requirement of the training is to facilitate communication skills with visiting library users in public libraries. Second, the VR simulation should have an anthropomorphic design of the virtual avatar, increasing the authentic interaction for the client conversati on. The human-like appearance of the avatar is essential to empower the communication not only because of verbal interaction but also non-verbal interaction, including gestures and feelings of the avatar. Last, the simulation should not be based on simple-response interaction but multiple responses by the avatar to communicate with the users. The variety of responses by the avatar is essential to amplify the social presence of the users. Although there are various methods to implement the multiple responses, it is not considered to apply the selection criterion because it is a matter of technical aspect of the simulation.

In the selection process, we sampled three simulations with the reviews of how each simulation is working with theoretical evidence of publications in academia. The selected cases were VR training simulations for other professionals - nurses, dentists, and teachers. All the authors agreed and selected three examples satisfying the selection criteria. Three cases of VR training simulations for other service-oriented professions: nurses, teachers, and dentists. The examples should provide useful insights for the design, development, and implementation of VR-based training for librarians to develop their empathy, cultural competency, communication, and other critical skills needed to support their careers and communities. The cases satisfied the criteria for training simulation. We reviewed the features of VR simulation implemented by the public librarian by reviewing the selected VR simulation by the analysis frameworks.

3.2 Analysis Framework

An expert review method was applied with two steps in the data analysis. First, the authors involved multiple reviews in setting up the analysis framework to delineate the design features of professional development for the public librarians. A brainstorming session was held with the authors, comprising an interdisciplinary focus group, to elaborate on specific characteristics of the selection criteria. We concluded three pertinent analytic aspects for this case study to address, as follows:

1) What would be vital theoretical assumptions?
2) How is the interactive design working with the avatar?

3) What would be the design principles of the virtual learning environment?

Second, three subject matter experts (SMEs) among the authors discussed until they reached a consensus on the three characteristics from the selected cases. The SME discussion was to ensure triangulations in analyzing the cases. SMEs played as an investigator to analyze the key characteristics of the cases. The SMEs had a workshop to sensitize the framework to follow consistently. Once they completed the session to discuss, they conducted in-depth reviews in pairs with the selected cases. The SMEs recalibrated the reviews intermittently for consistency.

3.3 Selected Cases

We selected three professional training simulations for this study: 1) SimCARE for nursing education; 2) SimDANVI for dental training simulation; and 3) SimTEACHER for pre-service teacher training. While these cases are focused on different professions, they require effective interaction and communicat ions with persons and communities with diverse backgrounds, much like librarianship. As such, reviewing cases from other service-oriented professions that require communication, empathy, and cultural competency can provide insights for the development of VR training simulations for public and other types of librarians.

First, SimCARE stands for Simulation for Culturally Appropriate care in Real-life Episode. SimCAR E is designed to enhance cultural competency. Nursing education is one of the representative fields where the use of VR simulation is intensely considered for student training purposes (Marja & Suvi, 2021). According to Chae and her colleagues (2021), health professionals are expected to provide culturally competent care to multicultural populations with the rapid migration growth in South Korea. In addition, their communication, competence, and the establishment of reliable relationshi ps with patients have become the most common challenges (Chae et al., 2018). Chae and her colleagues (2021) recently conducted a literature review investigating the effectiveness of VR simulation in enhancing cultural competence in nursing education. They concluded that VR simulation provides several advantages for learning the appropriate care for migrants, mainly that it can be an effective learning intervention in the era of a pandemic. In particular, a co-research team of the Department of Nursing with the Department of Education at Chonnam National University recently unveiled SimCARE, an acronym for Simulation for Culturally Appropriate care in Real-Life Episode, which aims at enhancing cultural competence for nursing students (Ryu et al., 2021).

Second, SimDANVI stands for Simulation of Dental Avatar for Narrational Virtual Interaction. It is a VR simulation for dental education designed to promote clinical motor skills with VR controllers and enhance empathy and communication skills with a virtual child patient (Kim et al., 2020). Dental education is one of the fields that recently have paid close attention to the use of VR simulation for the past few years (Imran et al., 2021; Li et al., 2021; Moussa et al., 2021; Nassar & Tekian, 2020; Towers et al., 2019). The primary purpose of VR dental simulations is to enhance motor skills (Joda et al., 2019) because hand techniques are necessary (Lee, 2018) in dental education. Thus, a haptic-based VR simulation became a core element of the development of VR dental simulation. However, empathy and communication skills can also be considered for various dental education reasons. Amini et al. (2021) showed a scripted VR simulation where users take the role of an

English-speaking caregiver who needs to communicate with a Spanish-speaking child who seeks dental care with limited socioeconomic resources. In addition, dental anxiety and phobia are the most frequently encountered problems in dental offices, so communication skills, rapport, and trust-build ing are essential for dentists (Appukuttan, 2016).

Third, SimTEACHER stands for Simulation for Teaching Enhancement of Authentic Classroom beHavior EmulatoR (Park & Ryu, 2019). The simulation is to train the pre-service teacher. SimTEACHE R is one of the most representative VR simulations for pre-service teacher training. Teachers face a wide variety of problem situations in school, so teaching simulation has attracted attention for the past two decades because it provides pre-service teachers with great opportunities to train their teaching strategies, classroom management skills, and communication skills (Kim et al., 2020). SimTEA CHER contains several authentic scenarios where pre-service teachers can interact with virtual students in each scenario. For instance, as seen in Ryu and Kim (2020), pre-service teachers are asked to communicate with students who have negative attitudes toward teachers. A more recent version of SimTEACHER showed a scenario of a parent-teacher conference (Kim et al., 2021) that aims to enhance pre-service teachers' empathy and communication skills.

3.4 Design Elements of VR Prototype

Based on the case review, we present the VR prototype to train the public librarians for the cultural competencies. The prototype includes the scenario structure, virtual human avatars, scene creations. Each question is related to the following questions. The VR prototype will show how the application would be look-like.

1) Scenario structure: It is to present job requirements in systematic ways while it helps the users experience authentic situation. We applied a step-wised model from the review cases.

2) Virtual avatar: It is to provide avatars in the VR simulation. The avatars amply the cultural situations which can be happened in the public library. In the prototype we proposed virtual avatars.

3) Virtual environment design: We reconstructed university library in the virtual environment. The library is based a recently opened build, and it represents spatial structure in a very realistic manner. Construction of the virtual model in the VR simulation was completed using Unity3D. The original model was developed by 3DMAX, we transformed the models into the VR simulation.

4. Findings

4.1. Theoretical Background: Scenario-Based Learning

The selected VR simulations provide various situations to practice communication in the places of the professions. The primary goals of simulations were to interact appropriately for each context of the VR simulations. Given the real-life situations in VR, the users can practice a highly authentic learning experience. The practical training method creates highly immersive experiences. The significan t theoretical background of VR simulations was scenario-based learning (SBL), which is extensively

used in online training as a popular instructional strategy.

As it uses real-life situations VR simulations, reviewed in this study, SBL is an instructional method to support authentic learning in contextual circumstances (Mehall, 2021). A well-designed SBL is developed by a concrete theoretical framework that illustrates the order of behaviors in authentic scenarios. In addition, subject matter experts participated in the validation phase of the developed scenarios. For instance, SimCARE employed the two communication models; BATHE (Background, Affect, Trouble, Handling, Empathy) (Markova & Broome, 2007) and LEARN (Listen, Explain, Acknowledge, Recommend, Negotiate) (Berlin & Fowkes, 1983). Those models help design authentic scenarios where users communicate with culturally diverse patients empathically and efficientl y. Six nursing professionals and two migrants validated the scenarios in SimCARE.

In the scenario of SimDANVI, a 4-year-old pediatric patient, who is afraid of dental treatment, refuses dental treatment and whines. The scenario was designed and then validated by pediatric dentists, and they emphasized that it is a pervasive situation where pediatric dentists need to treat and comfort pediatric patients. In the case of SimTEACHER, The Seven-Phase Model for Describing Acting-Out Behavior (Colvin & Scott, 2014) was considered in the scenario development phase. Among the seven phases (clam - triggers - agitation - acceleration - peak - de-escalation - recovery), four stages (triggers-agitation-acceleration-peak) were selected to simplify authentic situations. In-servi ce teachers validated various problematic scenarios in schools.

4.2. Design of Human-like Avatars and Virtual Learning Environment

Designing realistic virtual human avatars is one of the primary concerns to improve immersiveness and realness in the visual stimulus. Avatars with unnatural appearance may hinder users from being absorbed in the scenario situations. Hence, developers focus on designing the appearance based on the avatars' characteristics determined by the scenarios. **Figure 1** shows the virtual human avatars in SimCARE (A), SimTEACHER (B), and SimDANVI (C). Their appearance, clothes, even speech tone were determined by their characteristics assumed by the developed authentic scenarios. In consideration of the age and gender of the avatar, an authentic human voice was recorded and used.

Fig. 1. Virtual Human Avatars (A: SimCARE, B: SimTEACHER, C: SimDANVI)

The spatial design of a virtual learning environment is another crucial factor that can make users immerse themselves in the situation. As visual stimuli, environment design includes multiple resources, such as background materials, 3D objects, and even sunlight. Auditory stimuli, such as sound effect

and background music, are also considered to make the situations more authentic. **Figure 2** presents the virtual environments of SimCARE, SimTEACHER, and SimDANVI. The real environments were visited to take pictures, researched online, and investigated to imitate as much as possible. During the construction of the virtual environment, feedback from experts was reflected in the process of selecting the virtual environment' floor plans and 3D interior objects.

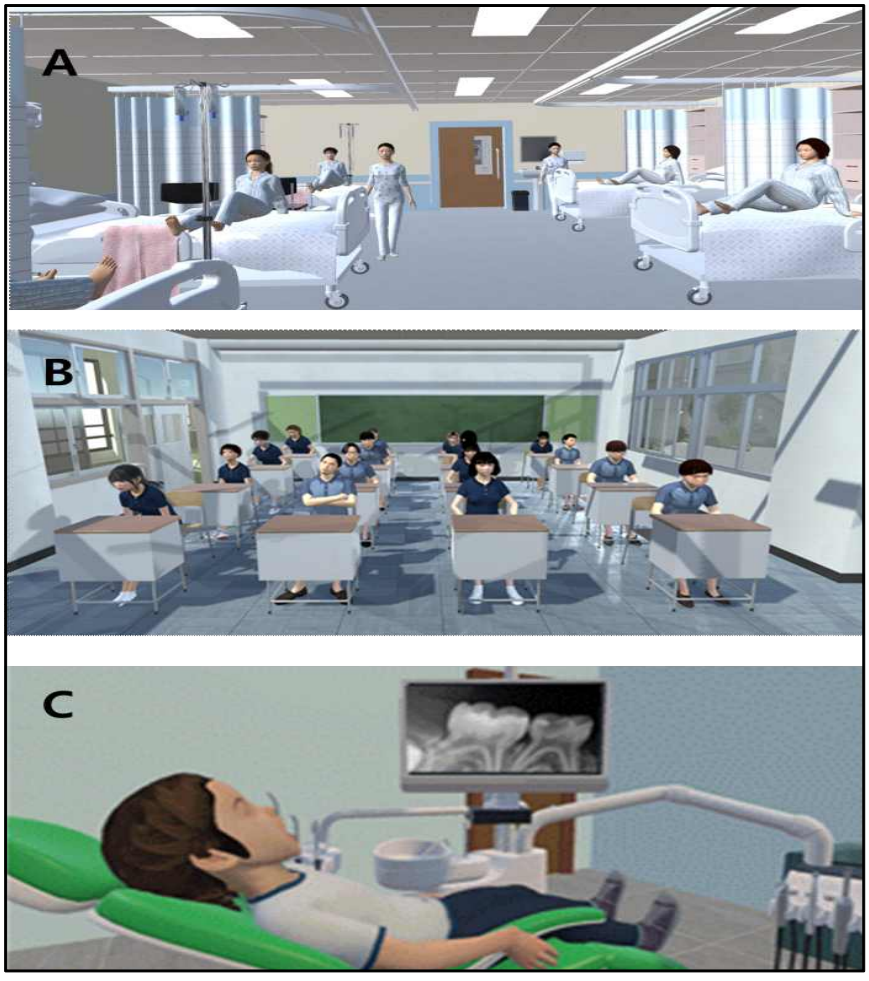

Fig. 2. Virtual Environments (A: SimCARE, B: SimTEACHER, C: SimDANVI)

4.3. Interactive Communication Design

Interactive design is crucial for the users to provide an authentic experience of interacting with virtual avatars in the virtual environment. For the response design in SimCARE, we implemented a visual interface to select a user response among the plausible answers in a certain circumstance. The user can pick one response among the three response options in a simulation situation (see **Figure 3**. A). The advantage of this message design is to display a clinical dialogue on the screen

while the user can hear auditory information. However, the users can increase the interaction with sub-menu functions on the left-wrist shown in **Figure 3**. B. In SimTEACHER and SimDANVI simulations, a moderator operates the avatars' verbal/gesture response by keyboard. A moderator executes the most appropriate avatar response to the user's reactions to proceed with the interaction between the avatar and the user. The keyboard was coded to activate the recorded avatar's response and gestures when pressing the keyboard, thus the moderator could press the keyboard to elicit the avatar's pre-set response. Picture C in **Figure 3** is an experiment scene of SimDAVNI (left: a moderator, right: a user). This picture shows how this simulation is operated.

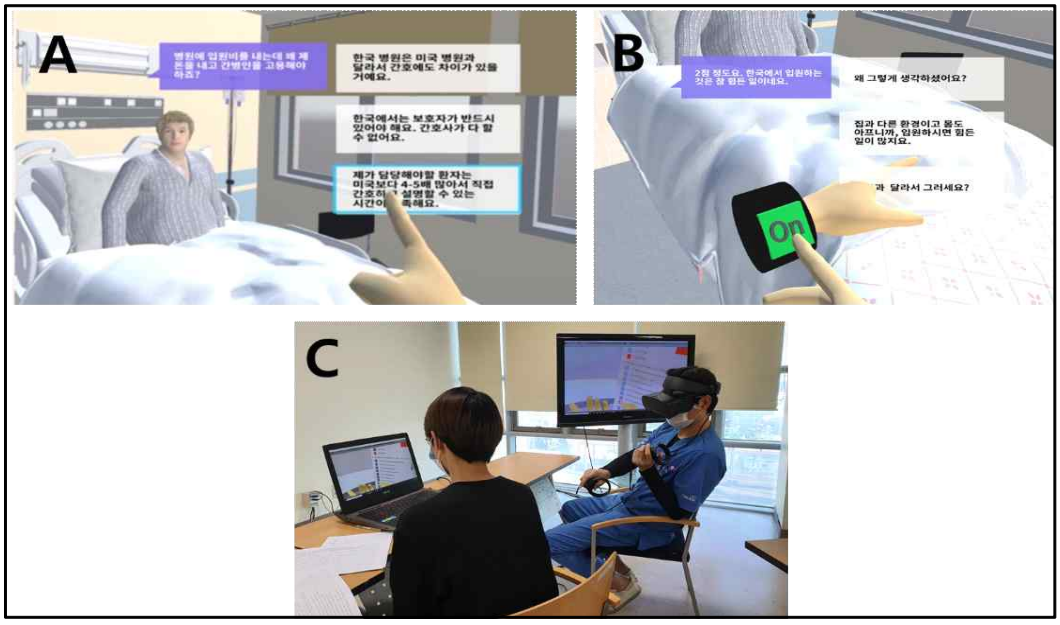

Fig. 3. Interaction with Virtual Avatars (A and B: SimCARE, C: SimDAVNI)

4.4. Prototype of VR Simulation

As described in the design elements of VR prototype, three features were implemented. First, we applied the scenario structure with four steps. The purpose of this prototype is to enhance authentic situations by providing a systematic approach for the users: pre-service librarians. To achieve this purpose, we applied a five-stage model for the scenario structure. This model helps a user to understand the situation. **Figure 4** shows LEARN model which stands for Listen, Explain, Acknowledge, Recommend, and Negotiate (Berlin & Fowkes, 1983). This scenario structure should capture crucial requirements as a public librarian while the problem situation brings concrete behaviors, and goals can be achieved through the achievement of each step in the model. Thus, scenarios have their objectives achieved by the users following the steps of model. The following description of each step shows what to do for each step.

Fig. 4. LEARN Model for Scenario Structure

1) *Listen: Librarians identify the needs of the patrons with diverse backgrounds. In this stage, the librarians actively listen to the patron's requests with empathy and understand their potential difficulties in expressing their needs. Their needs could be about how to find the books, how to use the library services, and how to use the library facilities, but the librarian should not make assumptions about what the patrons need.*
2) *Explain: Librarians communicate with the patrons to explain and confirm the librarians' understanding of the patron's requestions or information needs. This requires active communication or conversation with the patron to make sure the librarian correctly understands the patron's needs.*
3) *Acknowledge: Librarians acknowledge and understand that cultural or lingual differences may cause communication issues or misunderstandings. In this stage the librarians may need to acknowledge their own limitations and seek help from other libraries or librarians. This step could occur concurrently with the 'explain' step.*
4) *Recommend: Librarians examine what resources or services they can provide and make appropriate recommendations based on the patron's needs and context. In addition to providing the requested information, they may also provide instruction on how to use the library's catalog, databases, or mobile app, or how to sign up for library membership, services, or programming.*
5) *Negotiate: If the patron is unsatisfied with the recommended resources or services or needs additional information or assistance, librarians must again communicate with the patron to negotiate and clarify their needs so that the librarian can provide relevant resources and services. In this case, the librarian should be willing to change their search strategy or restart the process if needed to provide solutions that are aware of and account for the needs of the patron and their cultural or situational context.*

The model LEARN model can also be related to the Reference and User Services Association's (RUSA, 2013) guidelines for reference and information services. RUSA (2013) recommends that librarians to: (1) be visible and approachable; (2) express interest in the needs and wants of the library patron; (3) actively listen and ask questions to clarify the patron's needs; (4) use an effective strategies to search for and present information to the library patron; and (5) ensure that the patron is satisfied with the results and feels welcome to ask for more help or information. When providing reference services, such as a reference interview, librarians must be able to effectively communicate with patrons to identify their needs, change search approaches and find additional information as needed, and provide explanation or instruction on how the information was or could be found

(Markey, 2019; RUSA, 2013).

Second, we developed virtual avatars to represent various cultural features. **Figure 5** shows the examples of virtual avatars. There are two considerations for designing avatars, (1) appearance and (2) personality. Appearance is an important part of creating realistic simulations that emulate the cultural diversity of the real world. It can be achieved by adding features to the virtual avatar such as gender, outfits, cultural artifacts, age, skin color, hair colors and styles, etc. The second design consider is personality of the avatars. However, the personality cannot be displayed but presented with the scenario.

Fig. 5. Examples of Virtual Avatars for Diverse Groups

Third, we applied a real library for developing the virtual environment design. **Figure 6** shows the comparisons between realistic pictures and virtually created environment. The virtual learning environment provides some places to practice the required competencies thoroughly. It is important to select the places to create authentic situations in a high-fidelity virtual environment. **Figure 6** shows how the prototype is transformed into the virtual learning environment by comparing a real place and virtual created in the prototype.

This prototype is built to validate the design features of VR simulation for the librarian training. To facilitate the VR training effectiveness, we emphasize two crucial design perspectives: (1) interactive design for authentic experience. The VR simulation is supposed to provide the opportunity to face and solve the situational problems in public libraries for cultural issues. The prototype provides the trained personnel with an opportunity to manage the situations thoroughly. (2) immersive factors by the similarity between real and virtual places. It is crucial to increase the virtual presence when a user gets into the virtual environment. The VR simulation should be able to create immersive perception with high realness in the virtual learning environment.

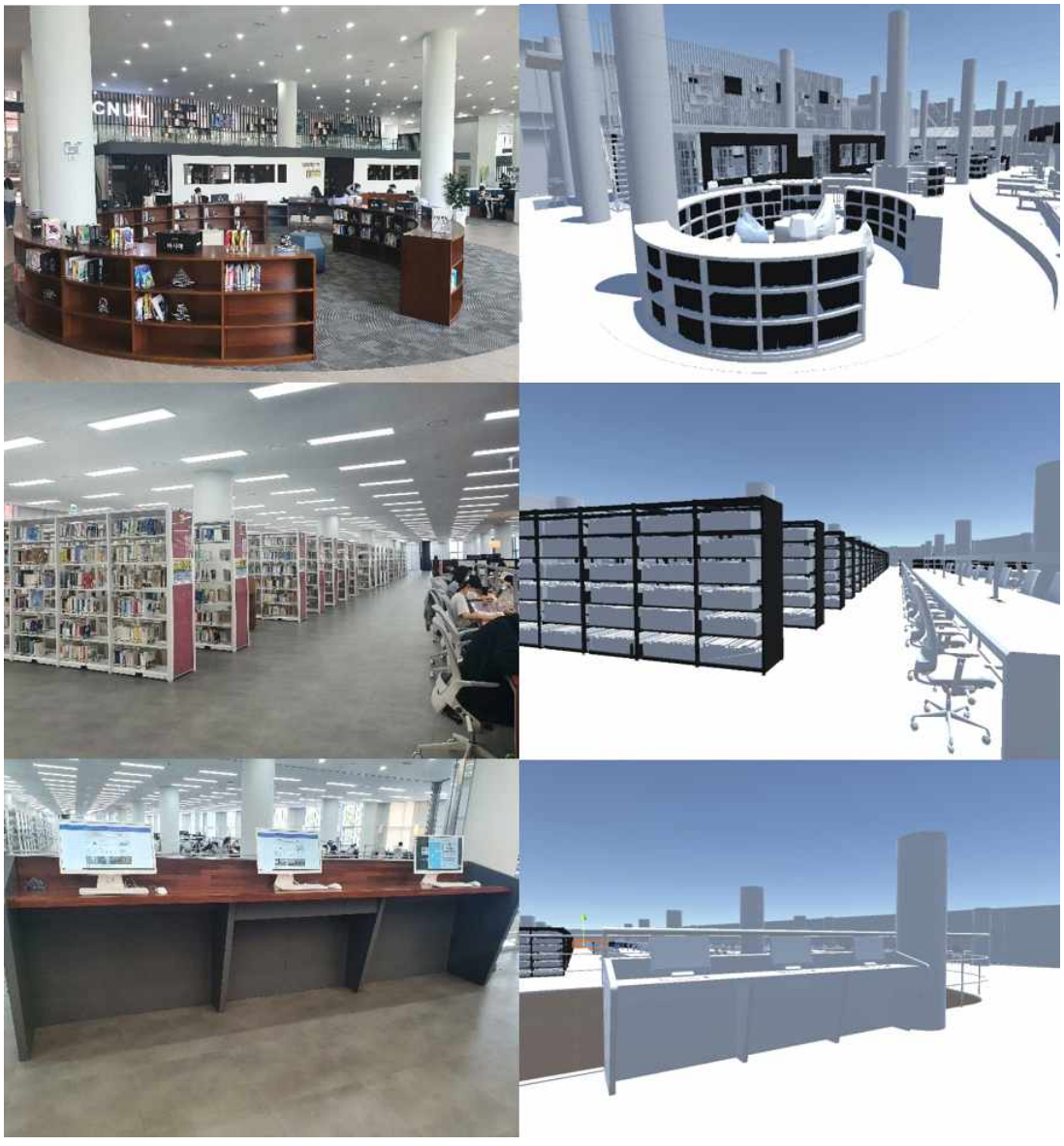

Fig. 6. Virtual Learning Environment Prototype

5. Discussion

5.1. VR Simulation for Building Empathy in LIS Research and Practice

Cultural competencies, empathy, and communication skills are not just for multicultural services, they are fundamental baseline skills for all librarians. Through a series of focus groups, interviews, and a case study with public librarians and public library users, Birdi et al. (2009) found that

empathy is important for communication between library users and staff regardless of their first language. However, their findings suggest that teaching librarians to be empathetic may be difficult due to individual differences, ideologies, and willingness, as some librarians are resistant to change. They discuss another consideration from their literature review and findings: whether empathy is an innate, intuitive ability, or a cognitive skill that can be taught. Birdi et al. (2009) suggest that rather than focusing on empathy directly, librarian training that focuses on building cultural awareness may also simultaneously increase their ability to empathize with people with different cultural backgroun ds. However, they caution against only including empathy in cultural awareness training because it may make it seem like a skill and extra effort only to be applied when dealing with marginalized groups or people from different backgrounds, when in fact, it is useful for effectively interacting with library users and fellow library staff members of all backgrounds and across myriad contexts.

As such, professional development programs, not just VR training simulations, focused on improving empathy, communication, and cultural competency should be refined and expanded across contexts and include considerations for marginalized persons, including people of color, women, immigrants, non-local languages speakers, LGBTQIA+ community members, religious minorities, disabled persons, financially disadvantaged persons, persons experiencing homelessness, seniors, and persons in rural areas or that otherwise face geographical, transportation, or access issues, children and young people among others. Phillips (2017) notes that in addition to being seen as sources of information and instruction, librarians also provide social, emotional, and psychological support to young library users, and that empathy can help youth feel more welcome and secure in the library as well as enhance librarians' abilities to provide said information and instruction. Phillips and Anderson (2020) argue that empathy is helpful for supporting young neurodivergent young library users, who are more prone to being bullied. Since public librarians in South Korea continuously rotate job positions in 2−3-year intervals, all librarians, both in- and pre-service, should be prepared to interact and serve diverse community members (Chang & Lee, 2017; Koo et al., 2020).

During the COVID-19 pandemic, many library services were successfully transformed into online, digital versions. While the pandemic will, hopefully, end, online and/or combined online and face-to-fac e forms of library collections and services as well as professional development and, perhaps, LIS education in South Korea are likely to remain popular and in demand due to their convenience and accessibility. As the National Library of Korea (2021) plans, innovative education platforms and programs using AR/VR/MR and Metaverse should be developed. Recommendations of this and subsequent research should be helpful for designing VR and extended reality-based training simulations and education programs for pre-service and practicing librarians as well as library users and LIS educators that can be offered online or in physical settings.

Of course, there are a variety of other issues and challenges associated with VR and other extended reality technologies for librarians and LIS educators to consider. These include, and are not limited to, cost, lack of content, accessibility, health and safety, data privacy, security, and intellectual property (Clark & Lischer-Katz, 2020; Colegrove, 2018; DuBose, 2020; Kroski, 2021; Lee et al., 2020; Van Arnhem et al., 2018; Varnum, 2019). While most of these issues and challenges are outside the scope of this particular study, they warrant continued research and should still be addressed to better facilitate the use of VR and other extended reality technologies for use in training and

education as well as library collections and services.

5.2. Suggestion for designing educational programs with VRS

The potential requirements of VR simulation for the public libraries are conversational interactions with the virtual avatar to enhance social presence with library users in the context of a public library. The librarians can facilitate the application process and critical thinking by providing real-life situations. We suggest two design factors for the instructional strategies of scenario-based learning. First, it is essential to identify contextual needs in the public library in communicating with library users. There are considerable gaps between an education setting and a realistic job setting. These gaps in training for librarians are made all the more difficult. While professionals have relied on competencies of real-life skills, little has been done to integrate these gaps into educational training to prepare student librarians for the classroom. Thus, it is vital to bridge the lack of continuing job-related competencies to create authentic situations.

Second, it is essential to research to enhance realistic spatial perceptions in the Virtual Learning Environment. In the VR simulation, the users navigate through the virtual learning communication. A highly immersive virtual learning environment enhances a spatial presence. The virtual learning environment makes it easier to engage the users, librarians, which then facilitates immersion into the virtual experience (VE). Therefore, suspension of disbelief should be considered when assessing spatial presence.

6. Conclusion

6.1 Challenges with VR, Empathy, and Cultural Competence

Given its immersive and perceptual aspects, Milk (2015) argues that VR has potential to be an ‘ultimate empathy machine’. However, some scholars are skeptical or cautious about accepting such claims so early. Moroz and Kroll (2018) caution that more research on the short- and long-term impacts of VR on empathy are needed, specifically regarding whether empathetic cognitive activity stimulated by VR is the same as real world stimuli and whether using VR over extended periods of time could lead to emphatic burnout or desensitization. Hargrove et al. (2020) found that VR experiences may not lead to greater changes in empathy than embodied empathy exercises, physical, in-person role-playing activities, suggesting that VR is not necessarily the best nor sole means for encouraging empathy development. As such, VR training simulation developers and educators should not rely solely on the immersive characteristics of VR, but curate, create, and use meaningful VR content.

Nakamura (2020) warns that VR documentaries about the lives and experiences of people of color made by white Westerners may instill in white audiences a false sense of empathy and a feeling that they are part of solving the problem simply by interacting with the VR media, resulting in the audience feeling as if they have taken action to address injustice or inequality when they

have not and are unlikely to do so. Gruenewald and Witteborn (2022) similarly argue that humanitarian VR films are more about providing emotional support and a sense of global citizenship to the audience from a safe distance rather than lead to action or a nuanced understanding of the geopolitical factors that lead humanitarian problems. While these issues are discussed in the context of VR films, they should be considered in the development of VR training simulations.

In the context of using VR for empathy training of nurses, Dean et al. (2020) argue that the long-term impact of the training matters most: that nurses should remain curious and communicative with patients about their experiences and feelings, and not just focus on what a certain type of patient are supposed or likely to feel. Additionally, components of empathy, such as empathy-based guilt and personal distress, have been associated with burnout and compassion fatigue in nurses (Duarte & Pinto-Gouveia, 2017) and social workers (Thomas, 2013). Regarding healthcare professionals, Slatten et al. (2011) suggest that reassignment of patients, mentoring programs, training, and, especially, a compassionate organizational culture can help address compassion fatigue.

As such, VR training simulation developers and educators should consider short- and long-term impacts of the training and strive for experiences that encourage trainees to not just feel better about themselves and the situation, but to incorporate empathy and cultural competency into their personal and professional lives, leading to meaningful engagement, taking action, and making changes to address issues related to inequality, inequity, and injustice. As discussed above, this suggests that empathy, communication, and cultural competency skills are important across contexts and all types of libraries and should be trained as such. Additionally, VR training developers and educators should address the negative aspects and possible outcomes of empathy and include strategies and tools for librarians to lessen these issues.

6.2. Suggestion for designing educational programs with VRS

The purposes of this study are to review related literature and analyze example cases of VR training simulations for service-oriented professionals and to provide useful guidelines and recommendations for designing VR-based training programs for public librarians to promote cultural competencies, empathy, communication, and other critical skills. Three VR training simulations, developed for nurses, dentists, and teachers, respectively, were reviewed and analyzed. From the analysis, three foundational elements for designing and developing VR simulations were identified: authentic scenario-based learning; realistic virtual human avatars and learning environment; and an interactive communication design. Through multiple scenario-based simulation programs with rich interaction using virtual avatars, practicing and pre-service librarians as well as LIS educators and library users may be able to develop empathy, communication, and cultural competency skills. For maximizing the benefits of VR-based training, close attention and specialized techniques are required in creating realistically anthropomorphic avatars and virtual environments. As discussed, training simulations should also be concerned with the negative outcomes related to empathy, such as burnout and compassion fatigue, as well as the limitations of VR technology, such as cost and accessibility.

While this study did not develop or implement VR-based training, it lays the groundwork to do just that; the research team hopes to create and evaluate VR simulations for teaching empathy,

communication, and cultural competency skills to public librarians soon. Given increasing diversity and the advent of the metaverse and Fourth Industrial Revolution, teaching practicing and pre-service librarians about empathy, communication, and cultural competence through an effective medium like VR will help prepare them for successful careers in the twenty-first century. We hope that core findings and recommendations from this analysis may be a useful guide for designing VR-based professional development for librarians at any type of libraries as well as to promote other skills that promote cultural competence, reduce biases and prejudice, build rapport with library users, and to integrate those skills into the everyday work of the library, from instruction, reference, and collection development, to programming, community engagement, and marketing. As such, VR training simulations may help librarians and libraries to become more socially inclusive.

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