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Research Article

Exploring health sciences students' experiences of interprofessional education to improve quality learning outcomes

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Abstract

Interprofessional education (IPE) is a practical pedagogical approach to strengthening teaching and learning in higher education to improve students' competencies. These competencies include an enhanced understanding of content knowledge and skills from different professions. To ensure quality teaching and learning, it is envisaged that IPE will strengthen and advance the knowledge and skills of students. The COVID-19 pandemic offered the opportunity to adopt multiple approaches to support students in acquiring the knowledge, skills, values and attitudes towards the programme through the support of interprofessional educators and resources. However, there is a lack of research to explore students' experiences and views on IPE in an acupuncture programme within the South African context, particularly with technologies. This study was anchored in the Technological, Pedagogical, Content Knowledge model as a theoretical lens to explore students' experiences of the IPE using technologies. The authors employed an interpretivist paradigm within a qualitative case study design. They used purposive sampling as a technique since the participants in this study were acupuncture students at a South African university. The researchers interviewed six (6) undergraduate students for this study. The findings revealed that students showed positive attitudes towards IPE. They believed the IPE would improve their competencies in clinical practice. Results also suggested that specific programmes should allocate sufficient time for IPE. Institutions should provide professional training to academics since IPE require more comprehensive content knowledge and pedagogical approaches. To promote effective teaching and learning, IPE should be the norm at universities. Universities should provide relevant support for the appropriate implementation of IPE from policy and resource perspectives.

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Introduction

In recent years, interprofessional education (IPE) has gained increasing attention in teaching and learning at higher education institutions (HEIs) in various fields (Ratka et al., 2017). The reason is that educators agree that IPE is a practical approach to improving students' competencies and skills. From a medical teaching perspective, these competencies and skills aid in promoting and ensuring optimal patient care in the real world (Reeves et al., 2012). Interprofessional education is defined as academic activities when professionals from different healthcare fields participate in teaching and learning simultaneously (Barr & Low, 2013; Treadwell et al., 2014). It provides an opportunity for students to gain an in-depth understanding and experience of the practice from different professionals. This view concurs with Müller and Couper (2021), who suggest that to cope with the complexity of patient care and health care systems, IPE and collaborative practice are recommended in undergraduate clinical training and, where clinical and contextually relevant, have merit in improving comprehensive patient management. This approach (IPE) can be further supported through various resources, such as technologies. For this study, the focus is on the IPE in the acupuncture programme.

Background to Acupuncture and Interprofessional Education

Acupuncture is widely accepted globally as a form of healthcare service. It is one of the modalities of Traditional Chinese Medicine (TCM) that is performed by inserting needles on specific points of the body to prevent and treat various diseases (World Health Organization [WHO], 2019). The authors identified IPE as a necessity to strengthen and enhance students' competencies of acupuncture knowledge and skills. Girard (2021) and Müller and Couper (2021) agree that IPE is an effective means to optimise patient care by promoting students' competencies in clinical practice through knowledge and understanding from different professionals in the field. Despite scholars contending on the importance of IPE, the Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria (PACCARB) (2021) points out that there is a lack of a shared vision of an educational framework for IPE. For this reason, IPE is rarely implemented in higher education institutions to promote and strengthen students' knowledge and understanding of content.

At their institutions, the authors have noticed that most programmes are still trained in silos, which limits students' exposure to other disciplines. This may negatively affect students' competencies in their practice and communications with professionals in other fields. Furthermore, most programmes at HEIs focus mainly on traditional teaching and learning (Hu & Venketsamy, 2022a). The COVID-19 pandemic offered the opportunity to adopt multiple approaches to support students in acquiring knowledge, skills, values and attitudes towards their respective programmes. One such approach was teaching and learning through technology, collaboration and engagements with other professionals in teaching activities.

In South Africa (SA), acupuncture is classified as a 'scarce skill' due to the fewer acupuncturists available in the country (The Allied Health Professions Council of South Africa [AHPCSA], 2020). Consequently, the authors believe that there is a need to improve the capacity of training high-quality acupuncture service providers by strengthening pedagogical approaches, such as IPE. For this reason, the authors intended to explore students' experiences and views of the IPE in the identified acupuncture programme at a public HEI in Gauteng province.

The authors adopted a qualitative case study design to explore students' views and experiences on IPE and the use of technologies in the identified acupuncture programme. The conceptual framework used in this study was the Technological, Pedagogical, Content Knowledge (TPCK) model developed from Shulman's (1986) Pedagogical Content Knowledge (PCK) model and the Technological, Pedagogical and Content Knowledge (TPACK) model developed by Mishra & Koehler (Venketsamy & Hu, 2022). The TPCK model emphasises content knowledge (CK), PCK and technological content knowledge (TCK). The findings of this study contributed to gaining an in-depth understanding of students' experiences with IPE in the acupuncture programme. This further assisted in strengthening the quality of acupuncture education through collaboration and partnership with other professionals. This study also

contributed to a pilot study for a hybrid model of IPE in complementary medicine in higher education in the South African context.

Literature Review

To gain an in-depth understanding of IPE in the acupuncture programme in SA, the researcher conducted a literature review of recent publications, text and other sources.

Explanation of Interprofessional Education

Interprofessional education is not a new concept in health care education, despite it gaining increasing and extensive attention in recent years. From the literature, there is a lack of uniform definition of IPE. The World Health Organization defines IPE as learning activities that involve two or more professionals to enable effective collaboration and improve health outcomes (Olenick et al., 2010; Yan et al., 2008). Barr and Low (2013) articulate that IPE is a teaching and learning process that promotes health care quality through collaborative work. Kitto et al. (2013) emphasise that IPE must take place when two or more professions engage in one activity simultaneously.

On the contrary, Johnson (2016:4) emphasises that IPE refers to "students from multiple disciplines learning about, from, and with each other's disciplines." Angelini (2011) states that interprofessional education is more commonly used than interdisciplinary education, which refers to different disciplines working together without much interaction. Despite the different emphases in the definition of IPE, all these researchers concur that IPE aims to promote students' learning outcomes to improve patient care in medical education. They further contend that IPE offers an opportunity to achieve effective collaboration and improve patient quality of health care (Barr & Low, 2013; Johnson, 2016). In this study, the authors contend that IPE refers to an umbrella term as an interdisciplinary education where students learn from two or more professionals from different fields to improve learning outcomes to optimise patients' health outcomes.

Significance of Interprofessional Education

Interprofessional education allows students to learn together to develop attributes and skills effectively and efficiently (Reeves et al., 2012). Treadwell et al. (2014) further assert that collaboration in the education of different fields significantly improves students' competencies in optimising patient care. Therefore, IPE plays a significant role in strengthening students' competencies in clinical practice, which further promotes healthcare services. This view is further supported by WHO (2013), revealing that IPE significantly enhances learning outcomes by effectively collaborative learning. Ratka et al. (2017) and Treadwell et al. (2014) state that IPE is an integral approach to optimise the healthcare system, measured by optimal patient outcomes through enhanced students' competencies. World Health Organization (2010) highlights that IPE promotes mutual understanding of content knowledge and skills from various medical fields. Students learn to work more effectively by collaborating with professionals in their teams from different fields (WHO, 2013). These scholars concur that the practical application of IPE will benefit students' competencies in clinical practice, which further optimises the delivery of service, patient care and safety.

Interprofessional education provides an opportunity for students to learn from different medical fields, which further enhances their knowledge and clinical skills. Barr and Low (2013) agree with Reeves et al. (2012), who claim that IPE meets the requirement of comprehensive health needs. Anderson et al. (2009) concur that IPE equips students with higher levels of skills through teamwork. They agree that there is a need for IPE in health sciences education to equip students with adequate content knowledge and skills to ensure students' competencies. The authors believe that IPE can be implemented and accommodated in any programme at higher education institutions. Reeves et al. (2012) further state that effective collaboration with professionals from different medical fields is fundamental for the complex nature of health care.

Interprofessional Education and the Acupuncture Programme

Acupuncture plays a critical role in promoting health goals due to its effectiveness and cost-effectiveness. Many countries acknowledge the importance of acupuncture in promoting public health (Hu & Venketsamy, 2022b). Li et al. (2019) report that the public increasingly accepts acupuncture since many medical conditions can be treated with acupuncture.

Yang et al. (2014) report that acupuncture regulates the balance of the body at the molecular level, which potentially impacts human diseases. From their study, Skjeie and Gardasevic (2013) conclude that acupuncture shows positive efficacies in many clinical conditions, especially concerning chronic pain. Both general health and the financial burden of medical services will be relieved by affordable quality acupuncture services (Kwon, 2014; WHO, 2019).

Consequently, the authors believe there is an urgent need to ensure the quality of acupuncture services. Therefore, it is crucial to ensure that acupuncture educational programmes are delivered through appropriate pedagogical approaches, such as IPE. To ensure that students receive the highest quality education in acupuncture, the authors concur that support from various professionals (IPE) will strengthen students' competencies.

Although acupuncture practices are available in many African countries, such as Zimbabwe, Botswana, Mauritius, Zimbabwe and SA (WHO, 2019), SA is the only country that provides formal acupuncture higher education in Africa. In SA, TCM (including acupuncture) higher education was first introduced at the University of Western Cape (UWC) in 2003 (Traditional & Natural Health Alliance [TNHA], 2018). However, this institution has discontinued all new enrolments as of 2019 (TNHA, 2018). In 2020, the University of Johannesburg (UJ) started offering an acupuncture programme for the first time to build the capacity for training professional acupuncturists in this country (UJ, 2021). To ensure the optimised learning outcomes of the acupuncture programmes, the authors believe that there is a need to adopt IPE in the acupuncture programme to promote students' competencies.

Figure 1

An IPE Class at the HEI (one conventional medicine practitioner was participating in the IPE section through Zoom meeting, while the rest of the class presented in a contact class.)

Strengthening Technology Use for Improving Learning Outcomes

Due to the impact of COVID-19, many HEIs shifted to emergency remote education (ERE). Emergency remote education is the urgent but temporary adjustment to an alternative mode of delivery in education (Hodges et al., 2020). Technology in this study refers to the internet. Tejedor et al. (2021) argue that the use of technology in education has been developed and implemented for decades to aid traditional face-to-face teaching and to learn to improve education outcomes. As a result of COVID and its restrictions, the authors argue that IPE can still be implemented through technology. Technology has provided both students and IPE professionals to interact with each other. Cloete (2017) states that the internet has become an essential technology in HEIs worldwide and this technology has created an opportunity for online teaching and learning. Budhwar (2017) agree with Cloete (2017) that students' performance and achievement can be improved by using technology and the support of IPE professionals. Chau (2010) further states that the barrier to access to education can be eliminated by using technology, reducing the financial costs of education. The relief of financial costs of education, such as IPE, is of great significance since the increased financial cost of IPE is a critical fact, particularly in African countries where poverty is still prevalent (Mellor, 2014; WHO, 2013).

Challenges in the Implementation of IPE

Despite scholars acknowledging the importance of IPE, many professionals are still trained separately (PACCARB, 2021). This lack of interaction between disciplines allows each to have its own culture, leading to a clash when disciplines do come together. There is a need to integrate IPE in the education of health sciences to overcome barriers in communication among professionals from different medical fields (Forte & Fowler, 2009; Treadwell et al., 2014).

Barriers to communication and collaboration among medical professionals are critical in clinical practice. For example, the inconsistencies in terminology and lexicons may result in misunderstandings and misinterpretation among professionals. This view concurs with Reeves et al. (2012), who report that patient safety is affected by poor communications among different professionals.

Experts in health sciences emphasise students' competencies in clinical practice to ensure that they (students) are competent, confident and capable of performing their clinical duties to optimise patient care. Frenk et al. (2010) reported that many professionals in the healthcare field enter practice without sufficient knowledge and practice for the delivery of interprofessional care. One of the reasons is the reluctance of clinicians to participate in educational activities due to their existing clinical workload (WHO, 2013). The limited clinical exposure is another challenge in ensuring students' competencies in clinical practice. Therefore, it is critical to develope an effective strategy to bridge the gap: students' competencies using acupuncture in clinical practice and communications with other healthcare professionals.

The lack of IPE in the acupuncture programme may negatively affect students' competencies in clinical practice to patient care. This may particularly affect the communications with professionals in other medical fields. Ratka et al. (2017) state that the transformation of IPE into practice relies on clinical instructors. The successful transformation of IPE will be achieved only if lecturers possess adequate content knowledge and skills of the specific modality to train students. These researchers concur that the implementation of IPE in healthcare education enhances students' competencies in clinical practice. The authors contend that there is a need to effectively support staff to conduct IPE in the acupuncture programme.

Conceptual Framework

This study was anchored within the conceptual framework, Technological, Pedagogical, Content Knowledge (TPCK) model as a theoretical lens to explore students' experiences and views on the IPE with technology in the acupuncture programme. This model primarily focuses on CK, PCK and TCK. Figure 1 below illustrates the outline of the TPCK model. Shulman (1986) contends that it is necessary to accommodate particular subject content knowledge with various pedagogical knowledge in education (Hu & Venketsamy, 2022a). The reason is that appropriate pedagogical knowledge in teaching and learning will improve students' learning experiences and promote learning outcomes (Venketsamy et al., 2021). Consequently, Shulman (1986) proposed the concept of PCK, which is defined as the knowledge utilised for particular content knowledge to enhance learning outcomes (Kultsum, 2017).

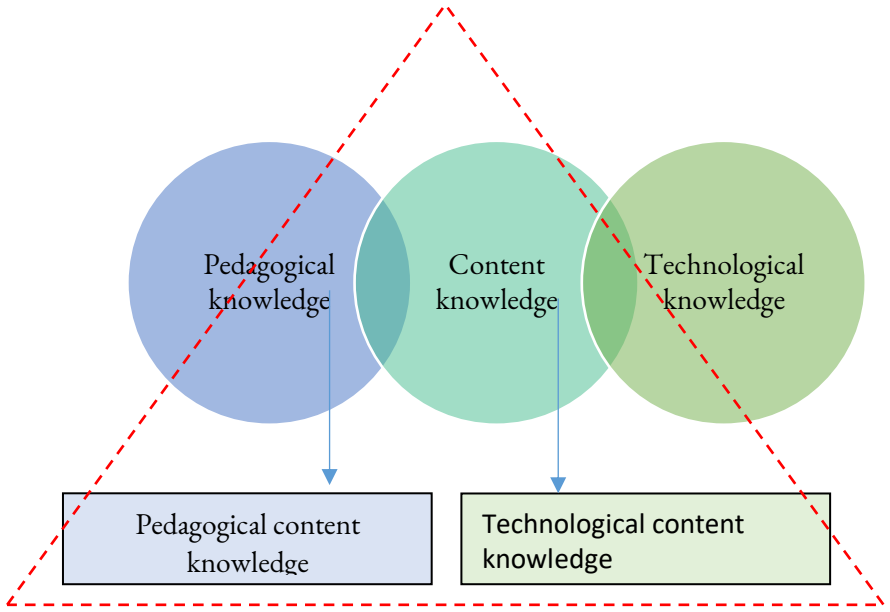

Figure 2

The TPCK Model (Own model adapted according to Shulman [1986] and Mishra & Koehler [2006])

Pedagogical content knowledge refers to knowledge of particular teaching techniques utilised to deliver specific content to strengthen learning outcomes (Kultsum, 2017; Shulman, 1986). PCK is the blending of content and

pedagogy to enhance understanding of how particular topics, problems, or issues are organised, represented, and adapted to the diverse interests and levels of students' abilities. To understand how to integrate technology in teaching and learning, Mishra and Koehler (2006) proposed adopting the TPACK model. This model was built upon Shulman's PCK model to promote effective teaching by integrating pedagogical, content and technological knowledge (Hu & Venketsamy, 2022a; Koehler et al., 2013).

There are seven elements in the TPACK model, which are derived from three core components, pedagogical knowledge, content knowledge and technological knowledge (Oner, 2020). Koehler et al. (2013) explain that the appropriate integration of the three core components further generates four other types of knowledge. This knowledge includes PCK, TCK, technological pedagogical knowledge and TPCK. The technology component of this model has a significant impact on this study since the HEIs were implementing online teaching and learning (Hu & Venketsamy, 2022a).

The TPCK model proposed for this study emphasises the importance of CK, PCK and TCK. Content knowledge refers to knowledge of specific subjects for achieving required learning outcomes for teaching and learning (Bhukuvhani, 2018). Technological content knowledge demonstrates the knowledge of applying appropriate technology to represent particular CK in education to promote teaching and learning (Koehler & Mishra, 2009; Koehler et al., 2013). The authors believe that the TPCK model provides a basic assumption of employing appropriate pedagogical approaches and technology to particular subject content knowledge to strengthen learning outcomes. Therefore, it is applicable to be utilised the teaching and learning at HEIs during the COVID-19 pandemic. Consequently, the authors believed that the TPCK model was a sound theoretical lens to explore the dynamic elements in education with technology.

According to the TPCK model, technology must be well understood and grounded before implementation. The utilisation of the TPCK model in this study assisted in analysing students' experiences from different perspectives, which further assisted in developing recommendations to strengthen IPE in the acupuncture programme. The authors believed that the TPCK model was suitable for this study since it provided practical approaches to analyse the phenomenon from technological, pedagogical and content knowledge perspectives.

In this paper, the authors employed the TPCK model to explicit students' views and experiences of IPE.

Research Problem

The primary research question

- How do students experiences IPE in the acupuncture programme?

Secondary research questions

- What are students' experiences with IPE in the acupuncture programme?
- What are students' views on the use of technology in IPE?

Method

Research Design

In this study, the authors adopted a descriptive qualitative single case study design with an interpretivist paradigm to explore participants' experiences with IPE in the acupuncture programme at the identified HEI. Venketsamy and Wilson (2020) agree with Yin (2018), who state that a case study is an approach to investigating and examining one or a few sites and providing in-depth explorations of phenomena. The interpretive paradigm refers to an approach used to understand and comprehend the truth and knowledge of the natural world (Hu, 2022). The interpretivist paradigm was appropriate for this study because it was a subjectivist epistemology that relied on the researcher's understanding and comprehension when making sense of participants' experiences (Creswell, 2014).

A single case study design was selected for this study. This method offered an opportunity to explore and make meaning of participants' experiences. Yin (2018) agrees that studying a single case provides a particular in-depth investigation of significant factors of the phenomenon. The Complementary Medicine Practice 3 (COPCMY3) module in the Bachelor of Health Sciences in Complementary Medicine (BHSsCM) at the identified HEI was selected as the case in this study. The reason was that IPE was adopted in the COPCMY3 module to strengthen students learning of

clinically related content. During a typical IPE class, a professional from the conventional medicine field would join the class through Zoom meeting to discuss the topic presented in that section.

Participants

A purposive sampling strategy based on volunteers was employed to identify participants. The authors invited participants who responded to the advertisement placed as a poster on the notice board on the identified HEI campus. Those who met the inclusion criteria and consented were selected to participate in this study. The inclusion criteria were as follows: a. participants needed to be registered for the COPCMY3 module of the BHSsCM, and b. participants must consent and sign the acceptance forms for participation. A sample of six (6) students was selected as the participants in this study since there were only six students responded to the invitation and signed the consent form. Pseudonyms were used in the data analysis and reporting phases of the study. Table 1 illustrates a summary of the participants' information.

Table 1

Participants' Information

Participants	Gender	Age
P1	Male	23
P2	Female	24
P3	Female	27
P4	Female	24
P5	Male	23
P6	Male	26

Data Collection Tools

Formal permission from the head of the department was sought prior to the commencement of this study. All participants were invited to a focus group after the IPE section for this study. The focus groups took place between February and March 2022. Saturation was achieved in after the third focus group. The data was transcribed and organised into themes for thematic analysis.

Data Analysis

The six-step framework of thematic analysis proposed by Creswell (2014) was followed in this study to analyse the data. The six steps include familiar with data, coding, generating themes, reviewing themes, defining themes and writing up (Venketsamy et al., 2021). Qualitative validity criteria, including credibility, transferability, dependability, and confirmability, were ensured in this study by being audited by a second coder.

Ethical Committee Permission

A Research Ethics Committee approved ethical clearance at a public university in Gauteng Province (Reference: EDU137/21).

Results

Findings from this study highlighted that all participants shared a positive attitude and views towards IPE, and however, they shared ambivalent views on the use of technology during IPE. Three major themes emerged from the data during the coding process: a) Students' views and experiences of IPE; b) Students' experiences of the use of technology in IPE; and c) Strategies to improve IPE.

Theme 1: Students' Views and Experiences of Interprofessional Education

Despite their ambivalent views on IPE, all participants in this study agreed that the IPE would benefit them by improving their competencies in clinical practice. Participants concurred that IPE allowed mutual understandings with other professionals who would benefit from their competencies in working.

To this, P1 said: "*IPE helps me revise knowledge in diagnostics and internal medicine in conventional medicine, which I might have forgotten because I did not revise the content regularly*."

P2 mentioned:

> *"During IPE, both lectures explain the same medical condition from different perspectives, which makes us easier to understand a specific disease from acupuncture and conventional medicine points of view. More importantly, it makes our future practice safer for patients as we have a better understanding of when to refer patients and when to seek medical assistance from conventional medicine."*

P4 and P5 both contended that IPE allowed them to acquire a better understanding of the knowledge and skills from different fields.

P6 added:

> *"We cannot deny that we are in a society where conventional medicine dominates. We have to understand the medical term so that we can communicate with medical doctors. Because we will need to refer patients to medical doctors. In the meantime, we will also receive patients from referrals from medical doctors if they understand what we can provide to improve patients' care."*

The findings of this study also suggested that sufficient time should be allocated for IPE in the acupuncture programme since more time was required for the implementation of IPE. P1, P3, P4 and P6 indicated a lack of time for the IPE in the acupuncture programme. P3 stated: *"I would prefer if more time could be allocated to IPE sections. Because sometimes we are not familiar with the knowledge from other fields. I believe that a longer duration in the IPE will allow better understanding."*

Theme 2: Students' Experiences in the Use of Technology in IPE

Although technology has been adopted in education, especially during ERE, participants still express ambivalent views on using technology in IPE in the acupuncture programme. Some participants indicated that technology-enabled the implementation of IPE in the acupuncture programme since it was more convenient and affordable for medical doctors to join the discussion. According to P2 and P5, they were told that the availability of medical doctors had negatively affected the implementation of IPE in terms of time and high cost. P2 highlighted: *"Using the Zoom meeting in the IPE sections allows conventional medicine doctors to attend our class while still working in the clinics."* P5 added: *"It may be cheaper to invite medical practitioners to participate in the IPE sections through Zoom meetings since it significantly reduces the time budget."*

However, some participants also expressed their reluctance to accept using technology in the IPE. They believed that all clinical training should be delivered in person since the experiences from virtual classes were not the same as contact classes. P1 mentioned: *"I feel very different from online discussion. I prefer all lecturers present in contact classes. This is especially useful when demonstrating physical examination and other practical skills."* P4 indicated: *"I can learn better if I see the demonstration physically instead of online."* Both P3 and P6 stated that they did not acquire authentic experiences from the virtual discussion similar to the real world. P6 added: *"I am glad that we are in a contact class for the IPE sections, although the medical practitioners join us online. I feel more beneficial if everyone presents in contact classes."*

All participants agreed that technology had been an effective means of communicating online with IPE professionals across the globe. They further articulated the importance of online teaching and learning amidst the COVID pandemic.

Theme 3: Strategies to Improve Interprofessional Education

The findings of this study highlighted some strategies to improve the IPE in the acupuncture programme. They supported that institutions should provide academic and professional training since IPE requires more comprehensive content and pedagogical approaches. Both P2 and P4 pointed out that lecturers should be equipped with knowledge from different medical fields. To this P2 said: *"It makes the study more difficult if the lecturer does not fully understand the discussion with conventional medicine doctors."* P4 added: *"It would be great if our lecturers have an in-depth understanding of the content knowledge during IPE. I believe that the university should provide proper training for lecturers who conduct the IPE."* P5 indicated:

> *"We have various departments in our faculty which focus on different domains, such as complementary medicine, emergency service, nursing, environmental health, chiropractic, etc. It would be great if we had some*

classes with students and lecturers from different fields. I trust this will significantly improve our competencies in clinical practice and promote acupuncture. Because in this way, other medical fields also have a better understanding of acupuncture."

Summarily: Graphically

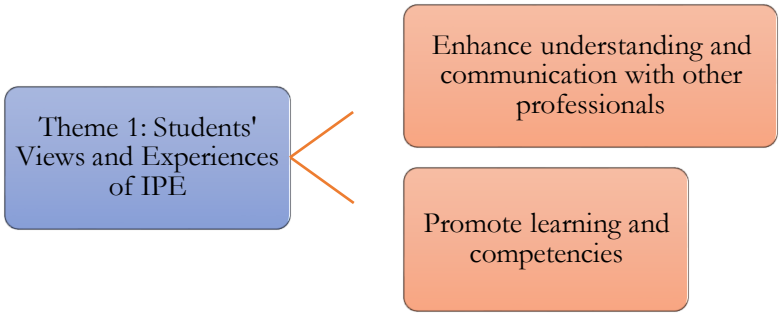

Figure 3

Codes of Theme 1: Students' Views and Experiences of IPE

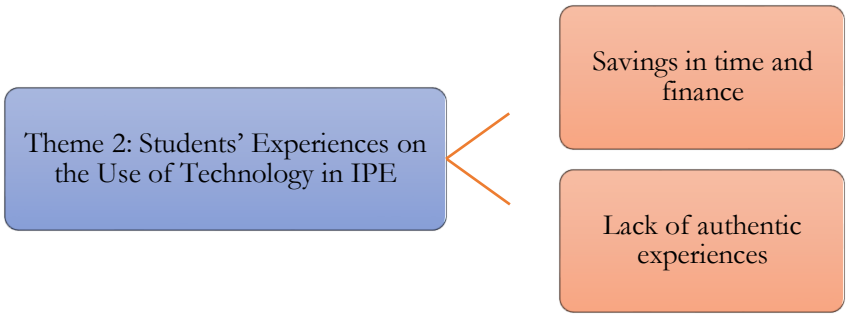

Figure 4

Codes of Theme 2: Students' Experiences in the Use of Technology in IPE

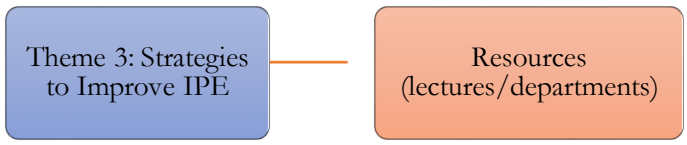

Figure 5

Codes of Theme 3: Strategies to Improve IPE

Each of these images is a graphical representation of the themes and the elements which were discussed above.

Discussion and Conclusion

Importance of IPE

Literature reveals that IPE is a practical pedagogical approach to strengthening students' competencies in health sciences (Johnson, 2016). Barr and Low (2013) and Reeves et al. (2012) concurred that IPE improves students' competencies to enable comprehensive needs in clinical practice. They agree that IPE significantly strengthened their learning which would benefit their future clinical practice in optimising patients' care (WHO, 2010; 2013). The findings of this study agreed with the literature that supported the importance of IPE in health sciences education. Participants in this study concurred that IPE promotes their learning and strengthens their competencies in clinical practice. The findings of this study contended that IPE offered an opportunity to improve learning outcomes which further enhances patient care.

Scholars, such as Frenk et al. (2010), acknowledge the importance of IPE in teaching and learning. Therefore, they agree that strategies should be developed to support the effective implementation of IPE (PACCARB, 2021; Ratka et al., 2017). However, the findings of this study concurred with the literature that there was a lack of interaction between

disciplines (Treadwell et al., 2014), and most professionals were still trained in silos. The authors contended an urgent need to develop strategies to support IPE at HEIs to promote students' learning and competencies.

According to the TPCK model, there are multiple perspectives in successfully delivering an educational programme, such as content and pedagogical content knowledge (Mishra & Koehler, 2006; Venketsamy, Smart & Hu, 2020). The PCK should be well structured to ensure the effective delivery of the content knowledge (Mishra & Koehler, 2006). The authors believed that adopting IPE as a pedagogical approach would benefit students' competencies in clinical practice. Interprofessional education was an appropriate pedagogical approach to delivering clinical-related content knowledge and skills. In their study, Venketsamy and Wilson (2020) highlighted the importance of content knowledge in the efficient teaching and learning in a programme. The authors believed that both PCK and CK should be well designed prior to the implementation of IPE in the acupuncture programme.

Technology Use in IPE

Technology is a crucial instrument in 21st-century education (Tejedor et al., 2021). The impact of COVID-19 promotes the shift to online teaching and learning through technology (Hodges et al., 2020). The findings of this study supported the literature that the effective use of technology will support teaching and learning (Budhwar, 2017; Cloete, 2017). The findings also concurred with Chau (2010) and Mellor (2014), who agreed that technology would allow education to be more affordable and accessible.

However, this study revealed a need to ensure the effective use of technology in the delivery of educational programmes. The reason was that not all CK was suitable to be delivered online, particularly in health sciences, where many practical skills were required. According to the TPCK model, technology is critical in promoting teaching and learning (Koehler et al., 2020). The authors believed that the adoption of technology in acupuncture should take into consideration specific content knowledge. Consequently, there was a need for institutions and educators to have a comprehensive understanding of particular TCK to determine how to use technology effectively for specific CK. This view concurred with Venketsamy and Wilson (2020), who emphasised the importance of technology in the twenty-first century to optimise education outcomes.

Conclusion

In conclusion, acupuncture is gaining increased interest globally. There is an urgent need to improve the capacity of training acupuncture service providers through quality educational programmes. This paper aimed to explore students' views and experiences on IPE in the acupuncture programme at the identified HEI in Gauteng. Interprofessional education is an effective approach to improving students' learning outcomes in health sciences. Despite research evidence of the effectiveness of IPE in promoting in-depth knowledge and understanding, this study found that most South African HEIs are focused on traditional teaching and learning. There is minimal collaboration among professionals within and outside of the institution. Interprofessional education provides an opportunity for collaborative teaching and students' professional development (Ratka et al., 2017). This view concurs with WHO (2013), which emphasises the significance of IPE in promoting learning outcomes in the field of health sciences. The interpretive approach and focus group allowed participants to share their experience and understanding of the IPE in the acupuncture programme and the value of IPE which added to their existing knowledge and understanding of acupuncture. The findings in this study will significantly contribute to the quality promotion of learning in acupuncture programmes in higher education within the South African context.

The TPCK model used in this study contributed to the analysis of the educational phenomenon in the 21st century, which places much emphasis on CK, PCK and TCK. To ensure effective teaching and learning, academic staff should possess comprehensive CK and PCK. This view concurs with Koehler et al. (2013) and Shulman (1986) who emphasise the importance of CK and PCK in education. The findings of this study also contribute to strengthening the effective teaching of clinical content knowledge at HEIs. Educators' in-depth understandings of the elements in the TPCK model will enhance their teaching practice in the real world through the effective integration of the elements in education. It

can be argued that IPE as a practical approach should be implemented in all HEI programmes to support students' learning.

Recommendation

The findings of this study reveal that students benefit from IPE in the acupuncture programme at the identified HEI. For the effective implementation of IPE, the authors concurred with the following recommendations:

- Effectively implementing IPE in the acupuncture programme – sufficient time allocation should be ensured to support IPE in the acupuncture programme. The use of technologies in IPE should be well-structured before the implementation of IPE. Lecturers should consider content knowledge in their lesson plans.
- Institutions should provide academic and professional training since interdisciplinary approaches require more comprehensive content knowledge and pedagogical approaches.
- To promote effective teaching and learning, interdisciplinary education should be the norm at universities. Universities should provide relevant support for implementing interdisciplinary education from policy and resource perspectives.

Recommendations for Further Research

The authors believe that this study should be explored more broadly at different HEIs. They further recommend that this study be conducted with various research paradigms to strengthen the findings. Therefore, future studies should be conducted using a quantitative paradigm or mixed methods approach. Further studies should also be conducted to investigate the effectiveness of IPE in other educational programmes involving clinical content knowledge at HEIs. Further studies are recommended to include a larger sample size to yield different results and recommendations; to investigate other technological and pedagogical approaches which can benefit teaching and learning.

Limitations of the Study

Since this study was conducted within a qualitative paradigm, the small sample size in the case study design negatively impacted the transferability of the findings. This study was also limited to exploring students' views and experiences on IPE at one HEI in Gauteng Province in SA. Subsequently, there was a lack of comparisons.

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