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Mathematic Comic Mobile Learning (MCML) for Class VII

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Abstract

The global intervention by universities to minimise the devastating effect of the COVID-19 pandemic on education compelled many institutions to resort to emergency online interactions using virtual platforms. As a result, institutions adopted asynchronous, or synchronous, or both to facilitate knowledge with students. This study explored students' experiences with synchronous online teaching and learning model adopted by a university in South Africa. We employed an interpretive qualitative design and gathered data through an open-ended questionnaire administered to twenty students purposively sampled from a population of sixty-eight rurally resident final year students, and focus group interviews with six of the twenty students. Data was analysed using constructs guided by connectivist theoretical framing. The study revealed behavioural change, positive attitude, commitment, self-discipline, improved study skills, proficiency in using online tools, improved peer-peer and student-lecturer interactions as constructive experiences. However, identified obstacles such as initial perceptions about the synchronous online learning, environmental complications (geographical location and domestic responsibilities), inefficient local digital technology infrastructure and intermittent electricity interruptions. Also mentioned, was the communication gap between authorities and students on e-learning decisions. We recommend the introduction of asynchronous and synchronous model to enhance flexible learning experiences. Further, a critical review of students' biographical information is necessary to assist in customizing digital resources that meet their needs. "A no student must be left behind" principle adhered to and the exclusion of students in the learning process avoided.

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INTRODUCTION

Universities across the world intervened to minimise the catastrophic impact of the COVID-19 pandemic on education. This move warranted a shift in curriculum facilitation from the traditional face-to-face culture to an online environment that satisfies students' instructional needs. Incorporating the online collaboration model as an option required transformation of pedagogy, induction of creativity and innovative approaches using appropriate platforms to enrich learning and teaching experiences in higher education (Mondal & Mete, 2012). Further, with an ideal environment, with available personal, portable wireless devices, students have seamless digital systems for flexible online collaborative engagements (Chu & Mok, 2016). Interestingly, Chu and Mok (2016) posit an online learning environment enhances digital interaction between lectures and students using e-learning platforms (social web technologies, virtual etc.) synchronously and or asynchronously.

Digital synchronous (same time) collaboration involves interaction between lecturers-students, and students-students in real-time through virtual classrooms or chatrooms (Mondal & Mete, 2012). According to Li et al. (2020), synchronous learning provides an environment to transform traditional formal education into digital education with student cohesion maintained. Further, Li et al., (2020); Cidral et al., (2018) and Bower et al., (2015) suggest that electronic synchronous (e-synchronous) teaching and learning could be as effective as traditional face-to-face education and requires full class attendance. Virtual platforms (Microsoft teams, Zoom etc.) are pivotal e-learning synchronous tools that create an environment similar to the traditional face-to-face space where students engage in discourses to share understanding, construct knowledge and advance learning experiences. Asynchronous (not same time) facilitation, according to Mondal and Mete (2012) and Wilson, et al. (2018) involves individual student-student and lecturer-student engagement at convenience through electronic resources (email, forums, chats) and lesson recordings.

The institution in context adopted a synchronous model for knowledge dissemination and development (cyber classroom) to supplement the predominant traditional face-to-face approach. The purpose was to share intellectual opportunities including educational activities with all students equally ignoring their geographical and educational landscapes. Synchronous learning environment requires adequate digital technology infrastructure, tools and resources (Wi-Fi, data, connectivity, network etc.) for all geographical settlements. The privileged urban students can afford these resources coupled with strong digital infrastructure and Wi-Fi, unlike their rural counterparts

The Problem Statement

Most universities responded to the surge of the COVID-19 pandemic for continual high quality and equity education to all students (Obeidat, 2020) through digital technology online mode. Many studies (Leob, 2020; Dennon, 2020; Obeidat, 2020; Abbasi, et al. 2020; Poernamasari et al., 2022) focused on students' perspectives about online learning, synchronous and asynchronous activities in a general context. However, not much information is available on rural students' experiences (benefits and obstacles) who suffer digital technology resource exclusion in migrating to digital synchronous learning environments with digital technology dearth in their rural settlements thus, prompted the study. A critical review of students' learning experiences of synchronous e-learning relative to the students' preparedness and digital infrastructure inclusive of resources and tools were the basis of the study.

Research Question

The overarching question was "What were students' experiences on the synchronised remote emergency teaching and learning

adopted by the university during the surge of the coronavirus"?

Research Objectives

The research objectives below, guided by the main question and theoretical framing provided trajectory for the study:

- Explore students' pre-synchronous interaction with online teaching and learning;
- Examine benefits of the synchronous e-learning process to the students; and
- Understand the obstacles encountered by the students during the synchronous remote e-education process.

Theoretical Framing

To understand the students' experiences with synchronous online education, the study engaged Siemens' (2005) and Downes' (2007) concepts of connectivism learning theory. According to the theory, learning is not only limited to our internal construction of knowledge but also through connecting information in external networks such as "nodes" and "links" (Siemens, 2005). Accordingly, knowledge distribution is across a network of connections; therefore, learning is attainable through the construct and transverse of those networks characterised by the reflection of a constantly changing society (Downes, 2007). Consolidating, Siemens (2005) and Downes (2007) identified principles that underpin the theory as:

- Learning and knowledge rest in the diversity of opinions;
- Learning is a process of connecting;
- Learning may reside in non-human appliances;
- Learning is more critical than knowing;
- Nurturing and maintaining connections are needed for continual learning;
- The ability to see connections between fields, ideas, and concepts is a core skill;
- Accurate, up-to-date knowledge is the aim of all connectivist learning; and
- Decision-making as a learning process. What we know today might change tomorrow; while there is a right answer now, it might be wrong tomorrow due to the constantly changing information climate.

Consequently, migration to the emergency online education environment elevates learning beyond what one knows but where knowledge can be found, the knowhow, know what and supplementing knowledge through networks (connectivism) that meet students' needs.

In the context of this study, the participants were comfortable with the traditional face-to-face teaching strategies, and then the sudden migrating to a remote online teaching environment. The theory is relevant due to the students and the university's geographical locations, notwithstanding the inadequacy of technological infrastructure, resources, tools and processes. The adopted connectivist theory interrogated the students' remote online learning experiences and hence, helped disentangled influential factors such as the interaction of students and available learning technologies, thereby contributed to extracting valuable constructs cited in students' conversation such as key benefits and obstacles in the synchronous emergency remote learning process.

METHODOLOGICAL DESIGN

The study was located within the interpretive qualitative design that allowed for a flexible relationship between participants, researchers and the environment (technological and physical) (Okeke & van Wyk, 2016). The single case study targeted students situated in a purposively selected geographical environment. An open-ended questionnaire (principal tool) and a focus group interview (semi-structured) allowed the participants to discuss or corroborate responses to the open-ended questionnaire. Further, the researchers developed a conversational relationship with the participants that promoted "corridor" discussion on the subject matter, which was recorded (in the researchers' diary) to corroborate the other data sources. Piloting of the previous two

instruments with non-participating students from another faculty minimised ambiguity, structural and grammatical deficiencies.

A convenient purposive sampling method was engaged in selecting the university (historical background, rural setting, previously disadvantaged, servicing rural communities) and the two departments (willing to participate) from two different faculties hosting a very high population of students from deep rural settlements. Electronic survey questionnaire focusing of many issues including geographical location administered to all the sixty-eight students in the two faculties helped in sampling the twenty (ten females and ten males) deep-rural (farmstead, hamlet, vill) participants. The researchers self-administered the open-ended questionnaire to the participants and received all back. The focus group interviews scheduled assented to participants' availability and lasted for two hours per three sessions.

The captured and transcribed data member-checked by the participants confirmed authenticity. The data were subject to thematic analysis as a method of data analysis (Braun & Clarke, 2006; Clarke, et al., 2015; Terry et al., 2017). The theoretical framework guided the constructs developed and presented descriptively.

Tabel 1. Biographical Information of Participants

Code	Gender	Age	Location	Digital Tool	Service Provider	Service Signal
FMB_1	Male	21	Farmstead	Smartphone	Cell C	Poor
FMB_2	Male	23	Vill	Laptop	MTN	Poor
FMB_3	Male	25	Village	Laptop	MTN	Very poor
FMB_4	Male	26	Farmstead	Smartphone	MTN	Bad
FMB_5	Male	23	Village	Laptop	Vodacom	Unstable
FMG_6	Female	26	Hamlet	Laptop	MTN	Very bad
FMG_7	Female	25	Village	Smartphone	Cell C	Okay
FMG_8	Female	22	Farmstead	Smartphone	MTN	Poor
FMG_9	Female	22	Vill	Laptop	Vodacom	Very weak
FMG_{10}	Female	25	Hamlet	Laptop	Vodacom	Poor
FEB_1	Male	22	Cottage	Laptop	Vodacom	Weak
FEB_2	Male	26	Village	Smartphone	Cell C	Okay
FEB_3	Male	24	Farmstead	Laptop	Vodacom	Unstable
FEB_4	Male	22	Cottage	Smartphone	MTN	Poor
FEB_5	Male	26	Village	Smartphone	MTN	Unstable
FEG_6	Female	21	Hamlet	Smartphone	Cell C	Bad
FEG_7	Female	22	Farmstead	Laptop	Vodacom	Weak
FEG_8	Female	26	Farmstead	Smartphone	Vodacom	Poor
FEG_9	Female	25	Cottage	Smartphone	MTN	Unstable
FEG_{10}	Female	23	Farmstead	Smartphone	MTN	Okay

The researchers used codes to identify with the participants such as: FMB, FMG, FEB and FEG (F for faculties, M or E for the departments, B and G for the male and female respectively. The biographical information revealed gender equity (ten males and ten females), though not a gender reflection in the selected population (twenty-eight males against forty females). All the participants were in the final level of their study programmes without any outstanding modules. This was very important for the researchers since the time required from the participants was an extra demand and should not inhibit their academic progress. The participants were between the ages of twenty-one and twenty-six years hence, made an informed decision to partake in the study. Many of the participants claimed to have been using e-resources and tools

(smartphones) for social activities and rarely engage in academic interactions. The few with laptops used the tool for marginal academic purposes, such as sending and receiving electronic messages from friends and peers.

FINDINGS AND DISCUSSION

The presentation and discussion of the findings followed the constructs of the objectives.

Constructs

The principal constructs developed from the data were:

- Pre-synchronous Interaction learning experiences;
- Benefits and obstacles during synchronous emergency remote online education.

Pre-synchronous Interaction learning experiences

Sub-constructs such as Students 'readiness, interactions with social digital technology space, and student engagement on e-learning (interaction with content, peer-peer, and lecturer-peer).

Students' Readiness

The institution's readiness to embark on the online teaching and learning journey was a concern to the students. The institution claimed to have challenges in providing digital resources to all students. The digital technology laboratories lacked adequate tools and resources to meet the students' training needs. Participant FEG_6 and FMB_1 expressed:

"We fight over computers in the laboratories due to insufficiency..(FEG_6). *There were always queues in order to access the laboratories. I do not foresee the institution providing digital gadgets to all the students for online education".* (FMB_1)

Resources are essential in effective remote online curriculum facilitation. Many students from poor, disadvantaged communities had funding of digital resources a huge challenge. Consequently, the university's inability to provide resources and training made students perceive the synchronous online education as an academic dishonour and disadvantage

"I was very comfortable with the onsite education and had not prepared for a sudden shift in the medium of learning. It will be a problem for some of us if the institution does not supply the equipment necessary for the e-learning process" FMB2, FMB5. FEG1.

Successful implementation of remote e-learning, require support from stakeholders to enable students acquire the necessary digital resources and training. This view is similar to the finding of Alea et al. (2020) on institutions' preparedness for distance learning programmes. Participants expressed students' preparedness as paramount to the effective implementation of the emergency remote online education. In addition, the data admits the need to improve students' e-learning capacity and escalate their ability and intentions to use e-learning resources before engaging in full-blown remote education.

"I was surprised when the university informed us about the remote online system without adequately preparing us for the journey" (FEG_{10},). *I am unsure if most of us could cope without mental, emotional, academic and curriculum preparedness"* (FMB_3).

It points to the suggestion that students did not foresee institutional preparedness (university and students) adequate to make effective use and functionality of synchronous remote learning systems. This finding corroborates Raza, et al. (2020) argument on the importance to improve students' e-learning experience when using e-learning systems.

Perspectives on interactions with Social Digital Technology Space

The digital technology education space seems to be a relatively new experience to the participants, especially those from isolated farmsteads (countryside) as confirmed in the mixed responses from participants. Some claimed that the use of personal tools, resources and social space for teaching and learning

infringes on their individual rights whilst others hailed it as a contemporary learning space that encouraged education for ones' own development.

"I don't see the possibility of having online education using my own data and technological equipment after paying such a huge amount of fees. It is unfair to use our social space for teaching and learning". FMG$_9$

Participants FEB$_3$, FEB$_5$ and FMG$_{10}$ expressed similar sentiment. The comment demonstrated how some students perceived the academic use of digital social environment to enhance the academic agenda as an abuse thus, the initial resistance to the remote e-education.

In contrast, FEG$_7$ and FMB$_4$ perceived migration to the digital social space a step in the right direction since the opportunity was there to combine learning with other responsibilities.

"I have a baby and always had to plead with the granny to take care of the child whilst at school the remote e-learning helps in joggling between academic and social responsibilities". FEG$_7$

My frail parents need support to collect their social grants. I perceived the online education as a way of getting education as well as satisfying their basic needs". FMB$_4$

These comments conceded to the positive contribution to the remote e-education. Domestic responsibilities may not allow for absolute focus on the academic journey during synchronised e-learning conceptions however, more convenient than shuttling between campus and home.

The multi-layered views reflected the mind-set of the students' as they migrated onto the online teaching and learning stage. Davis (1998) argued that using social media for academic activities encroaches on students' social rights; while Oberiri (2017) advised students to incorporate, learning experiences on social platform discussions.

Benefits and obstacles of the synchronous emergency remote online education

The data revealed benefits (behavioural, and interactions - peer-peer and student-lecturer) and obstacles (perceptions, environment, infrastructure, decision making) of synchronous emergency remote teaching and learning encounter.

Behavioural

Commitment and self-discipline characteristics reflected in the data. The participants claimed to being committed to the synchronised online sessions whenever connectivity, network and resources (data) allowed despite domestic challenges. Motivation (intrinsic and extrinsic), time management, enabling learning approaches and instructional designs promoted their devotion to the learning process. Despite the nature of their learning environment (geographical), poor technology infrastructure and lack of academic support, they participated in sessions. Participants FEG$_{10}$ and FMG$_7$ contended:

"…there was no way I would miss a session. Even if the sessions were recorded, there was not enough data to replay and make notes" FEG$_{10}$. *"…I try as much as possible to capture whatever needed to be noted and ask questions during future sessions…."* FMG$_9$

We believe that a sense of urgency coupled with real-time deadlines and expectations inspired participants despite challenges. The study found that the participants developed a sense of ownership that translated into commitment and self-discipline.

"Though studying at home was a difficult one, I decided to create a positive atmosphere coupled with a self-determined approach towards the synchronised remote e-education" FMB$_7$.

The positive attitude espoused the participants' personal characteristics (age, academic level etc.) that steered their synchronous online trajectory though direct contact mode was preferred (Abbasi et al., 2020). For instance, during the university based traditional face-to-face period, many students were compelled to attend to unavoidable social responsibilities, at home and communities thus had to skip classes whenever duty calls. According to FEG$_7$ and FMG$_{10}$:

"… I take care of my physically challenged granny as such often called to take her to see the doctor. FEG$_7$

"…….. the synchronised emergency remote online education assisted in programming my social and academic responsibilities". FMG$_{10}$

Due to compelling domestic disruptions, the students claimed not benefit fully from the traditional schedule academic system however, obtained maximum benefits from online e-education, a finding aligned with Wilson (2019).

An important characteristic that also emerged within the behavioural context was adaptability. The flexibility that accompanied the e-learning environment was adaptable in addition to self-discipline and commitment, as discussed above.

Interactions – Peer-peer and Student-lecturer

The synchronous space encouraged collaboration amongst students in real-time, especially during breakaway sessions where lively conversations and varied interaction deepen understanding.

"What I enjoy most during sessions was that one can ask questions at a point of misunderstanding without being shouted down by colleagues", FEG$_9$ lamented.

FMB$_3$ raised a similar argument:

"… the learning environment is very friendly and flexible such that I can participate in group conversation especially during breakaway sessions for better understanding of the subject matter".

Social engagement was an integral component of the synchronous online education process. Participants mentioned the social value of e-learning in developing effective interaction with lecturers and peers in obtaining academic information for self-development, hobbies and interests. Further, the learning space supported students to express their feelings and intellectual opinions, increased awareness of developments in education, promoted knowledge of diversity, and shared interest.

"The social environment created by the platform allowed for intellectual interaction and self-propelled interest discussions and awareness on trends in the subject related area". FMG$_{10}$

:

"Through social interaction with lecturers and peers via the platform increased my confidence level and now could communicate effectively in face-to-face class sessions," FEG$_6$ asserted.

Alghamdi and Plunkett (2021) concurred with the important role of remote e-learning environment in stimulating students' self-confidence to communicate with lecturers, peers and other groups to advance knowledge acquisition.

Synchronous emergency remote online education is less intimidating to students compared to the face-to-face learning space as expressed:

"…the lecture environment allows for free interactions with colleagues…." FEB$_5$

"*… ease of communication with lecturer and peers without reservation. The environment generates rapport and is very interesting".* FEG$_7$

"…the learning atmosphere gives opportunity to receive immediate feedback to questions from peers and lecturers…" FMB$_2$, FMG$_8$

According to Abramson (2021), online teaching and learning space is less intimidating compared to the face-to-face, where shyness, pride, and arrogance prevent students from understanding content better. Accordingly, the synchronous remote e-education space created a "blind" environment for students to interrupt discussions with questions or comments, thus allowing an organic conversation to unfold. Consequently, the environment encouraged freedom of communication and negotiated dialogue between peers and lecturers. Notwithstanding the flexible environment demonstrated in sessions, the participants highlighted flexible scheduling as an integral benefit that facilitated their conscious adapting and structuring of activities accordingly.

Emerged evidence in published studies alluded that e-learning environment give

students varied opportunities to participate in teaching and learning activities, engage with peers and lecturers at any place and time through computer and internet connectivity. Further, it gives students substantial time to elucidate responses in-depth, and encourages consolidated creative thinking by promoting a learning-centred approach.

"…remote online education set the stage for sharing and constructing knowledge from anywhere provided there is network connection" FMB_4.

Through collaboration, students share ideas, deliberate on academic issues, and negotiate understanding leading to knowledge development. In the process of collective knowledge sharing, students develop confidence, self-motivation, and appropriate communication practices. In addition, the synchronised learning environment acted as a medium for students to search and share knowledge and learning experiences; put the pieces together to develop the whole related to the field of study.

According to FMB_5, FMB_1, and FEG_9:

"Cooperative learning, discussions and information sharing promotes better understanding of learning material". FMB_5, FMB_1.

"…each of us contributes in class discussions and consolidates our ideas into a comprehensive unit…". FEG_9

The comments indicates that the e-learning environment allowed for active engagement between peers and lecturers. Synchronous emergency remote education promotes collaboration thus broadens students' perspectives, appreciation of academic and cross-cultural hallmarks in addition to transforming thoughts and the acquisition of appropriate interactive skills (Obeidat, 2020). Further, the ability to share ideas and thoughts culminated into imagination, creativity and innovation through the engagement. Meeting in real-time (synchronous) provides an opportunity for students to ask questions for elaboration and clarification instantly, obtain authentic feedback and guidance on trending employable skills.

"It is very pleasing when one asks a question during sessions and gets an elaborate response from the facilitator or colleagues. This approach speeds up understanding of learning material". FEG_7

The participants claimed that guiding them to relate interactive sessions with work situations make conceptualisation easier. The finding resonates with Villaroel, Bloxham, Bruma, Bruma and Herrera-Seda (2018) that authentic learning support student to integrate the classroom with employment.

Developing students' digital proficiency and competencies is of utmost relevance in the current education system. The findings highlighted the digital knowledge growth of students with the continual use of e-education platforms and processes. According to FEB_4 and FMG_8:

"Initially, I struggled to log on and effectively participate in the sessions. However, with persistence, my perfection improved….." FEB_4

"…….. now I am quite proficient with the medium and process". FMG_8

The participants alluded that the medium was easy to navigate as the lecturers employed evidence-based practices, project-based and self-regulatory strategies (Probowati et al.(2021) that catered for diverse learning needs, notwithstanding the space for reflection and realignment of learning in new domains in the contemporary education environment.

Obstacles

The obstacles encountered by students from the data were categorised as perceptions, environmental, infrastructural and e-learning decision making

Perceptions

Unfavourable views and perceptions on the synchronous online process before and at the initial implementation stage made some feel stressed and emotionally disorganised hence, caused digital anxiety and divide amongst

students however, they settled in very quickly and smoothly. On the other hand, some students were sceptical caused by the lack of appropriate resources, inadequate training, fear of less cognitive engagement with peers and the mere thinking through the medium of education hence hesitant about the synchronous digital education environment.

FEB_2 reported; *".. limiting dialogue and discussion does not encourage learning in e-education space".*

According to FEG_6: "*for best results in learning, effective interaction between classmates and facilitators is essential".*

The limited time for dialogue, interaction, discussions and negotiated understanding between peer-peer and students-lecturer seem to affect students' engagement with the learning material when they reflected on achievements made during sessions.

Environmental

Data illuminated non-conducive learning environment as an obstacle for achieving learning outcomes

"It was really unfortunate that some students open their mics during lessons". FEG_7

"I stay in a farmstead with network accessibility and connectivity challenges. The distance to the nearest town if seventy kilometres worsened by the poor transport infrastructure ". FEB_1

"Sometimes you may be in a session and be called by your parents to serve visitors. This causes breaks in interaction and inconsistency in knowledge construction…" FMG_8

Imagine living in the deep valleys or high up in the mountains with your uneducated parents who have little knowledge about online education but see your stay at home as a privilege to continue with domestic chores.

Infrastructural

Students revealed that inefficient local digital technological infrastructure resulted in bad network, poor internet connectivity and intermittent electricity interruptions were of great concern. FMG_8, FEB_3, FMB_4 and FEG_{10} asserted:

".... sometimes the internet was unstable and electricity interrupted, especially during sessions…" FMG_8

"Poor attendance to session sometimes was due to poor network, no data …" FEB_3

"In my village, there is regular electricity outage, as such; I find it difficult to enjoy full sessions …" FMB_4

"The inability of some students to continue with the e-education was probably due to the lack of digital devices, poor connectivity and others" FEG_{10}.

Majority of the participants claimed to have experienced technical challenges including internet lagging which impaired their learning experiences. Aggravating the situation was the lack of appropriate technology devices that could enhance learning experiences. Studies by (Obeidat, 2020; Yan, et al., 2021) confirmed stable internet connectivity to be vital for students' synchronous online learning experience as it involves real-time communications. The university should have screened all the students and provide services that best respond to individual needs with respect to their biographical characteristics including geographical space (Kauffaman, 2015; Yan, et al., 2021). For example, students who experienced internet lagging could have recorded lessons or digital textbooks delivered to them though may require data to play and real-time interactions.

Accessibility of appropriate technology devices especially desktop or a laptop was a challenge hence students resort to smartphones. Invariably, the increasing use of smartphones calls for the adoption of a platform customised for online teaching on such devices. Understandably, the potential use of this device with limited screen display and inadequate data may limit engagement with peers, lecturers, study materials and more so study skills development not ignoring the eyestrain from extensive use of this gadget due to its small screen size (Yan, et al., 2021). Apparently, the

participants admitted that accessibility of quality digital infrastructure was a luxury (Obeidat, 2020) due to their geographical settlements.

E-Learning Decision Making

A less mentioned obstacle not reflected in many studies about students' e-learning experiences is the disengagement of students in the migration and implementation decisions. Emerging from the data was the students' unawareness of the synchronous e-education agenda. It is important to understand that awareness predicts perceived usefulness and ease of using remote e-learning platforms and other e-resources. The participants believed that the institution did not provide sufficient information or adequately make them aware of the synchronised emergency remote online education, especially the system, implementation and processes. As a result, students did not form part of the decision-making process, which probably led to the 'one-size fit all' implementation. Some of the participants vehemently exclaimed:

"…this online thing was forced down our throat. We were not engaged in the process either in decisions taken which invariably affected us. In fact, quality education on the engagement and the e-learning process was absent. How was such a valuably engagement ignored?" (FMG$_8$, FMG$_9$, FEB$_5$)

Engaging students and lecturers on the functionality of the e-learning agenda would have make a difference in preparedness, efficient participation, acceptability and implementation of the medium. Haire (2019) argued that awareness of any e-learning system and its implementation process allows for perceived usefulness and ease of mind for acceptability. The finding echoe those of other researchers (Zia, 2020; Nikou & Maslov, 2021). The participants argued that getting them involved in negotiating appropriate delivery environments could have helped customizing suitable platforms for geographical areas for effective interactions. We are convinced that engaging students would have generated positive emotions and curiosity as such prepare students for accomplishment. Further, engagement, acceptability and implementation of any new teaching and learning approach requires a meltdown of traditional cultures such as attitudes, behaviours and beliefs thus prepare individuals ahead of change (Saseres & Makhasane, 2020, Omodan & Ige, 2021).

CONCLUSION AND RECOMMENDATIONS

The adoption of synchronous emergency remote online education was necessary due to the rapid spread of coronavirus across all tertiary institutions for continuity of education. Inadequate infrastructure and insufficient preparations positioned many institutions, students and lecturers at the negative end of high-quality teaching and learning continuum. Despite these general challenges, the process supported learning and the construction of knowledge. The study revealed digital interaction space to be new to many students, especially those from the deep rural areas of South Africa. Furthermore, the instructional readiness was absent, hence lack of support (awareness, resources, etc.) for students at the initial implementation stage of the programme. However, the students and lecturers were committed; this, coupled with self-discipline, social and academic engagements led to them benefitting from the system. Participants reported issues such as behavioural change, positive attitude, commitment, self-discipline, improved study skills, proficiency in using online tools, improved peer-peer and student-lecturer interactions as their constructive experiences. However, highlighted concerns of their initial perceptions of the synchronous online learning programme, environmental complications (geographical location and domestic responsibilities), inefficient local digital technology infrastructure and intermittent electricity interruptions. Also mentioned, as an obstacle was the poor communication between authorities and students on the e-learning decisions. With the institution relocating

teaching from the traditional face-to-face and emergency remote online synchronous education to a blended learning space, the study recommends the introduction of asynchronous, alongside the synchronous model of curriculum engagement to enhance the flexibility of learning opportunities. Further, a critical review of students' biographical information is necessary to assist in customizing digital resources that meet their needs, "A no student must be left behind" principle adhered to and the exclusion of students in the learning process avoided.

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