

ENGINEERING INNOVATIVE WAYS TO SUSTAIN LEARNING FOR PRE-SERVICE ECONOMIC AND MANAGEMENT SCIENCE TEACHERS IN CURRICULUM PRACTICE

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Abstract

Remote learning is the future of teaching and learning. The inception of Covid 19 has disrupted the traditional face to face teaching and learning and raised a need for scholars to investigate innovative ways to adapt to global disruption. Remote learning was the preferred option as it is effective and efficient to sustain learning even post the disruptions. In recent years, extensive research has been conducted on how to use the industrial revolution in curriculum reform. Remote learning is one of the recent initiatives in the curriculum and pedagogy reform package in South Africa that involves the use of remote learning to improve teaching and learning. This article investigates innovative ways to engineer a shift to remote learning for pre-service economic and management science teachers and the use of remote learning curriculum practice to achieve pedagogy mastery. The aim of the article is to answer the research question: what innovative ideas can be generated to engineer shift to remote learning in curriculum practice. Architecture theory is used as the main lens for the study. Connectivism learning approach as a form of education science is used to generate data in this study. Connectivism is immersed in the narrative that knowledge is distributed across networks through connections and connectivity, and learning is guided by connections and connectedness. Based on technology, connectivism is a learning approach that emphasizes knowledge acquisition focused on the future, rather than the past. Connectivism is relevant to this study because it encourages and changes the essential nature of building knowledge. Connectivism empowers teacher educators as well as pre-service students through using collaboration in learning. Critical discourse analysis was used to arrive at the following broad findings: Pre-service economic and management science teachers should participate in diverse learning spaces indicated by the varying standards of learning embodied in the existing context of the South African society embracing educational inequalities. Implementation of the three c's of remote learning: connectivity, content and capacity will enhance possibilities for economic and management sciences pre-service teachers to use remote learning in their practice of the curriculum. The paper concludes with expected recommendations that the prefigured remote learning for professional teaching practices be reconfigured.

Keywords: remote learning, engineering, connectivism, curriculum practice, architecture theory.

1 INTRODUCTION

Teaching and learning in the context of South African schools changed over the years [1]. Subjects in curriculum practice are changing and expanding rapidly to respond to the needs and critical scarce skills requirements of the country and the international community [2]. Specifically, economic and management sciences (EMS) curriculum is assumed to be one of the practice subjects in curriculum practice that is enhanced to respond to the needs of South African society and the global community. The study of economics and management focuses on improving the efficiency and effectiveness of the use of different kinds of resources to meet the needs and desires of society. Entrepreneurship, running a business, managing money, as well as learning how businesses operate and many elements of enterprises, are among the subjects covered [3]. EMS curriculum practice seems to be the answer to the challenges and needs of the country, both social and economic needs of the country. [3] further opines that the challenges of unemployment which perpetrates social ills may be resolved through empowerment of communities through EMS, hence a great need for the empowering pre-service EMS teachers with correct learning tools and methods to ensure efficiency and effectiveness in delivering EMS curriculum practice.

Economics and Management Sciences (EMS) as a subject was introduced as a solution to real and practical needs of the society in the 21st century. [3] opines that EMS curriculum was apparently designed to respond to the needs of the country such as, to alleviate poverty and reduce unemployment, furthermore, to empower learners with subject knowledge relevant for transition to subjects related to

Further Education and Training (FET) [4]. The continuous changes in the curriculum and pedagogical content requires a pre-service teacher who can adapt quickly to the changing environment.

Adamantly Covid 19 also accelerated the change in curriculum practice as teaching and learning was met with forced transition from face to face to remote instructions. There was an increased need to develop new teaching and learning strategies in line with lockdown regulations [5], COVID-19 occurrence transformed how people live, work, and interact. Massive closures in the educational setting resulted in students having less time to study, changing interactions, showing signs of stress, losing interest, and being forced to learn remotely. Thus, learning was faced with numerous challenges [6,7,8].

While [9] asserts there is ongoing discussions in developed countries about fear of how education will look like in the future. There is an argument that there is a need to future proof the children to learn in the uncertain future. The bone of contention cycles around the current pre-service teacher's ability to adopt innovative teaching and learning methods to be prepared and be flexible to impart relevant knowledge to the future learners in the uncertain and complex teaching environment [10]. Consequently, there has always been disruption in the teaching and learning. [11] argue that from the 15th century there has always been a race between education and technology, [11] further reveals technology has always been far ahead of education. Institutions of higher learning needs to introduce innovative ways borne out of scholarly work to engineer ways of closing the gap between technology and education. One of the most innovative paths to prepare for the future is to reach a stage as envisaged by [12] ("what if one learner could have one teacher", could technology help to bring closer this idea), this study argues that incorporation of hybrid learning will go a long way to innovatively sustain teaching and learning for pre-service EMS teachers and also bridge the gap created by the race between education and technology in the South African education context.

On the other hand [13] argues that in the developing countries, specifically in Africa, access to technologies and digital education remains a big challenge. Pre-service teachers and the teacher educators are still faced with the dilemma of the principle of first knowledge "use of computers", and that seems to prolong their ability to adapt and sustain the use of hybrid learning strategies. There have been some major unprecedented disruptions in education system in the recent past, but one thing is for sure: technology offers a variety of new opportunities to combine face to face, remote, synchronous, and asynchronous learning, which, when innovatively engineered, will assist both pre-service teachers and teacher educators achieve success and help shape a flexible learning environment that is suited for a hybrid learning context.

2 PROBLEM STATEMENT

Pre-service teachers' ability to learn effectively and efficiently is essential as the future teaching and learning in South Africa depends on their ability to grasp content and be able to transfer the knowledge to the younger generation sufficiently to an extent that learners will be confident to compete in the future and find space in the forever changing social and economic environment. The argument is made that pre-service teachers should be empowered with flexibility skills to future-proof their capability and enhance their ability to secure participation in diverse communities, as well as be able to respond to and reflect on diverse needs of the learners in their classrooms. Specifically in South Africa, it is expected that schoolteachers constantly reflect on and develop effective teaching ideologies that promote equal education. Information, communication technologies, and online education resources are also expected to be critically interrogated, analysed and discussed by teachers [14].

Pre-service teachers need to integrate flexible teaching and learning tools and skills into their respective curriculum and professional development opportunities more effectively. It can be initiated through developing skills and confidence for using digital tools as well as the ability to critically engage with knowledge and tools. Such initiatives should not only focus on using digital tools effectively but should also aim to improve their ability to create knowledge and meaning [14]. [15] argue that there is often a disconnect between pre-service teaching experiences and workplace expectations when it comes to the integration of learning technologies in schools at South African higher education institution. [14], [15] argues that the 21st century teachers should be holistically competent to respond to the continuous changes that occur in teaching and learning. The empowerment of pre-service teachers for the modern days may be achieved using hybrid learning and collaborative learning.

2.1 Hybrid learning

2.1.1 Pre-service teachers in South Africa context

South Africa ranks among the most unequal countries in the world, as recorded by [16]. [16] further argue that South Africa is experiencing glaring inequities in its material and digital resources as a result of its history of discrimination. However [17] asserts the inception of the pandemic has fast track the transition to use of remote learning technologies in the midst of connectivity challenges. Furthermore [18] observe that scholars are generally concerned about the sustainability of remote learning technologies use in teaching and learning even post the pandemic period while connectivity and access challenges still exists.

2.2 Personalised learning

Personalised learning centered pedagogy can be developed through the use of technology and online educational resources and also enable teachers to respond to their learners' interests and eagerness for certain aspects of learning including the of remote learning to ignite cognitive functioning through remote gamification of learning [19]. Collaboration in the learning community is a process of engineering deep networks of resources and connections that are relevant to simplifying real life challenges [20]. In the information/networked age, collaborative learning through group work (community) has gained prominence and assumes that pre-service economic and management science teacher have ubiquitous access to networked technologies. Presumably the learning environment that encourages innovation and creativity as a pathway for pre-service teachers is when there is collaboration in learning with initiative maintaining both face to face learning and remote learning.

3 THEORETICAL FRAMEWORK

Architecture as a theory underpins the study. The theory is advocated by Zaha Hadid. The adoption of the theory is inspired by the advancement of digital technologies reflected in her work through the use of parametricism to enhance style and form in architecture. Parametricism in architecture coins the use of narrative that "If a computer calculated all architectural design factors, it could design a building that reflects and responds to all the architectural arrangements" [21]. Simply put parametricism manifest seems to reveal prospects about a simplicity achieved through use of network technologies for architectural design.

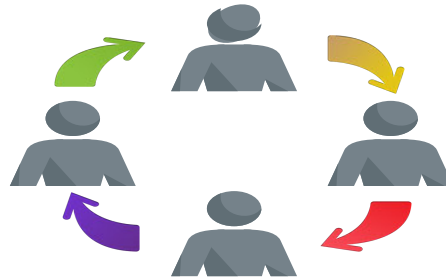
The architecture theory as championed by Hadid's incorporation of elements of constructivism in the design and construction of architectural work [22], is also a narrative supported by the teachers who instruct learners using learner centered teaching methods that conform to constructivism. New, innovative architectural principles that are rigorously developed in response to the new complexity of society become very conspicuous rather than by design. The new complexity of society requires increasingly complex urban and architectural designs. When a new, innovative approach is rigorously used, architecture becomes highly visible by default rather than by design, the new forms of societal complexity demand a greater degree of complexity at the urban and architectural levels.

We adopted this theory because we trust it would enable us to unmask the hidden curriculum practices used by pre-service EMS teacher's ability to engineer innovative was to sustain their learning while initiating technological teaching and learning strategies to improve their learning to remain relevant in the future of teaching and learning.

4 METHODOLOGY

The study embraced qualitative research methods to engineering innovative ways to sustain learning for pre-service economic and management science teachers in curriculum practice. The approach to the study is aligned to the social sciences community study Participatory Action and Learning research (PALAR). PALAR will be of interest to emerging and experienced researchers alike as it contributes to the creation of knowledge about community-based research. Its objective is to reveal practical methods for bringing about change at an individual, professional, and organizational level. By advocating "research with, rather than on people," authors clearly endorse the concept of community engagement for social change. Theories give researchers different "lenses" through which to look at complicated problems and social issues, focusing their attention on different aspects of the data and providing a framework within which to conduct their analysis.

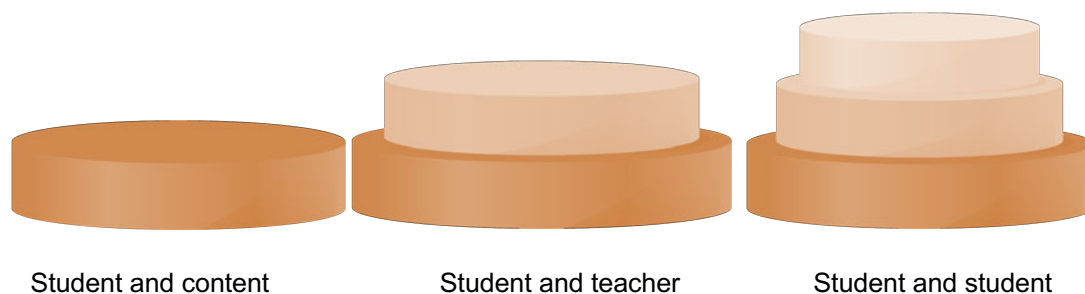
Interestingly connectivism learning approach as a form of education science is used to generate data in this study. Connectivism is immersed in the narrative that knowledge is distributed across networks through connections and connectivity, and learning is guided by connections and connectedness. Based on technology, connectivism is a learning approach that emphasizes knowledge acquisition focused on the future, rather than the past. Connectivism is relevant to this study because it encourages and changes the essential nature of building knowledge. Connectivism empowers teacher educators as well as pre-service students through using collaboration in learning.



5 FINDINGS AND DISCUSSIONS

These broad conclusions were reached using critical discourse analysis: Pre-service economic and management science teachers should participate in diverse learning spaces indicated by the varying standards of learning embodied in the existing context of the South African society embracing educational inequalities. Implementation of the three c's of remote learning: connectivity, content and capacity will enhance possibilities for economic and management sciences pre-service teachers to use remote learning in their practice of the curriculum.

- Student and content learning engagement
- Student and teacher learning engagement
- Student and student learning engagement



A student-centered instruction style puts the emphasis on the pre-service teachers engaging content rather than the teacher educator. Teacher educators are bound by profession to avail teaching and learning resources to create a conducive learning environment for pre-service economic and management sciences teachers to engage learning content spontaneously [24]. Teacher educators together with pre-service teachers will participate in student-centered teaching and learning as partners in learning. Research indicates that pre-service teachers will be actively engaged and actively learn when the methods of teaching and learning incorporates flexibility [25].

As one of the tools or alternatives that teachers use in providing learning materials for their students, remote learning has become increasingly popular in the world of education, especially in universities. Remote learning can also be used to create an active learning experience since students can explore self-study materials over the internet independently. Furthermore, Interaction in teaching and learning has a considerable impact on students' learning outcomes and is inextricably linked to educational success. According to the sociocultural perspective, human beings have the ability to influence each other, such as changing their thinking patterns.

[26] opines that Sociocultural theory narrates that "knowledge and interactions are constructed through relationships with other people in line with student and student interaction." Learning and development are viewed by sociocultural theory as a process of increasing mental sophistication, but also as mediated through social and cultural interactions. Institutions of higher learning have a role to promote

contextualized and contemporary learning through incorporating this teaching and learning interactions to promote and empower pre-service teacher innovating learning strategies to sustain learning.

Research as discovered by [27] asserts that innovation in education is achieved through a combination of multiple pathways relevant to teacher education in the post Covid-19 environment. Teaching and learning in the 21st century require a pre-service teacher with access to connectivity, who also engages content to achieve mastery in the subject field while also aiming to positively impact education and have capacity to effect teaching and learning effectively in the future classroom. Engineering innovative ways to sustain learning for pre-service economic and management sciences teachers in curriculum practice may include connectivity to enable learning for pre-service EMS teachers, content to enable learning for pre-service EMS teachers and capacity to enable learning for pre-service EMS teachers.

5.1 Connectivity to enable learning for pre-service EMS teachers

Access to online technologies is not a new concept in teacher education, it stems from distance learning where there is no physical face to face engagement of teaching and learning. Connectivity is the ability of the pre-service teacher to engage spontaneously with the teaching and learning material at their own time with leisure to repeat the lesson to maximise understanding. Connectivity allows pre-service teachers access to internet using soft gadget amplified with educational software that allows link to online learning. Mphuthi and Tshelane argues that pre-service teachers were not empowered with teaching and learning tools to sustain their learning, essentially the success of hybrid learning bothers on the ability to connect to online tools while others are on face-to-face learning with the teacher educator.

5.2 Content to enable learning for pre-service EMS teachers

Earlier we pointed out that the world is changing and there is a fear that the pre-service teacher who is not able to adapt to change may be exposed to obsolete knowledge of the subject that may not benefit teaching and learning. Content knowledge of EMS as a subject is very crucial for pre-service teacher to show mastery in the subject during planning implementation and delivery. However with the ongoing changes in subjects and curriculum in practice , research affirms that pedagogical content knowledge and content knowledge should be combined with technological pedagogical content knowledge. Technological pedagogical knowledge will maximise ability for pre-service teachers to be being exposed to recent information about the subject as changes [28]. Shulman's idea of pedagogical content knowledge is incorporated into Technology Pedagogical Content Knowledge, which attempts to capture some of the essential knowledge that teachers need to integrate technology in their teaching, while also addressing how teacher knowledge is complex, multifaceted, and situated [29].

5.3 Capacity to enable learning for pre-service EMS teachers

Teacher competencies are skills and knowledge that enable both professional and novice teachers to achieve success at the training stage and during delivering classroom instruction. It is imperative that teachers have a broad range of competencies in order to maximize student learning in a complex environment that demands hundreds of critical decisions every day [30]. In the various fields of economic activities, professional judgment and evidence-based competencies are integrated as they are in teaching. Education institutions provide pre-service teacher education programs that prepare quality teachers with an understanding of and willingness to accept new technologies [31]. There is also an increased need to ensure pre-service teachers are capacitated with adequate digital skills to enhance their capability to be flexible and change with times as needed. As digital literacy grows and remote learning tools become increasingly available, it is inevitable that teacher education programs will use technology more effectively [31].

6 CONCLUSIONS

Novice EMS teachers in the profession have a dire need to be empowered with flexibility skills to avoid their pedagogical content knowledge being obsolete. Hence the study argues engineering innovative ways to sustains their learning to ensure relevance when they get to the field [32]. Moreover, there is has been continuous change in South African education department as they transitioned from various curriculum changes. The is because the knowledge base of the subjects that are taught in school education in the 21st century required flexibility as a character attached to novice and professional teacher traits. [33] discovered that teachers who are flexible and able to adapt to a forever changing

environment. Additionally, the study conducted [34] further unearthed a positive correlation between innovative ICT use and its adoption in teaching and learning

Since the advent of educational technology, research has been conducted on the attitudes of pre- and in-service teachers towards ICT [35]. This tradition arose from the question of what factors might contribute to teachers' intentions and actual usage of ICT. This study discovered that pre-service teacher may have a positive attitude towards incorporating technologies in their learning when its innovatively incorporated to benefit their learning. The study therefore will recommend further studies into exploration of innovate ways to sustain learning for pre-service EMS teachers using hybrid learning. [30] opines that, education has reached a stage where technology is no longer a luxury, but a necessity. This makes teacher preparation an even greater responsibility in ensuring integration of technology into teacher professionalism.

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