

Research

Gamification in health professions education

P. Sooful¹, Kearns, K², Moore, L³

¹ Allied Health Clinical Educator, Top End Health Service, Darwin Australia

² Nurse Education and Research Co-ordinator, Top End Health Service, Darwin Australia

³ Allied Health Lecturer, Flinders NT, Darwin Australia

Correspondence Prasha Sooful, Allied Health Directorate, Royal Darwin Hospital, Rocklands Drive, Tiwi NT 0811.

Email: Prasha.Sooful@nt.gov.au

Accepted 21 September 2020

Effective clinical training for health professionals in a large health service plays a vital role in delivery of patient care. Traditional training methods tend to be didactic whereas progressive methods are interactive. This project explored two contemporary learning activities i.e. digital escape rooms and Kahoot; trialed within existing allied health and nursing courses. 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

Cite This Article As: Sooful, P., Kearns, K., Moore, L (2020). Gamification in health professions education. *Inter. J. Acad. Res. Educ. Rev.* 8(6): 141-145

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 (TEHS Strategic Plan, 2017). The population of 241,196 people are dispersed over a wide geographic area and present with high rates of chronic disease. Chronic conditions are associated with a complex range 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 (TEHS Strategic Plan, 2017). Inter-professional 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 (Learning and Development Strategic Plan, 2017). 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 (Learning and Development Strategic Plan, 2017). 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 (TEHS Workforce Action Plan Plan, 2019). 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 (Guglielman, 2012). The brain of an adult human is by no means hard wired. Learning through play and games are believed to create faster synapses in the brain (Guglielman, 2012). Adding gamification or elements of game design to a learning environment creates learning challenges and rewards completion of challenges (Totara Gamification Guide,

2020). Benefits of gamification in education has been shown to improve learner participation and recall of core concepts by making dry content palatable and enjoyable (Totara Gamification Guide, 2020; Eukel et al 2017). Gamification incentivises learners and game design can be adaptable to any subject area. The Top End Health Service nursing and allied health training curriculums use a combination of the SPICE (Harden et al 1984) and PRISMS model (Bligh et al 2001). Both models focus on a learner-directed, problem-based approach

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 organisational 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. Recently, a rise in the popularity of educational escape rooms has been become evident (Garwood, 2019; Brown et al 2019; Clarke et al 2017). An educational escape room is typically defined as a group problem-solving activity used to promote critical thinking skills (Zhang et al 2018; Jambhekar et al 2020; Rincon et al 2019; Moore et al 2019; Wu et al, 2018). Furthermore, in 2020 digital / virtual escape rooms saw 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 (Cain, 2019), however the NT Department of Health ICT policy restricts access to this platform and similar free platforms. Due to the ICT restrictions, the virtual escape room was built into a course container on the organisation'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.

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.

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 of Kahoot! (Wang et al 2020). 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.

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.

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 AND DISCUSSION

Table 1 Summary of the courses and activities trialed

Table 1. Summary of the courses and activities trialed

<i>Training course / event</i>	<i>Contemporary Activity Trailed</i>	<i>Participant numbers and professional stream</i>
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

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.

As seen in Figure 1, 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”



Figure 1. Ethics digital escape room pre and post knowledge

BLS and AED: A total of 128 nursing, allied health and medical professionals' trialled 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”

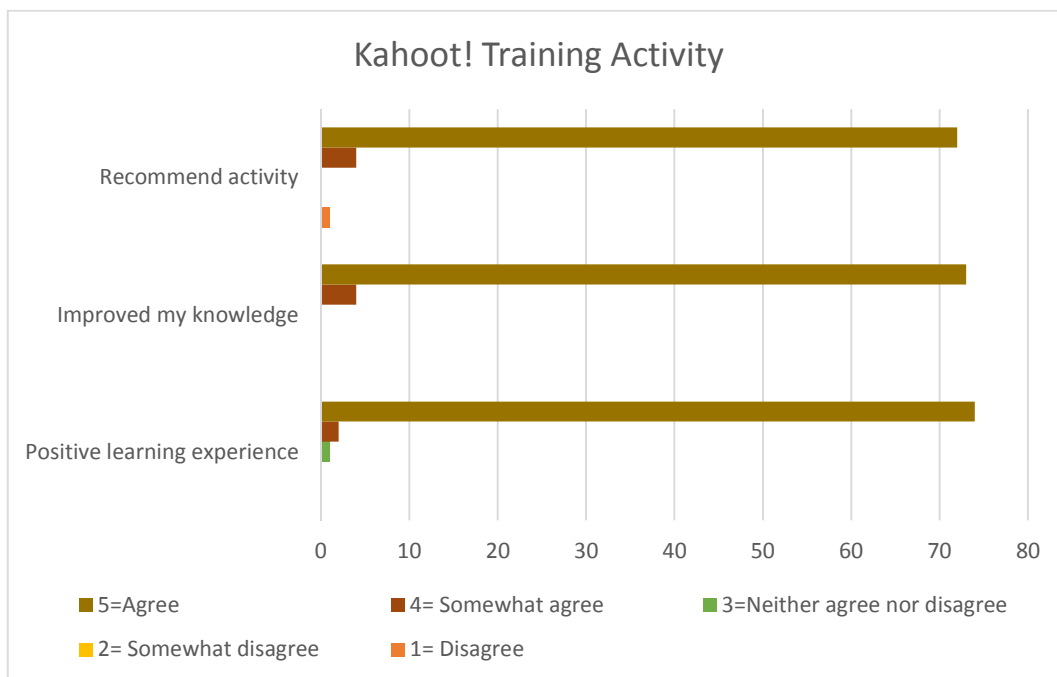


Figure 2. Kahoot! Evaluations

According to Kirkpatrick’s training evaluation model (2006) both contemporary activities trialled 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 engrossing and an unconventional 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.

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 February 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.

REFERENCES

- [1] Top End Health Service Strategic Plan 2017-2021 (2017). Northern Territory Government. Department of Health. Darwin.
- [2] Learning and Development Strategic Plan 2017-2018 (2017). Northern Territory Government. Department of Health. Darwin.
- [3] Top End Health Service Workforce Action Plan 2019-2022 (2019). Northern Territory Government. Department of Health Darwin, 2019.
- [4] Guglielman E (2012). The Ageing Brain: Neuroplasticity and Lifelong Learning. *eLearning Papers*, vol 29, pp 1-7.
- [5] Gamification Guide. (2020). Totara. <https://www.totaralearning.com/resources/how-use-gamification-improve-learner-engagement>
- [6] Eukel HN, Frenzel JE, and Cernusca D (2017). Educational Gaming for Pharmacy Students - Design and Evaluation of a Diabetes-themed Escape Room. *Am J Pharm Educ*, vol 8, no 7, pp 1-5. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC29109566/>
- [7] Harden R, Sowden S and Dunn W (1984). Educational strategies in curriculum development: the SPICES model. *Med Educ*, vol 18, no 4, pp 284-297. doi:10.1111/j.1365-2923.1984.tb01024.x
- [8] Bligh J, Prideaux D and Parsell G (2001). PRISMS: New educational strategies for medical education. *Med Educ*, vol 35, pp 520-1. doi:10.1046/j.1365-2923.2001.00984.x.
- [9] Garwood J (2019). Escape! Using an Escape Room to Promote Active Learning and Clinical Outcomes. *30th International Nursing Research Congress*, Canada.
- [10] Brown N, Darby W and Coronel H (2019). An Escape Room as a Simulation Teaching Strategy. [11] *Clinical Simulation in Nurs*, vol 30, pp 1-6, 2019.
- [12] Clarke S, Peel D, Arnab S, Morini L, Keegan H and Wood O. (2017). escapED: A Framework for creating educational escape rooms and interactive games for higher / further education. *Int J Serious Games*, vol 4, no 3, pp 73-85, 2017. doi:<https://dx.doi.org/10.17083/ijsg.v4i3.180>
- [13] Zhang X, Lee H, Rodriguez C, Rudner J, Chan T and Papanagnou D (2018). Trapped as a Group, Escape as a Team: Applying Gamification to Incorporate Team-building Skills Through an "Escape Room" Experience. *Cureus*, vol 10, no 3, pp 2256, 2018.
- [14] Jambhekar K, Pahls R and Deloney L (2020). Benefits of an Escape Room as a Novel Educational Activity for Radiology Residents. *Acad Radiol*, vol 27, no 2, pp 276-283. doi:10.1016/j.acra.2019.04.021
- [15] Rincon SXJ and Mejia AT (2019). The learning behind the escape room," *Med Teach*, vol 1, pp 480-481. doi:10.1080/0142159x.2019.1654090.
- [16] Moore L and Campbell N (2019). Novel interprofessional learning for healthcare students: An escape room pilot. *Focus on Health Prof Educ*, vol 20, no 1, pp 1 – 7.
- [17] Wu C, Wagenschutz H, and Hein J (2018). Promoting leadership and teamwork development through Escape Rooms," *Med Educ*, vol 52, no 5, pp 561-562. doi:10.1111/medu.13557
- [18] Cain J (2019). Exploratory implementation of a blended format escape room in a large enrolment pharmacy management class. *Curr Pharm Teach Learn*, vol 11, no 1, pp 44-50. doi:<https://doi.org/10.1016/j.cptl.2018.09.010>
- [19] Wang A and Tahir R (2020). The effect of using Kahoot! for learning – A literature review. *Comput Educ*, vol 149. doi.org/10.1016/j.compedu.2020.103818
- [20] Kirkpatrick D and Kirkpatrick J (2006). Evaluating Training programs: The Four Levels. *Berrett-Koehler Publishers, Inc.* San Francisco, 3rd ed.