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Research Article

# From experience to insight: Investigating first-year radiography students' experiences of the Amazing Radiography Race through the Gibbs reflective cycle

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## ABSTRACT

**Introduction:** The clinical environment can be intimidating for first-year university students, particularly those without prior exposure through job shadowing. A student's first hospital experience is therefore crucial in shaping motivation and commitment to their chosen career path. Traditional hospital orientation, often limited to passive departmental tours led by supervisors, may fail to actively engage students or leave a lasting impression. The Amazing Radiography Race (ARR) introduces a gamified alternative, engaging students in group-based clue solving and task completion tailored to each radiography department. This study aims to explore students' experiences of the ARR, captured through reflective report writing

**Methods:** The study was conducted at a University in South Africa. The study population is 60 first-year radiography students, selected through a purposive sampling method. Data was collected prospectively using reflective reports guided by the six steps of Gibbs' reflective cycle, which includes, 1) description, 2) feelings, 3) evaluation, 4) analysis, 5) conclusion, and 6) action plan. Content analysis was used to analyse the data.

**Results:** Five main themes were developed: 1) Positive affective experiential learning 2) Introduction to foundational radiographic principles, 3) Insight into the reality of the clinical environment and career progression, 4) Learning through peer-mentorship and 5) Improvement of game dynamics. The students' reflections indicate that the ARR had a multitude of benefits that the students could use to build on as they start their first year of study

**Conclusion:** The Amazing Radiography Race demonstrates the value of gamification in health science orientation, promoting self-directed learning, teamwork, and essential interpersonal skills. It provided meaningful exposure for students with limited preclinical experience and highlighted the critical role of enthusiastic facilitators, especially senior students, in creating a supportive learning environment. While clinical settings may pose challenges, the ARR offers a scalable, context-sensitive model for enhancing orientation across disciplines.

## RÉSUMÉ

**Introduction:** L'environnement clinique peut être intimidant pour les étudiants de première année à l'université, en particulier ceux qui n'ont pas eu l'occasion de s'y familiariser auparavant dans le cadre d'un stage d'observation. La première expérience hospitalière d'un étudiant est donc cruciale pour façonner sa motivation et son engagement envers la carrière qu'il a choisie. L'orientation hospitalière traditionnelle, souvent limitée à des visites passives des services guidées par des superviseurs, peut ne pas susciter l'intérêt des étudiants ou ne pas leur laisser une impression durable. L'Amazing Radiography Race (ARR) propose une alternative ludique, qui consiste à faire participer les étudiants à la résolution d'énigmes et à la réalisation de tâches en groupe, adaptées à chaque service de radiographie. Cette étude vise à explorer les expériences des étudiants dans le cadre de l'ARR, telles qu'elles sont décrites dans leurs rapports de réflexion.

**Méthodologie:** L'étude a été menée dans une université sud-africaine; la population étudiée comprenait 50 étudiants de première année

**Contributors:** All authors contributed to the conceptualisation and design of the work. The co-authors who were not directly involved in teaching the clinical radiography module were responsible for the data management and data analysis to ensure rigor and credibility of the results, void of bias. All authors were involved in the editing and compiling of the final manuscript. **Funding:** Funding for this work was provided by the University of Pretoria, through a Scholarship of Teaching and Learning grant, awarded post-completion for the dissemination of results. **Competing interests:** All authors have completed the ICMJE uniform disclosure form and declare no conflict of interest. **Ethics approval:** The study was granted ethical approval from the Research Ethics Committee of the Faculty of Health Sciences (122/2025).

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en radiographie. Les données ont été collectées rétrospectivement à l'aide de rapports de réflexion guidés par le cycle de réflexion en six étapes de Gibbs, qui comprend 1) la description, 2) les sentiments, 3) l'évaluation, 4) l'analyse, 5) la conclusion et 6) le plan d'action. L'étude a utilisé l'analyse de contenu pour analyser les données.

**Résultats:** Cinq thèmes principaux ont été développés : 1) Apprentissage expérientiel affectif positif, 2) Introduction aux principes fondamentaux de la radiographie, 3) Aperçu de la réalité de l'environnement clinique et de l'évolution de carrière, 4) Apprentissage par le mentorat par les pairs, et 5) Amélioration de la dynamique du jeu. Les réflexions des étudiants indiquent que l'ARR présentait de nombreux avantages

*Keywords:* First-year radiography students; Gamification; Gibbs reflective cycle; Hospital orientation; Reflection report

## Introduction

A student's first year of university is critical, whereby students transition from high school to university life [1]. This year serves as a foundational year that can determine the student's future academic success [2]. The first day and subsequent first weeks of university life are known as the encounter stage, which largely influences students' transition period into higher education [3]. Healthcare science students, in particular, experience several challenges with regard to transitioning, as they have to adjust to both the academic and clinical settings.

Clinical training forms an integral component for all healthcare programs, whereby students can apply the theoretical component into practice [4,5]. This enables them to develop critical thinking skills and offers them a glimpse of themselves as future professionals [4]. In the radiography discipline, it is reported that first-year students are often daunted by the placement experience, due to the high-risk nature of working with ill patients and ionizing radiation [6]. Educators of first-year healthcare science students therefore have an additional responsibility of ensuring that students are well supported, particularly during the encounter phase of transition [1].

The encounter phase for health science students includes an orientation to the hospital setting. Students entering the hospital environment for the first time for clinical training may feel anxiety and stress related to the new expectations placed on them as health professionals [7]. It is therefore crucial that the encounter stage of hospital orientation is a positive one. In this stage, students are making sense of the new context and thus adjusting their initial expectations [3]. In addition, students identify their prior knowledge and abilities while building new relationships with peers [3]. A study by Kemal and Bebis (2022) conducted a hospital orientation in Greece for student nurses in three stages, whereby students were provided with general information, followed by an overview of the history and staff members of the department, and lastly, personal needs of the students [7] Beavers et al [8]. followed a similar approach, whereby their hospital orientation consisted of a tour and knowledge dissemination regarding the units [8].

dont les étudiants pouvaient tirer parti au début de leur première année d'études.

**Conclusion:** L'ARR a démontré la valeur de la ludification dans l'orientation en sciences de la santé, en favorisant l'apprentissage autonome, le travail d'équipe et les compétences interpersonnelles essentielles. Elle a permis aux étudiants ayant une expérience préclinique limitée de se familiariser avec le domaine et a mis en évidence le rôle essentiel des facilitateurs enthousiastes, en particulier les étudiants seniors, dans la création d'un environnement d'apprentissage favorable. Si le contexte clinique peut poser des défis, l'ARR offre un modèle évolutif et adapté au contexte pour améliorer l'orientation dans toutes les disciplines.

Gamification is an alternative method that can also be used to create an informal yet impactful learning environment. Gamification includes elements of games that are embedded into a non-game environment, such as classrooms [9]. The inclusion of games within an educational context facilitates critical thinking, motivation, and fun whilst learning [9]. Gamification in health education can be applied using various methods. In South Africa, gameboards were used to teach radiographic techniques [10]. Findings from this study indicated that the interaction between team players assisted in building positive communication and relationships through collective problem-solving [10].

Sanz Martos et al. (2024) applied gamification in nursing inspired by a television series, "The Squid Game," whereby students dressed as participants from the show [9]. Results from this study showed that there was an improvement in critical thinking skills and knowledge levels from the gamification sessions. The Amazing Race is another reality television show that has inspired gamification in education. Smiley S. utilized episodes from the game show to teach cultural geography to introductory-level honors students in the United States [11]. It is, therefore, evident that gamification can be applied in various contexts and disciplines, with the main objective of creating a stimulating learning environment.

Gamification is grounded in Howard Gardner's Multiple Intelligences Theory (1983) [12] and Constructivist Learning Theory [13,14]. These theories provide a structured foundation for understanding how students construct knowledge through experiential and sensory engagement. Gardner's theory suggests that individuals process information through different cognitive strengths, influencing how they learn and interact with their environment [12].

Constructivist learning theory emphasizes that students actively construct knowledge rather than passively receiving information [14]. Social learning, as proposed by Vygotsky (1978), is evident in how students collaborate, discuss, and scaffold their learning through teamwork [14]. The theoretical integration of multiple intelligences and constructivism ensures that

learning is active, context-driven, and long-lasting, equipping students with essential spatial awareness and problem-solving skills for their future radiographic practice.

In the South African context, the Bachelor of Radiography program is a four-year professional qualification that integrates academic and clinical training. Typically, clinical placement for first-year students begins after the first six months of study, once foundational theoretical modules, such as Radiographic technique and Radiographic imaging and science, have been introduced. However, as part of the initial program orientation, students are provided with structured exposure to the clinical environment. This early familiarization helps them contextualize and connect theoretical concepts to real-world radiographic practice, fostering professional identity formation from the outset.

In academic training hospitals, several radiography departments often exist on multiple floors to support clinical services related to various specialized departments. Hospital orientations traditionally involve a tour of the departments with the lecturer explaining the radiographic services rendered in each department.

Interest in the radiography profession has increased, with student numbers steadily increasing over the years. This is evident in the Department of Radiography, University of Pretoria, where in 2025 and 2024, 66 and 74 students were enrolled, respectively, compared to 51 in 2021. The increase in student numbers requires an alternative approach to hospital orientation as opposed to the traditional tour-based approach, which is not feasible and conducive to learning with a large group. Additionally, the long tour often becomes monotonous, resulting in the students becoming disengaged and eventually forgetting the various departments over time.

The first-year lecturers, therefore, designed an Amazing Radiography Race (ARR) themed hospital orientation inspired by the dynamics of the Amazing Race reality show. The ARR is structured to promote learning through active participation, allowing students to experience, reflect, construct meaning, and apply their knowledge in real-world settings. By navigating the hospital, students develop a deeper understanding of its layout rather than merely memorizing its structure. This experiential approach strengthens knowledge retention through direct, meaningful interaction with the clinical environment. The study, therefore, aims to explore and describe first-year students' experiences of the ARR through reflective report writing

#### *Dynamics of the amazing radiography race*

The students were divided into small groups of five to seven learners. The ARR is divided into four segments: 1) locating the different x-ray departments, 2) problem-solving activities, 3) tour of the department, and 4) prizegiving with debriefing. The segments include the following:

- 1) Students received an ARR envelope, which provides them with their first clue specific to a radiography de-

partment at the hospital. Students work collectively using critical thinking skills to solve the clues and physical activity to navigate through the different levels of the hospital (Fig. 1a and b). The academic training hospital where the ARR took place has four radiography departments, each housing different imaging modalities, namely General, MRI, CT, Mammography, Ultrasound and Fluoroscopy

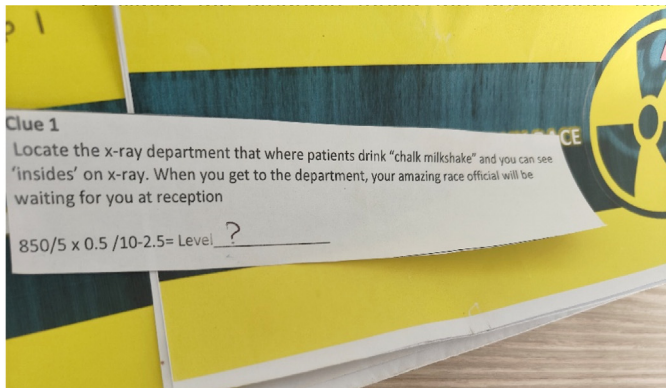
- 2) Game rules included a no-running policy and no taking pictures of patients. Any group breaking the game rules was informed that they would be eliminated from the game.
- 3) When the students found the department, they were met with an ARR official who was a senior radiography student. They then have performed radiography-related activities unique to that particular department (Figure c). They were allowed to use the internet to self-discover the answers.
- 4) After the successful completion of the activity, the ARR official took them on a comprehensive tour of the department and introduced them to staff and other students.
- 5) In the final segment of the race, students were met by their lecturer and all the ARR officials, welcoming them to the finish line. There were no winning titles, and all students were awarded the same small prizes and debriefed about their experience.

#### *Ethical consideration*

The study received ethical approval from the Faculty of Health Sciences, University of Pretoria and permission from the Head of the Radiography Department. The study adhered to the following ethical principles, namely autonomy, non-maleficence, justice, and beneficence. The student's right to autonomy was protected during the study by ensuring that they had access to the information leaflet and consent form before submitting. The researchers made online consent available whereby the students can indicate whether or not they want their reflection reports included in the study. Students were informed that participation in the study is completely voluntary and they are not forced to partake in the study. The study ensured that the students were not harmed in any way [15]. which was achieved by not having a mark allocation to the reflective report. The students were therefore free to write a true reflection report without fear of punitive action if they had a negative experience. The student names on the reflection reports were anonymized by a co-researcher who does not know the first-year students. The participants' identities were therefore blinded during the analysis.

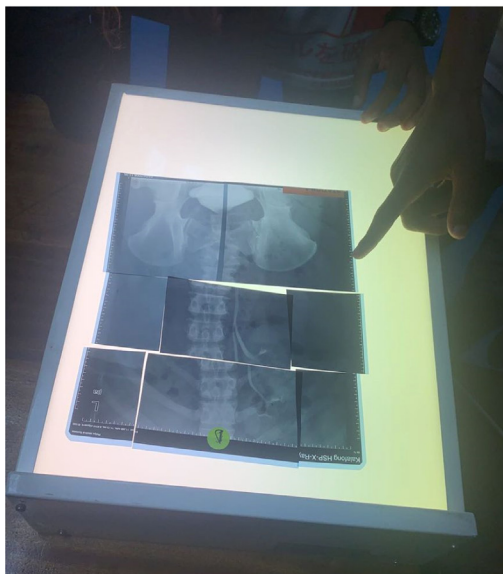
#### **Methods**

The study adopted a qualitative research design with a descriptive approach. The ARR was conducted at the Department of Radiography of a large academic hospital in South



a)

b)



c)

Fig. 1. a) ARR envelope with a clue to assist students to navigate to the hospital level where the radiology department is located. b) Students using teamwork to solve mathematical equations. c) Interdepartmental activity related to the radiography department's speciality.

Africa. The study population includes all first-year radiography students who participated in the ARR in 2025. The total number of students is 60. A purposive sampling method was used whereby the first-year radiography students were invited to participate in the study after participating in the ARR. Fifty students consented to participating in the research study. Exclusion criteria included first-year students who were absent in the ARR due to illness, Second-year students who did not have an ARR, Third and fourth-year students who had a pilot ARR in 2022 and 2023. The ARR of 2025 offers a more structured approach, and therefore, students before this year would not have the same experience. In addition, the students would not be able to provide an in-depth and accurate Gibbs' reflection report due to the number of years that have passed.

#### Data collection

Permission was granted by the Head of the Radiography Department to conduct this alternative orientation in comparison to the traditional tour-based orientation. The data was collected prospectively, whereby all students were requested to write a reflective report on their experiences of the ARR and submit their reflection reports on a cloud-based learning platform, Click Up. The students were informed of the nature and purpose of the study through an information leaflet and consent form uploaded with the reflection report guidelines. Before submitting the reflection report on Clickup, the students were asked to complete the online consent form. If they agree to partake in the study, they will be requested to click yes. However, if they do not want their report included in the data collection, they will be requested to click, no. A copy of the reflection reports

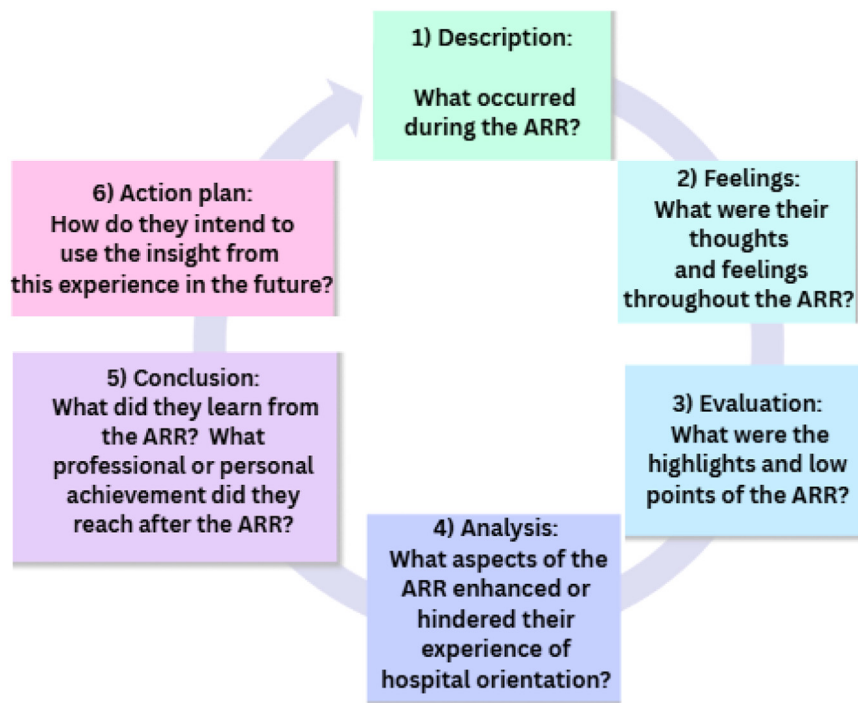


Fig. 2. Gibbs reflective cycle applied in this study.

of the students who consented to their reports being used was then downloaded and anonymized by the co-researcher.

The study utilised reflective reports as a data collection tool. Reflective reports reflect information about students' personal experiences and enhance professional development [16]. The literature shows that reflective reports could be used to improve students' practice, reflective writing, and critical thinking, which can lead to better analytical thinking, as well as improve problem-based learning [16]. The Gibbs reflective cycle was used as the template for writing the reflective report [17]. This cycle includes six stages, namely, 1) description, 2) feelings, 3) evaluation, 4) analysis, 5) conclusion, and 6) action plan. In this study, the questions asked of the participants are described in Fig. 2.

#### Data analysis

The data was analysed using content analysis of the documents. Content analysis is defined as "a strict and systematic set of procedures for the rigorous analysis, examination and verification of the contents of written data" [18]. To ensure credibility, two researchers who are not involved in the facilitation of ARR were responsible for anonymising the downloaded reflection reports and data analysis process, as they do not have any preconceived ideas regarding the ARR. Content analysis comprises of seven stages [19], namely:

1) preparing the data, 2) defining the unit of analysis, 3) developing categories and a coding scheme, 4) test the coding scheme on a sample of text, 5) code all text, 6) assess coding consistency, 7) draw conclusions from coded data, and g) report methods and findings.

Data saturation was reached at 33 reflective reports, whereby no new patterns of information were found. Therefore, no further reports were analysed.

#### Findings and discussion

The data was analysed using content analysis, whereby codes, categories, and themes were generated. The coding tree used to generate the emerging themes is presented in Fig. 3.

##### Theme 1: Positive affective experiential learning

The students described positive affective emotions associated with the ARR. The rationale and purpose of the ARR, as explained to the students which provided an overarching objective and self-directed learning outcomes that the students could formulate on their own, through experiential learning. The students described feelings of excitement and comprehension of the ARR's objectives. Further, they reflected on the interactive nature of the ARR, which transformed an ordinary hospital orientation into something meaningful. These findings were reported in the following narrations:

*The excitement of navigating between departments and trying to complete tasks made the whole activity feel more like a game than an educational event. What really stood out to me was how interactive the experience was, it wasn't just sitting and listening; I got to see, touch (in some cases), and really immerse myself in the tools used in the field. It felt like education coming alive, and that made the day both engaging and rewarding.* (p26)

*One of the biggest highlights of the ARR was how it transformed what could have been an overwhelming orientation into an engaging and interactive learning experience. Instead of obedi-*

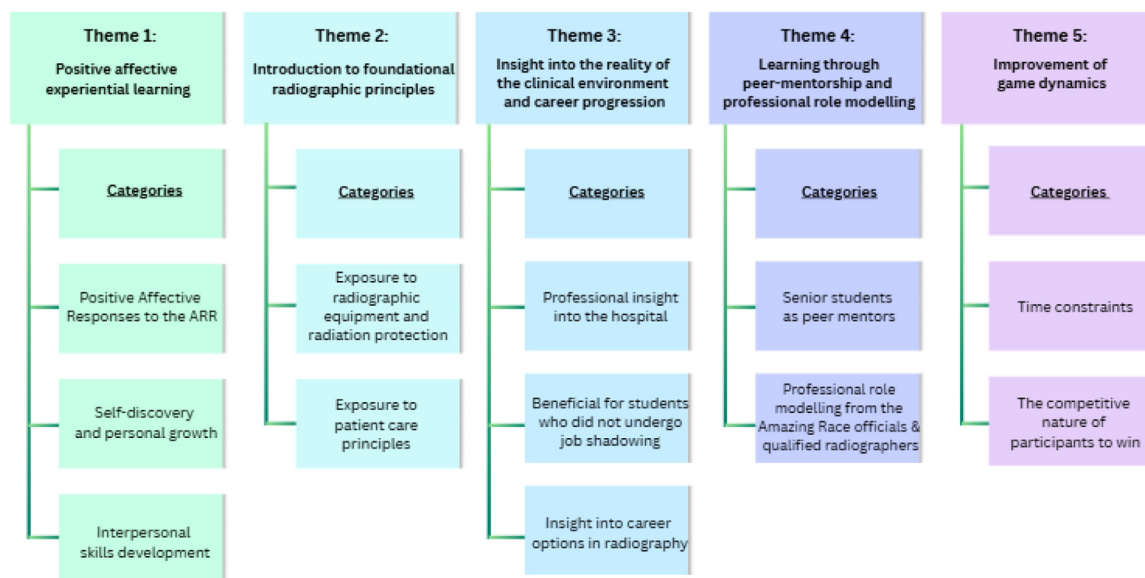


Fig. 3. Themes and categories of the research study.

ently listening to explanations about different hospital departments, we actively explored them, met professionals in action, and applied our knowledge in real-time scenarios. This hands-on approach helped me understand the workflow of the radiography department more clearly. (p14)

Having to actually figure out which floor things are on rather than just being shown where it is allows you to remember it better definitely helped enhance the experience. (p31)

The participants further reflected on how the ARR fostered collaboration through social interactions, which facilitated bonding and positive relations among peers. The ARR took place at the start of the year, when students were still in the process of developing friendships. The results of the study show that the ARR was particularly beneficial for introverted students who struggle to make connections with their peers. This was highlighted by the following participants.

The highlight was the sense of teamwork and camaraderie with my group. The interactive nature, the sense of competition, and the opportunity to bond with my classmates while exploring the hospital. (p15)

Personally, I struggle with social interactions, but that day I was able to collaborate with my teammates, so I got over my fear of social interactions and I saw the importance of teamwork and collaboration, as this is one of the skills I will need to have coming into Radiography as I will be working with other health professionals. (p17)

The narrations, in keeping with Gibbs reflective cycle question two, strongly indicate that students felt excited and interested in the ARR, which overshadowed fears and anxiety often associated with the hospital environment.

Hospital orientation for new students has been known to be a daunting experience. As far back as the 1980s, Rauch

reported on several aspects of hospital orientations that can evoke anxiety in new students; these include complicated hospital geography, meeting hospital staff, and information overload [20]. Decades later, the hospital environment continues to cause fear and anxiety among new students [21]. A study by Cruz et al., therefore, recommended that interventions need to be considered to help students manage their lack of self-confidence, anxiety, and fear of clinical placements as early as possible. These strategies are assumed to improve student performance [21]. There is, however, little consensus on the best method to prepare learners for clinical learning [8].

In this study, results reflected that the ARR, a form of gamification, presents an alternative innovative approach to hospital orientation. In contrast to several reports of fear and anxiety associated with the clinical environment [8,22], the ARR offered a meaningful engagement, which fostered positive emotions, such as fun, enjoyment, and interest. The ARR shifted the focus away from structured learning to one that was more aligned with self-discovery and engagement in diverse ways. A similar application of gamification was applied by Marcus and Beck [23], who used a treasure hunt to orient first-time users to the library. Results from their study shared similar findings to the ARR, whereby students had a very positive attitude towards the orientation, making them feel more comfortable in the new environment [23]. This is particularly useful for first-year students who are not only entering university, but also the clinical environment for the first time. New environments are often catalysts for the perceived threats in students' clinical training experience, resulting in psychological, behavioural, and physiological responses that can evoke stress related to the experience [22]. It is therefore necessary to ensure that first-year healthcare science students are well supported in this transition, which can be offered through meaningful orientation programs.

Traditional orientations often include a tour of departments and knowledge dissemination regarding the different units [23]. However, including interactive elements that facilitate engagement has far-reaching effects in terms of memory retention and active learning [23]. The findings from this study support this notion, whereby ARR is grounded in multiple intelligences theories described by Howard Gardner's (1983) [12] and Constructivist Learning Theory [13,14]. These theories provide a structured foundation for understanding how students construct knowledge through experiential and sensory engagement. Gardner's theory suggests that individuals process information through different cognitive strengths, influencing how they learn and interact with their environment [12]. This was evident in the current study, whereby bodily-kinaesthetic intelligence was activated as students physically moved through the hospital, reinforcing spatial memory and orientation. Spatial intelligence is developed as students navigate multiple floors and departments, strengthening their ability to map environments mentally. Logical-mathematical intelligence was further applied when students analysed clues and used reasoning to solve quizzes. By activating these intelligences, the ARR promotes multi-modal learning, accommodating diverse cognitive preferences among students.

### **Theme 2: Introduction to foundational radiographic principles**

The ARR comprises strategically formulated quizzes and activities that surround aspects of radiographic imaging and radiation protection, specific to each imaging modality. The students were therefore required to use several cognitive functions, including kinaesthetic, visual, and auditory functions in order to learn. In doing so, the students were introduced to several foundational radiographic principles that underpin the theoretical and clinical components of the radiographic practice. These include imaging modalities, radiation protection and soft skills. Students reported that the ARR was beneficial to their learning, described in the following narrations:

*I felt engaged and curious throughout the ARR. I enjoyed learning about the different x-ray machines and techniques, and I appreciated the hands-on experience. Solving the mathematical equations added an exciting challenge to the experience. I felt a sense of accomplishment when we successfully navigated to the correct levels. (p30)*

*It was easy for me to understand RSC [Radiographic Science] module better because it teaches us about the machines and X-ray tubes, Protection like aprons and everything that we saw there and that's made me to get 98 percent on my first test for RSC (p12).*

*I learned that pregnant women can actually get x-rays, for the longest time I had always assumed that it was impossible for them to do so. I am now aware of the safety precautions that need to be taken into account when a pregnant lady needs an examination (p28)*

The ARR required the students to work together to solve different activities. They were also required to allocate different

responsibilities to each other. This facilitated collaboration and communication, which are soft skills that are necessary for a future radiographer. The participants reported attaining these skills through the ARR:

*From the Amazing Radiography Race, I learnt how to be competent in the aspects of collaboration and communication, which are both essential professional attributes in the field. (P23)*

*Professionally, it gave me a better understanding of what it takes to be a radiographer not just technical knowledge but also teamwork, problem-solving, and the ability to stay composed under pressure. Personally, I gained confidence in my ability to navigate unfamiliar environments and work through challenges with a positive mindset. I learned many things at the ARR. I learnt that as a radiographer, you must always be very patient and caring so that you will be able to deal with different types of patients you come across. I also learnt that you must be confidential about the patients' information. (p14)*

The evidence of learning was apparent in the students' reflections, whereby they reported having greater understanding of various aspects of radiography, such as equipment, radiation protection, interpersonal skills, and communication. Ofori-Manteaw. B [24] states that whilst technical skills are important, integration of soft skills into the curriculum of medical imaging students is a necessity to ensure the delivery of comprehensive patient care [24]. These skills include communication, empathy and teamwork [24]. The ARR, consequently served as an opportunity for students to acquire these soft skills implicitly, without explicit awareness of the development process.

Several applications of gamification in radiography have also been used to develop soft skills, examples of which include a board game to teach radiographic technique [10], as well as a Radiography Escape room [25]. These examples of gamification in radiography education used teamwork to foster critical thinking and problem-solving skills. Collaborating with classmates further developed students' interpersonal skills, which is particularly useful for first-year students to develop resilience during the formative years [26]. However, these examples of gamification required students to draw on their prior knowledge. In this study, the ARR took place before formal lectures, and therefore, the students did not have prior knowledge. This enabled students to self-discover foundational knowledge that they can use to build on during the formal lectures and add a unique aspect to the ARR.

### **Theme 3: Insight into the reality of the clinical environment and career progression**

In this theme, findings emerged that not all students had prior exposure to the clinical environment. At the institution where the students are enrolled, job shadowing is no longer an admission requirement due to inequity of access to hospitals, particularly for students coming from rural disadvantaged communities. Through the narrations, it was therefore evident that the ARR was the first exposure to the hospital for many students.

*Amazing race made me to know the in and outs of the hospital since it was my first time going there. We gained a lot of information there the things we didn't know, it was like a job shadowing cause we saw everything it was very effective to me, who did not do job shadowing. (p12)*

*During the ARR it was the first time that I have been able to walk around in such a big hospital with patients from all over. It has always been my dream to work as a healthcare worker, and the ARR was one of the first steps in order to accomplish that dream, so my personal achievement is that I have made it to this point (a radiography student), and I can't wait to go further. (p10)*

For some students, their first experience of the radiography department within a hospital setting made them question their career path in healthcare. However, for some students, it served as a strong intrinsic motivator to assist sick patients. This was reported in the following narrations:

*As a person who is very sensitive, it was sad to see patients in critical conditions and others breathing with machines, it made me question my choice of career. (p2)*

*At first, I did feel a little bit unsure of my choice of studying for something that required me to work in a hospital setting when I saw sick patients lying down, but at the end of the race it is what made me motivated to study radiography so I can get to help people who someday, help save someone's life. (p27)*

*It is sad to see numerous of patients in pain and desperate for help, but for me as a 1st year student, that gives me motivation to work harder so that I can be part of the group of people helping those who are in pain. (p10)*

The ARR also served as a validation of career path for some students and also provided more information to improve their understanding of different dimensions of the radiography profession. This was alluded to in the following narrations:

*The Amazing Radiography Race (ARR) was more than just a game it was a meaningful introduction to the profession I am stepping into. It provided me with invaluable insights, strengthened my confidence, and set the tone for what I hope will be a rewarding journey in radiography. (p14)*

*Learning and getting more clarity about radiography, because really, I had no deep insight about radiography. I only knew about what everybody knows about radiography that when you have a fracture you go to the hospital and the doctor send you to do x ray and come back with a picture of a fractured bone and that's it (general radiography department). After the amazing race I understood that there is more into radiography, such as mammography, CT, MRI, etc.(p18)*

From the results, it was also evident that the first-year students entering the radiography program lacked significant information regarding career pathways they can follow in radiography. They indicated that the ARR provided them with the

opportunity to be acclimatized to different career pathways, as described in the following narrations:

*ARR really helped me because I wanted to continue with my studies even further but I didn't know where to start but now I know, ultrasound really had my heart and seeing everything and being explained to about it made me fall in love with it even more. I took something out of the ARR. (p17)*

In many universities, clinical visits are recommended as part of the admission process for radiography programs [27]. However, unequal access to hospitals for clinical shadowing, particularly for disadvantaged groups, creates disparity in pre-clinical experience among newly admitted students [28]. As a result, some universities have removed job shadowing as part of admission, resulting in first-year students entering the program often not knowing what to expect. In South Africa, a study by Motsepe et al [29]. confirmed that most radiography learners had limited knowledge about the radiography profession prior to enrolment. In this study, students shared similar challenges and reflected on how the ARR was able to bridge that gap by providing a glimpse into their future careers. These findings strongly align with a study by Basukala and Chaudhary [30], who explain that pre-clinical exposure offers a preview of medical specialities and potential daily responsibilities in the medical field. In addition, students reflected on how seeing ill patients moved them emotionally, but also inspired them to want to help them. This is in keeping with intrinsic motivation, whereby students had an authentic interest in helping improve patients' health instead of potential secondary gains [31]. This is particularly noteworthy, as it fosters the importance of patient-centred care from an early onset. Students also reported that the ARR not only gave them insight into what they will be doing in their early formative years of study, but also provided them with an opportunity to see various career pathways in radiography that they can pursue. Creating positive experiences is critical towards motivating students to advance their career intentions in the radiography discipline and thus growing the profession. Hizzett and Snaith [32] suggest that early career guidance is essential for students and that clinical and academic radiographers should be aware of the influence that they may have on students' future career choice [32].

#### **Theme 4: Learning through peer-mentorship and professional role modelling**

The ARR was facilitated by amazing race officials who were carefully selected 2nd, 3rd and 4th year radiography students, by the first-year program co-ordinator based on their professional conduct and passion for radiography demonstrated in their previous years. Newly qualified radiographers were also selected to assist in the ARR event. The students reported that ARR student officials showed great enthusiasm and created a nurturing, comfortable environment for them to ask questions freely. Further, the positive attitude of the ARR officials inspired many students to also want to be facilitators in the future.

*My highlight was how the chosen students to collaborate with welcomed us and how they looked so willing to give us the in-*

formation we needed. They had smiles on their faces and they made the profession look amazing. The presentation of the ARR was top tier (p20).

Senior students teaching us all of that became an easy experience we were not shy to ask questions, and they were very nice and professional to a point I even had a thought of participating to do an amazing race for the next group of first years in the upcoming years. (p18)

It was also a good experience receiving the tour from fellow 2nd or 3rd year students, I think that gave all of us 1st years more motivation. Overall, I think the ARR is necessary and that it gives students a great kick-off to their 1st year. (p10)

This theme, in keeping with Gibbs' reflective cycle question four, strongly suggests that the senior students as officials enhanced the ARR experience by serving as a motivation and inspiration to the first-year students. The success of educational initiatives often depends on the delivery and the enthusiasm of the facilitators. In this study, students reflected on the positive attitudes and professional role modelling displayed by the senior students of the ARR. A study by Barker et al. [33] shared similar findings, whereby senior students were used as peer mentors for a hospital orientation of medical students [33]. This proved to be effective, whereby learning from a senior student motivated first years to want to complete the course and be reassured about the future [33]. Students from this study further reported having additional learning opportunities through informal conversations with peer mentors beyond the scope of the handbook [33]. The findings, therefore, indicate that it is critical to ensure that appropriate officials are chosen for orientation programs, which can influence first-time experiences.

#### **Theme 5: Improvement of game dynamics**

In keeping with Gibbs reflective cycle question four, students were asked to describe any aspects of the ARR that hindered their experience. Most students reported that time was a major limitation. Based on the fact that this was the first hospital exposure for many students, it is assumed that they may have wanted to spend more time immersing themselves in each department. However, the ARR aimed to provide a snapshot of what to expect in each department and how to navigate their way to specific departments. The ARR was scheduled during their radiographic technique period, which constituted 3 h. Having a time limit appeared to place pressure on the students and hindered their full engagement with ARR officials. However, some students reported that the time pressure made them develop critical skills they could use in the future. The students expressed the following limitations related to time.

*What hindered our experience of hospital orientation was the limited time we had and the continuous rush to finish first as we were divided into two groups. I feel that we could have spent more time engaging with the radiographers and learnt from their acquired skills and experiences. (p23)*

*A little more time at each station might have allowed me to dive deeper into understanding the machines and their applications. (p26)*

*Navigating the hospital under time, pressure was tricky, and there were moments when I felt lost or unsure of where to go next. Some instructions weren't clear in terms directions to the actual department when we arrived at that specific level, even though we knew how to navigate to the different levels through clues that we were provided with. But I now see these challenges as valuable learning moments, real-life hospital work is fast-paced and sometimes unpredictable, so learning to stay calm and problem-solve in those situations was beneficial. (p14)*

The ARR is based on a reality TV game show, The Amazing Race, whereby participants race to the finish line. However in the *Amazing Radiography Race*, students were specifically informed not to race, as this would disrupt the hospital and evoke alarm fear and alarm in the patients. Students were therefore encouraged to walk and keep to the time limit, which would have been adequate. However, the student's natural response to the term race, fostered competitiveness, which compelled them to want to win. This translated in anxiety and pressure, resulting in a distraction. This was evident in the following narrations:

*Anxiety and worry kicked in whenever we struggled to find our next level or department and had to start all over again. Also frustrations and fatigue when the other group outrun us. For the entire race I kept on thinking whether we are number 1 or not which raised panic because we really wanted to win the race. (p20)*

Lastly, one student recommended that there be take-home material to consolidate the information learnt on the day, as described in the following narration:

*It might be great to receive a small booklet or summary at the end of the race, consolidating everything we learned. (p26)*

Whilst the ARR appeared to have many benefits related to self-discovery, learning, and peer-mentorship, game dynamics also proved to be an important aspect in gamification, which can also influence students' experience. In this study, students reflected on how the time limitation inhibited the full learning experience, whereby they would have preferred to spend more time with the student mentors. This aligns with a study by Garcia-Iruela et al. [34], which reported that whilst time limits enabled students to advance faster, it was considered the least valued element of a game by students. This is due to the fact that time limits have the potential to generate stress and not enable students to fully engage [34]. It is therefore an important consideration in game design to avoid possible negative effects [34]. Another fundamental aspect of game design in gamification is competition. In this study, students reported feeling anxious about winning and the disappointment of not being the first team to reach the finish line. This feeling is common in competitive environments, whereby losing the game creates a risk of loss of intrinsic motivation and negative feelings towards the game [35,36].

Arruzza and Chau [37] report that gamification in medical radiation sciences remains low. Games such as the ARR, therefore, provide an example of how educators and clinical tutors can apply gamification in other contexts to introduce concepts and build early relationships among peers and senior students.

## Limitations

None of the students reported negative experiences while navigating through the hospital, particularly in response to question 4 (Fig. 1), which asked: “What aspects of the ARR enhanced or hindered your experience of the hospital orientation?” It is possible that participants reflected more deeply on their group interactions and the game dynamics rather than on the external environment itself. In future, focus group interviews will be conducted to ensure clarity and thorough probing into their experiences of ARR. Additionally, the hospital setting may have limited opportunities for expressing or experiencing negative aspects, as it is not inherently conducive to playful activities. Given that the environment is shared with patients who may be easily disturbed, specific game rules were implemented to maintain decorum, including a strict no-running policy, with any group breaching this rule being eliminated from the game. In addition, students were advised to also not to raise their voices and cause any disruptions as they moved through the various floors. Through thoughtful, rigorous game design [37], ARR was therefore able to maintain the nature of a traditional hospital tour-based orientation, whilst incorporating activities within each department, that was facilitated by officials who were able to guide students to spaces away from patients during these sessions.

The second limitation of the study was that the data collection method used incorporated paper-based reflection reports. Whilst reflection writing has several benefits, it is also subject to limitations such as misinterpretation of what students wrote. It is recommended that future studies apply an action research approach with multiple data collection methods.

## Conclusion

In conclusion, the Amazing Radiography Race (ARR) presents a compelling example of how gamification can be effectively utilised within health science programs, particularly during first-year orientation. As a novel approach to clinical orientation, the ARR integrates multi-sensory learning through self-discovery, team building, and social engagement—fostering interpersonal skills essential for resilience, interprofessional collaboration, and patient care. Importantly, it also offers a unique job-shadowing component, bridging the gap for students who enter their studies with limited preclinical exposure or understanding of radiography as a career path. While the hospital environment may not always lend itself naturally to gamified approaches, the study demonstrates that, with thoughtful design and clear objectives, gamification can be both engaging and effective without disrupting clinical operations. Furthermore, the success of such initiatives is closely tied to the en-

thusiasm and commitment of facilitators. The involvement of senior students as peer leaders proved especially beneficial, creating a comfortable, inspiring environment that eased anxiety and nurtured confidence among first-year participants. The ARR model is therefore not only adaptable across disciplines but also a promising framework for enhancing student transition, engagement, and long-term professional development in healthcare education.

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