Learners' Adaptation to Blended Learning in the Post-Covid 19 Era in South Africa: A Systematic Literature Review

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Abstract. This study explores learners' adaptation to blended learning using a transformed curriculum in the post-COVID era, using the case of a previously disadvantaged university. The restrictions on teaching and learning during the COVID-19 lockdowns interrupted the contact learning process to control the spread of COVID-19 between people. To adapt to changes induced by COVID-19, institutions of higher learning (IHL) adopted blended learning that has culminated in the hybrid mix of teaching modalities in institutions of higher learning. Hence, online teaching and learning were integrated into learning modalities as an alternative to contact sessions while learners and instructors worked off-campus. In post-COVID-19, universities could re-group and adopt suitable strategies which allow students to adapt and cope with the new normal that recognises students' cultural themes and experiences in diverse disciplines. This study interrogates the blended learning approach concerning the experiences of learners and instructors while adapting to the new normal. This paper uses the adaptive complex systems approach to understand blended learning through different lenses and to understand the influence of environmental changes on the higher education (HE) landscape. A systematic literature review was analysed qualitatively from books, online accredited journals, policy reports and commissioned studies. Findings from this study contribute to improving teaching strategies in higher education

Keywords: Adaptive System, Blended Learning, COVID-19, Learner-centred approach, Learning environment.

1 Introduction

The adoption of blended learning in the post-COVID era has been received with mixed feelings in South African Higher Education (HE). In the present dispensation, higher education has been exposed to global challenges that tamed South Africa to transform teaching and learning while responding to COVID-19 restrictions. This responsiveness focused more on embedding the teaching technologies which could be used more often in the new standard [1]. Developing African countries, including South Africa, have been allowed to transform their operations and respond to global and local challenges. At the same time, they do not have enough resources to be prepared for such change [2]. University students had to adapt to this change and organise themselves to learn

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online since they were restricted from contact sessions. The post-COVID-19 era reflects universities' resilience in change management directed at the core business of universities. While universities had to cope with the lockdown restrictions during the COVID era, they faced the challenges of preparing and adapting to the new normal of teaching online. In the post-COVID era, online learning became the bigger picture for teaching and learning. In doing so, HE adopted new forms of blended teaching and learning, including contact and online teaching, to adapt to the new normal while retaining the old capability to teach with other modalities.

Liu [3] states that blended learning combines contact sessions with online teaching and learning. Academics now recognise several benefits and drawbacks to exclusive in-person or virtual learning environments [4]. Thus, scholars have started to combine aspects of these two distinct learning environments to maximise the benefits and minimise the drawbacks of both instructional modalities. This type of instruction is commonly called "blended learning" (BL) and can take many forms. Adapting to BL is diversifying teaching tools to optimise the learning process by integrating instructional strategies to enhance the learning results [5].

In developing nations, specifically within the Eastern Cape Province, universities are compelled to adapt to change and prepare their teaching infrastructure to allow for the adoption of blended learning to be receptive to student needs. Blended learning enhances e-learning, which needs to be prioritised and influenced by the introduction of new attributes for graduates in some universities [6]. BL combines face-to-face instruction with online components and has the potential to address educational needs and bridge the digital divide in these contexts. In recent years, universities in developing African countries have tried integrating e-learning strategies into their teaching methods [7].

However, progress has been uneven, and many institutions still need help incorporating blended learning approaches effectively. The COVID-19 pandemic further highlighted the urgency for universities to adapt and enhance their online education capabilities. Within the South African context, the adoption of blended learning has been influenced by various factors, including limited access to technology, socioeconomic disparities, and inadequate infrastructure [8]. The Eastern Cape Province, with its unique rural landscape and specific challenges, provides a valuable lens to examine the implementation and experiences of blended learning in a developing African context. This study explores the use of adaptive blended learning in diverse learning settings to recommend strategies to improve learners' adaptation in the post-COVID-19 era.

2 Problem Statement

Limited policy guidelines to fully support adopting blended learning to improve learners' performance in most disadvantaged universities create complexities for learners to adapt to change [1]. The enforcement of blended learning has resulted in mixed feelings

among scholars even though they acknowledge the complexities in South African higher education [9]. In the same vein, Badaru & Adu [10] assert that the lack of preparedness of universities during the COVID lockdown left students vulnerable with no instruments to learn. Although the Department of Higher Education (DoE) and the National Student Financial Aid Scheme (NSFAS) provided financial support to universities, more was needed to cover all the needy students. The upgrading of some teaching infrastructure, such as lecture halls and digital projectors, experienced delays, especially for historically disadvantaged students [11]. In the context of this study, blended teaching and learning brought an array of challenges to some universities in the Eastern Cape Province due to internal and external factors that are socioeconomic and political in nature [12]. Therefore, adapting learning to the BL approach in the post-COVID era is problematic; hence, this paper intends to assess the influence of blended learning on learners' performance in historically disadvantaged universities.

3 Research Methodology

This study adopted a qualitative research paradigm using secondary data. Qualitative research is relevant for this study since it provides deeper insight into real-life experiences without using numbers to explain them [13]. Online research outlets, such as books, articles from credible journals and policy documents, were mainly used for data collection. Search engines include Google Scholar, Ebsco Host, Academia, Emerald, Elsevier, and online libraries from diverse universities. Diverse sources that focus on blended learning, online teaching and learning, teaching and learning modalities, online teaching in higher education during and after COVID-19, and a cantered approach were drawn to review literature that aims to respond to the aim of the study. Articles focusing on teaching in a historically disadvantaged institution were prioritised as units of analysis targeting undergraduate and post-graduate studies. The researcher also reflected on the experiences of teaching as an academic with long experience in higher education, and the knowledge of the student's interaction with the researcher influenced the analysis of this qualitative study. Out of 78 articles on blended learning experiences, only 40 articles and books were relevant to this study. The researcher systematically scrutinised and reviewed the literature and created themes for data analysis. The findings from this study are expected to contribute towards improving teaching styles to enhance learner performances at a university.

Qualitative researchers must reflect before and during the study process to give readers context and comprehension. For readers to better understand the filters through which the variables were viewed to respond to the aim, data were gathered and analysed, and findings were reported. After that, researchers must reflect upon and clearly articulate their position and subjectivities (worldview, perspectives, biases). This is why being reflective requires researchers to do more than try to ignore or avoid their own biases. The thematic analysis approach assisted this researcher in avoiding biases and relying on the data, which is drawn from the studies conducted by scholars internationally and

locally on the adaptation to blended learning approaches. To prevent biases and subjectivity, the researcher's reflections on the teaching experiences were clearly and precisely articulated well. The second section will deal with a literature review.

4 Literature Review

4.1 What is Blended Learning?

The body of literature settles on blended learning, which refers to a teaching style integrating more teaching modalities, like contact learning, with online teaching and learning. According to Albiladi and Alshareef [14], blended learning combines traditional face-to-face and online teaching. This implies that the learning process combines multiple teaching styles, where learning occurs in the lecture hall/ classroom and online. Likewise, while investigating learners' readiness for online learning, Adams et al. [15] assert that blended learning can be more predominant than other teaching methods since it combines contact and online teaching. While examining the barriers and advantages of online learning during COVID-19, Stecuła and Wolniak [16] argue that blended learning emerged strongly as a combination of teaching methods that emerged when online teaching and learning were introduced during COVID because learners and teachers were restricted from having close contact.

Therefore, contact learning was not prioritised during COVID-19; hence, other means of learning became significant while the teaching landscape was changing. It is worth noting that while scholars have been aware of the concept of blended learning for some time, blended learning that augmented online teaching presented a new normal that also introduced advantages and challenges that shaped the teaching landscape in higher education. Blended learning strategies include the Flipped Model, where Students learn through a series of learning activities in class during specific scheduled periods. There is a rotation for online instructional activities. Activities include small group instruction, group projects, individual guidance, and assignments. According to Zulhamdi et al. [17], active learning and the flipped classroom are synonymous in the minds of some. The flipped classroom is only one of the various approaches to include active learning in one’s classes. Using lectures or direct instruction is not the most efficient way to use class time, which is the foundation of a flipped classroom. Higher-order thinking tasks can occur when students engage with knowledge outside of class.

Another teaching style is collaborative learning activities, carried out by small groups at each station. According to Dabae Lee et al. [18], the best way to administer collaborative learning is to create more teaching space to allow joint projects, and the original learning framework gets inverted. The other commonly used method is the face-to-face model, which can be conducted through live events.

5 Theoretical Framework: Adaptive Systems Approach

This study adopts the adaptive systems approach (ASA) to understand the learner's adaptation to the blended learning (BL) approach. According to Buck [19], the capacity of a system to modify or adapt to better suit or perform in a particular circumstance is known as adaptivity. A learning system should adjust to each learner or team for the scenario to maximise the learning experience, much like a human mentor or instructor would adapt to each student's unique needs. A complex system and adaptive approach are standard in understanding the responsiveness and ability to adapt of higher learning institutions and the students involved. The components of the adaptive systems approach are the significance of how the systems work and their components, the extent to which the components are influenced by change and how organisations must manage change [20]—a theory for re-conceptualising blended learning. McGee & Poojary [21] assert that the suitability of the systems approach in blended learning lies in its strength and use to understand the complexities of the learning environment in higher education.

This study adopted an adaptive systems approach (see Fig.1) that supports learners as active agents to cope with and adapt to the learning environment by understanding issues based on their cultural background and experiences.

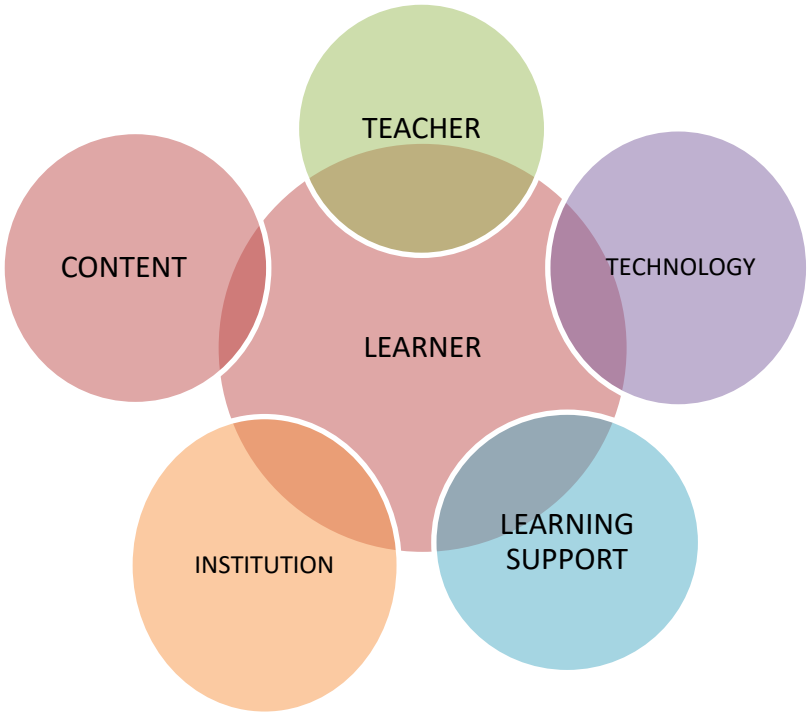

Fig. 1. Adaptive **Systems Approach** Source: Adopted from Wang et al. [20]

This study also recognises using a learner-centred approach to promote participatory teaching, sustainable practices, and online creative engagements to promote critical thinking and a transformed decolonised curriculum. By identifying the background of learners in a previously disadvantaged university, this study notes teaching strategies that recognise the inclusive and diversified needs of learners from various backgrounds, learning modalities and abilities.

Based on the above diagram, the Inputs may include the emergence of new elements in teaching and learning, curriculum changes, learner support material, technology, content, and institutional resources [22]. In the issue related to teachers, this study notes that teachers may contribute to the adaptation of students by guiding them with adequate knowledge about e-teaching, study materials and assistance with leaner support from the Centre of Teaching and Learning and the quality assurance directorate. In contrast, learners may face financial difficulties, motivation issues, difficulties with progress assessments, social isolation, insufficient skills and experience in distance learning, and problems with affection and the social domain.

Health surroundings and the environment in which learning takes place are also significant for adaptation, allowing learning progress—face challenges in evaluating advancement across several domains. The curriculum is also affected in the post-COVID-19 era; the university will have to adjust its contents and subdivide them to suit teaching modalities at each level. Sometimes, the content must do the available resources, instruction, and assessment. The university is also expected to play a dominant role in restructuring the teaching environment and address structural elements and legacies that may impede the university's teaching and learning development, especially in visiting policies and guidelines to adapt to the new normal.

The university management is responsible for addressing Complexities that may arise during the conversion of inputs into outputs. It is expected that there may be some problems with the effects of change and the impact of the interaction between these new elements. The universities must process the inputs to outputs through teaching, community engagement and research. During adaptation, learners rely on the university resources and policies guiding teaching and learning as a closed system. The university’s ability to form new rules from combinations of old regulations and further information from the environment is imperative to avoid conflict and disagreements while students adapt to change.

6 Application of Blended Learning Using Online Teaching

According to the National Academies of Sciences, Engineering, and Medicine [23], teaching online is an integral part of the education system that is interrelated with the other components of teaching and learning. Therefore, the instructors use software programmes employed as an open innovation or a traditional innovation technique that is a foundation for an e-learning strategy that instructors and learners can use without going to class. Turnbull, Chugh and Luck [24] agree that online learning tools for university students' development, administration, and distribution of course materials are known as learning management systems or LMSs. Learning management systems (LMSs) are crucial for improving and streamlining instruction in today's increasingly digitalised world. The most common LMSs are the Blackboard and Moodle software.

Open innovation can be defined as a development process that combines internal and external ideas, particularly when utilising new technology. The open innovation method in e-learning might be based on combining external solutions like software and apps and technical solutions like Blackboard and Moodle and other programs used by internal organisational experiences. The efficacy of creative solutions applied in university education may increase due to this strategy.

Through MLS, instructors can upload work, reference sources and links for learners to work on independently. Learners can also write an online test that students can complete at a specific time and within a set period. It is crucial to seek out experience and knowledge from sources outside the university to install the chosen LMS programme. The Information Technology Communication Department can install the programme and train the first-time users of these LMSs.

The advantage of the online system is mastering information by learning key concepts and terminology during off-classroom time. The learners are also able to be exposed to reflective thinking by analysing terms and cases offered by the instructor through information recall; b) Some students can build vocabulary from the one they learnt in class progressively and apply information for preparing their assessment tasks, which can be a trial and error. c) Instructors can also use online learning as problem-based learning that needs students to deal with problem cases as a group or collaboratively; d) Lastly, the information can be reinforced when learners deconstruct the information and create solutions based on their background. It may add value to instructors and further request the students to go beyond what is studied in class, create their understanding, and base these practical solutions on their communities.

7 Discussion

The reviewed literature demonstrates that adopting a systematic approach is needed for blended learning. Adaptive learning to remote education is only sufficient if it is ac-

companied by high-quality resources, an enabling environment, user-friendly instruction, assessments of students' knowledge and abilities, and, most importantly, qualified teachers. It is a reality that some universities are grappling with the new normal brought about by COVID-19 [29]. Based on the literature reviewed, COVID-19 restrictions augmented the use of online teaching [30]. Based on the literature, the emphasis in practice in understanding LMSs is a crucial factor that affects students' behaviours and overall academic achievement [31]. The adaptive systems approach used in this study informs us that it is a challenge to address a complex issue, like dealing with a new normal of introducing various learning approaches. In contrast, in the pre-COVID setup, traditional contact learning was dominant. In the post-COVID-19 era, diverse teaching methods are integrated with online learning. Nathiel [28] asserts that although students work independently, they still need support from the faculty and can communicate with administrators and instructors online and by email.

Learner support is also a significant issue since blended learning needs an environment that uses internet data, various tools like laptops and computer labs, smart classrooms, and digital projectors for teachers to teach [32]. University infrastructure can be upgraded when funds are available to do so. The Department of Higher Education provided universities with financial support to set up online teaching during COVID-19. Some learners are directly supported by their more affluent families. Other learners are sponsored by the National Student Financial Aid System (NASFAS). Those who need support to buy devices struggle to learn off campus. Learners who have financial problems struggle to cope. The absence of motivation can also add up to more problems. Learners also suffer from peer pressure when their financial problems are not attended to, which can, in turn, lead to a drop-out situation because the financial struggles of learners can affect their assessments and progress, causing isolation from their peers. At the same time, inadequate skills and experience in distance learning also play a negative role.

Instructors need support from universities since they, too, are affected by change. Some issues during adaptation include a need for more adequate resources and a comfortable teaching environment, especially e-teaching. According to Gonzalez et al. [33], students who passed more significantly due to favourable assessments of their progress in the different domains contributed to increased throughput rates and classroom numbers. Crowded classes need more resources and time for teachers to grade their assessments. According to Orr [34], there are cases where instructors create ambiguity in the curriculum and compromise quality due to insufficient resources and lack of knowledge. The other challenge in the teaching process can be caused by the need to evaluate the university processes and the organisation of the operations and organogram changes, which lead to restructuring and downsizing of instructors as part of the adaptation and effects of structural factors in this area.

An adaptive approach can be created through synchronous learning. Increasing student engagement and learning requires synchronous learning, which entails in-person lectures and interactions [35]. This can be augmented through the participatory character

of synchronous learning, which facilitates rapid interactions between students and instructors, fostering a sense of community and reducing the perceived distance between participants. For instance, synchronous activities can assist students in building healthy relations among themselves by working together in groups on projects within the larger classroom setting [36]. Many students were forced to switch to alternative forms of instruction during the COVID-19 pandemic because they could no longer attend face-to-face classes. Synchronous learning enabled students to respond to their lecturer's instructions remotely using the LMS. Table 1 provides an overview of the literature reviewed.

Table 1. Overview of Included Studies on the Adaptive Approach

Study	**Learning purpose**	**Methodology**	**Findings & Conclusion**
1. Wang, Y., Han, X., & Yang, J. [20].	To address a gap in blended learning research — the absence of a systems approach to understanding blended learning research and practice.	Secondary literature collected on blended learning covers January 1, 2013, and August 21, 2014—eighty-seven journal articles on empirical studies.	The investigation on using adaptive blended learning can support a methodical and comprehensive understanding of blended learning, providing a fuller picture of such learning.
2. Smaili, [25]	Researchers used an adaptive e-learning system to exploit the traces left by users' interactions with their learning environment.	Systematic literature review and quantitative use of Algorithm.	This study suggested a sustainable e-learning system to tackle school dropouts. The idea is to provide courses corresponding to

			how learners can adequately complete their learning process.
3.Alarthi er al. [26].	To provide a systematic literature review of the sustainability meta-requirements for eLearning systems to identify open problems and to present the state of the art of this research are	Reviewed literature review and analysed 124 papers.	After analysing the literature on sustainable online learning, they identified 18 high-level sustainability requirements for eLearning systems.
4. Buck et al. [19]	To demonstrate adaptation using an integrated adaptive learning prototype, to create a seamless adaptive learning experience on the part of the student, as well as plans to conduct an effectiveness study using the adaptive learning methods.	Mixed method study.	Experience has taught us that there are advantages and disadvantages to various methods for content adaptation, feedback, and student modelling.

5. Osadcha [27]	The organisational and pedagogical conditions of ASIPT, which are led by the requirements of integrated learning and subject-subject interaction between the primary actors in the educational process (teacher, student), influence all subsystems and are interconnected.	Quantitative method.	The study demonstrates the conception of a functioning prototype for an adaptive system based on the array of instructional information and communication technologies.
6. Nathaniel [28]	Assessing the use of adaptive blended learning method to necessitate pedagogical needs with digital technology using online learning activities to implement student learning in a medical neuroscience course for year one medical student. by the Covid-19 pandemic. This model combined	Mixed methods.	The adaptive blended learning approach effectively enhanced academic performance for high-performing medical students. A significant feature of this adaptive blended learning approach is that it enabled medical students

			to utilise an individually customised, fluid schedule concerning their learning activities.
7. Rawajat [22]	This study investigated the application of computer-assisted edge cloud strategies to optimisation planning.	Quantitative.	Combining historical scheduling information with cloud server information allowed the optimisation of the future performance of the intelligent edge IIoT.

Source: Researcher's work

8 Conclusion and Recommendations

This study demonstrated that diverse subjects in disciplines can use an adaptive blended learning approach for learners to enhance their teaching and learning in the post-COVID-19 era. There are profound implications for student adaptations to a new learning system in the post-COVID-19 era. The above discussions have revealed findings that contribute to the existing literature on the blended learning approach, and they also provide lessons to other stakeholders in the university community and other universities to learn about the challenges of blended learning. This could help identify mechanisms to improve their performance post-COVID-19 transitions.

This study implies that in higher education institutions, students and instructors are continuously affected by the changes experienced after the COVID-19 pandemic in South Africa and are forced to adapt to change. Based on the analysis of scholarly literature, this study settles on the fact that there are available studies on blended learning approaches after the pandemic. There are also more studies on e-learning during and after the pandemic. However, studies published on the learners' adaptation to blended learning during and after COVID-19 can be enhanced.

It is highly recommended that learners and instructors continue attending training research on diverse teaching styles, address their challenges while using blended learning, and thereby devise the means to enhance their understanding of it. They can be exposed to training sessions on BL and workshops to gain insights on how to use them better for their assessments and information searches. Students rely heavily on online teaching and AI to do their academic work. They sometimes communicate with their instructors and peers using smartphones and emails. However, they need to be trained in various reference methods and academic writing to improve their skills in writing, research, and oral presentations. Students must be exposed more to writing and research skills and catch up on interactive skills. Blended learning is here to stay; therefore, instructors must continue to attend workshops to improve their skills in using LMSs for teaching, research, and community engagement.

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