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THE COVID-19 PANDEMIC IS A CLARION CALL FOR A SYSTEMS-THINKING BASED APPROACH

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ABSTRACT

This qualitative research-based study evaluates the level of preparedness of newly qualified higher learning entrants to higher learning centers. The outbreak of the Covid-19 pandemic has brought about an unexpected innovation to higher education. The post effects are a clarion call to the global community to jointly collaborate, integrate and interconnect learning to cope with any unexpected pandemic in the future. The pandemic is continuously making an abecedarius of a systems-thinking based approach. Whilst learning is increasingly relying on digital technology, the overall education approach is missing an approach that integrates pre and post higher learning elements to a sustainable education system which is ready for any future pandemic. The study is based on responses of ten university students who entered the university for the first time during the COVID-19 pandemic. The students were randomly selected to answer 5 open-ended questions using a qualitative research method. The results have shown that moving from a normal school learning environment to a higher education environment was traumatic and created unnecessary confusion. Also, the support given at the time was inadequate as students had to climatize themselves with university life. The results further point out that there must be an integration between high school and university education. The integration requires adequate support for everyone involved in the education system. Importantly, the study recommends that investing in digital technology is an indispensable necessity that does not only make students to be globally competitive but makes them to be ahead of any eventuality. This study provides feedback from universities' students/participants to better improve e-learning.

Keywords: Covid-19 pandemic, systems thinking, e-learning, fourth industrial revolution, learning management systems.

1. INTRODUCTION

The effects of Covid-19 were a serious threat facing the African higher education system. Higher education is sometimes referred to as tertiary education. It comprises of public and private universities. The effects of Covid-19 were severe to all African universities irrespective of each country socio-economic status. Covid-19 had the possibility to collapse education not only in Africa but worldwide. However, there was a dire need for an African based intervention to usurp the scourge. Therefore, all African institutions had no alternative but to embark on a drastic intervention to save the continent[1]. They had to avoid education defeatism. There was no uniquely African intervention other than the e-learning which was the global approach aimed at saving the collapse of education. The outbreak of the Covid-19 pandemic has brought about an unexpected innovation to higher education. The post effects are a clarion call to the global community to jointly collaborate, integrate and interconnect learning to cope with any unexpected pandemic in the future. The pandemic is continuously making an abecedarius of a systems-thinking based approach. Higher education institutions are required to revisit their business continuity strategies as part of sustainable learning.

This study is aimed at reflecting on sustainable intervention and specifically arguing for a more collaborative and interconnected learning. To respond to the aims of the article, first-year students were randomly selected to answer 5 open-ended questions using the qualitative research method.

2. THEORETICAL PERSPECTIVES

Covid-19 has forced African universities to accept and recognize that the future is now and must quickly adapt to remain relevant

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1 Lis Lange, 'Against the " new normal" - reflections on universities after COVID-19," (News UCT, 2022) <http://www.news.uct.ac.za> accessed 28 September 2023

as sources of knowledge production[2] . Faraj's argument omits that all African universities must employ the most appropriate theory to cope with the complexity of the pandemic. All countries on the African continent are interconnected, inter-dependent and integrated. Many researchers and authors argue that systems thinking is increasingly becoming an essential model in dealing with organizational complexity, which itself relates to copying with the ever-increasing demand for the coordinating of various similar and at times diverse elements for reaching maximum performance[3]. Therefore, it becomes necessary to consider systems thinking theory in the study, the biomatrix systems thinking model. It was chosen because it is an African developed theory by the PhD students from various fields at the University of Cape Town.

The theory can graphically be presented in the following Figure 1.

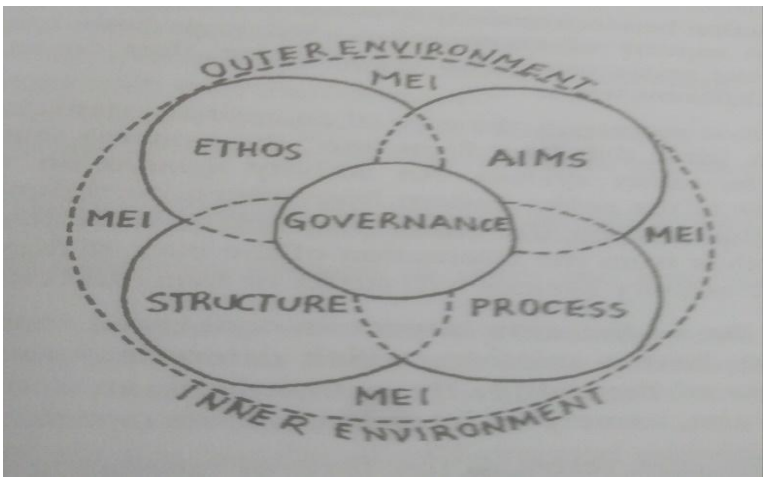

Figure 1: Interconnections of the systems aspects
Source:[4]

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[2] Gaidi. Faraj, 'The impact of COVID-19 on Universities in Africa' (Accord, 2020). <http://www.accord.org.za> accessed 21 October 2023

[3] Phakamani. Buthelezi, 'An analysis of South Africa public entity performance using biomatrix systems thinking theory: a case of South African Water boards' (Unpublished PhD thesis, Stellenbosch University, 2022)

[4] Elisabeth Dostal, Cloeate Anarceon and György Járos, Biomatrix: A systems approach to organisational and societal change (Sun Press, no. 3rd edition, 2006)

These features can be translated into the seven biomatrix model features that are referred to as aspects. These are the environment aspect, ethos (value) aspect, aims aspect (existence), process aspect, structure aspect, governance aspect and substance aspect.

In terms of the features, they represent the following: environment aspect – it is about connecting the internal and external education systems. It calls for a country-to-country internal connections, for example; within each country there must be e-learning coordination of higher institutions and collaboration with the rest of 1 225 universities in Africa. The ethos aspect is about the common values within higher learning such as offering education that meets the above-mentioned Agenda 2063 goals. The aims aspect deals with the existence which is to ensure sustainability of learning irrespective of the pandemic. The process aspect is about the components of the system such as having the right support to students and LMSs. The structure aspect deals with the architecture of learning which should an African based education system and yet globally competitive. The governance aspect is focusing on the role of any governance arrangements such as the Council / senate or similar. The substance aspect is mainly the relevance of the curriculum and supporting mechanisms.

3. AFRICAN AGENDA 2063

Agenda 2063 is an inspirational vision made up by all 54 nation states. It is the vision that aims to deliver on its objectives by promoting inclusiveness and sustainable development[5] There are 20 goals in total of which 4 goals are arguably about promoting an inclusive and sustainable education system across all 54 states. The African Union[6] state the following:

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[5] Africa Union, 'African Union Agenda 2063: The Africa We Want' (Africa Union, 2023) < http:// www.au.int/en/agenda 2063/overview>

[6] Ibid

Table 1: Agenda 2063 Goals

Number	Goal
1.	A high standard of living, quality of life and well-being for all citizens.
2.	Well educated citizens and skills revolution underpinned by science, technology and innovation
3.	Healthy and well-nourished citizens.
4.	Transformed economies

Source:[7]

The above-mentioned goals are mandatory to all African institutions of higher learning to craft post Covid-19 strategies which are in line with the objectives of the Fourth Industrial Revolution. Education is central to Africa's technological advancement and requires a systems-thinking based approach that co-ordinates various elements into the whole part of sustainable development. Africa is a vast continent with many priorities, challenges, and strategies. Thus, any e-leaning approach has to be tailored to achieve the above-mentioned goals.

4. AFRICAN UNIVERSITIES POST COVID-19

According to UniRank[8] which is a credible database, in 2020 there are 1 225 out of 13 800 worldwide which are officially recognized higher education institutions in the continent[9] . In an article published by Gilbert Nakweya[10] on 09 March 2023, argues that COVID-19 brought greater awareness of the benefits of blended tuition in Africa. Whilst it is so, however, the focus has shifted from the technical stability of learning management systems

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7 Ibid., p3

8 Unirank, 'World University ranking 2023' (Unirank, 2023) <https://www.uniranks.com/ranking> accessed 18 March 2023

9 Africa Check, 'How many universities are in Africa?' (Africa Check, 2021) <https://wwww/[africacheck.org/infofinder/explore-facts/how-many-universities-are-there-africa>. Accessed 18 March 2023.

10 Gilbert. Nakweya, 'Online learning has taken root. Now lets turn to quality' (University World News, 2023) <http:universityworldnews.com> Accessed 19 March 2021

(LMSs)[11] . Instead, it is more about the best possible ways to support students and lecturers to get most of the edtech platforms. The primary focus is to enhance the quality of teaching and learning. The primary focus must always be on the students, particularly those entering the university for the first time and irrespective of faculties of enrolment. First year students are the ones who mostly face test anxiety, exam anxiety, depression, lack of motivation and loneliness.

5. METHODOLOGY

The paper focuses on the responses obtained from students who entered tertiary education for the first time in 2021. The data was obtained using five open-ended questions. The questionnaire was designed using a qualitative research method. These as follows:

1. What was your overall experience with virtual learning when joining the university for the first time?
2. What do you consider as challenges in the utilization of virtual learning for students specifically for those entering the university for the first time?
3. What do you consider as essential elements required in developing an integrated virtual learning?
4. How did virtual learning either positively or negatively impact your university or tertiary experience?
5. Can you describe the advantages and disadvantages of virtual learning?

The above-mentioned questions were then translated to a thematic code. The following Table below gives the themes:

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[11] Ibid., p4

Table 2: Questions and thematic analysis

Questions	Themes
1. What was your overall experience with virtual learning when joining the university for the first time?	Experience
2. What do you consider as challenges in the utilization of virtual learning for students specifically for those entering the university for the first time?	Challenges
3. What do you consider as essential elements required in developing an integrated virtual learning?	Elements
4. How did virtual learning either positively or negatively impact your university or tertiary experience?	Learning
5. How can you describe the advantages and disadvantages of virtual learning?	Outcome

Source: Author's Own Construction

COVID-19 was essentially the ebb to Africa's tertiary education. In order to respond to the research objectives and questions, the TA method was applied in interpreting and analyzing the results. TA is about offering a model for systematic qualitative analysis with clear procedures for checking the quality of the analysis conducted[12] as well as offering the conceptualization of analysis in terms of codes and themes[13]. The application of the TA method was in terms of the five main questions.

6. RESEARCH SETTING AND DATA COLLECTION

The study was based on responses of ten university students who entered the university for the first time during the COVID-19 pandemic. The students were randomly selected to answer 5 open-

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[12] Joffe, Helene, and Lucy Yardley. 'Chapter four: content and thematic analysis in Marks D, Yardley L (ed): Research Methods for Clinical and Health Psychology (Sage Publications, London 2003)

[13] Vaismoradi Mojtaba, Jacqueline Jones, Hannele Turunen, and Sherrill Snelgrove, 'Theme development in qualitative content analysis and thematic analysis' (2016)

ended questions. The results have shown that moving from a normal school learning environment had an impact to students. The researcher conducted individual sessions with each participant. Participants volunteered their own peculiar experiences in answering the questions. The author then used paraphrasing and interpretive mechanism to collect data. The session lasted between 15 to 25 minutes. Table 2.2 displays the demographics of the participants.

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Table 3 demographics of participants

Demographics	**Number of participants**
Gender	
Female Male	6 4
Age	
15 – 20	6
21 -25	3
26 – 30	1
31 – 35	0
36 -40	0
Above 41	0
Faculty	
Commerce Health Sciences Science Art and Social Science	3 1 2 4

Source: Author's Own Construction

7. ETHICAL CONSIDERATIONS

All participation was completely voluntary. Participants responses were not identified by name, thereby limiting confidentiality concerns. Participation and withdrawal were given with full assurance: Participants were allowed at any time without penalty to withdraw themselves. They were informed that they may simply stop answering the questions. None of the participants opted for a withdrawal. Due to the importance of the study, the author allowed all participants to debrief.

7.1 Data analysis

As mentioned, data was obtained based on the outcomes of individual interviews using the questionnaire. The author then employed thematic analysis. The responses were then superimposed on the biomatrix systems thinking theory.

7.2 Results

1. What was your overall experience with virtual learning when joining the university for the first time?

All participants unanimously stated that the overall university life was traumatic and created a level of anxiety. The responses were common to all the genders, ages, and faculties. The experience was not great. It was difficult to concentrate for a long period of time. All participants never received any e-learning training or guidelines. It was a learning on the deck syndrome. One participant was direct by stating that there was a disconnect between the students and lecturers. Students were unable to ask questions in areas where they did not understand the subject matter. If one had to ask a question it was by sending an email. The responses were not quick, such as coming back a week later and by that time the knowledge gap was reaching a point of deficit. The whole experience was stressful for students. They were unable to interact with other people. The participant further stated that it was like watching a movie. The responses suggest that universities were also caught off-guard. It then begs the

question on how best their business continuity plans are developed, adapted, and implemented in the face of uncertainties. However, the literature has shown that South African universities were not alone in the state of unpreparedness. COVID-19 was the main threat across the globe. du Plessis, Van Vuuren, Simons, Frantz, Roman and Andipatin[14] in their article on South African Higher Education Institutions correctly argue that COVID-19 created ambiguity and uncertainty. Universities were faced with tough decisions concerning the academic year resulting in unpleasant disorder, disconnection, and disintegration. Hence, it is within that understanding that all participants experienced trauma and anxiety.

2. What do you consider as challenges in the utilization of virtual learning for students, specifically for those entering the university for the first time?

Seven out of ten participants stated that the main challenge was adjusting to the new Covid-19 normal whilst fitting into university life, such as being unable to ask for help when needed the most. It was difficult to keep up with the pace of teaching and not making friends. Also, every lecturer themselves was in a learning curve as they appeared not to be adequately prepared for the new way of teaching. Another challenge was loadshedding as at that time not much technology was available to cope with energy cuts. Loadshedding led to not attending virtual classes. The learning was much faster, and it was difficult to grasp. Most lecturers were doing e-learning for the first time and the teaching method was not the best way for new entrants. The answers to the question further point out that virtual learning became an unexpected harmful advantage. There was no win-win solution for both parties – students and lecturers.

3. What do you consider the essential elements required in developing integrated virtual learning?

Integrated learning that does not only provides a seamless education from post high school to higher education but within

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[14] du Plessis Marieta, and others 'South African higher education institutions at the beginning of the Covid-19 pandemic: Sense-making and lessons learnt' (2022)6 Frontiers in education

the entire higher learning African education is indispensable for Africa's human development and economic growth. Less people on a course as by having many students on a course automatically turn off the microphone. Had to wait until the lecture and by that time there was no time anymore. The only option was to email and if there are too many emails from the same class to one lecturer, the feedback would not be as quick as required. The environment has to be conducive, physical experience with hands-on experience like hearing, and asking questions.

4. How did virtual learning either positively or negatively impact your university or tertiary experience?

Virtual learning has its own marks on salvaging education as it offered continuity. It positively affected the university experience by being able to attend lectures at a later time convenient to participants. It was flexible in that manner. It negatively affected the mental life as participants felt alone and isolated without anyone to talk to and share some knowledge derived from the classes.

5. Can you describe the advantages and disadvantages of virtual learning?

Advantages can work at ones' own time, flexible, access material at any time, not need to be in the lecture room. The lack of technology devices was single out as the main disadvantage especially for students coming from poor communities. It is not easy to simply purchase laptops to most students coming from the historically disadvantaged background. Therefore, equal education needs to have access to the internet and loadshedding does not make things easier for students. Nevertheless, there is a compelling need for lecturers to be "digitally competent to enable the creation of learning material that allows students to have exceptional learning journeys"[15]

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[15] Ibid., p4 Gilbert. Nakweya, 'Online learning has taken root. Now lets turn to quality' (University World News, 2023) <http:universityworldnews.com> Accessed 19 March 2021

8. CONCLUSIONS AND RECOMMENDATION

The following is a set of conclusions and recommendations:

(a) The responses to the above-mentioned questions pointed out that all first-year university students were ill-prepared to cope with the new e-learning method. It was a new environment with a way normal. However, students were ill-prepared because the lecturers were inadequately trained and not entirely prepared for the new normal.
(b) Experience – the overall experience was traumatic and not supportive to first year students.
(c) Challenges – were mainly loneliness, loadshedding (energy availability), lack of the right technology to further support the new environment.
(d) Elements – there was no coordination between high school education and university education to cope with the demands of e-learning. There was no clearly defined theoretical model used by the university to offer a balanced education.
(e) Learning – learning was characterized by duality; being positive as students can access their learning materials any time of the day and by also negative as the pace of learning was fast without an opportunity to ask questions.
(f) All LMs must be designed not only from the university environment but be interconnected with the high school environment.
(g) All African centers of higher learning must employ the biomatrix systems thinking model as part of their e-learning mechanisms.
(h) Outcome – the outcome was a clarion for a systems-thinking based approach to advance the African agenda in terms of sustainable education.
(i) It is therefore recommended that –
    - African universities partner with private sector to advance viable technology equipment.
    - African universities explore various e-learning models for transitional arrangements bridging the gap between university and high school education.
    - Set an all-African e-leaning academy focusing on sustainable education irrespective of the pandemic or endemic challenges.

- African universities formally adopted a systems-thinking approach such as the biomatrix systems thinking model or similar model.