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Theme Session 7D
Learning, teaching and assessment strategies

7Di, 10:30 - 12:15, 3 September 2021
Research paper
The effectiveness of a simulation game on Nursing students' clinical reasoning skills
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Promotional abstract: The purpose of this study was to evaluate the effectiveness of a simulation game on Nursing students' clinical reasoning skills. The results revealed that mean scores in post-test were higher than in pre-test, indicating that participants rated their clinical reasoning skills better after playing than before playing the simulation game. Therefore, it is recommended to use simulation games in learning clinical reasoning in Nursing Education.

Background, including underpinning literature and, wherever possible, the international relevance of the research: Students should be able to practice clinical reasoning regularly since especially first year students have difficulties in demonstrating the process of clinical reasoning. Utilising game elements in virtual simulations, the phases and steps in the clinical reasoning model can guide learners through the clinical reasoning process. Previous research concerning the use of simulation games in Nursing education mainly focused on students' experiences about learning through gaming or developing games for educational purposes. Research about the effectiveness of simulation games on Nursing students' clinical reasoning skills is still very limited.

Aim(s) and/or research question(s)/research hypothesis(es): The purpose of the study was to evaluate the effectiveness of the simulation game on Nursing students' clinical reasoning skills. Research questions:

- How were students' clinical reasoning skills before and after playing the simulation game?
- How have clinical reasoning skills changed between pre-test and post-test?
- What is the relationship between students' characteristics and self-evaluated clinical reasoning skills?

Research methodology/research design, any ethical issues, and methods of data collection and analysis: The study took the form of a quasi-experimental design with pre-test-post-test measurements. All participants attended a one-week intervention. There was no control group. Participants consisted of nurses, nurse-deaconesses, paramedics, midwives and Public Health Nursing students (n = 378). The Clinical Reasoning Skills scale (CRSs) was used in this study. The data was collected in three universities of applied sciences in Finland (1.3.2018 - 31.5.2019) in two phases: before and after intervention. The students were instructed to play each of the five surgical patient scenarios at least once, but the number of played scenarios and the playing time was not limited. The data was analysed using descriptive statistics and multivariable analysis.

Key findings and recommendations: A little less than half of the respondents were in the age group 21–25. The majority were female. The largest group of respondents were Nursing students. Statistically significant differences were found between gaming activity and background variables. Men played more non-digital and digital games than women. Participants with a practical nursing background played fewer educational games than participants with an upper secondary school background. Nursing students played more non-digital, digital games and educational games than Midwifery students. The results revealed that mean scores (difference between means) in post-test were higher than in pre-test indicating that participants rated their clinical reasoning skills better after playing than before playing the simulation game. The difference was statistically significant in almost all 25 items.

Conclusion: Results showed that playing the simulation game had a positive impact on students' self-rated clinical reasoning skills. Despite regional and cultural differences, clinical reasoning skills are common competencies appropriate for professionals, and thus the simulation game could be applicable across international educational systems. In the future, clinical reasoning skills should be investigated using objective measures, such as analysing students' performance in the simulation game by using game data.

Three key points to indicate how your work contributes to knowledge development:

- The contribution of this study has been to confirm the effectiveness of simulation games for clinical reasoning skills.
- This work contributes to existing knowledge of using serious games in Nursing Education by providing an understanding of what characteristics of students affect self-rated clinical reasoning skills.
- This study lays the groundwork for future research into proving that simulation games are a valid teaching method in Nursing Education.

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Keywords: Clinical Reasoning Skills, Effectiveness, Simulation Game, Nursing Students, Quasi-Experimental.

Innovation paper
Using immersive video to develop empathy in Mental Health Nursing students within simulated practice sessions
Laura Hollinshead and Victoria Sweetmore, University of Derby

Promotional abstract: This session will provide an outline of the immersive video case study used to humanise the lived experience of patients and encourage empathy and critical thinking in Mental Health Nursing students at the University of Derby. The session will provide an overview of the approach taken to develop the case study and deliver as part of simulated learning through both face-to-face and online delivery. It will provide an overview of the evaluation data gathered from students and discuss applications of the approach within other Health disciplines.

Background, context and evidence base for the innovation, including, where possible, its international relevance: There are two fundamental issues within teaching Nursing students. Addressing the theory-practice gap (Carson & Harder, 2016) and the development of empathy (Bas-Sarmiento *et al.*, 2020). The use of 'simulation' has become a popular practice to overcome these problems (Brunero *et al.,* 2010). There are, however, challenges with sustaining this approach with costly equipment, limits to its availability, suitable teaching spaces and ever-increasing class sizes (Carson & Harder, 2016). Some educators have turned to technology to assist in overcoming these challenges with the use of video technology becoming a popular cost-effective option (Snelgrove *et al.*, 2016).

Aim/focus of the innovation: Through simulation students can reflect critically on their actions, allowing them to apply their knowledge to patient care and helping them link theory to practice through their exposure to active learning situations (Felton & Wright, 2017). The experiential learning this provides students has been shown by several studies to help develop clinical reasoning (Herron *et al.*, 2019), complex decision making (Felton & Wright, 2017), self-confidence (Jefferies & Rizzolo, 2006), and empathy (Brunero *et al.*, 2010). In 2019, the Mental Health Nursing Team at the University of Derby created a project to explore the use of immersive video to help bring to life the experience of a mental health patient and their journey within the healthcare system.

Implementation of the innovation: A case study was created around a generic patient 'Sam' and set at several key points within the patient journey, e.g. pre-admission, admission onto a ward, an experience in a communal area and a multi-disciplinary meeting. Subject matter experts including healthcare practitioners, Experts by Experience (ex-patients) and academic staff all contributed in different ways to ensure an authentic patient case study was created. The case study was filmed using a combination of point of view (POV) video and 360° video, enabling the viewer to see through the eyes of the patient, helping them to consider how the experiences they see might make them feel.

Methods used to assess the innovation: Delivered within a classroom setting and online as part of simulated learning, the case study videos were used to immerse students within the patient experience. Getting them to consider how the experience they see might be felt by the patient, developing empathy for their situation and experiences, and going on to critically examine the healthcare practitioner's role within this experience. Through watching and re-watching the videos and engaging in debate and dialogue with their peers and academic staff, students can consider the importance of compassion-focused and person-centred care helping to humanise the lived experience of the future patients they will care for. The use of the videos within the simulated learning session was evaluated through a questionnaire.

Key findings: Responses demonstrated an increased confidence in understanding the lived experience, empathy, and critical reflection on how their practice contributes to the patient's experience. Students also felt that as a result of this experience they would make changes to their practice and had made them consider aspects of patient care and treatment they had not previously considered. A similar approach to the one taken could help to support interprofessional learning across health disciplines, with further case studies exploring the relationships between different health professionals and how they contribute collectively to the patient experience. At the university we can see the potential for this in subject areas such as Occupational Therapy, Social Work and other areas of Nursing.

Three key points to indicate how your work contributes to knowledge development within the selected theme:

- Use of video case studies to immerse students into the patient experience.
- Developing empathy in students through humanising the lived experience of patients.
- Designing sustainable and scalable technology-based solutions for simulated learning.

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Keywords: Immersive, Simulation, Empathy, Humanising, Video.

HeARtbeat: An augmented reality application for immersive learning of Cardiology
Professor Kevin Moffat, University of Warwick

Promotional abstract: HeARtbeat©2020 is an augmented reality (AR) application (App) that realistically portrays a beating heart in its normal state and abnormal state (atrial fibrillation). Pharmacy and Biomedical Science students consistently commented that the causes of atrial fibrillation and its treatments, compared to other heart diseases, are difficult to comprehend. The App was developed as a technology-based strategy to continuously improve the teaching effectiveness and students' learning experiences. Users are able to interact with the heart model in real-time while navigating through the content of the App that presents information from Basic Sciences (Anatomy, Physiology, Pathophysiology) and Pharmacology to clinical application.

Background, context and evidence base for the innovation, including, where possible, its international relevance: In this context Pharmacy and Biomedical Science students consistently commented that the causes of atrial fibrillation (an international health issue) and its treatments, compared to other heart diseases, are difficult to comprehend. The complexity of atrial fibrillation is likely the cause of the challenges that students face. Given academics locally and globally are being encouraged to innovate in their teaching, demonstrated the need for a novel and creative way to teach this complex subject. AR with its unique features of integrating digital information with the user's environment, provides an opportunity to convert complex knowledge into engaging, interactive, and immersive learning content.

Aim/focus of the innovation: The focus of the innovation was to proactively address the gaps in interdisciplinary learning, comprehension, analysis and knowledge application related to atrial fibrillation through the use of digital technology. An aim was to provide academics with a delivery platform (AR) that allowed students to access this interactive information on their smart phones or tablets over a 24-hour, seven-day cycle. A further aim was to provide healthcare providers (medical, nursing, paramedics, allied health) and patients to complement and contribute to both clinician and patient education needs, along with improving disease awareness and treatment, medication adherence and treatment outcomes.

Implementation of the innovation: Implementation has been through a series of agile development stages to ensure the design and development remained focused on the specific aims. Each iterative phase was evaluated by all involved in the project with feedback allowing further refinement. Code development was shared between a small number of software development personnel to ensure quality control over production. With the funding model came a number of milestones needing to be achieved and these have all been met. This innovation activity occurred in three countries/three campuses, across three continents and three time zones.

Methods used to assess the innovation:

- Proof of concept to initially demonstrate viability.
- Initial Alpha and periodic Beta testing schedules.
- Intermediate student surveys - multiple schools and campuses.
- Demonstrations to academics, healthcare clinicians and patients.
- Final product student surveys - March / April 2021 results pending.

Key findings: Initial surveys conducted showed that the HeARtbeat App was well received by students. Monash Pharmacy students noted that the novelty, the realistic heart model, and the easy-to-understand content have improved their learning. Warwick Biomedical Science students meanwhile thought that the visualisation and the learning design of the App would encourage its use. The beta version of the App has been demonstrated to and drawn interest from cardiologists and patients with positive feedback. Data would suggest that HeARtbeat is useful in supporting interdisciplinary teaching and learning, and could well serve various industries and stakeholders.

Three key points to indicate how your work contributes to knowledge development within the selected theme: Under the theme learning, teaching and assessment strategies and sub-theme of technology enhanced learning, the design, development and beginning roll out of the HeARtbeat App is demonstrating its contribution to knowledge development, using innovation in mobile, digital technology, as indicated through the increasing levels of learning effectiveness from the preliminary data gathered. Further evaluations in early 2021 will contribute further to these data and expansion of the scope of work.

As evidenced from an industry peer perspective the HeARtbeat App was awarded Gold medal in the 31st International Invention, Innovation & Technology Exhibition (ITEX 2020) held in Kuala Lumpur in late 2020.

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Keywords: Augmented Reality, Healthcare Education, Innovation.