Research



# An exploration of entrepreneurial knowledge and skills acquired by radiographers during radiography training at the University of Technology in KwaZulu-Natal

**V Govender,**[1] BHSc (Diagnostic Radiography); **M N Sibiya,**[2] DTech (Nursing); **N P Gam,**[1] PhD (Health Sciences)

[1] *Department of Radiography, Faculty of Health Sciences, Durban University of Technology, South Africa*
[2] *Division of Research, Innovation and Engagement, Mangosuthu University of Technology, Durban, South Africa*

**Corresponding author:** *V Govender (varushan22@gmail.com)*

**Background**. The South African (SA) radiography curricula have notable shortcomings in adequately preparing students for entrepreneurship, leaving most graduates disinterested in starting their own private firms. As a result, they primarily seek employment opportunities. Promoting entrepreneurship in radiography could help meet the growing demand for radiography services in SA.
**Objective**. To explore the entrepreneurial knowledge of radiographers in SA to formulate recommendations for improving entrepreneurship in radiography curricula.
**Methods**. A qualitative exploratory research design was employed, involving diagnostic radiographers and ultrasonographers from the eThekwini district of KwaZulu-Natal. Primary data were collected through a semi-structured interview schedule with a sample size of 1 ultra-sonographer and 14 diagnostic radiographers. Kolb's experiential learning cycle served as the study's theoretical framework.
**Results**. The study identified three key themes: (a) incorporation of entrepreneurial and business skills; (b) entrepreneurial knowledge and skills acquired by radiographers during radiography training; and (c) proposed changes that should be made to the radiography curriculum to develop successful entrepreneurs.
**Conclusion**. The study revealed that, while the structure of the radiography curriculum is generally satisfactory, there is a significant lack of theoretical and clinical training in entrepreneurship. This gap hinders graduates from transitioning to clinical practice. Therefore, it is crucial for tertiary institutions to restructure the curriculum, incorporating modules and activities that specifically promote entrepreneurship in radiography.
**Keywords.** Entrepreneurship, graduates, private practice, radiographers, radiography education.

*Afr J Health Professions Educ* 2024;16(4):1300. https://doi.org/10.7196/AJHPE.2024.v16i4.1300

Minimal attention has been given to evaluating radiography training curricula in KwaZulu-Natal (KZN) and South Africa (SA). Furthermore, there is a lack of literature assessing the success of radiography graduates in entrepreneurial roles. This deficiency or dearth of research within this domain is considered a cogent concern as there is no clear indicator of the effectiveness of modern teaching methods and curricula in promoting entrepreneurship.[1] The absence of specific models or benchmarks to measure the effectiveness and efficiency of these modern teaching methods complicates this issue. Therefore, it is necessary to evaluate the radiography curriculum, and this study serves as a starting point. It aimed to determine whether the radiography education curriculum in KZN equips graduates with the knowledge and skills needed for success. The researcher approached the study by focusing on the development of the curriculum, considering the modules and training provided by tertiary institutions in the eThekwini district.

The demand for radiography services in SA has remained persistently high, placing a heavy burden on the state,[2] a situation worsened by the global COVID-19 pandemic. Without effective interventions, this demand is expected to continue escalating. One strategic response is to nurture and support private radiography ventures. This could help alleviate the burden on both the public and private sectors improving the radiographer-to-patient ratio and promoting high-quality radiography services. Although the SA radiography curriculum has been reviewed and revised multiple times to address the field's specialised needs,[3] gaps still exist that may hinder graduates from successfully establishing private practices.

Tertiary institutions that integrate entrepreneurial activities throughout learners' studies can potentially cultivate graduates with independence, innovation and a willingness to take calculated risks. Exposure to entrepreneurial concepts during higher education may help students internalise these qualities. In addition, graduates with entrepreneurship and business skills are more likely to be motivated to establish private practices. A strong entrepreneurial foundation can foster the development and effective implementation of innovative ideas.

This study evaluated whether radiography training in the eThekwini district, KZN equips students with the knowledge and skills needed for entrepreneurial success. It examined whether entrepreneurial modules, such as Business Management and Managerial and Entrepreneurial Skills, are included in the radiography curriculum. Furthermore, the study evaluated the entrepreneurial knowledge and skills acquired by graduates during their training and identified necessary curriculum changes to better promote and encourage entrepreneurship.

## Methods

### Study design

An exploratory qualitative study using open-ended questions was conducted.[4] This research design allowed for data interpretation,

minimised bias and captured a broader range of opinions. The interview schedule, developed by the researcher, was based on contemporary literature and aligned with the study's objectives.

### Study setting

The study focused on the experiences of radiography graduates from the eThekwini district of KZN. Participants comprised graduates from the only university of technology in the district that offers radiography training. This group included diagnostic radiographers and ultrasonographers who had finished studying and were employed in both public and private hospitals.

### Sampling procedures and sample size

Approximately 582 radiographers are employed in KZN. A non-probability purposive sampling technique was followed, selecting two diagnostic radiographers from public hospitals and 12 from private hospitals, along with one ultrasonographer from a private hospital, to constitute the sample size. A purposive sampling technique was equally used in selecting eight health facilities within the eThekwini Municipality. Table 1 illustrates the healthcare centres from which the sample was gathered.

### Study tool and data collection procedure

Primary data were collected through a semi-structured interview schedule administered by the researcher through an online meeting platform. The interview schedule was distributed to participants from two public and six private hospitals in the eThekwini district. Given that this study aimed to evaluate the specific experiences of diagnostic radiographers and ultrsonographers, an interview schedule provided the best and simplest way to collect data, opinions and experiences.

Before data collection commenced, we obtained ethical clearance from the Institutional Research Ethics Committee (IREC) of the Durban University of Technology. Gatekeeper permissions were obtained from the eThekwini District Manager, the KZN Department of Health and hospital managers. After receiving the necessary approvals, the researcher was advised to visit the health facilities during times deemed most suitable for the interviewees. Upon arrival, the primary researcher approached potential participants and informed them about the study, as outlined in the information letter. The researcher contacted qualified diagnostic radiographers and ultrasonographers who had completed the BHSc at a university of technology in the eThekwini district, was registered with the HPCSA and were currently working in the area. This group was then narrowed down based on availability. The participants signed consent forms to confirm their voluntary participation in the study.

**Table 1. Classification of healthcare centres from which data was collected**

| Healthcare centre | Classification | Number of participants |
|---|---|---|
| Hospital A | PB | 1 |
| Hospital B | PB | 1 |
| Hospital C | PV | 3 |
| Hospital D | PV | 1 |
| Hospital E | PV | 3 |
| Hospital F | PV | 2 |
| Hospital G | PV | 3 |
| Hospital H | PV | 1 |
| Total | | 15 |

PB = public; PV = private.

After participants signed the consent form online, along with other ethical requirements, the primary researcher shared a link via an online platform that enabled interviewees to participate in the interview. The questions posed during the online interview were guided by the interview schedule.

A pilot study was conducted prior to data collection. The study tool comprised two parts: Section A collected demographic information from the participants, while Section B focused on their experiences as radiography students in training, based on the study's objectives. The questions in Section B were mainly open-ended and organised in a standardised interview sequence. The data collection included a precise and systematic set of activities for gathering data that are directly connected to the study objectives. The study was guided by Kolb's experiential learning cycle, which provides insights into the experiential learning process and is divided into four distinct stages: concrete experience, reflective observation, abstract conceptualisation and active experimentation.[4]

The researcher presented participants with specific questions under the concrete experience stage. Concrete experience is derived from active participation in tasks; while individuals can watch or read about something, true learning and development occur through the act of 'doing'. Therefore, in this phase, the participants were able to respond based on their knowledge and experiences of the radiography curricula and entrepreneurship modules they were offered while at the university.

This invariably provided the researcher with insight into the nature of radiography training the participants had received. During the reflective observation phase, participants examined their concrete experiences from the past.[5] At the abstract conceptualisation stage, each participant drew conclusions and provided general responses, revealing their thought processes. Through these phases, participants provided insights into the entrepreneurial modules offered in their radiography training, the entrepreneurial knowledge and skills they acquired and the changes they believed would augment the radiography curriculum for developing entrepreneurs. The participants responded to the interview schedule and the researcher processed it for data analysis. Thus, the analysed data emerged through the written responses of the interviewees.

### Data analysis

Data analysis involves the arrangement, discussion and organisation of data so that it can be presented in a manner that is easily understood.[6] The researcher ensured that the interviews were reviewed regularly to promote the acquisition of significant elements. The accumulated information was gathered and arranged according to the themes that were uncovered using thematic analysis.[7] Thus, the themes were generated manually by the researcher after thoughtful consideration of similitude in specific trends. The adopted thematic analysis process was facilitated by familiarisation with the collected data. Through this familiarisation process, initial codes were generated. Thereafter, relatable themes were searched for and then carefully reviewed. Explicit themes were defined, forming the basis of the write-up. To ensure true representativeness of the interviewee responses, approaches such as triangulation were adopted to confirm that the generated themes accurately reflected the interviewee's responses. The information was triangulated with a literature review.

## Results

The study included 15 participants (Table 2). All participants had a bachelor's degree as their highest qualification. In addition, 13 participants were employed by private hospitals and the remaining two by public ones. Finally, all participants were employed on a full-time basis.

### Themes of the study

The researcher derived three main themes from the thematic analysis. These themes were further broken down and processed into several sub-themes (Table 3).

#### Theme 1: Incorporation of entrepreneurial and business skills

The study enquired about the essential components of entrepreneurship and if relevant modules were included in the institution's curriculum. There were differing perspectives on some, which were consolidated as the sub-themes of the research.

##### *Essential modules for entrepreneurship*

The following modules were viewed as essential for entrepreneurship: Small Business Management, Accounting, Managerial and Entrepreneurial Skills, Management for Health Professionals, Ethics and Medical Law, Professional Practice and Management, Leadership and Supervisory Development and The Entrepreneurial Edge. Furthermore, participants suggested that some modules provided by their tertiary institution were enough for entrepreneurship. These included Professional Practice and Management, Small Business Management, Leadership, Management, and Values in the Workplace. Finally, other participants stressed that essential modules for entrepreneurship were Entrepreneurial Edge, Small Business Management and Leadership and Supervisory.

The radiography curriculum in SA has undergone revision, and it incorporates theoretical and research-oriented elements like Entrepreneurship and Business Studies. The Cape Peninsula University of Technology (CPUT) offers modules similar to entrepreneurship as electives[8] while the Central University of Technology (CUT) provides modules that include Project Management Process and Entrepreneurship as electives.[9] The Durban University of Technology (DUT) takes a more proactive approach to entrepreneurial radiography training by offering Professional Practice and Management I and II as compulsory modules during the first 2 years of tertiary studies.[10] Furthermore, DUT provides Leadership and Supervisory Development on a compulsory basis and Entrepreneurial Edge as an elective in the third year. In the final year, DUT provides Professional Practice and Management III and Small Business Management on a compulsory basis.

##### *Significance of entrepreneurship modules*

The field of radiography faces challenges, including limited human resources, delayed care and patient mismanagement. To address these issues, some have suggested revising the curriculum to cater to different career paths and incorporating task-shifting for diagnostic radiographers. Furthermore, van de Venter and Engels-Hills argue that higher education programmes must 'need to be responsive to societal needs and changes, as well as to the developments within the profession.'[11] Given the current economic climate in SA, there is a clear societal demand for radiography services that public care alone cannot meet. However, education programmes appear unresponsive to this need. Although the participants indicated that the most important modules had been provided by their tertiary institution, these modules were presented in a manner that failed to promote the participants' entrepreneurial goals.

In essence, the participants believed that only a few modules provided actual entrepreneurship value, which only benefitted a handful of radiographers. This contrasts with a study conducted by Ncube and Lekhanya[12] at public institutions in KZN, which found that 'the existing entrepreneurship curriculum equips students with enough skills to start-up their own ventures'.

##### *Introduction to business management*

Participants highlighted that while the institution offered essential entrepreneurship modules, these did not seem to provide information that encouraged students to pursue private practices. Price and Ronnie [13] argue that entrepreneurship education in SA is underdeveloped, particularly in motivating professionals to venture into private practice.

**Table 2. Participant demographic**

| P number | Hospital code | P code | Age | Highest degree or level of education | Public/ Private sector | Current Employment Status |
|---|---|---|---|---|---|---|
| P1 | C | C | 18 - 24 | Bachelor's degree | Private | Employed full-time |
| P2 | D | D | 18 - 24 | Bachelor's degree | Private | Employed full-time |
| P3 | F | ME | 25 - 39 | Bachelor's degree | Private | Employed full-time |
| P4 | F | ME | 18 - 24 | Bachelor's degree | Private | Employed full-time |
| P5 | B | KE | 25 - 39 | Bachelor's degree | Public | Employed full-time |
| P6 | H | H | 25 - 39 | Bachelor's degree | Private | Employed full-time |
| P7 | E | E | 18 - 24 | Bachelor's degree | Private | Employed full-time |
| P8 | A | I | 18 - 24 | Bachelor's degree | Public | Employed full-time |
| P9 | E | E | 18 - 24 | Bachelor's degree | Private | Employed full-time |
| P10 | G | CG | 18 - 24 | Bachelor's degree | Private | Employed full-time |
| P11 | C | C | 18 - 24 | Bachelor's degree | Private | Employed full-time |
| P12 | G | CG | 18 - 24 | Bachelor's degree | Private | Employed full-time |
| P13 | C | C | 18 - 24 | Bachelor's degree | Private | Employed full-time |
| P14 | G | CG | 18 - 24 | Bachelor's degree | Private | Employed full-time |
| P15 | E | E | 18 - 24 | Bachelor's degree | Private | Employed full-time |

Key: P = participant.

This is supported by Zegeye and Singh[14] who argue that tertiary curricula are designed to train students to be effective workers rather than to pursue their own private practice. Radipere[15] further emphasises that SA curricula rely on teacher-centred methodologies and lack practical learning avenues. These findings are consistent with this study, which demonstrates that while participants were provided with fundamental knowledge, the information lacked practical guidance on how they could establish or run their own businesses. The participants were not inspired to establish their own private practices by the information presented in the modules that made up their curricula and consequently did not think they could manage or run their own practice.

***Modules to be incorporated into radiography curricula***

Participants stated that several modules met the necessary criteria to be incorporated into the radiography curricula to foster entrepreneurial ventures among graduates. These modules included Business, Entrepreneurial Skills, Human Resources, Franchising, Operating Strategies and Health Management. According to the participants, these modules are essential for enhancing entrepreneurial knowledge and skills and are consistent with curricula at other universities.

Radipere[15] highlights the lack of practical entrepreneurial learning in SA tertiary education. This emphasises the need to restructure the curriculum to include critical modules that would support students in starting private ventures. The necessity of essential entrepreneurship education was confirmed by a study by Pieterse *et al.* ,[16] which assessed whether 3rd-year radiography students at a SA tertiary institutions had problem-solving skills. Their results showed that a large contingent of the students had minimal problem-solving skills. This finding emphasises the lack of provision of essential modules in the curricula that could foster critical thinking and independence, both essential for managing private practice.

**Theme 2: Entrepreneurial knowledge and skills acquired by radiographers during radiography training**

The researcher asked participants about the skills and characteristics they believe are necessary for starting a business and whether they felt adequately equipped with entrepreneurial and workplace management skills during their undergraduate tenure. The following sub-themes emerged:

***Lack of entrepreneurial and workplace management skills***

Participants consistently indicated that the institution lacked adequate training in entrepreneurial and workplace management skills. They were either provided with basic skills or none at all. The focus was primarily on theoretical knowledge, with limited practical experience during their studies. Graduates felt they were not given adequate real-life experiences that could be applied in managing their own businesses. While some of the entrepreneurial and managerial elements taught were relevant to general business operations, none was directly applicable to radiography.

Although work-integrated learning (WIL) placements were instituted at SA universities offering radiography, their effective implementation has often been criticised. Therefore, it is necessary to effectively integrate facets of entrepreneurial skills that align specifically with radiography practice.

**Table 3. The themes and sub-themes of the study**

| Themes | Sub-themes | Verbatim quotations |
|---|---|---|
| Incorporation of entrepreneurial and business skills | • Essential modules for entrepreneurship.<br>• Significance of entrepreneurship modules.<br>• Introduction to business management.<br>• Modules to be incorporated into radiography curricula. | 'The essential modules are Small Business Management, Accounting, Managerial and Entrepreneurial Skills'. (P4)<br>'Modules that I found essential components for entrepreneurship in radiography were Management for Health Professionals, Small Business Management, Ethics and Medical Law and Professional Practice and Management'. (P7)<br>'The modules I believed that are instrumental to entrepreneurship were; Leadership and Supervisory Development, The Entrepreneurial Edge and Small Business Management'. (P8) |
| Entrepreneurial knowledge and skills acquired by radiographers during radiography training | • Lack of entrepreneurial and workplace management skills.<br>• Basic theoretical skills provided.<br>• General skills.<br>• Entrepreneurs in the field of radiography.<br>• Lack of involvement of personnel in running a private practice. | 'The modules focused on just the basic idea of entrepreneurship and business management, it did not incorporate how we could use these skills in the field of radiography'. (P1)<br>'I was not adequately equipped with the skills required to be a successful entrepreneur'. (P2)<br>'The modules allowed us to have a substantial amount of entrepreneurial and management skills'. (P13)<br>'During our studies we were only equipped with skills associated to our degree and none of which can assist with entrepreneurship'. (P15) |
| Proposed changes that should be made to the radiography curriculum to develop successful entrepreneurs | Introduction of the practical aspects of entrepreneurship to the radiography curricula.<br>Encouragement of students to pursue entrepreneurial ventures.<br>Relevance of radiography training modules.<br>Incorporation of modules pertaining to the financial aspects of running a successful business and radiology department. | 'Specifically, in radiography, final year students should be given an opportunity to organise and operate their own clinic just to get a feel what's it like before heading off to community service'. (P2)<br>'Motivate them to start their own practice. Educate them thoroughly to be aware of what they may face as radiology practice owners'. (P11)<br>'Universities should also host entrepreneurs from the radiography field to speak to students in order to improve their understanding of the requirements of starting and managing their own department'. (P14) |

***Basic theoretical skills provided***

Continuing from the above sub-theme, participants echoed that they were only offered basic theoretical knowledge with regard to entrepreneurship and workplace management skills. This is unsurprising, as university-based entrepreneurship education has often been criticised for being too theoretical.[17] The absence of dedicated entrepreneurship modules, except for the electives offered at some universities, means that students receive the most basic skills, which are integrated into other curriculum modules.

***General skills***

Participants felt that the entrepreneurial and workplace management skills offered by the institution were primarily of general application. However, the curriculum still aims to provide students with procedural knowledge relevant to the field of radiography and to facilitate their ability to apply this knowledge in a professional context.

***Entrepreneur in the field of radiography***

The researcher asked participants about the skills essential for success in private practice. They identified several key skills, including financial skills, business development skills, innovative and creativity skills, critical thinking skills, entrepreneurial skills, business management skills, communications skills, clinical skills, business strategy skills, time management skills, organisational skills and marketing skills.

Modules that enhance students' critical thinking, problem-solving, leadership, entrepreneurial and managerial skills are crucial in the radiography industry. These highlighted graduate attributes can potentially propel enthusiasm, good communication flow within the practice, good customer care and strong financial management, which will inversely impact on delivery of superior services.

***Lack of involvement of personnel in running a private practice***

The researcher asked participants to share the challenges they faced in running their private firms. However, since the participants were not engaged in any entrepreneurial ventures, they could not provide answers. The second theme suggests that radiography students have not been equipped with knowledge and skills related to entrepreneurship. This finding contrasts with a study conducted by Ncube and Lekhanya,[12] which noted that lecturers educate students about the significance of entrepreneurial ventures and motivate them to pursue such opportunities.

**Theme 3: Proposed changes to the radiography curriculum to develop successful entrepreneurs**

The researcher sought to find out the strategies that tertiary institutions must implement to promote entrepreneurship among their students. The following sub-themes emerged:

***Introduction of the practical aspects of entrepreneurship to the radiography curricula***

Radipere[15] argues that to enhance students' entrepreneurial ventures, practical learning activities are essential. This is consistent with the study's findings, which emphasise the need to introduce practical elements of entrepreneurship that are directly related to radiography in higher education curricula. If students are provided with practical or real-life experiences in entrepreneurial radiography, they gain a clear understanding of what it entails. Participants reiterated that while the entrepreneurial modules in the curriculum are important, tertiary institutions must ensure that practical elements are included to immerse students in the real-world business environment.

***Encouragement of students to pursue entrepreneurial ventures***

One key idea that emerged from the study was the need to incorporate entrepreneur-based modules into the radiography curriculum. When asked what measures they believed their institution should implement to promote entrepreneurship among graduates, participants expressed that tertiary institutions must find ways to encourage and motivate students to pursue starting their own businesses.

***Relevance of radiography training modules***

Participants were asked about modules provided by their institution that they considered less relevant. They acknowledged that while most modules were important, some were seen as less relevant and had to be revised.

***Incorporation of modules on the financial aspects of running a successful business in radiology***

Finally, participants were asked to outline the modules they believed must be incorporated into their curricula. They indicated that modules on the financial elements of overseeing an enterprise were necessary. The participants believed that for entrepreneurs to be able to oversee and run a private practice, they should be acquainted with financial management skills. They were aware that administering finances is an essential part of a private business, and that it must be taken into serious consideration when someone seeks to be successful. Bellavatis *et al.*[18] confirms that entrepreneurs must be well-versed in financial management so that their firms can be successful.

## Limitations

Firstly, the study was carried out during a time when lockdown restrictions were in place due to the COVID-19 pandemic. As a result, the researcher did not have regular personal contact with the participants of the study. However, the researcher ensured that this issue was addressed by using semi-structured interviews that encouraged the participants to include additional reasoning for the answers provided. Secondly, the researcher had completed a degree in radiography, making him an insider to the investigation being conducted.

Nevertheless, the researcher followed the required methods strictly so that any previous involvement in radiography training would not affect study activities such as data collection, evaluation and presentation. In addition, other strategies like group membership verification, co-coding and triangulation were applied to the study. Since it is necessary for the researcher to indicate prior knowledge and experience whenever it is present, the researcher compiled personal observations pertaining to the time he was studying radiography. Importantly, the researcher explicitly stated that his own experiences would not influence or contribute to the investigation, emphasising a focus solely on the experiences of the sample size.

## Implication for practice

Radiography plays a vital role in SA's healthcare system, where there is a significant demand for its services. However, the state struggles to meet this demand, resulting in an overload of service provision. Hence, this study aimed to contribute to the understanding of the importance of fostering entrepreneurial radiography. By promoting the establishment of private firms, the study seeks to augment the provision of radiography

services in SA, suggesting that affordable private practices could alleviate some of the burdens on the overburdened public sector. The researcher envisages the gained experiences and expertise of radiographers running their private practices will ultimately help alleviate the pressures exerted on the radiography services. These long-term benefits may also include the establishment of a diverse range of sustained private practices.

## Conclusion

The radiography curriculum in SA tertiary institutions incorporates elements that support entrepreneurial ventures. However, significant gaps need to be addressed to bridge the divide between theoretical knowledge and practical application, enabling graduates to establish a meaningful connection with the industry before completing their studies. Assessing the effectiveness and efficiency of the radiography curriculum is instrumental in determining its ability to produce entrepreneurial radiographers. Through this evaluation, various aspects can be identified and directed towards ensuring that the curriculum consistently generates radiographers of this calibre. Ultimately, this commitment to excellence will result in the delivery of superior-quality radiography services in SA. More so, the acquisition of entrepreneurial skills can foster a client-centric approach within practices, inspire enthusiasm among personnel and enhance professionalism, thereby improving service delivery.

**Declaration.** None.

**Acknowledgements.** All participants who were involved in this study.

**Author contributions**. The authors contributed equally to the study.

**Funding.** None.

**Data availability statement.** The corresponding author can provide, on request, the data obtained and analysed during this study.

**Conflicts of interest.** None.

1. Olutuase S, Brijlal P, Yan B. Model for stimulating entrepreneurial skills through entrepreneurship education in an African context. J Small Bus Entrep 2020;35(2):263-283. https://doi.org/10.1080/08276331.2020.1786645
2. Ngoya PS, Muhogora WE, Pitcher RD. Defining the diagnostic divide: An analysis of registered radiological equipment resources in a low-income African country. Pan Afr Med J 2016;25:1-7. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5325496/
3. Mudavanhu Y. Teacher educators' views of student learning and experiences offered to support learning. J Educ Train Studies 2016;4(9):209-221. https://eric.ed.gov/?id=EJ1110938
4. Kolb AY, Kolb DA. Eight important things to know about the experiential learning cycle. Australian Educational Leader 2018;40(3):8-14. https://search.informit.org/doi/abs/10.3316/informit.192540196827567
5. Wach-Kakolewicz A. Constructivist approach in teaching in higher education. Poznan: UNI-DRUK 2016:1-152.
6. Creswell JW, Poth CN. Qualitative inquiry and research design: Choosing among five approaches. California: SAGE Publications; 2016. 4th ed, pp 1-488.
7. Castleberry A, Nolen A. Methodology Matters: Thematic analysis of qualitative research data: Is it as easy as it sounds? Currents Pharm Teach Learn 2018;10(6):807-815. https://www.sciencedirect.com/science/article/abs/pii/S1877129717300606
8. Cape Peninsula University of Technology (CPUT). Diagnostic Radiography. Cape Town, CPUT 2022. https://prospectus.cput.ac.za/index.php/course-details?q=BPSDGR&f=180.
9. Central University of Technology (CUT). Radiography in Diagnostics. Durban, CUT 2022. https://www.cut.ac.za/programmes/radiography-in-diagnostics
10. Durban University of Technology (DUT) Career Information. Bachelor of Health Sciences: Radiography. Durban, DUT. 2022. https://www.dut.ac.za/wp-content/uploads/career_leaflets/HSc%20Radiography.pdf
11. van de Venter R, Engel-Hills P. Diagnostic radiography education in South Africa: Where we were, where we are and possible futures. S Afr Radiogr 2022;60(1):15-19. https://doi.org/10.54450/saradio.2022.60.1.693
12. Ncube TR, Lekhanya LM. Evaluation of the effectiveness of entrepreneurship education in public institutions of learning in the province of KwaZulu-Natal. Int J Entrep 2021;25(7):1-18.
13. Price K, Ronnie L. Contextual factors influencing entrepreneurship education at a South African University of Technology. South Afr J Entrep Small Bus Manag 2021;13(1):1-11. https://sajesbm.co.za/index.php/sajesbm/article/view/394
14. Zegeye B, Singh M. The state of entrepreneurship education in higher education institutions of Africa. Glob J Manag Business Res 2019;19(6):26-34.
15. Radipere S. South African university entrepreneurship education. Afr J Business Manag 2012;6(44):11015-11022. https://academicjournals.org/journal /AJBM/article-full-text-pdf/4C7022016971.pdf
16. Pieterse T, Lawrence H, Friedrich-Nel H. Problem-solving abilities of radiography students at a South African university. Afr J Health Prof Educ 2014;6(1):33-36. https://journals.co.za/doi/abs/10.7196/AJHPE.297
17. Decker-Lange C, Lange K, Dhaliwal S, et al. Exploring entrepreneurship education effectiveness at British universities: An application of the World Café Method. Entrepreneurship Educ Pedagogy 2022;5(1):113-136. https://journals.sagepub.com/doi/full/10.1177/2515127420935391
18. Bellavatis C, Filatotchev I, Kamuriwo DS, Vanacker T. Entrepreneurial Finance: New Frontiers of Research and Practice. Int J Entrep Finance 2017;19:1-16. https://www.tandfonline.com/doi/full/10.1080/13691066.2016.1259733

*Received 1 August 2023. Accepted 5 June 2024.*