Emerging pedagogies in Higher Education: Cutting through either-or binaries with a heteroglossic plurilingual lens

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TETFLE TEACHER EDUCATION THROUGH
FLEXIBLE LEARNING IN AFRICA
JOURNAL

Abstract

Technology use can introduce fundamental pedagogical changes that are integral to achieving significant academic improvements in higher education. When used to support learning, technology permeates higher education with digital learning mechanisms; enlarges course offerings and instructional alternatives; facilitates learning 24 hours a day; develops 21st century skills; enables greater student motivation; and facilitates deeper comprehension of concepts. The use of technology also has the potential to modify learning by instituting a new model of intertwined instruction. Present-day multilingual technology has transcended the debate about language dominating the educational space. Instead, it is now a question of how progressive multilinguals act differently as they take part in current opportunities offered by the various languages on the web. The appreciation and embracing of heteroglossic perspectives in e-learning repudiate inscribed ideologies that posit monolingualism as the default norm in education. Through a sociolinguistic lens focusing on the Funds of Knowledge theory, this article seeks to explore the role language plays in e-learning and how educators can use multilingualism as a teaching/learning resource in higher education. The study presents results from a mixed methods approach in which 42 purposively sampled distance teacher education undergraduate students were taught through English and Shona. Data was collected through focus group interviews and a written assessment activity. Quantitative data suggests an improved performance while qualitative data presents an acknowledgement by students of the efficacy of multilingual pedagogy. The article recommends the use of multilingual approaches in today's linguistically diverse e-learning higher education classrooms. It further justifies acknowledging that multilingualism is not new, even if the dramatic secularisation of the term seems recent.

Keywords: e-learning; higher education; monolingualism; multilingualism; translanguaging

Introduction

The academic pass rate for secondary school General Science students in Zimbabwe – some of who will enrol to train as secondary school science educators – keeps dropping annually, with researchers and educationists continuously suggesting the difference between the students' home language and the schools' language of instruction as the major cause for underachievement (Chireshe & Musengi, 2012). In the year 2018, Zimbabwe's pass rate for Ordinary level General Science was 32.83% (Zimbabwe School Examinations Council, 2019). It should be noted that the country's education cycle takes 13 years and involves a dual phase model, namely primary and secondary school. The first grade in formal primary school (Grade 1) starts when the child is approximately six years old. After completing the seventh grade, students sit for a national primary school-exit examination. The successful ones then proceed to secondary education.

After the first four years of secondary education (referred to as Form 4), students sit for examinations and need to obtain a pass in a minimum of five core subjects (English, History, Mathematics, General Science and a technical or vocational subject). The next two years of schooling after Ordinary level is referred to as Advanced level, where a student takes a minimum of three subjects. To obtain a pass at A-level, the Ministry of Primary and Secondary Education (2015) requires two passes. In 2018, Zimbabwe had a General Science pass rate of 32.83% in the Ordinary level examinations. Some of these students were involved in the current study as they were enrolled as first-year students for the Bachelor of Education degree to specialise in secondary school science education in the year 2021. In attempting to find solutions to the current underachievement of students in Zimbabwe, studies continue to provide strong evidence of the efficacy of multilingual approaches to education (Sibanda, 2015). Few (if any) studies have however focused on the Bachelor of Education degree specialising in secondary school science education.

Zimbabwean universities, like other universities across the globe, are witnessing an increase in the enrolment of a linguistically diverse teacher education student population, which means that greater academic demands are made on these institutions. In 2020, the situation worsened following the emergence of the Coronavirus disease (COVID-19), an infectious disease caused by the SARS-CoV-2 virus and spread through human-to-human transmission. To minimise the transmission of COVID-19,

institutions had to suspend contact academic activities, leaving them with only one option: e-learning. E-learning is an instructional system that enables teaching and learning at places away from the traditional lecture room by using applications and processes such as web-based learning, computer-based learning, virtual education opportunities, and digital collaboration. E-learning facilitates the transfer of skills and knowledge through technology at a time and place convenient to individual students.

Zimbabwe – like most countries in the world and in Africa in particular – is not unaffected by multilingualism and translingual practices have always been the norm within the country's institutions of learning. This presents an incontestable case for the use of multilingual instructional practices that blur boundaries between different languages. The country recognises 16 official languages, namely Chewa, Chibarwe, English, Kalanga, Khoisan, Nambya, Ndau, Ndebele, Shangani, Shona, Zimbabwe Sign language, Sotho, Tonga, Tswana, Venda, and Xhosa (Author, 2019a). These languages are used as mediums of instruction in the first two grades only. Education from the third grade up to higher education is offered solely in English.

While numerous studies on multilingual pedagogy have appraised the prevailing monolingual approach to education, a sprinkle of frameworks have been advanced to demythologise the ontological, epistemological and methodological framing of these practices with regard to e-learning (Sun & Chen, 2016). Predominant conversations about 21st century education amid the COVID-19 pandemic centred on institutions' efforts to conserve the academic year. In the present study, the delivery of e-learning to multilingual students has been appraised through a sociolinguistic lens on the Funds of Knowledge and Vygotsky's sociocultural theories. The study examines the perceptions of undergraduate teacher education science students regarding multilingual e-learning pedagogy as well as the latter's efficacy as taught at a university in Harare, Zimbabwe.

Theoretical Framework

Funds of Knowledge are collections of knowledge – based in different cultural practices that are part of a family's inner culture, work experience, or their daily routine. It is the knowledge and expertise that students and their relatives have by virtue of their roles in their families, communities, and culture. The theory of Funds of Knowledge recognises the potential associated with the knowledge that emanates from these students' active participation in multicultural, multilingual, and multigenerational

households and/or community activities (Gonzalez, 2005). Students, regardless of gender, race, language or socioeconomic background, do not arrive in the science classroom as blank slates (Goossens, 2019). As such, the Funds of Knowledge theory argues that academic instruction should be linked to students' lives, and the details of effective pedagogy should be linked to local histories and community contexts with regard to language, culture, and socialisation (Gonzalez et al., 2005).

This theory has its origin in Vygotsky's (1978, 1980) Social Development Theory, which is built on three concepts – Social Interaction; the More Knowledgeable Other; and the Zone of Proximal Development. Vygotsky argues that together, these principles advocate for a social approach to learning that involves a kind of academic apprenticeship. The latter enables students to bring their own experiences into the science classroom and to explore and build on these experiences in a way that acknowledges them as individuals, with individual funds of knowledge (Gonzalez et al., 2005). In drawing up a curriculum based on the Funds of Knowledge theory, institutions will arrive at a curriculum that seeks to connect homes, classrooms and communities.

The Funds of Knowledge theory is concerned with making learning 'real' (McKinney & Tyler, 2019). It tries to get out of the existing deficit model by paying attention to the academic journey rather than just measuring the student's shortcomings against the intended destination. Kiramba and Smith (2019) argue for a conceptual space that bridges the space between marginalised funds of knowledge such as students' home languages and academic knowledge. In this space, different discourses between home and school contexts are explored, and everyday knowledge is integrated with academic learning to create new ways of knowing (Gonzalez, 2005). Embedded in the students' funds of knowledge is their language, a resource that should also be harnessed in the classroom situation.

The current study examined – from a Social Development Theory perspective (Vygotsky, 1978; 1980) and by using the Funds of Knowledge theory – the learning of multilingual teacher education students in a science course at a university in Zimbabwe. Considering these theories, language and learning are regarded as action-situated in a historical, cultural and social context, irrespective of the learning area (MacSwan, 2017). According to these theories, while a pragmatic perspective on learning has enabled an analysis of language, gestures and physical artifacts by focusing on their use and consequences in a specific context, sociocultural perspectives have made it

possible to approach these resources as mediating means, having both affordances and constraints for multilingual science students (Barakos & Selleck, 2019).

Vygotsky's theories deal with the concept that language plays a central role in mental and concept development. Vygotsky focused on the interactions and shared experiences between people and their sociocultural context (Bonomi, 2019). The use of multiple languages in the classroom has been shown to offer a smoother interface between home knowledge and school knowledge, and to support students to comprehend the scientific knowledge more deeply, easily and faster (Meyerhöffer & Dreesmann, 2019). Garcia (2009) refers to the simultaneous use of multiple languages as translanguaging.

Literature Review: Translanguaging and Science Education

Translanguaging was originally conceived as a classroom strategy for bilingual alternation between English and Welsh (Collins et al., 2019). In its original form, translanguaging referred to a language communicative function of receiving input in one language and providing output in another language (Jang & Brutt-Griffler, 2019). This allowed bilingual students to use their home language and develop positive experiences in the classroom in any subject area (Hornberger & Kvietok Dueñas, 2019; Li, 2018).

Garcia (2011) expanded the concept of translanguaging to account for multilingual communicative practices that include a wide array of multiple discursive practices in spatial, visual and spoken modes across the globe. She furthermore construed the complexity of bilingual education through a recurring analogy of the banyan tree. It is an image that captures the myriad of contextual variables and choices involved in multilingualism and multilingual education, and it allows for 'growth in different directions at the same time [while] grounded in the diverse social realities from which it emerges' (García, 2011). As this analogy shows, multilingual education is multi-faceted in its complexity, since historical, linguistic, cultural, political and social realities must be considered prior to any useful discussion (García & Leiva, 2014). Taking into account Garcia's model of multilingualism, languages previously separated on the basis of cultural and linguistic differences can converge through fluid classroom interactions (Goossens, 2019) and so enhance students' academic performance (Cunningham,

2019) in the science classroom. This approach counters and redresses the traditional view of languages in which they are treated as separate and bounded entities (García & Li, 2014) to avoid contamination of one language by the other. As societies become culturally and linguistically more diverse, many science students enter the classroom with a home language that is different from the language of instruction used at school (Hamman, 2018).

Translanguaging is now a revised pedagogy that moves away from monolingual teaching strategies towards a more integrated, less bounded use of language resources in teaching and learning (Meyerhöffer & Dreesmann, 2019). It already features strongly in the daily practices of these science students and teachers (Author, 2019a). In the science classroom, for example, multilingual students might receive information in the language of instruction, but for self-understanding and processing of the concept, they might itemise the point in a different language – whether in writing or by discussing it with classmates (Benson, 2018; McKinney & Tyler, 2019). Research shows that there is increased participation and academic performance in classrooms where translingual practices are used in science classrooms. It is also suggested that the use of more than one language allows students to 'bridge' between their everyday knowledge and the scientific knowledge in science books (Barakos & Selleck, 2019; Meyerhöffer & Dreesmann, 2019). As such, translanguaging in the science classroom can be viewed as an ecological approach where the teacher creates interactive lessons and uses the languages not rigidly separated, but in a flexible, fluid and concurrent fashion – for the benefit of the students.

Translanguaging concerns the act of languaging, which is inseparable from the social, historical and institutional context in which it occurs (Li, 2018). In the Zimbabwean context, no major empirical study exists of dual-language or 'two-way' programmes, in other words those that mix English and African languages in roughly equal proportions to foster full bilingualism and biliteracy, with a focus on science education (Karlsson et al., 2018; MacSwan, 2017). Recent studies also suggest that translanguaging is the most effective strategy for educating science students whose home language is different from the school's medium of instruction, as it helps them to become competent bilinguals without sacrificing either their English development, science teaching/learning, or their home languages (McKinney & Tyler, 2019).

Research Questions

The study sought to answer the following questions:

1. What are the perceptions of undergraduate science students regarding multilingual e-learning resources?
2. How does the use of multilingual e-learning resources affect science students' academic performance/comprehension of scientific knowledge?
3. What are the implications of the above findings for teacher education?

Materials and Methods

In the present study, the undergraduate teacher education students attended lectures on diversity, change and continuity focusing on evolution by natural selection. One of the specific aims of the module relates to appreciating and understanding the history, importance and applications of Life Sciences in society. Due to the COVID-19 pandemic, lectures were delivered in the form of videos, animations and narrated slides in English. The videos and animations also had subtitles in Shona. According to the student profiles, all participants spoke Shona as home language, hence its use in the materials' subtitles. For ethical reasons, all names in this article are pseudonyms. Excerpt 1 presents an example from a multilingual e-learning video presented by Dr Gloria Nyoni (lecturer's pseudonym) on the sub-topic 'Evolution by natural selection'. Excerpt 1:

English voice note	
The five main observations in Darwin's theory of natural selection.	
Variations in characteristics of individuals occur in a population and these can be inherited.	
More offspring are produced than can survive on the available resources.	
There is competition for limited resources, i.e. people struggle for survival.	
Natural selection allows only the "fittest" to survive and breed.	

When developing the multilingual resources, the lecturer made the following remark:

> '*When it comes to key terms, it's either I deliberately leave these in the English language and explain them in Shona enabling my class to know their meanings while at the same time remembering the term in English language for examination purposes'*.

At the end of the six weeks, the teacher education students were given a multilingual end–of–module assessment activity written in the two languages (English and Shona). In Zimbabwean institutions of higher education, assessments are part of cardinal contexts that restrict linguistic preferences by promoting monolingual, standard language use (Omidire, 2019). All assessments are inevitably tests of language, considering the way in which language conciliates assessment administration, content, instructions, or responses. Several scholars focusing on assessments in education have recommended the incorporation of multilingualism in the design and administration of assessment activities (see for example Otheguy et al., 2015; Shohamy 2011). In completing the end–of–module assessment task, participants were given the freedom to use either English, Shona or both languages.

Examples of questions from the assessment task are presented in Excerpt 2.

Excerpt 2:

Question 1

English: Name the part of the ear that is responsible for balance of the human body due to gravity and describe how this balance is brought about.

Question 2

English: Explain why it was necessary for the researchers to collect DNA samples.

Data collection and analysis

The study was carried out at a teacher education university in Harare, Zimbabwe's capital city. Harare is a populous city that houses around 17% of Zimbabwe's total population (United Nations, Department of Economic and Social Affairs, Population

Division, 2019) and a total number of seven universities. The 42 participants, selected through purposive sampling, were the only teacher education first-year students enrolled for the Bachelor of Education, followed by specialisation in the secondary school science course.

All 42 of these undergraduate science students, as well as the lecturer, were native Shona speakers coming from various parts of the country. The study was conducted over seven weeks. As researcher, I attended the group's online lectures once a week. Each lecture was 60 minutes long. To protect the participants' identities, pseudonyms were used throughout the study and all ethical considerations were observed. Due to the COVID-19 pandemic that restricted face-to-face interactions at the time, qualitative data was collected from two focus group interviews held via Microsoft Teams. An advantage of using Microsoft Teams is that it records and immediately transcribes the proceedings, hence safeguarding against any loss of data.

I interviewed the course lecturer, Dr Nyoni, at the beginning and end of the study to gain better insight into her role in e-learning instructor and to understand how she advanced cognition of scientific knowledge among her undergraduate teacher education students by re(shaping) the prevalent linguistic landscape in this first-year science course. A combination of both inductive codes originating from an analysis of the interview transcripts and deductive codes resulting from the literature reviewed was used to analyse the data collected during the study (Alok & Mishra, 2017). I subsequently identified recurring patterns to construct conceptual categories and themes (Bhattacherjee, 2012). To ensure the validity and trustworthiness of the findings, direct quotes from some of the participants are included in the Results section.

Results

Academic benefits of integrating multilingualism into higher education e-learning

In view of the Funds of Knowledge theory, the linguistic repertoire of multilingual teacher education students at university can become a principal pedagogical resource in higher education, especially when they are taught through a language different from their home language and struggle to meet the academic demands of the curriculum texts.

During the interviews, all 42 students (100%) agreed that multilingual e-learning resources facilitated their fuller and deeper understanding of the scientific concepts they were taught during the course. This was because '*all of us here are Shona speakers and only speak English during the lessons. This has made our learning difficult even in secondary [school]*' (Tendai, 16 July 2021).

In line with Tendai's response, Tapiwa remarked, '*if we speak English outside of class, it's mostly Shonglish* [laughs]'. In Zimbabwe, the term 'Shonglish' refers to a mixture of Shona and English in the same sentence, for example: This course is *gozharing* (difficult). The word *gozharing* is constructed from the Shona word '*gozha*' (difficult) to which 'ing' is added. This is further evidence that students at this university engage in multilingual practices. On explaining why they would resort to 'Shonglish', Anopa pointed out:

> '*Look at our secondary school results, I got an E for English at A level and my other friend only did English at 'O' level so how can we understand everything in class? Plus science uses some big words not found in the dictionary*'.

In Zimbabwe, an E in A-level examinations denotes a mark between 40% and 49%. However, to study education, a student is required to have passed O-level English with a grade C (50-50%) or better. This also gives a clear indication of the proficiency of some of these university students in the language of instruction.

Although English has become the lingua franca in Zimbabwe, it is the home language for less than 1% of the country's population (United Nations, Department of Economic and Social Affairs, Population Division, 2019). Its exclusive use in education has been blamed for students' academic underachievement, as 99% of the country's population are not native speakers of the language of instruction (Author, 2020b). This corresponds with the findings of a body of recent research in science education that suggests that low proficiency in the language of instruction is the major cause of low academic performance amongst science students whose home language is different from the language of instruction (Li & Lin, 2019; Omidire, 2019). The fundamental cause of this problem is that, as students reach higher grades of study, both the content and language of science become increasingly difficult.

As a result, by spurning multilingual teacher education students' use of their linguistic repertoire in e-learning these students are expected to perform well in academic activities while being allowed to use only a fragment of their linguistic resources for meaning making (Yuvayapan, 2019). Vygotsky (1978) positions students

as social actors whose intellectual blossoming is contingent upon language. Through multilingual e-learning pedagogy, these multilingual undergraduate science students decode relations between their everyday languaging practices and higher education languaging, which in turn aids their knowledge comprehension and assimilation (García, 2017).

To this and similar interview responses, Dr Gloria Nyoni remarked:

> '*Most of these students have a poor command of English language and letting them make use of their linguistic repertoire helps [the students] understand science better. This [use of more than one language] has also resulted in students getting higher scores in assessments.*'

An analysis of students' performance in the end-of-module assessment shows 26 of them (62% of the participants) attained a score above 80%, while 38% of the participants (16 participants) scored between 70% and 79% because, '*how can I fail when I was taught in Shona and English? It's different from other modules when we use English only*' (Nosta, 16 July 2021). The students' academic performance during the study confirms the efficacy of multilingual pedagogy. The assessment carried 50 marks, converted to a percentage for easier analysis. Table 1 shows the statistical analysis of the students' academic performance in the assessment, while Table 2 shows their academic performance before the intervention (i.e. the use of multilingual pedagogy).

Table 1: Students' performance in end-of-module assessment

	Mean ($\bar{x}$)	Median	Standard deviation (σ)	Range	% pass rate
Participants (n= 42)	82.5	82	7.7	28	100

Table 2: Students' performance before the intervention (multilingual pedagogy)

	Mean ($\bar{x}$)	Median	Standard deviation (σ)	Range	% pass rate
Participants (n= 42)	47.6	48	9.8	40	45.2

Table 1 shows that the average score attained by the students was 82.5%, with a standard deviation of 7.7. In terms of the university's assessment criteria, 78.6% of the participants passed with a distinction (75% or higher). Commenting on the students'

academic performance in this assessment, Dr Nyoni stated:

> *'Such excellent performance is a result of using more than one language. I used English and Shona in the videos, animations and lecture notes I gave to the students and guess what? They all understood the concepts. I have never had such a high mean and low standard deviation before'.*

Empirical studies suggest that if science students do not have the requisite communicative skills in the medium of instruction, such students are bound to have problems with access and comprehension of scientific knowledge, especially when delivered through e-learning. E-learning also prevents students from demonstrating their actual scientific knowledge, and therefore gives rise to a defeatist spiral in which motivation, interest and scientific knowledge acquisition might become reduced (Bonomi, 2019). This consequence was confirmed by the academic performance of the teacher education students before the use of multilingual pedagogy when the pass rate was 45.2%, compared to 100% after the study. There was also a difference of 34.9 between the respective means, with the end-of-module assessment having a higher mean and a smaller standard deviation. Our study clearly corroborates the findings of other studies that suggest the efficacy of multilingual pedagogy (see for example Aluko, 2019; Omidire, 2019).

Discussion

E-learning in higher education should not be viewed only as a question of university students' biologically given capacity to master scientific knowledge. Instead, prior knowledge, literacies and proficiencies need to be aligned to the specific educational context (Benson, 2018). In this regard, educators must take note of how university students relate to their colleagues, as well as how they make use of different intellectual, physical, cultural and linguistic resources in the process of e-learning (Vygotsky, 1978).

Teacher education institutions in some countries have accepted multilingualism as a legitimate, socially just pedagogical approach that facilitates the scaffolding of one communication mode by another and for the making of meaning in the educational space (Burgess & Rowsell, 2020). For instance, in Asia, Europe and North America, students are taught in their home language (Wolff, 2018) and they only learn some of the global languages, such as French and English, to prepare them for

global communication later in life. Such global languages are used alongside students' linguistic repertoire as a scaffold to assist them to fully comprehend the complexities of their linguistic repertoire (Cummins, 2008; Wolff, 2018).

Through multilingual e-learning, university students enrolled in distance teacher education are given the opportunity to make use of an integrated meaning-making system. In this system, multiple discursive practices are used to understand the multilingual world and to develop education spaces that are conducive to the use of their entire semasiological and semiotic repertoire in higher education (García & Otheguy, 2020). A study conducted by Caruso in 2018, dealing with the effectiveness of multilingual pedagogy in higher education, examined linguistic practices in a course attended by a linguistically diverse student population. During the course lectures, the university students were allowed to use their various language resources in all instructional activities and at the end of the course; they submitted a structured multilingual final assessment task. The research reported better academic performance among the students and accredited it to the affordance of spaces conducive to translingual practices during the lectures and assessment. Multilingual e-learning pedagogy can therefore transform higher education institutions from being places for mere random transferrals of global theories and information into spheres where acts of cognition are brought about with students' linguistic repertoire (Fanga et al., 2020).

As distance teacher education becomes more widely available and more internationalised (Maringe, 2013), there is a need for pedagogical evolution. The acceptance of multilingualism is a top priority, as it affords students a great opportunity to understand the world by making use of every linguistic resource at their disposal (Mendoza & Parba, 2018; Ocampo, 2018). Multilingual education is associated with transformation, social justice (Hurst & Mona, 2017) and decolonisation, all of which are essential for an efficient and productive higher education (Palfreyman & Walt, 2017). Multilingualism is also a policy orientation towards the formal recognition of multiple languages. It includes all the non-standard varieties under postmodern notions of heteroglossia, which gives equal standing to all languages and dialects spoken within a formalised system (García, 2017; Palfreyman & Walt, 2017; Poza, 2019). Through multilingual e-learning, languages that were historically separated based on racial, cultural and linguistic disparity will no longer be seen as rigid or stabilised entities. Instead, they can amalgamate through fluid instructional interactions and so deepen multilingual students' comprehension of knowledge across university

curricula (Wedin, 2020).

In current e-learning in the higher education space, language and other forms of communication neither have predetermined or prevalent meanings, nor do they subsist on their own. Languages rather gain meaning through their contextual use (Garcia, 2011). Hence, e-learning communicative practices of distance teacher education should incorporate a wide range of students' linguistic resources, which will eventually contribute towards students' acquisition of scientific knowledge. The current study puts forward the hypothesis that permitting multilingual university students to use their linguistic repertoire in e-learning offers effortless confluence between their home knowledge and academic knowledge, thus scaffolding their mastery of scientific knowledge.

Research by Kiramba and Harris (2019) presents a comparative study of English-only instruction and multilingual practices in science education. Their study suggests that English-only classrooms are underlined by rote repetition, copying, lack of motivation, and little participation from students during lessons and group discussions. In comparative science classrooms where the educators permitted multilingual practices, students engaged actively in knowledge production and exhibited excellent concept comprehension, suggesting the efficacy of multilingual pedagogy.

Considering the efficacy of multilingual pedagogy in contact classrooms, the current article suggests that educators should adopt the same approach in distance teacher education e-learning since language is central to cognition and scientific knowledge acquisition. In accordance with the interview responses and students' academic performance in the end-of-module assessment, multilingual pedagogy amplifies students' participation during e-learning lessons, keeps them highly motivated to learn, and expedites their optimal comprehension of scientific knowledge. Considering that heteroglossic practices are normal occurrences in most multilingual communities, educators should consider using this strategy to help multilingual university students draw on all their linguistic resources as they read, write, and discuss scientific concepts in the e-classroom.

Sociolinguists and neurolinguists argue that multilinguals do not have two separate languages but one linguistic repertoire comprising features of their verbal and non-verbal forms of communication (García & Otheguy, 2020). Their linguistic repertoire encompasses features (phonological, morphological, syntactic, and pragmatic) of all the languages they speak (García & Li, 2014). Effective higher education e-learning

approaches should therefore adopt instructional strategies that draw on all the language resources possessed by the multilingual students. What is evident from the current study is that, when distance teacher education e-learning embraces multilingual approaches, the scientific correctness of concepts does not change simply because a different language(s) has been used.

Considering the assessment of students online, the implementation of e-assessments will undoubtedly enhance cost effectiveness, as they will reduce the costs of traditional face-to-face teaching and learning practices related to the use of offices, pens and paper. Costs related to infrastructure will also be reduced as e-assessments will facilitate distance learning and a more convenient education setup. The adoption of e-assessments is a fast, innovative and quick way of handling student evaluation. The hypothesis that the present study seeks to defend involves a case for definitive attention to the language used by multilingual distance teacher education university students. Educators need to acknowledge and understand the link between language, science education and e-learning and recognise that language is the medium through which science students make meaning in academic activities.

Limitations

In order to determine the consistency or inconsistency of the present study's findings, the academic performance of these multilingual distance teacher education students should be monitored over time as the lecturer continues to use a multilingual pedagogy. Mine was a one-time study and the major limitation here was the sample used. More studies should be conducted, based on a larger sample size and focusing on various courses. Since Zimbabwe is a multilingual country with 16 official languages, further studies could also involve other African languages than only Shona.

Conclusion

E-learning presents an opportunity to deviate from the days when higher education was socially stratified and students were expected to carry bags full of instructional resources to attend lectures in specified lecture rooms, in specified ways and seating positions, and during fixed times. When they use e-learning, universities can adopt either a synchronous or an asynchronous model of science teaching and learning.

Whichever e-learning model higher education lecturers choose to accomplish effective teaching and learning, and achieve lesson outcomes, they have to support their students in any reasonably possible way. The results of the present study show that multilingual higher education students appreciate multilingual e-learning strategies and resources. This emphasises the crucial role that language plays in e-learning and towards the academic performance of undergraduate students who are taught through a language different than their home language.

Higher education institutions can enhance students' academic performance by acknowledging students' available linguistic repertoire in e-learning. Multilingual e-learning in higher education allows different languages to be used to enhance effective learning, as these languages will be working with and not against each other. The current study recommends that universities move away from the current practice of linguicide which has also resulted in epistemic injustice towards multilingual students who are taught in a language different from their home language. It is further suggested that a multilingual e-learning approach promotes a deeper and fuller understanding of scientific knowledge; it enhances the sustainability and development of minority languages, promotes cultural cohesion, instils confidence in students, boosts their self-esteem, improves academic performance, and promotes oneness among students, parents and lecturers (Caruso, 2018; Fanga et al., 2020).

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