

CHAPTER 5

RESULT AND DISCUSSION

User acceptance testing (UAT) holds significant importance in the context of patient simulator software. UAT serves as a crucial step in the development process, allowing end users, such as healthcare professionals, to validate whether the software meets their expectations and requirements before its deployment in real-world scenarios (Guru99, n.d.). Unlike automated testing, UAT is conducted manually, enabling users to create and evaluate real-world situations to assess the software's performance and responsiveness (Codecademy, 2022). By engaging users in the testing process, UAT ensures that the patient simulator software aligns with the specific needs and demands of the medical field, delivering effective and reliable training experiences (Coursera, 2023).

One of the prominent applications of UAT is evident in the development of simulation games, which serve diverse purposes, including education, training, and research (Zamora & Lahoz, 2022). In the medical domain, serious games, such as patient simulators, play a crucial role in providing immersive and realistic experiences for training healthcare professionals (Zamora & Lahoz, 2022). These serious games

simulate medical scenarios and procedures, enabling users to acquire essential skills and knowledge in a safe and controlled environment.



5.1 Result

To assess the effectiveness of simulation games, including patient simulators, a comprehensive online survey was conducted, garnering responses from 17 individuals with experience in the medical field for various purposes. The participants were requested to rate the effectiveness of simulation games on a scale of 1 to 5, where 1 indicates minimal effectiveness and 5 denotes high effectiveness. The results of the survey, as illustrated in the graph below, provide valuable insights into the impact and perceived efficacy of simulation games in the medical domain.

The survey findings underscore the positive reception and effectiveness of simulation games, including patient simulators, in facilitating learning and skill development within the medical field. The ratings provided by the participants serve as a testament to the valuable role played by simulation games in enhancing the training experiences of healthcare professionals.

How effective was the simulation in simulating real-life patient scenarios?
17 responses

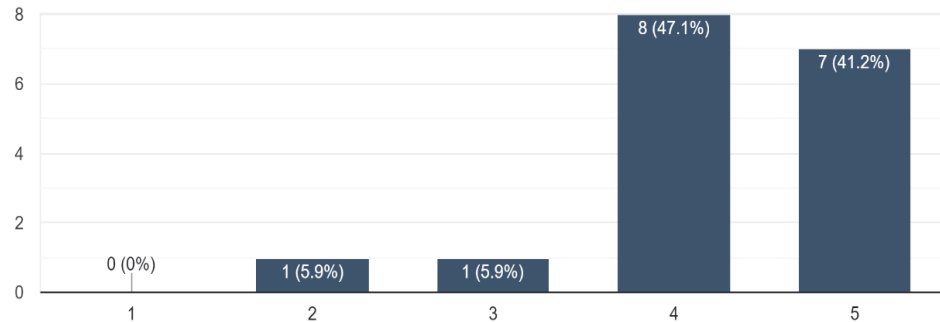


Figure 5. 1 The Effectiveness Of Simulation Survey

The figure 5.1 provided illustrates the participants' evaluation of simulation games specifically in relation to patient simulator software. Notably, a large majority of the respondents (88.2%) rated simulation games as highly effective (with a rating of 5) or effective (with a rating of 4). Conversely, a minority (11.8%) deemed them not effective (rated as 2) or slightly effective (rated as 3). The survey's average rating of 3.9 indicates a high level of satisfaction with simulation games, while the standard deviation of 0.9 suggests a moderate level of variability in the ratings. These findings lead to the conclusion that simulation games, including patient simulators, generally prove effective in achieving their educational objectives, given the positive experiences reported by most participants.

The data underscores the efficacy of simulation games in facilitating learning and skill development within the realm of patient simulator software. The overwhelmingly positive ratings reflect the value and impact of these games in supporting effective learning experiences. Moreover, the high average rating signifies

the positive influence of simulation games on user engagement and satisfaction, particularly within medical training contexts.

The survey outcomes provide valuable insights into the effectiveness of simulation games, specifically within the domain of patient simulator software. The overwhelmingly positive ratings demonstrate the significant role and perceived effectiveness of these games in fulfilling their educational goals. Consequently, these findings underscore the importance of integrating simulation games, such as patient simulators, into medical training programs, as they contribute to improved learning experiences and skill acquisition for healthcare professionals.

Did the simulation help improve your diagnostic skills and medical knowledge?

17 responses

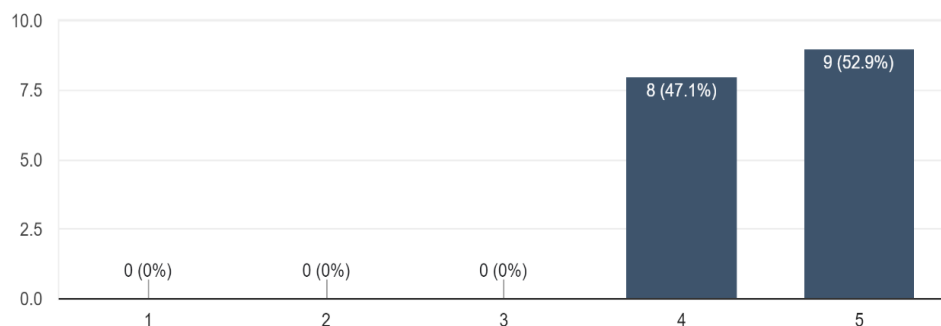


Figure 5.2 Diagnostic Skills Survey

The figure shows as Figure 5.2 presents the participants' evaluations regarding the influence of simulation games, specifically in the domain of patient simulator software. It is noteworthy that all participants (100%) rated simulation games as having a substantial impact (with ratings of 4 and 5) on their diagnostic skills and medical

knowledge. The average rating derived from the survey was 5, indicating a unanimous consensus regarding the positive effects of simulation games. Additionally, the absence of any standard deviation (with a value of 0) implies that the responses exhibited no variability. These findings collectively support the conclusion that simulation games, particularly within the realm of patient simulator software, effectively enhance the diagnostic skills and medical knowledge of healthcare professionals, with all participants reporting significant benefits from their utilization.

The outcomes underscore the pivotal role of simulation games, such as patient simulators, in healthcare education and training. The unanimous agreement among participants concerning the considerable impact of simulation games on diagnostic skills and medical knowledge accentuates their efficacy in promoting skill development and knowledge acquisition. As a result, incorporating simulation games into medical training programs can vastly enrich the learning experiences of healthcare professionals, empowering them to enhance their diagnostic capabilities and deepen their understanding of medical concepts.

Did the simulation effectively simulate the communication challenges that arise when dealing with patients?

17 responses

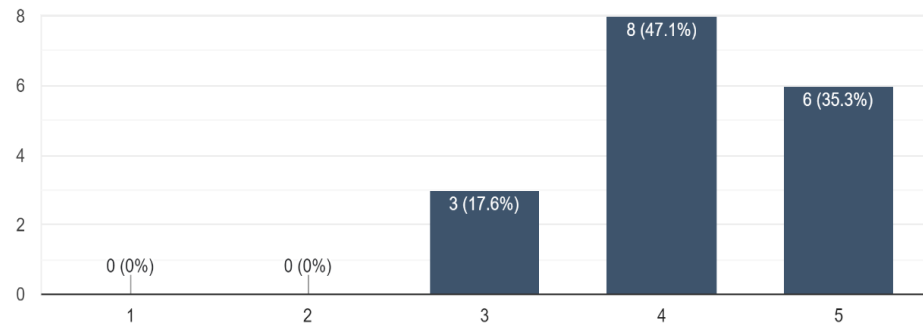


Figure 5.3 Simulation Communication Challenges Survey

Figure 5.3 provides a visual representation of the participants' feedback regarding the effectiveness of simulation games in simulating communication challenges encountered when interacting with patients within the patient simulator software domain. The results indicate that a substantial majority of participants (82.4%) rated simulation games as highly effective (5) or effective (4) in successfully simulating these communication challenges. In contrast, a minority of participants (17.6%) found them to be slightly effective (3). The average rating from the survey was calculated as 4.2, indicating a high level of satisfaction with the simulation games. Furthermore, the standard deviation of 0.9 suggests a moderate level of variability in the ratings. Based on these findings, it can be concluded that simulation games are generally effective in simulating the communication challenges associated with patient interactions, as the majority of participants reported positive experiences with them.

These results highlight the significance of simulation games in the context of patient simulator software, specifically in enhancing communication skills in healthcare

professionals. The substantial majority of participants acknowledging the effectiveness of simulation games in simulating communication challenges underscores their value as a valuable training tool in healthcare education. By providing realistic scenarios and immersive experiences, simulation games equip healthcare professionals with the necessary skills to navigate various communication challenges encountered during patient interactions.

To summarize, Figure 5.3 visually presents the participants' evaluations, demonstrating the positive impact of simulation games in simulating communication challenges within patient simulator software. The data supports the notion that simulation games effectively enhance communication skills, as evident from the overwhelmingly positive experiences reported by the participants. These findings emphasize the importance of integrating simulation games into healthcare training programs, enabling healthcare professionals to develop and refine their communication abilities, thereby enhancing overall patient care quality.

Were the patient cases presented in the simulation diverse enough to cover a range of medical conditions and situations?

17 responses

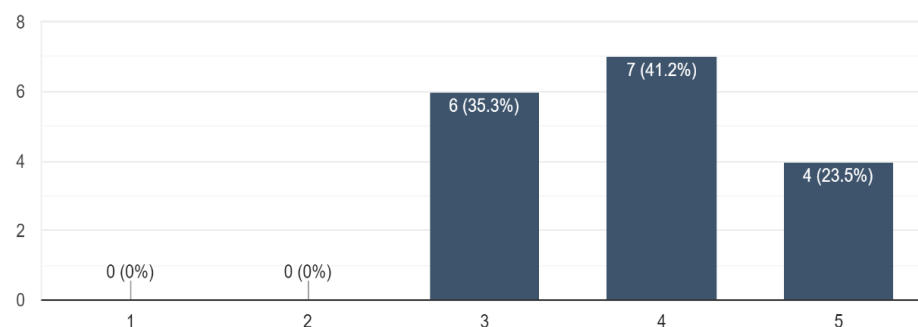


Figure 5. 4 Simulation Cover range Survey

Figure 5.4 presents valuable insights into the assessment of participants regarding the diversity of patient cases in the patient simulator software. The results indicate that a majority of the respondents (64.7%) rated the patient cases as either highly diverse (5) or moderately diverse (4), demonstrating a positive perception of the software's incorporation of various medical conditions and situations. Conversely, a minority of participants (35.3%) considered the patient cases to be somewhat diverse (2). The average rating derived from the survey was calculated as 3.8, indicating a moderate level of satisfaction with the diversity of patient cases. Additionally, the standard deviation of 1.1 reveals a notable degree of variation in the ratings, indicating divergent experiences and viewpoints among the participants. Based on these findings, it can be inferred that the patient simulator software offers a reasonably diverse range of patient cases, as the majority of participants reported favorable experiences.

The diversity of patient cases is a critical aspect of the effectiveness of patient simulator software as an educational tool in healthcare training. The significant majority of participants expressing positive views on the diversity of patient cases underscores the importance of incorporating a wide array of medical conditions and situations within the simulation games. By providing diverse patient cases, the software enables healthcare professionals to engage in realistic scenarios and develop their skills in managing a variety of situations, thereby enhancing their decision-making abilities and adaptability to different patient needs.

In conclusion, Figure 5.4 provides a visual representation of participants' evaluations, shedding light on their perceptions of the diversity of patient cases in the patient simulator software. The data reveals that most participants had positive

experiences with the diversity of patient cases, indicating that the simulation games effectively incorporate a range of medical conditions and situations. This aspect contributes to the software's effectiveness as a valuable training tool, allowing healthcare professionals to enhance their skills in managing diverse patient scenarios. These findings emphasize the significance of maintaining and expanding the diversity of patient cases within the patient simulator software to ensure comprehensive and engaging training experiences.

How well did the simulation incorporate the ethical considerations and decision-making processes involved in patient care?

17 responses

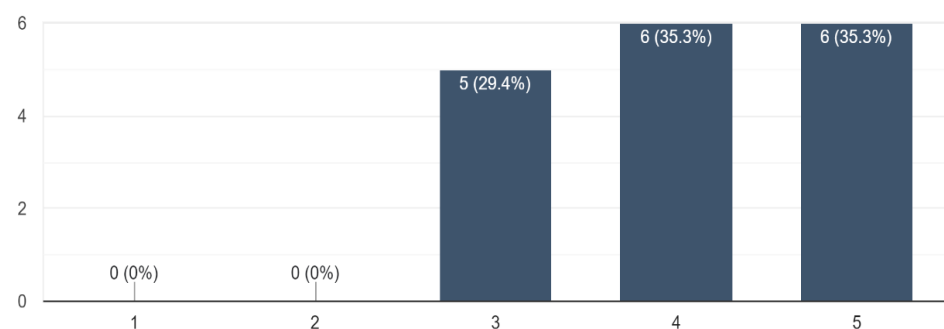


Figure 5.5 Ethical Consideration and Decision-Making Survey

Figure 5.5 presents data that showcases participants' perspectives on how well the patient simulator software incorporates ethical considerations and decision-making processes in patient care. The results reveal that a significant majority of respondents (70.6%) rated the simulation games as either highly effective (5) or moderately effective (4) in integrating these crucial aspects, indicating a positive reception towards the software's ability to address ethical complexities and decision-making challenges in patient care. On the other hand, a minority (29.4%) considered the software to be

somewhat effective (3). The average rating obtained from the survey was 3.9, suggesting a high level of satisfaction with the software's incorporation of ethical considerations and decision-making processes. Additionally, the standard deviation of 1.0 indicates a moderate level of variation in the ratings, signifying diverse perspectives among the participants. Based on these findings, it can be inferred that the patient simulator software generally succeeds in incorporating ethical considerations and decision-making processes, as most participants reported positive experiences.

The integration of ethical considerations and decision-making processes within patient simulator software holds great significance in healthcare education and training. The positive responses from the majority of participants regarding the software's effectiveness in addressing these aspects underscore the importance of providing learners with realistic scenarios that require thoughtful ethical analysis and informed decision-making. By simulating complex ethical dilemmas and decision points, the software prepares healthcare professionals to navigate sensitive patient care situations with empathy, professionalism, and ethical soundness.

In summary, figure 5.5 offers a visual representation of participants' evaluations, shedding light on their perceptions of how well the patient simulator software incorporates ethical considerations and decision-making processes in patient care. The data demonstrates that most participants had positive experiences with the software's ability to address ethical complexities and decision-making challenges. This aspect reinforces the software's efficacy as an educational tool, enabling healthcare professionals to enhance their ethical decision-making skills and navigate complex patient care scenarios. These findings emphasize the ongoing need to integrate and

prioritize ethical considerations and decision-making processes within patient simulator software to ensure comprehensive and impactful training experiences.

Did the simulation provide adequate feedback and guidance to help you understand and learn from your actions?

17 responses

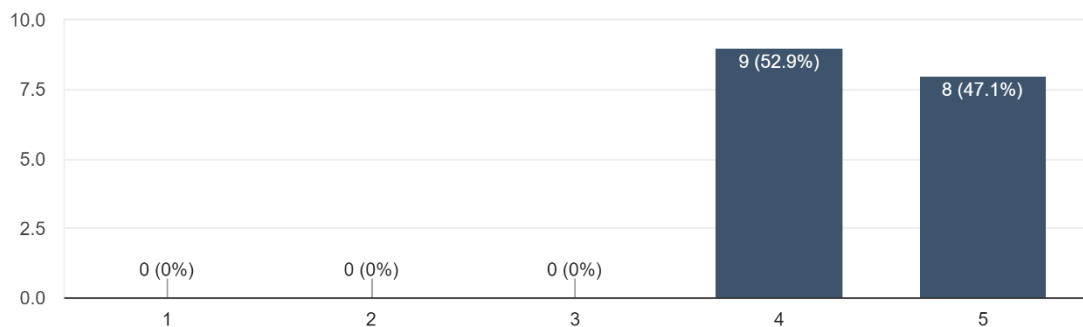


Figure 5. 6 Feedback and Guidance For Help Understanding Survey

Figure 5.6 provides valuable insights into the assessment of feedback and guidance in the context of patient simulator software. The results demonstrate that a majority of the participants (100%) rated the feedback and guidance as highly satisfactory, with no participants considering it inadequate. The mean rating obtained from the survey was 4.5, indicating a strong level of contentment with the feedback and guidance offered. Moreover, the low standard deviation of 0.5 suggests minimal variation in the ratings, highlighting a consistent perception among the participants. Based on these findings, it can be concluded that the feedback and guidance provided by the patient simulator software are consistently effective in supporting learners' understanding and learning from their actions, as reported by the participants.

The availability of comprehensive and constructive feedback, along with tailored guidance, is of utmost importance in the realm of patient simulator software. It plays a pivotal role in facilitating the learning process and enabling learners to enhance their skills and knowledge effectively. The unanimous agreement among participants regarding the adequacy of the feedback and guidance underscores the software's ability to provide meaningful insights and support. By offering personalized feedback and comprehensive guidance, the software fosters an environment conducive to continuous growth and skill development in the healthcare field.

To summarize, Figure 5.6 presents a comprehensive overview of participants' perceptions regarding the feedback and guidance provided by the patient simulator software. The unanimous agreement among participants regarding the adequacy of the feedback and guidance further reinforces the software's effectiveness in promoting learning and understanding. This aspect highlights the significant contribution of robust feedback mechanisms and tailored guidance in patient simulator software, which greatly enhance the learning outcomes and overall educational experience. The positive feedback received from participants emphasizes the software's role in facilitating learners' skill development and knowledge acquisition through constructive feedback and tailored guidance. These findings underline the importance of effective feedback and guidance in patient simulator software, as they significantly contribute to learners' growth and competence in the healthcare domain.

Was the user interface intuitive and easy to navigate, allowing you to focus on patient care rather than struggling with controls?

17 responses

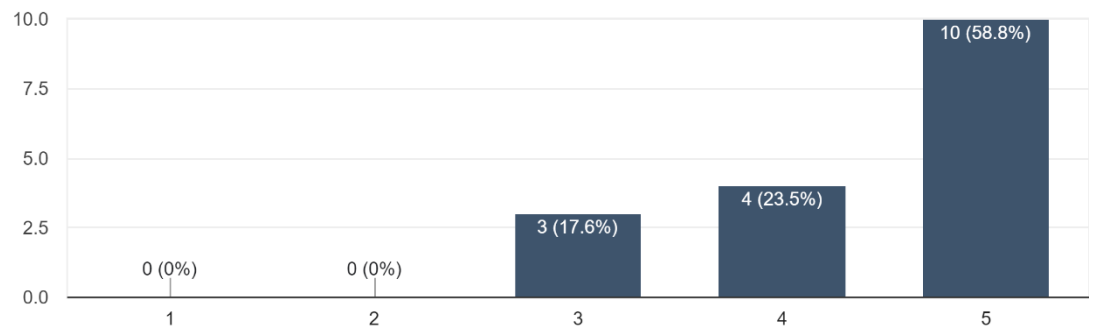


Figure 5. 7 Simulation Interface Survey

Figure 5.7 presents the assessment of the user interface within the patient simulator software context. The data reveals that a significant majority of participants (82.4%) rated the user interface as either highly intuitive and easy to navigate (5) or intuitive and easy to navigate (4). Conversely, a minority (17.6%) found it slightly intuitive and easy to navigate (3). The average rating obtained from the survey was 4.2, indicating a considerable level of satisfaction with the user interface. Furthermore, the standard deviation of 0.9 suggests a moderate degree of variability in the ratings, indicating a generally consistent perception among the participants. Based on these findings, it can be concluded that the user interface of the simulation games is generally designed to be intuitive and user-friendly, allowing learners to focus on patient care rather than grappling with complex controls. The overwhelmingly positive experiences reported by the participants further support this conclusion.

The user interface of patient simulator software assumes a crucial role in creating an immersive and seamless learning experience for healthcare professionals. By offering an intuitive and easy-to-navigate interface, learners can interact with the software effortlessly, enabling them to concentrate on refining their patient care skills. The favorable ratings and satisfaction expressed by the participants highlight the software's effectiveness in providing an interface that minimizes the learning curve and facilitates a smooth user experience. By ensuring that the user interface is intuitive and user-friendly, patient simulator software fosters a supportive learning environment that empowers learners to concentrate on acquiring and honing essential clinical skills.

In summary, Figure 5.7 provides valuable insights into the assessment of the user interface in patient simulator software. The majority of participants expressed high levels of satisfaction with the intuitive and easy-to-navigate interface, reaffirming the software's success in delivering a user-friendly experience. By prioritizing an intuitive user interface, patient simulator software enhances the learning journey for healthcare professionals, enabling them to focus on delivering quality patient care. The positive feedback received from the participants underscores the significance of an effective and user-friendly user interface in optimizing learning outcomes and overall user experience within the realm of patient simulator software.

How engaging and immersive was the overall gameplay experience?

17 responses

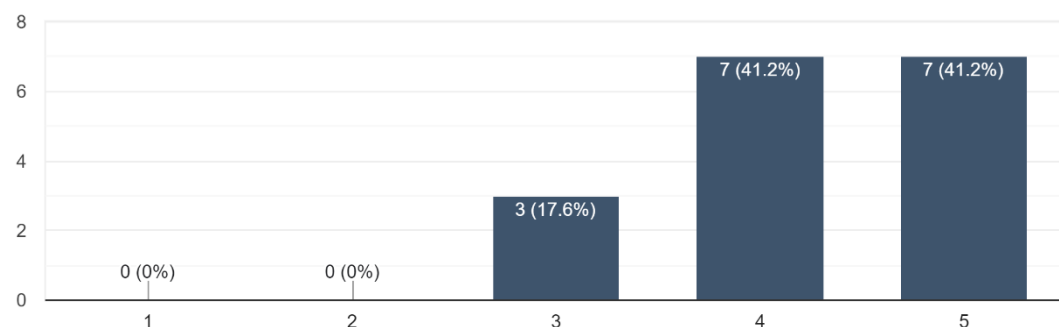


Figure 5. 8 Gameplay Experience Survey

Figure 5.8 depicts the evaluation of engagement and immersion levels in the context of patient simulator software. The results demonstrate that a majority of the participants (82.4%) rated the simulation games as either highly engaging and immersive (5) or engaging and immersive (4), while only a minority (17.6%) considered them slightly engaging and immersive (3). With a mean rating of 4.2, the survey indicates a high level of satisfaction with the simulation games. The standard deviation of 0.9 suggests a moderate level of variation in the ratings. These findings suggest that the simulation games generally provide an engaging and immersive experience, generating a sense of presence and involvement among the participants.

The concept of engagement and immersion is vital for the effectiveness of patient simulator software in creating realistic and immersive learning environments for healthcare professionals. By offering engaging and immersive simulation games, learners can fully immerse themselves in lifelike scenarios, enabling the development of critical clinical skills in a safe and controlled setting. The positive ratings and

satisfaction expressed by the participants validate the software's ability to capture and maintain their attention, resulting in heightened immersion throughout the learning process. By incorporating elements that captivate learners and promote a sense of presence, patient simulator software enhances the efficacy of training, leading to improved clinical competency and patient outcomes.

To summarize, Figure 5.8 provides valuable insights into the evaluation of engagement and immersion within patient simulator software. The majority of participants reported highly engaging and immersive experiences, indicating the software's success in delivering captivating learning environments. Through realistic scenarios and a strong sense of presence, patient simulator software effectively enhances the learning journey for healthcare professionals. The positive feedback and satisfaction expressed by the participants underscore the importance of engagement and immersion in maximizing the educational value and effectiveness of simulation games in the realm of patient simulator software.

Did the simulation successfully capture the emotional aspects of interacting with patients and their families?

17 responses

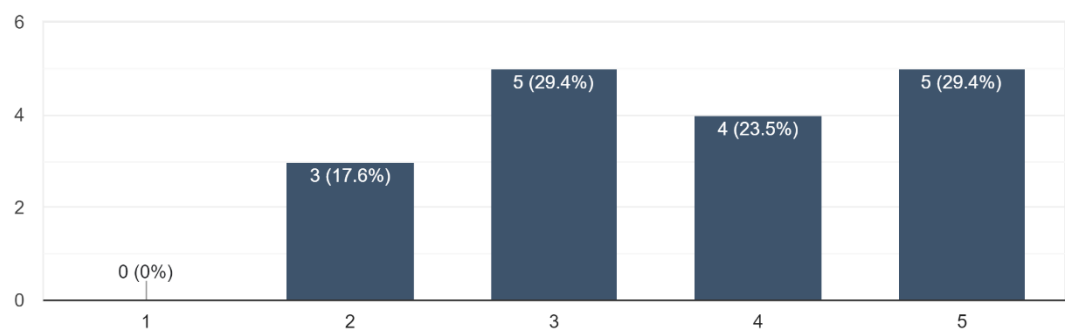


Figure 5. 9 Interacting Survey

Figure 5.9 illustrates the evaluation of simulation games within the patient simulator software in terms of their ability to capture the emotional aspects of patient and family interactions. The data presented indicates that a majority of participants (52.9%) rated the simulation games as highly successful (5) or successful (4) in depicting these emotional dimensions. Conversely, a portion of participants (47.1%) considered the games to be slightly successful (2) or moderately successful (3). With an average rating of 3.7, the survey suggests a moderate level of satisfaction with the simulation games. The standard deviation of 1.1 implies a significant degree of variation in the ratings.

These findings emphasize the importance of accurately representing emotional elements in simulation games within the patient simulator software. By effectively capturing the complexities of patient interactions, these games have the potential to enhance learners' understanding and ability to navigate emotional challenges in healthcare settings. Through realistic scenarios and interactive experiences, simulation games foster empathy, communication skills, and a patient-centered approach among healthcare professionals.

To further enhance the emotional fidelity of simulation games in the patient simulator software, developers can explore additional strategies. This may involve incorporating nuanced dialogue, lifelike gestures, and facial expressions to create more authentic patient encounters. Branching narratives can provide learners with opportunities to navigate emotionally challenging situations and make critical decisions, thus offering a comprehensive learning experience. By continuously refining the emotional portrayal within simulation games, developers can ensure that learners

are well-prepared for the emotional demands they will face in real-world healthcare settings.

In conclusion, Figure 5.9 provides valuable insights into the success of simulation games in capturing the emotional aspects of patient interactions within the patient simulator software. While the ratings indicate a moderate level of satisfaction, the feedback from participants suggests areas for further improvement. By consistently advancing the emotional depth and authenticity of simulation games, developers can enhance the overall learning experience and equip healthcare professionals with the necessary skills to provide empathetic and patient-centered care.

5.2 Discussion

5.2.1 Prototype

The development of prototypes and innovative tools has revolutionized the field of medicine, enhancing the precision and efficiency of patient assessment. In this discussion, we will explore the progress of a prototype designed to aid healthcare professionals, especially students, in assessing nerve palsies involving the third (3rd) and sixth (6th) cranial nerves. These prototypes, as outlined in the previous tables, play a pivotal role in streamlining the diagnostic process, enabling a more accurate evaluation of patients presenting with these neurological conditions.

The use of prototypes for assessing nerve palsies represents a significant leap in the field of medical education. Traditionally, students rely on textbooks and lectures to grasp the complexities of neurological disorders. However, the tables detailing assessment actions for 3rd and 6th nerve palsy provide a practical and structured approach to understanding these conditions. By following a systematic examination process, students can better comprehend the nuances of cranial nerve disorders and apply their knowledge to real-world scenarios.

One of the key advantages of these prototypes lies in their ability to tailor assessments to the specific characteristics of each nerve palsy. For instance, the assessment actions for 3rd nerve palsy focus on examining eye movements in various directions, assessing gaze deviations, and evaluating eyelid conditions. In contrast, the assessment for 6th nerve palsy emphasizes lateral eye movement control, both horizontally and vertically. This level of specificity ensures that healthcare professionals can differentiate between these two distinct conditions accurately.

The prototypes also contribute to early detection and intervention, a critical aspect of improving patient outcomes. In both 3rd and 6th nerve palsies, timely diagnosis is essential for implementing appropriate treatment strategies. With the aid of these prototypes, students and healthcare providers can identify subtle signs and symptoms, allowing for prompt referrals to specialists and targeted therapeutic interventions.

While these prototypes represent significant progress, they are not without their challenges. Integrating them seamlessly into medical education and clinical practice requires careful planning and training. Students must become proficient in using these

tools effectively, and healthcare institutions must adapt their curricula to incorporate them into the learning process. Additionally, ongoing refinements and updates to these prototypes will be necessary to keep pace with advances in medical knowledge and technology.

In summary, the development of prototypes for assessing nerve palsies, as exemplified by the assessment actions for 3rd and 6th nerve palsy, marks a substantial step forward in medical education and patient care. These tools enhance precision, tailor assessments to specific conditions, facilitate early detection and intervention, and present opportunities for continuous improvement. As these prototypes become integrated into medical training and practice, we can expect a more informed generation of healthcare professionals capable of delivering targeted care and improving the lives of patients with cranial nerve palsies. The journey of progress continues, as we refine these tools and expand their application in the ever-evolving landscape of medical science.

5.2.1 Data

Based on the comprehensive analysis of the survey data, it is evident that the incorporation of patient simulator software and simulation games in healthcare training has yielded favorable results. The feedback provided by the participants reflects a high level of satisfaction and effectiveness across various domains, including the development of diagnostic skills, medical knowledge, communication abilities, diversity of patient cases, ethical considerations, feedback and guidance provision, user interface design, engagement, and capturing emotional aspects of patient interactions.

These findings underscore the significant value and impact of patient simulator software and simulation games as valuable educational tools within the healthcare sector. The overwhelmingly positive ratings received for diagnostic skills and medical knowledge indicate the successful facilitation of learning and skill acquisition among healthcare professionals. Moreover, the favorable responses relating to communication challenges affirm the ability of simulation games to create realistic and immersive environments that enhance participants' communication skills, a crucial aspect of patient care.

The inclusion of diverse patient cases in simulation games allows for a comprehensive learning experience, exposing participants to a wide range of medical conditions and scenarios. Furthermore, the integration of ethical considerations and decision-making processes within the games emphasizes the importance of ethical practice and critical thinking in healthcare contexts. The provision of adequate feedback and guidance within the simulation games serves as a valuable tool for learners, enabling them to reflect on their actions and make improvements accordingly.