CURRENT PEDAGOGICAL PRACTICES EMPLOYED BY A TECHNICAL VOCATIONAL EDUCATION AND TRAINING COLLEGE'S MATHEMATICS LECTURERS

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ABSTRACT

Concerns are increasing about the pedagogies employed by technical vocational education and training (TVET) colleges, particularly regarding the teaching of mathematics, exacerbated by the perception that TVET colleges are inferior to other types of educational institutions. Regardless of TVET colleges' need to produce skilled workers, the concerns increasingly impede accessibility and students' preparedness with sufficient workplace skills. While there has been a call to address several of the aforementioned concerns, one that has thus far attracted limited attention despite its importance is the pedagogical practices TVET colleges employ, particularly in mathematics. Guided by social constructivism, the study upon which this article is based explored the pedagogical practices employed by current TVET college lecturers in the mathematics classroom and the limited number of students enrolled in mathematics-based disciplines in TVET. Through a purposive sampling technique, ten (10) mathematics lecturers from a single TVET college in Gauteng were selected to participate in the study. The thematic analysis of the data revealed that these lecturers relied heavily on traditional approaches to teaching – the banking zone was the only approach used extensively – and only allowed for students' passive involvement with the use of resources limited to whiteboards and textbooks. The routine approach of reviewing homework followed by classwork was dominant and there was a lack of real-life examples. A key recommendation that emerged from the study was further training in various pedagogies and the use of resources in teaching, particularly in mathematics lessons and re-training in advanced pedagogical practices.

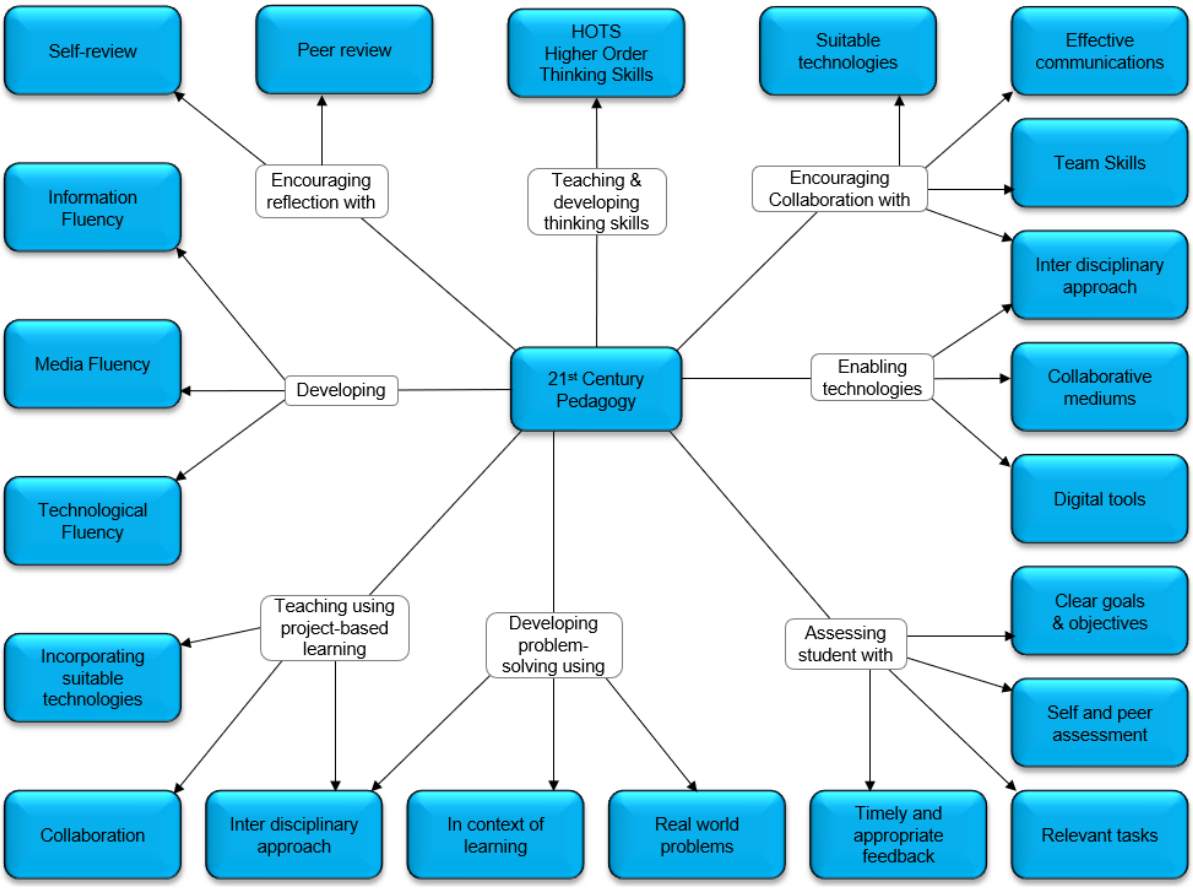
Keywords: pedagogies, mathematics, TVET, student-centred approach, traditional approach

INTRODUCTION

Ostensibly, TVET colleges are the technical institutions required by African countries to

address developments in technical workplaces (Afeti and Stefen 2014) because they are considered to be institutions that facilitate the acquiring of practical skills in the world of engineering and prepare students to become artisans. On the other hand, aspiring artisans are required to study mathematics as a fundamental subject for all engineering courses (Hashim et al. 2021). While mathematics is perceived to improve the skills required for a career in engineering, poor performance in mathematics has consistently plagued progress in engineering career.

Ngoveni and Mofolo-Mbokane (2019) identified key reasons for students' poor performance generally and in mathematics specifically, particularly among National Certificate Vocational (NC(V)) L2 students and these are shown in Figure 1: Pedagogical paradigm shift in the 21st century. For instance, while there are several reasons, negative attitudes and misconceptions regarding mathematics are judged to be high on the list (Madimabe, Omodan, and Tsotetsi 2020) and believed to be the result of the types of pedagogies used in the mathematics classroom, as reflected in Figure 1.



Source: Lazarov (2018); http://www.educatorstechnology.com/2011/01/21st-century-pedagogy-teachers-should.html

Figure 1: Pedagogical paradigm shift in the 21st century

For instance, it is argued that mathematics is taught in an abstract way, whereby lecturers do not relate the subject to real-life situations, as would be required by the pedagogical paradigm shift of the 21st century (Rusmar and Mustakim 2017). Although teaching mathematics occurs mostly at the school level, studies conducted by Ngubane-Mokiwa (2013) and Demssie and Endrisymam (2019) revealed that teaching staff in the South African context lack ideas and knowledge of how to deviate from standard teaching strategies and prefer to maintain the traditional ways of teaching mathematics and do not attempt to make the subjects they teach more interesting, especially mathematics. Despite the growing call to examine the current pedagogies (pedagogical paradigm shift in the 21st century) employed by TVET lecturers in the teaching of mathematics, limited research has been undertaken, particularly in the South African context. Consequently, this study aimed to examine the current pedagogies employed for mathematics at a TVET college. The key research question was: What is the prevailing pedagogical practice in the TVET college mathematics classroom?

Social constructivism theory and the study's aim guided the literature review in (a) contextualising South Africa's TVET colleges through various scholars' work including Schwartz (2019); (b) we used the work of Starkey (2010), Okolie et al. (2021), Ojo and Jeannin (2016), Nkwadipo and Rabaza (2021) and Pangeni and Karki (2021) to examine TVET pedagogical practices in general while juxtaposing these with the pedagogical paradigm shift in the 21st century and, (c) in examining the existing pedagogies employed by TVET lecturers in the mathematics classroom specifically, we extended our attention to the work of Gomez, Black, and Allen (2007), Bature (2020), and Harris and De Bruin (2018).

LITERATURE REVIEW

Contextualising South Africa's TVET Colleges

To examine the current pedagogies employed by TVET lecturers in the teaching of mathematics, it was important to contextualise South Africa's TVET colleges for international readers**.** In South Africa, TVET colleges were formerly known as Further Education and Training (FET) colleges but after a name change, evolved to become attractive educational institutions of choice for school leavers (Schwartz 2019; RSA 2013, xii). TVET colleges offer two programmes; the first of which is the National Certificate Vocational (NC(V)) from Level 2 to Level 4. This is a one-year programme. The second programme is the National Accredited Technical Education Diploma (NATED), which is divided into two components, namely the engineering and business components; the former is a trimester component and the latter a semester component. The business component covers N4 to N6 and thereafter, students may

require 18 months' work experience before being awarded a diploma. The engineering component is from N1 through to N6 with the option of seeking an apprenticeship after completing N3. The engineering course also requires 24 months' work experience to receive a Trade Test Certificate and diploma (Schwartz 2019). As the TVET colleges offer so many programmes, the quality of teaching needs to be taken into consideration to improve the quality of the graduates produced by these TVET colleges. Hence, the discussion of TVET pedagogical practices in general.

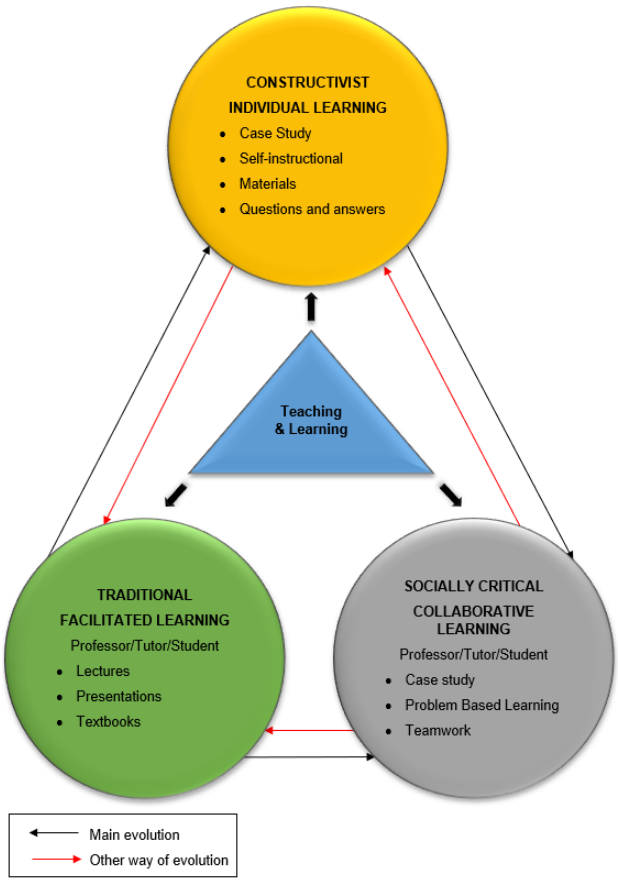
TVET pedagogical practices in general

As with the pedagogical paradigm shift in the 21st century, several studies have found that pedagogies have a significant role in addressing students' needs (Heong et al. 2019; Ojo and Jeannin 2016; Okolie et al. 2021; Pangeni and Karki 2021; Nkwadipo and Rabaza 2021; Starkey 2010). For instance, while pedagogies do not benefit only students but also teachers (Starkey 2010), Okolie et al. (2021) define pedagogies in TVET colleges as teachers' actions, practices and approaches to teaching that support student-centred learning. The implication is that TVET college pedagogies need to be examined to ensure that they support students' needs.

Generally, the expectation is that the pedagogies used in TVET colleges involve real-life problem-solving (Okolie et al. 2021). However, Figure 2 depicts Okolie et al.'s (2021) finding that several lecturers use traditional, planned pedagogical approaches that encourage students to learn by memorising the information they are taught.

The consequence of the mode of practice depicted in Figure 2 is that students listen to the lecturers (professors) who transfer knowledge to them. Sadly, this traditional approach is mostly theory-based rather than practical (Okolie et al. 2021). Pangeni and Karki (2021) argue that TVET teaching is dominated by conventional classroom-based activities, which is not only in contrast to the pedagogical paradigm shift in the 21st century but equally at odds with both constructivism and socially critical collaborative learning (Figure 2) (both are explained later in this article). For example, conventional classroom-based activities include standardised tests. In recent times, and contrary to the pedagogical paradigm shift in the 21st century, Ojo and Jeannin (2016) suggest that TVET colleges seem to not know much about the students they teach. Ojo and Jeannin (2016) further argue that the lack of understanding is due to the focus on chalk-and-talk teaching that hinders students' learning.

One of the consequences of students at TVET colleges being taught by the chalk-and-talk method is that they may struggle to apply what they have learned to a real-world problem (Nkwadipo and Rabaza, 2021), resulting in poor performance. There is a lack of a pedagogy



Source: Teaching and learning model (2022, March 12); https://www.google.comsearchq=social+constructivism+theory+in+mathematics

Figure 2: Teaching and learning model

that is directed by compassion, care, respect and love between students and teachers in terms of their identities, histories and experiences (Tawil et al. 2012). Scholars have suggested that the effectiveness of teaching and learning is determined by teachers' vocational content knowledge and pedagogical decisions (Heong et al. 2019), which implies that, as required by the pedagogical paradigm shift in the 21st century, TVET teachers need to have the skills required to make the right pedagogical decisions so that the purpose of teaching and learning can be achieved (Heong et al. 2019). Moreover, the pedagogical decisions made by lecturers determine the quality and effectiveness of the teaching and learning mode or process (Heong et al. 2019).

Based on the foregoing argument, the expectation is that TVET teaching needs to be transformed, relevant and aligned with 21st-century education (Pangeni and Karki 2021). Transforming the teaching at TVET colleges should include transforming mathematics teaching to be aligned with what is required in the labour market.

Pedagogies employed by TVET colleges in the mathematics classroom

As implied in the foregoing sections, pedagogical practices are associated with numerous benefits for both teachers and students (Gomez, Black, and Allen 2007; Starkey 2010; Okolie et al. 2021; RSA 2013). TVET students are expected to acquire the knowledge and develop the skills required for entry into the world of work and for that to occur successfully, the quality of TVET learning must improve (Billett 2014; Okolie et al. 2020; Ojimba 2012).

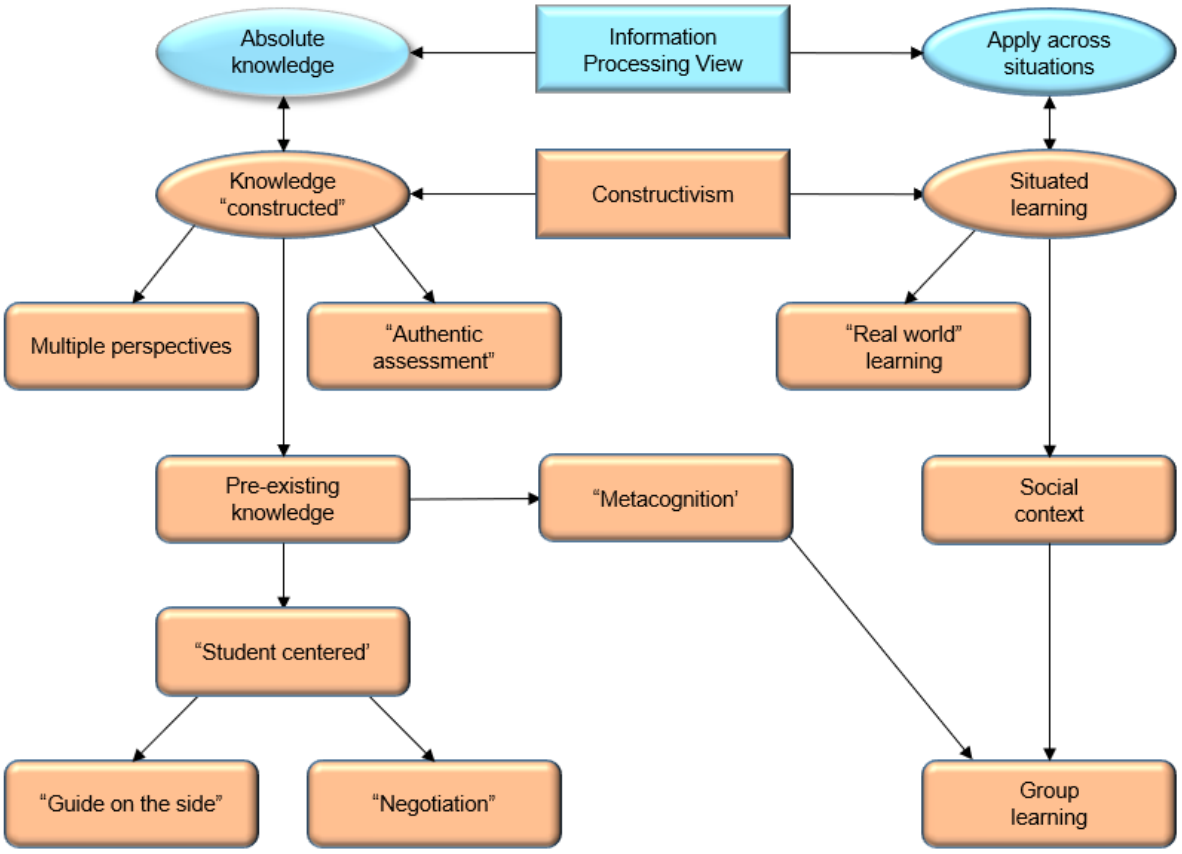
However, teaching and learning, particularly regarding mathematics in the TVET colleges, remain unchanged (Madimabe et al. 2020). Half a decade ago, it was argued that TVET college education is examination-oriented (Bhagat and Chang 2015) and that it focuses primarily on what is important for the examinations and promotes passive learning (Madimabe et al. 2020). Others argue that teachers at TVET colleges generalise students' abilities; teachers plan and teach lessons aimed at the average student and do not take others' talents or lack thereof into consideration (Tarmizi et al. 2010a).

In a Nigerian study, Bature (2020) found that mathematics teachers did all the talking, with students complaining about not being allowed to use alternative methods to solve mathematical problems. This could be the root cause of their inability to connect mathematics to the real world. With this disconnect in mind, Tawil et al. (2012) and Freire (2005) argue that a banking approach to education minimises students' creative power. Harris and De Bruin (2018), Kupari (2005), Akinseinde (2004) and Yusuff and Soyemi (2012) argue for the need to improve TVET teachers' pedagogical practices to provide insights into relevant guiding pedagogical principles for quality TVET learning through various innovative pedagogical practices, both in classrooms and at workplaces.

THEORETICAL FRAMEWORK

This study examined the current pedagogies employed by TVET college lecturers in the teaching of mathematics. Due in part to the aim of the study and the need to (1) understand TVET pedagogical practices in general and (2) comprehend the pedagogies employed by TVET mathematics lecturers, the study under discussion employed social constructivism as the appropriate theory, as illustrated in Figure 3.

The principal reason for selecting social constructivism as the framework for the study was that it provides a perspective with which to understand students' learning in their context (Simon 1995). The expectation is that social constructivism, as with constructivism and socially critical collaborative learning, views learning as a process of constructing meaning to make



Source: Hall (2022, May 18); https://web.mst.edu/~rhall/ed_psych/constructivism.html

Figure 3: Tenets of constructivism

sense of experiences (Caffarella 1999). Consistent with such an expectation, TVET lecturers are expected to know about their students (Ojo and Jeannin 2016). Thus, social constructivism, as with constructivism and socially critical collaborative learning, encourages an environment in which students are active participants in the creation of their knowledge (Schreiber and Valle 2013). An additional expectation is that, in social constructivism, teachers are encouraged to provide a structure and a set of plans that support the development of informed exploration and reflective inquiry without taking initiative or control away from the students (Amineh and Asl 2015; Barak and Rafaeli 2004; Ben-Zvi Assaraf 2011; Bozkurt 2017; Kim 2001; Simon 1995). Instead, they are encouraged to create a classroom environment that allows students to ask questions, pose problems and set goals; students must be encouraged to be active learners by exploring a variety of learning tactics (Simon 1995).

It could be inferred that allowing students to explore alternative learning tactics will allow them to collaborate and share ideas as opposed to lecturers speaking and students listening in the classroom. Constructivism and socially critical collaborative learning are both educational theories that tend to create an environment that allows students to share ideas, which implies considering what students know and putting that knowledge into practice (Amineh and Asl 2015).

STUDY OBJECTIVE

Based on the background and theory, the research set out to examine the current pedagogical practices employed by TVET lecturers in the teaching of mathematics.

METHODOLOGY

Based on the study's objective, a qualitative case study was deemed suitable and ten NC(V) and NATED mathematics lecturers were purposively selected to participate by providing pertinent information. The reason for the small sample was to generate as much relevant information as possible to address the research aim (Scotland 2012). The participants were mathematics lecturers from one of the TVET colleges in Gauteng. As this was an interpretive study, assumptions were made (Scotland 2012). The first was to assume that the pedagogies currently employed by TVET lecturers need to be transformed, as informed by literature and theory and the second was that mathematics teaching in TVET colleges is still conducted traditionally. Lesson observations, a video recorder and field notes were utilised in the data collection process. Observing mathematics lessons was intended to ascertain what resources are used, the teaching approach, student engagement and the use of real-life examples, as required by both literature and theory. Validity through transferability of the data refers to whether or not the data would yield similar results in a similar setting, as data were collected from only one TVET college. In this instance, the researchers provided a clear description of the data analysis to ensure that the findings could be transferred to other colleges or campuses (Cresswell 2014; Lincoln and Guba 1985). The researchers shared the data analysis with the respondents to ensure the credibility of the analysis and that the data were interpreted correctly. As part of the data collection process and to ensure dependability, which refers to ensuring that it is logical and documented accurately (Lincoln and Guba 1985), the participants received feedback about the lesson observations. This was also to ensure the consistency of the data (Cresswell and Poth 2018). Thematic analysis was employed to identify, analyse, organise, describe and report on the themes found within the dataset, as suggested by Braun and Clarke (2006). Specifically, a deductive thematic analysis was employed because the researchers had already identified themes to follow in the relevant literature and theory. With deductive thematic analysis, one generally begins with the precise content and then progresses to broader generalisations, as reflected in Table 1. The data were thus analysed according to the themes to address the research objective.

Table 1 summarises the data generated by the field notes. In compliance with Arifin's (2018) argument, ethical approval was sought and granted to conduct the study. All ethical

Table 1: Lesson observations[1]

Themes	Lesson observations
Resources used	Whiteboard (8 lecturers), textbook (all), smartboard (2).
Seating arrangement	8 lecturers used the normal seating arrangement; students were seated individually or in pairs facing the board and one lecturer grouped the students.
Teaching approach	All the lecturers began their lessons with homework examples followed by a classwork activity. The lecturers were the only ones writing on the board and talking.
Student engagement	Student engagement was minimal; they did not answer questions and mostly sat and listened to the lecturer, copied corrections and completed their homework.
Real-life examples used	No real-life examples were used. Only one lecturer used one example of soccer balls to explain how to group like terms in algebraic expressions.

[1] Researchers' compilation

considerations were adhered to to ensure the participants' protection. Permission was sought to conduct the research from the principal of the South West Gauteng College before collecting data. Personal information and data were restricted and confidential (Buys 2017).

FINDINGS

As directed by the study's objective as well as the methodology that was adopted, various themes were examined, namely resources used; seating arrangement; teaching approach; student engagement and use of real-life examples. These themes were explored through lesson observations and the works of Heong et al. (2019); Ojo and Jeannin (2016); Okolie et al. (2021); Pangeni and Karki (2021); Nkwadipo and Rabaza (2021) and Starkey (2010). A detailed discussion of these findings is provided in the ensuing section.

Resources used and seating arrangement

To determine the pedagogical practices employed in the mathematics classroom and as required by both constructivism and socially critical collaborative learning, the resources used in the classroom were also taken into consideration (Heong et al. 2019; Ojo and Jeannin 2016; Okolie et al. 2021; Pangeni and Karki 2021; Nkwadipo and Rabaza 2021; Starkey 2010). It was revealed that TVET lecturers utilise common resources such as the whiteboards and textbooks that are available to them. No other resources were used in their teaching while under observation. This study also considered seating arrangement, as this was a determining factor in the approach that was used in the mathematics classroom. It was also revealed that the seating arrangement was traditional in that the students were seated in columns facing the board.

Teaching approach, student engagement and real-life examples used

The findings that emerged from the lesson observations indicated that a traditional teaching approach was employed. It was a traditional approach in that only the lecturers spoke and wrote on the board. Three of the lecturers used the question-and-answer approach in vain. For

instance, they would ask questions but the students remained silent and the lecturers resorted to providing the answers to the questions. For example, lecturer M10 was teaching about integrals and asked: "Can you still remember how you integrated last trimester in N5? How do we integrate, class?" No answer was forthcoming and when probed, the students claimed to not recall anything they had been taught in N5. The lecturer had to take them back to N5 work and remind them about how integration is performed. Another of the lecturers would ask questions and quickly answer the question without giving the students sufficient time to think about a possible answer. He would ask students if they understood what he was teaching. "Class, do not keep quiet, please ask if there is anything you do not understand. Do you understand what I am doing?" (M6).

Again, the students remained silent without saying whether they understand or not. This was frustrating but the lecturer admitted that this was the normal behaviour in the classroom; silence and not asking or answering questions. Three of the lecturers started their lessons with a homework review, followed by examples and classwork and the students copied the correct answers. For example: "What were we doing yesterday? Don't we have any homework?" (M1). The lecturer started doing algebraic expressions homework on the board and asked the students to check those answers against theirs and make corrections if they had not worked out the correct answers. One of the lecturers did the homework on the board. A mistake had been made in the previous lesson and she started her lesson by correcting that mistake. "There was a mistake I made in the previous lesson, I want to start with that problem and then you copy it down or correct the one you wrote" (M1).

The lecturer gave them two minutes to copy the solution and then continued with other problems that were part of the homework. They were busy with exponents. The lecturer wrote all the problems on the board and gave them more problems as a classwork exercise. Only one of the lecturers (M3) used a different approach in that the students watched a video based on the topic to be taught. However, the objectives of watching the video were not clear. The lecturer would play the video, pause it and ask questions. "What have you learned from this video with regards to adding algebraic expressions? Could you add apples and pears together? Again, could you add 3 yellow balls to 5 blue balls and say the total is 8 yellow balls?" The intention of asking these questions was for the lecturer to ascertain if the students were concentrating while watching the video; he wanted them to get a better understanding of adding like terms and unlike terms, hence the examples of pears and apples and soccer balls.

The classroom environment was not conducive to students using alternative methods to solve mathematical problems and engagement was minimal. As mentioned in the foregoing discussion, the students neither asked nor answered any questions. Consequently, the lecturers

answered the questions themselves. In one lesson, a lecturer encouraged the students to ask questions if there were things that they did not understand but the students chose to remain silent. "Do you understand all these steps from these corrections? Please go through these corrections again and ask if there is anything you do not understand" (M1).

The lecturers seldom used real-life examples in their lessons. Only one of the lecturers used the example of soccer balls to add and multiply like terms, which was done after the students had finished watching a video. Similar to the gap identified in the literature, the students in this study were not allowed to respond and provide their perspectives regarding the mathematical principle under study. Several of the students said that they did understand the homework and could see where they had gone wrong. This lecturer was trying to engage her learners but the students were unsupportive. As the lecturers were the only ones writing on the board and doing the talking, student engagement was either absent or minimal.

In summary, the pedagogies employed by TVET lecturers are traditional and the students' involvement is passive; their characteristics are not recognised or seen as resources. One can argue that the environment was not suitable for students in general and TVET students in particular.

DISCUSSION

This section presents a discussion of the results in line with the relevant literature, the study's aim and the theory. Regarding the resources used in the classroom, the results revealed that TVET college mathematics lecturers did not use any innovative teaching and learning tools available to them; there was no improvisation, as they simply used a whiteboard, smartboard and textbooks. It was not clear to the researchers whether or not the lecturers used these teaching and learning tools because of a shortage of resources or if there were other reasons. Nevertheless, previous investigations found that TVET colleges are characterised by a lack of suitable resources (Buthelezi 2018). However, even if there was a shortage of resources, the lecturers could have improvised but they did not do so.

Considering the seating arrangement, the results revealed that the lecturers employed a traditional seating arrangement. Wannarka and Ruhl (2008) assert that it is far better if the seating arrangement in a classroom is not traditional with students seated facing the board, as this practice might restrict students from interacting with one another. Research has established that a semi-circle formation is recommended so that the students can work together as a community and ask questions while interacting with one another and the lecturer (Wannarka and Ruhl 2008). Kregenow, Rogers, and Price (2011) assert that a semi-circle arrangement helps lecturers to facilitate students' interaction. Kupari (2005) suggests that teachers should

become facilitators of the mathematics learning process and promote social interaction instead of controlling the learning.

In addition to the use of the resources available to them and the seating arrangement, the delivery of lessons requires attention. The findings revealed that lecturers used a traditional approach because they did all the talking. They reviewed homework and did corrections on the board. For example, M11 asked "What were we doing yesterday? Don't we have any homework?" The purpose of asking this question was to ascertain if any homework had been assigned because they usually started lessons with a homework review. "I want to start with that problem and then you copy it down or correct the one you wrote."

The lecturers who participated in the study were accustomed to reviewing homework and doing the corrections on the board with the students copying what they wrote. Thus, it was difficult to conclude whether these students were able to answer the questions or not. As an example, M4 asked, "Do you understand what I am doing? Please ask if there is anything you do not understand." Contrary to what was observed in the current study, Stonewater (2005) argues that in the mathematics classroom that employs a traditional method of teaching, the teacher begins by reviewing the homework and then demonstrating how the problems that were assigned as homework could be solved followed by students imitating the teacher's demonstration or the steps followed while solving the problems.

As opposed to the theory of social constructivism, in the current study, and based on the observation of the lessons, we argue that the questions that were posed did not encourage the students to respond and they remained silent even if they had something to say. Asking students to remember what was taught in the previous trimester could be too much for them. It goes back to the teaching approach being used by the teacher, as suggested by social constructivism and Freire (2005). In contrast to social constructivism and Freire (2005), the approach that was employed by the lecturers was the question-and-answer approach, which is a direct approach.

Inconsistent with previous research studies (Apple 2012; Graven 2013; Madimabe et al. 2020), the teaching of mathematics currently appears to focus on what is important for the examinations. For example, the lecturers did not relate mathematical principles to the students' lived experiences in any way. They only focused on the mathematics topics that would be covered in the examinations instead of focusing on the students' thought processes. Moreover, the lecturers did not appear to link mathematics to students' social and cultural environment, as they used a one-size-fits-all approach (Madimabe et al. 2020; Bartolomé 2010; Salazar 2013; Bature 2020). A one-size-fits-all is where teachers focus on the middle range of academic abilities, primarily using whole-class instruction (Bondie, Dahnke, and Zusho 2019). Using a one-size-fits-all approach indicates that an awareness of the rationale behind teaching and the

development of a responsive TVET education that entails knowing what teaching requires, was lacking. Madimabe et al. (2020) argue that the teaching of mathematics in TVET colleges encourages passive learning. This was evident in this study's findings, which indicated that the students were not engaged in the mathematics classroom, as they were largely passive in the lessons that were observed. The findings also revealed that the lecturers were not engaging the students, which was inconsistent with the literature that was reviewed (Cevikbas and Kaiser 2021). Unfortunately, this contravenes social constructivism theory, wherein students are not allowed to use alternative methods to solve mathematical problems, as they are not engaged in their lessons (Freire 2005).

The implication is that the minimal student engagement adversely affects their academic performance due to the teachers in the mathematics classroom controlling and dictating how the knowledge is transferred and the students accepting what is said without question (Bature 2020). The dominant approach was thus teacher-centred. Moreover, the lecturers did not use real-life examples in their lessons; if they had, it would have made the subject more meaningful for the students. This approach was found to be consistent with other studies (Rusmar and Mustakin 2017; Ngubane-Mokiwa 2013) that found that mathematics is often not related to real-life vocational experiences, which makes this teaching approach ineffective and unable to respond to TVET students' needs.

HOW DOES THIS RESEARCH ADVANCE TVET EDUCATION?

The use of social constructivism advances TVET education, as this theory contradicts the pedagogies currently employed by TVET lecturers by advocating for the construction of knowledge by the students and allowing the students to make meaning of their experiences. It also supports a learning environment, whereby students participate fully and take charge of their learning, which is something currently lacking in TVET classrooms. The environment in TVET classrooms does not allow students to ask questions, pose problems and set goals. Therefore, social constructivism contradicts the findings generated by this study.

CONTRIBUTION OF THE STUDY

This study contributed to the existing body of knowledge and the advancement of mathematics teaching in TVET colleges, as the findings revealed that the traditional approaches currently employed need to be replaced by a practical pedagogy that is appropriate for vocational students. That practical pedagogy is a humanistic, student-centred approach. However, the limited scholarship on TVET mathematics education both in theory and practice, requires that policymakers and practitioners exercise caution when selecting the pedagogies to be used in the

TVET mathematics classroom.

CONCLUSIONS AND IMPLICATIONS

Based on the objective of the study, it was revealed that the lecturers relied heavily on the traditional approach to teaching, using only the banking zone approach, which only allows for students' passive involvement. The use of resources was limited to a whiteboard and textbooks and a routine approach of reviewing homework followed by classwork was dominant. There was a lack of real-life examples. A key recommendation is further training in various pedagogies and the use of resources in teaching, particularly in mathematics lessons.

A key inference that emerged was that the teaching approaches being used in TVET are disempowering and dehumanising and require a more practical approach – one that is related to citizenship and the humanistic, student-centred approach within the contextual realities of South African education pedagogies for TVET students. Implementing a humanistic student-centred approach would not apply to TVET lecturers only but to all lecturers in higher education institutions.

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