

Gamification in Health Professions Education

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ABSTRACT

Effective clinical training for health professionals in a large health service plays a vital role in delivery of patient care. Previous training methods for clinical staff encompass didactic teaching styles. Progressive methods use interactive technology to encourage problem solving. This project explored two contemporary learning activities trialed within existing allied health and nursing training courses and developed a facilitator guide for incorporating non-traditional training methods into existing courses. Digital escape rooms and the Kahoot! Game learning platform were selected as the contemporary activities to be trialed. Results indicated that contemporary learning methods did improve participant engagement, learner motivations and overall performance in training content knowledge. Active engagement with the training content and with other learners also revealed improvement in retention and recall of training content.

Keywords: Allied health, Nursing, Interprofessional, Contemporary learning, Gamification

INTRODUCTION

The Top End Health Service (TEHS) began in July 2014, bringing together hospital, primary health, aged care and many other services across the Top End. The population of 241,196 people are dispersed over a large geographic area and present with high rates of chronic disease. Chronic conditions are linked to a complex array of risk behaviours and socio-demographic factors, the combination of which presents significant challenges to health service provision for TEHS. The core function of health professionals in TEHS is to deliver safe and quality patient centered health care services. Interprofessional practice and collaboration is critical whilst also maintaining the specialised strengths of different health professions. There is a

strong focus is on teamwork and communication which is demonstrated in the educational pedagogy of the health service. Clinical training requirements fall under several categories. Health professionals must ensure completion of all essential training requirements as a condition of employment with Northern Territory Government. Allied health and nursing professionals play a vital role in the health outcomes of patients in the Top End. Within the current multigenerational workforce, there are approximately 280 allied health professionals and 2000 nursing professionals. Effective training of these adult learners requires training content and training methods to be meaningful and engaging. Neuroplasticity of a learner changes throughout a person's lifetime. The brain of an adult human is

by no means hard wired. Learning through play is believed to create faster synapses in the brain. Adding gamification or elements of game design to a learning environment creates learning challenges and rewards completion of challenges. Game based learning has many advantages including engaging learners, increasing retention of core concepts and making dry content palatable and fun. Rewards and challenges also appeal to highly competitive learners and individuals who enjoy interacting with others. Game design is also adaptable to any subject area. In terms of health training curriculum planning, there has been numerous changes over the years beginning with SPICE model developed by Harden et al in 1984 to the PRISMS model developed by in 2001. Both models focus on a learner-directed, problem- based approach and both are utilised in the Top End Health Service in nursing and allied health training curriculums [1].

METHODS

Ethics approval for the project was granted by the Human Research Ethics Committee of the Northern Territory Department of Health and Menzies School of Health Research (HREC reference number 2019-3501).

Two current training courses were selected to trial contemporary learning activities. These courses were selected for various reasons, described below. Using a combination of SPICES and PRISMS curriculum planning models, the existing courses and facilitator guides were updated to incorporate the contemporary learning activities and how they relate to learning outcomes. Ethics for Allied Health: Traditionally this is a half day face to face training course which introduces allied health professionals to inter-professional team and organizational ethics as well as Indigenous philosophies and bioethics. Although the course has been well received since it was established, written feedback had indicated it was a dry topic and could benefit from additional group activities, interactions and case studies. Over the last 5 years, a rise in the popularity of escape rooms had been become evident. An escape room is usually defined as a live team activity in which participants solve a series of

puzzles within a specified time limit. It promotes problem based learning and use of critical thinking skills. Furthermore, from 2020 digital / virtual escape rooms have also seen an increase in popularity due to the Covid-19 pandemic. A digital escape room format was carefully selected to be incorporated into this training course as it promoted team building and critical thinking skills needed to handle ethical dilemmas in healthcare. Several online platforms for designing and building the virtual escape room were trialed. Most virtual escape rooms are designed and hosted with Google Forms however the NT Department of Health ICT policy restricts access to this platform and similar free platforms. Due to the ICT restrictions, the virtual room was built into a course container on the organization's Totara eLearning management system which can be used for asynchronous online training. The virtual room consisted of a generic ethical case study with clues built into the online room as well "virtual hints". The main aim was to answer five ethics questions and solve the dilemma. Participants were divided into two teams and each team had 10 minutes to complete the virtual room.

Figure 1 Visual Representation of the digital Ethics escape room logic
Basic Life Support (BLS) and Automated External Defibrillator (AED): This training is an essential clinical course for nursing, medical, allied health and support staff that provides the knowledge to assist professionals to improve outcomes for cardiac arrest patients. This training is divided into two components, theoretical and a practical assessment. Traditionally the theoretical component was only accessible as an hour long online PowerPoint presentation followed by a multiple choice quiz. The theoretical component is required to be completed every 12 months to keep knowledge up to date. For nursing, medical and allied health staff annual revision of the BLS and AED requirements can be challenging to complete therefore an optional change in learning style was welcomed [2].

The theoretical component of the BLS and AED training was restructured to a 30 minute training using the Kahoot! Game-based learning platform that could

be delivered face to face or via video conferencing. This platform was established in 2012 and primarily used by school age children but has since expanded into all areas of training. Over 93 studies have been conducted on the learning effect. A literature review of these studies concluded that it has a positive effect on learning performance and learner dynamics. Eighteen multiple-choice quiz questions on BLS and AEDs were designed for participants which could be accessed via the Kahoot application on their smartphone devices. Pictures, animations, music and a YouTube video were added to enhance engagement and learning. Participants were encouraged to use a nickname on the game application to remain anonymous. This removed stigma around the most experienced person expected to get the best results and any embarrassment around getting questions incorrect. If a number of questions were incorrectly answered, the facilitator provided education on important points. The participants did not need to get all questions correct as this was a learning activity and by the end of the session it was expected their knowledge had been improved [3].

Once the Ethics and BLS courses were redesigned to incorporate the contemporary activities and align with the learning outcomes for each course, they were advertised to health staff and trialed between October 2019 and June 2020.

Data Analysis: As different courses were selected for the project, a mixed method approach was utilised to collect and analyse the data. The ethics course used a written evaluation form with a numerical rating scale for pre and post ethics knowledge (1=low, 5= excellent) and an optional section for the collection of free text comments [4].

The BLS and AED course used a combination of the Kahoot! Platform and written evaluation forms. The platform itself has the inbuilt function to receive feedback from participants at the end of the session and a written evaluation form with a five point Likert scale for use of the Kahoot! application (1=disagree, 5=agree) and a numerical rating scale for pre and post BLS / AED knowledge (1=low, 5= excellent) as well as a free text section. Descriptive data analysis

was completed using Microsoft Excel and inferential analysis was done using the Graphpad software.

RESULTS

Tables 1 and 2 Summary of the courses and activities trialed.

Ethics course: A total number of 36 allied health professionals enrolled into the Ethics course from October 2019 to June 2020 and completed the evaluation forms indicating a 100% completion rate. The ethics knowledge pre-activity mean was 2.36. The mean score following the virtual escape room activity was 4.18. The two-tailed P value is less than 0.0001, this difference indicates a statistically significant improvement in ethical knowledge as a result of the training activity. Additionally, participants' reactions to the digital escape room were positive as highlighted by the comments:

"Loved the escape room (thanks!)"

"Interesting way to learn about clinical ethics through an online escape room"

"The digital escape room was fun and different"

BLS and AED: A total of 128 nursing, allied health and medical professionals' trialed the BLS and AED revised training using Kahoot!. Seventy seven evaluations were collected indicating a 60% completion rate. From Figure 2, it is evident that the Kahoot! game application provided a positive learning experience and was a recommended activity. The participants also agreed it improved their knowledge in an innovative way as demonstrated in the free text comments responses below:

"Very engaging, a great way to refresh BLS and AED" "Would love to see this used for other essential training" "Fun and engaging" "Fun way to learn about BLS."

According to Kirkpatrick's training evaluation model both contemporary activities trialed received strong positive feedback (Level 1: Reactions) and showed improvement in knowledge post activity (Level 2: Learning). With regard to Level 3 and 4 of the model i.e. Behaviour and Results (i.e. to what extent did participants change behaviour as a result of training and what organisational benefits resulted from the training), it is difficult to evaluate behaviours of participants and the impact on the workplace due to a high number of variables that can influence

these however an increase in training completion and compliance was noted with the BLS course using the Kahoot! application.

Respondents from allied health, nursing and medical streams found the contemporary learning activities to be engaging and a unique way to learn. Use of the digital escape room showed statistically significant participant improvement in content knowledge, indicating that the method was successful in achieving the desired learning outcomes. A facilitator guide was developed for course coordinators on how to incorporate digital escape rooms into existing courses and how to build digital case studies into current learning management systems [5].

Using the Kahoot! application to deliver face to face theoretical training in Basic Life Support and AED provided an alternative option for staff to complete the required annual training. It supported adult learning principles and allowed for large numbers of staff to complete training at one time in a safe environment. This assisted in improving essential training compliance to ensure safe and high quality care to patients in a cardiac arrest situation.

Limitations of this project included a 60% completion rate of the Kahoot! feedback with the most common reason being that participants had already logged off at the end of the session. The development of a facilitator guide will assist in prompting facilitators to ask for feedback early on to avoid this issue. In addition, the small sample size for the Ethics course is acknowledged. This was largely attributed to allied health staff being redeployed during the months of Feb 2020 to June 2020 due to Covid 19.

Further research is required to evaluate longer term impact on use and transfer of training knowledge to daily clinical practice. Furthermore, using a control group may be beneficial as a comparison in learning outcomes.

The feasibility of embedding gamification in health professions education was shown to be a successful alternative to traditional didactic approaches with these two courses as the time and costs involved in the development was comparable. There is a growing interest in this area and the application potential of game based learning is vast and requires further attention Figures 1 and 2.

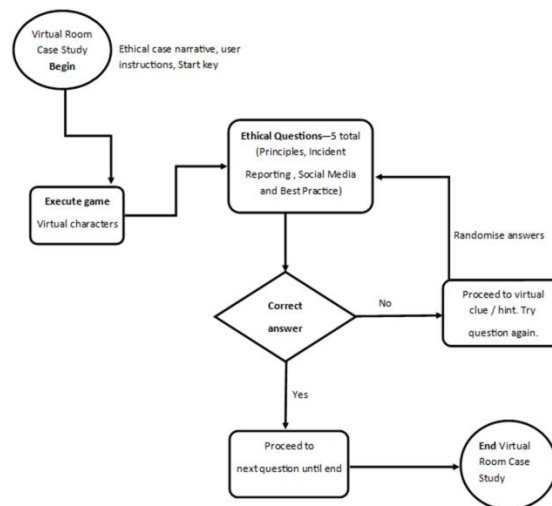


Figure 1: Visual representation of the virtual ethics escape room logic.

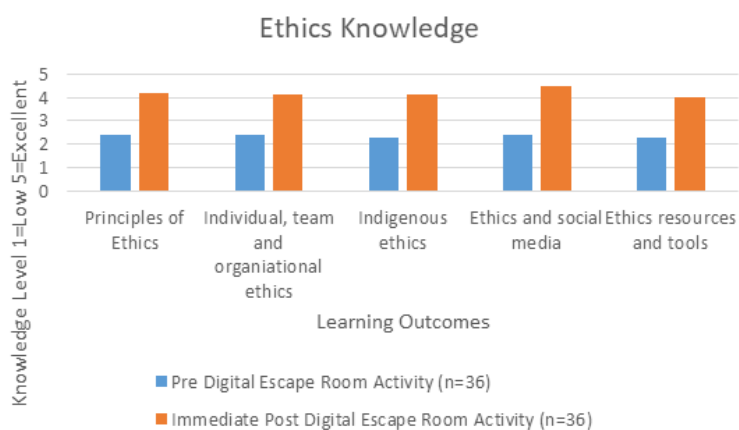


Figure 2: Ethics digital escape room pre and post knowledge.

Model Acronym		Model Acronym	
S	Student-Centred	P	Product-focused and Practice based
P	Problem based learning	R	Relevant to outcomes
I	Integrated curriculum	I	Interprofessional
C	Community orientation	S	Short courses and small group learning
E	Elective modules	M	Offered at multiple locations
S	Systematic curriculum planning	S	Symbiotic

Table 1: Curriculum Planning Models.

Training course / event	Contemporary Activity Trailed	Participant numbers and professional stream
Ethics for Allied Health	Digital escape room using Totara eLearning platform	36 allied health professionals
Basic Life Skills (BLS) & Automated External Defibrillator (AED)	Kahoot! game platform	128 nursing, allied health, and medical professionals

Table 2: Summary of the courses and activities trialed.

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