The Covid-19 pandemic and digital transformation in Zimbabwean State Universities: Opportunities, Challenges, and Implications for the Transition to Online Learning

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Abstract

During the Covid-19 pandemic peak, emergency online learning and investment in educational technologies became eminent for universities to remain relevant and serve their various stakeholders. Though there are several studies on the educational institutions' responses to the pandemic, these studies cannot be aggregated as key factors such as national, cultural, institutional, and continental contexts signify fundamental differences in possible opportunities, challenges, outcomes, and implications of implementing online learning in universities across the world. This study explores the implementation of online learning in Zimbabwean State universities during the Covid-19 pandemic. The reconstruction of the quick e-learning implementation and the lessons learned can be used as a foundation to inform the post-pandemic journey into building a resilient education sector that is digitally strong to function in the future. Employing the pragmatism research philosophy that crystallised through a sequential mixed method research design, the study found that the sudden move to online learning had some digital, organisational, and pedagogical opportunities, challenges, and implications. The opportunities include improvement in the quality of education, synergy, and flexibility in learning. Challenges encompass the lack of resources, poor technological infrastructure, poor internet connections, power disruptions, and expensive internet data. The study recommends investment in digital infrastructure, training of students and lecturers, psychological support, blended learning, and incorporation of educational technology and fourth industrial revolution tools in the university curriculum such that the key stakeholder (student)is fully served while upholding quality in teaching, learning, and assessment.

Keywords: *Digital Transformation; Online Learning, Students, Lecturers, Universities, Higher Education, Covid-19*

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1.Introduction

Institutions of Higher education such as tertiary colleges and universities have experienced a lot of advancements and usage in technology due to the growth in the fourth industrial revolution (4IR) and the Covid-19 pandemic (Mhlanga, 2020). The pandemic brought turmoil, upsetting all areas of the economy, and governments were forced to put in place measures to protect lives and mitigate the effects of the pandemic. The measures crystallised themselves in the form of lockdown restrictions, closure of schools and other educational facilities, reduced hours of operation for businesses, and virtual or remote working. The Covid-19 pandemic altered the way organisation do business and the way teaching and learning is taking place in the education sector. Even though digital transformation was slowly gaining a presence in higher education institutions around the world, the uptake was relatively slower in Africa, but the Covid-19 pandemic forced higher learning institutions in the continent to resort to digital transformation drastically and haphazardly (Benavides, Tamayo Arias, Arango Serna et a., 2020). Universities dramatically and rapidly switched to online learning as a crisis educational response platform to the disruptions and closures of face-to-face educational platforms (Adedoyin & Soykan, 2020). This migration brought challenges, barriers, opportunities, and implications. To emphasise the prevalence and breadth of digital transformation, von der Heyde, Auth, Hartmann & Erfurth (2019) state "Digital transformation is omnipresent". Previous research studied digital transformation from the perspective of the business world without paying much attention to digital transformation concerning education (Matt, Hess, & Benlian, 2015; Legner et al., 2017; Wilms et al, 2017), yet technological change is affecting all educational dimensions such as research and innovation, teaching and learning, community engagement as well as communication. The focus on the business world is reflected in the definitions of digital transformation given by researchers.

Gobble (2018:66) expostulates "Digital transformation is the profound transformation of business activities and organisations, processes, competencies, and models for the maximum transformation of the changes and opportunities of a technology mix and its accelerated impact on society, in a strategic and prioritised way". Digital transformation definitions can be customised to accommodate digital transformation in education as well as its impact thereon. For example, Sandhu (2018) gives a more accommodative definition. The researcher articulates digital transformation as the change in business processes, accompanying procedures, capacities, and other policies to exploit the modifications and opportunities that emerge from the application of contemporary technology. This also considers the effects on the broader society, while taking into cognisance the existing and upcoming trends in business and technology. The focus of digital transformation on education is rapidly gaining ground in scholarly research, especially with a focus on higher education and universities (Castro Benavides, Tamayo Arias & Burgos, 2021; Mhlanga, 2020; Mhlanga & Moloi, 2020; Mikheev, Serkina & Vasyaev, 2021). From the education perspective, the focus is on the modernisation of information technology (IT) activities that could significantly change all the dimensions of education, to improve institutional processes, teaching and learning, communication, and innovation in the interaction between lecturers and students.

A digitalised business can do business quickly and efficiently, is people-centred, more innovative, and customer-oriented (Gobble, 2018), thus improving value creation for customers and maximising shareholder value. Just like the way digital transformation greatly changes the operations of a business, bringing agility and efficiency in its functions, reactions to risk, and business decisions, in universities digitalisation could improve lecture preparation and deliveries as well as teaching and learning in general among other perspectives in education. This study focuses on digital transformation in Zimbabwean State Universities. The Covid-19 pandemic-induced challenges to access to education made it irrefutably essential to employ digital technologies in education. The paper focused on universities as part of the institutions of higher learning because of the contributions they make to developing the labour force and knowledge building in the economy. Despite the importance of digital transformation in universities, its implementation was fraught with obstacles. Marks, Al-Ali, Atassi, Elkishk, and Rezgui (2021) allude to

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the lack of clear vision and strategy, inadequate technological capabilities, and competences as hurdles to the effective implementation of online learning.

The paper explores the opportunities that were availed to both educators and students in the application of digital technologies in teaching and learning and other educational angles. It contributes to the body of knowledge on digital transformation in higher education, specifically online learning, which is one of the vital components of digital transformation in education and makes practical contributions to the seemingly urgent but challenging adoption of online learning. This research focused on online learning that relates to synchronous and asynchronous learning because these are the two forms of delivery that were adopted during the Covid-19 pandemic where face-to-face interactions were not possible. These two forms were in line with the Covid-19 measures to curb the spread of the virus such as lockdowns and social distance requirements during the peak of the pandemic. The paper focuses on Zimbabwe, an African country with a contextual environment, but that is also reflective of developing country settings in general. The paper also looks at the challenges to the effective application of digital technologies in Zimbabwean state universities. Section 1 gives the backdrop of digital transformation in higher education in general and in Africa to foreground and contextualise the study. Section 2 reviews related literature to situate the study in the context of the body of knowledge in the subject area. Section 3 outlines the research methodology applied in the research. Section 4 discusses the findings and implications of the research. Section 5, the penultimate section summarises the research, reflecting on the achievement of the research objectives, making recommendations, and submitting possible areas that could be addressed through further research.

2.Literature Review

Corona virus (Covid-19) was discovered in the later part of the year 2019 in China (Huang, Wang, Li et al., 2020) and clinical test outcomes revealed that it was transmittable through close interaction from one person to the other (Li, Guang, Wu et al., 2020). Countries worldwide took quick and drastic responses to preserve lives. The wearing of face masks became mandatory, social distancing was encouraged, physical business operations were closed in some places, and in some strict Covid -19 preventative measures were supposed to be in place, schools and other educational facilities closed and sports activities came to a halt. Businesses and all other institutions alike moved to online activities. Universities had to digitally transform their activities and online learning was a critical component of this digital transformation. OnliAdedoyin and Soykan (2020) describe online learning as "the use of the internet and some other important technologies to develop materials for educational purposes, instructional delivery and management programs". Online learning is described as distance learning, e-learning, virtual learning, or e-education. E-learning comes in various forms, and these are information and communication technology (ICT) enabled face-to-face learning, blended learning, flipped classroom learning, and synchronous and asynchronous learning (Alqahtani & Rajkhan, 2020).

Pure online learning comes in two forms, asynchronous and synchronous (Hrastinski, 2008; Mhlanga, 2020). Blended learning refers to the mix of conventional face-to-face and online classes. Flipped classroom describes a student-focused approach with online material availed to the students before class interactions and ICT-supported learning relates to conventional face-to-face learning complemented using ICT (Alqahtani & Rajkhan, 2020). Mhlanga (2020) expounds on the two forms of online learning in a way that points out the technological requirements of each and indirectly speaks to possible challenges and opportunities linked to each. Asynchronous refers to the situation whereby lecturers make lecture notes, slides, assignments, and other educational material accessible to the students in such a way that the student accesses them as and when they can. Delivery methods include uploaded videos, virtual libraries, and uploaded power point slides and lecture notes. On the other hand, synchronous learning takes place in real-time. Lecturers or educational facilitators and students interact

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through platforms such as video conferencing, live streaming of lectures, zoom, and google meet among others (Mhlanga; 2020). Implementing these two brought varying opportunities and challenges as well as barriers and implications.

2.1 Digitalisation and Digital Transformation Defined

Digital transformation in not modern to higher education, it has been taking place for years. What is new is the sense of urgency it has gained among stakeholders as Covid-19 made it indisputable that those rapid changes that embrace the use of ICT were necessary for all dimensions of higher education (Strielkowski, 2020). Digital transformation is often confusing and difficult to define. The confusion emanates from the ambiguity surrounding the phenomenon and the interchangeable application of the three related terms. These are digital transformation, digitalisation, and digitisation (Kopp et al, 2019). It is essential to explain terms to lay a foundation for understanding digital transformation. Digitisation refers to the change of atoms into bits.

Digitalisation is defined as a process of modifying social life processes around digital infrastructure and communication. It can also be described as using technology in a way that alters the way business operates or as a way of incorporating digital technologies in business operations (Schumacher, Sihn, & Erol, 2016). While digitalisation points to technological change in individual economic, operational, and social processes. Digital transformation does much more and entails the transformation of the business and its accompanying strategies (Kopp et al., 2019). Similarly, for higher education digital transformation has been contextualised in such a way that it addresses the education perspective though with varying definitions. Digital transformation has been articulated concerning institutions of higher learning not to only refer to online learning but to changes that affect the education of which online learning is a part. Digital transformation in education has been described as the re-definition of teaching and learning approaches through the employment of diverse technologies, modification of teaching materials, and enhancing access to technology-supported learning infrastructure, resources, and equipment such as smartphones, laptops, and tablets (Aditya & Kusumawadani, 2021). This is intended to improve knowledge generation and management as well as the skills and attitudes of learners and educators (Kalolo, 2019; Nayak, 2017). As expostulated by Kuzu (2020) the objective of digital transformation is to transform education (programs and academic processes).

2.1.1 Online Learning

Online learning moved from being viewed with a perspective of being disruptive to the dimension of being seen as essential to higher education. Alqahtani and Rajkhan (2020) posit that before the Covid-19 Pandemic e-learning was expanding by nearly 15.4% annually in learning institutions globally and doing so steadily without pressure on the educational facilities, educators, and students. The online learning adopted due to Covid-19 deviated from the envisaged gradual one that was supposed to be planned and funded appropriately. This online learning is described as "Emergency remote teaching" by Bozkurt and Sharma (2020). According to Hodges et al. (2020), the one implemented during Covid-19 should be rather viewed as a crisis management response. The researchers term it "emergency remote learning" to signal the lack of planning which could influence the quality of learning, the effectiveness, the challenges experienced, and the opportunities availed to both lectures and students. The researchers further explain that emergency online learning does not strive "to recreate a robust educational ecosystem but rather to provide temporary temporary access to instruction and instructional support in a manner that is quick to set up and reliably available during an emergency or crisis. This could reflect the theory of planned behaviour as the implementation was contrary to this theory. In affirmation, Barbour et al. (2020) adduce that the evaluation of planned online learning and emergency online must differ, taking into cognisance the lack of planning on the latter. Hodges et al (2020) submit that effective online learning must deliver on aspects such as teaching and learning, research, ethics, and assessment benchmarks. The

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assessment tools must be able to evaluate the quality of material, the delivery (teaching and learning), and the marking criteria among other areas (Adedoyin & Soykan, 2020). The lack of careful design, adequate development, and systematic rollout of online learning faced significant barriers and challenges to the acceptance and effectiveness of online education. Students and lecturers faced various challenges and more so those in developing countries where technological developments are comparatively slow, internet accessible limited, and technical knowledge are inadequate. Despite the obstacles faced there were some positives drawn.

2.2 Opportunities and Advantages of Digital Transformation in Institutions of Higher Learning

Digital transformation through online learning led to a forced migration from the commonly applied face-to-face, objectivist, and teacher-focused approach to online learning which is a more flexible, student-centred, constructivist, and cooperative pedagogy (Adedoyin &Soykan, 2020). According to Strielkowski (2020) despite the implementation being unplanned, Covid-19 helped fast-track the inevitable and led to institutions exploring novelties in technology that would have taken long to implement due to bureaucracies and varying managerial rules. Ribeiro (2020) points to digital transformation as bringing many logistical and attitudinal problems. The researcher alludes to the mandatory change in the attitudes of learners, lecturers, and education administrators on the importance of online learning as an obstacle to the effective migration to remote learning. This could also be seen as an advantage as without the pandemic making the transition compulsory it would never come or would have faced formidable resistance. Adedoyin and Syokan (2019) refer to advantages such as self-pacing, flexibility, and alignment of the technological skills of students to global practices, albeit unplanned. Manfuso (2020) affirms this by pointing out that online learning has availed an opportunity for lecturers to exploit, engage and collaborate and even build new markets for lecture delivery.

2.2.1 Technological Development and Innovation

Covid-19 propelled digital transformation in the educational sector. Stakeholders such as university administrators and lecturers as well as students were forced to change their attitudes and improve their technological skills. Online learning led to the upgrading of technological infrastructure in universities to make them compatible with platforms such as Zoom, video conferencing, and Google Meet to mention just but a few. Investments in digital technologies became a priority, thus ensuring that technological investments that would have taken a long time to fund were allocated funding immediately (Beech, 2020). Alqahtani and Rajkhan (2020) portend that e-learning not only leads to increased use of technology and innovation but also "allows students to better recall the information required for traditional education". This is because in asynchronous settings the information can be revisited repeatedly for example audio, videos, and lecture notes.

2.2.2 Research Opportunities

In managing the crisis, ICT technicians, lecturers and students were forced to research available online platforms and their usage. Online platforms also allowed researchers to connect from different locations. This spurred innovation in the education sector as educators, administrators and students worked together to find better ways of engaging and moving education forward

2.2.3 Socio-Economic Programs and Increased Opportunities for Corporate Social Responsibility

Several researchers portend that the Covid-19 pandemic has availed opportunities to corporates, alumni organisations, and private organisations to increase their corporate social responsibility activities by offering free data or financing data as well as offering laptops to universities for their supports to support online learning (Fishbane &Tomer, 2020; Joosub, 2020; Ogunmokun et al, 2020)

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2.3 Challenges of Digital Transformation in Institutions of Higher Learning

While evaluating the digital transformation in higher education, Kopp et al (2019) outlined five aspects as barriers to digital transformations. The researchers point out assumptions on change, technology, pace, competences, and financing. The researchers' submission is that firstly, there is a need for both lecturers and students to recognise that technology is continuously and rapidly evolving and is here to stay, therefore, stakeholders such as education administrators, lecturers, and students must have the ability to accept modifications brought by technology. Secondly, the assumption should not be that the pace is faster but there must be an acceptance that gradual change is also change and acceptable. Thirdly, the excuse is always that "digitalisation is a technical issue", technical as it might appear it has now indisputably become a part of everyday life in business, school, professional and personal activities (for example, work and banking). Fourthly, Competences, it is crucial for both lecturers and students to develop the right competences. Lastly, regarding funding, the assumption is that there are no funds to finance digital transformation. Institutions of higher learning must set aside funds for digital transformation. Joshi et al. (2020) posit that online learning instructional effectiveness is contestable because it takes away the face-to-face engagement between learners as well as between learners and lecturers and facilitators. Citing, Feldman (n.d), Adedoyin, and Soykan (2020) point out anxiety due to change, economic and racial differences, resource constraints, and lack of readiness or preparedness on the part of lecturers. Mhlanga (2020) and Mhlanga and Moloi (2020) allude to issues of inequality, lack of capabilities and competencies, inadequate finance, and lack of compatible equipment, while Mpofu and Tfwala (2021) submit challenges linked to the unsuitability of home environments for learning, psychological stresses, financial constraints, poverty, unstable internet, and exorbitant data as well power outages. Almaiah, Al-Khasawneh, and Althunibat (2020) grouped the challenges into change management challenges, cultural challenges, course challenges, technological challenges, and financial challenges. Mark et al. (2021) posit that the challenges include a lack of information technology integration, a shortage of expertise in digital transformation, and the absence of a clear vision. Eltahir (2019) alludes to the actuality of the obstacles to the implementation of online learning in developing countries, attributing them to the digital divide in these countries. The next subsections discuss the challenges of digital transformation concerning the aspect of online learning, bearing in mind that it encompasses several issues.

2.3.1 Socio-Economic Challenges (Poverty and Inequality)

Poverty and inequality in the socio-economic status of learners made the uptake of online learning slower for some students. Blundell, Costa Dias, Joyce, and Xu (2020) argue that the pandemic had a likelihood of heightening the already prevailing economic and social inequalities. This includes in terms of increased poverty and lack of access to education for some.

Those students from poor backgrounds would normally access the internet from schools and universities and the closure of educational institutions during the pandemic coupled with online learning left them severely disadvantaged. The vulnerabilities and inequality in education were further perpetuated as it meant the learners did not only have connectivity challenges but also could not purchase the necessary gadgets such as smartphones, iPads, tablets, and laptops to enable online learning (Mhlanga, 2020; Mpofu &Tfwala, 2021). Fishabane and Tomer (2020) posit that the vulnerabilities increased during Covid-19 due to job losses and further increased the number of students who could not access the internet. Toquero (2020) contends that those with special needs and disabilities were ignored as their voices were not considered, and their access and ability to use online gadgets were not paid attention to.

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2.3.2 The Unsuitability of Home Environments

Adedoyin and Soykan (2020) argue that the intrusion by family members and friends often disrupted students and diverted their attention, even lecturers were affected by this unsuitability of home environments for teaching and learning. Manfuso (2020) alludes to the intrusion by pets such as dogs and cats causing distractions.

2.3.3 Technological Challenges

The success of online learning is wholly dependent on the availability of technological equipment and gadgets such as laptops and computers (Adedoyin & Soykan, 2020; Almaiah et al., 2020). The absence and or incompatibility of this equipment as well as the lack of internet connectivity affected the participation of both lecturers and students in online learning especially in developing countries (Mhlanga & Moloi, 2020).

2.3.4 Skills, Competences, and Capabilities

The dependence of digital transformation on the people involved was more evident as the digital competencies of the various groups affected the implementation process, the ratio of ICT technicians to the academic and student population, and the staff (García-Peñalvo et al, 2021). Digital competences are defined by Adedoyin and Soykan (2020) as "the group of skills, knowledge, and attitudes needed when using ICT and digital devices to perform responsibilities, such as problem-solving, information management, collaboration, with respect to effectiveness, efficiency, and ethics". The number of technicians and their competences influenced the quality and regularity of the support given for online teaching and learning. Some students faced challenges in adapting to online learning due to inadequate ICT competences (Almahasees, Mohsen, & Amin, 2021). Similarly, some lectures also struggle with the methodologies used for online learning as well as in customising the material that they used during face-to-face lectures for online learning due to a lack of digital competences. Poor digital skills affect the use of online libraries which are part of digital transformation in institutions of higher learning (Adedoyin & Soykan, 2020). This inadequacy in skills also affects the use of online learning devices and platforms in an ethical manner. The lack of technological skills exposes lecturers and students to cybercrime, and infringement of their privacy and leads to failure to appropriately protect their data

2.3.5 The Lack of Preparedness

The unexpected and disruptive nature of the Covid-19 pandemic means that the incorporation of technology in professional, educational, business, and social activities in the way it quickly happened was unplanned. Stakeholders were unprepared. In the case of universities, the university administrators, lecturers, and students were not ready financially, physically, technically, and psychologically to embrace the digital transformation through online learning, yet the situation demanded that they do so as a matter of urgency. This led to inevitable weaknesses in the digital transformation strategies involved, as there was no guiding vision or objectives (García-Peñalvo, 2021). Administrators were not ready or in a position to finance the requirements in terms of equipment, gadgets, and data needed by lecturers, especially in developing countries where internet connectivity is poor and data expensive. Governments were also struggling to finance the health budgets and at the same time fund Covid-19 efforts to mitigate the spread and impact. Lecturers and students had to struggle to learn ways to conduct teaching and learning from their homes due to the confinements with very little technical support from technicians.

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2.3.6 Assessment Criteria

The general expectation is that after conducting lectures students are evaluated though tests, examinations, and quizzes as well as experiments to assess whether the objectives of the lecture or the module have been attained. Online learning brings challenges for educators on how to conduct effective and objective student assessments (Adedoyin & Soykan, 2020).

2.3.7 Variations in Disciplines

While online learning is compatible and effective in disciplines such as humanities and social sciences, its ineffectiveness and incompatibility have been evident in areas such as engineering, sports science, and medicine, where practical tests and experiments are vital (Adedoyin & Soykan, 2020). Leszczyński et al. (2018) contend that online learning cannot be used as the main learning and teaching platform in medicine because interaction with patients is an essential part of the discipline, it can online be used to support online learning. The challenges of digital transformation concerning the implementation of online learning in universities can be summarised from extant literature as shown in Table 1.

Table 1: Summary of Challenges towards Digital Transformation and online learning in universities

Challenge	Explanation	Studies
Technological obstacles	Lecturers, instructors, and students having difficulties in using online learning due to technological hurdles	Almaiah & Alyoussef (2019),
Inadequate technical support	Lack of technical assistance or the absence or irregular availability of ICT technical staff to assist with installing, operating, and maintaining the necessary hardware and software.	Eltahir (2019);
Universities' lack of preparedness	Universities, students, and lecturers are not ready for online learning. The lack of readiness is also reflected in the course content quality and the lack of adaptability of the course content to meet student needs	Almaiah &Al Mulhen (2018)
Lack of digital competences	Students and educators lack the necessary skills, knowledge, and awareness of technology and internet skills. At times due to resistance to change these stakeholders are not willing to invest time and effort in developing the skills.	Ali-Araibi et al. (2019), Mhlanga and Moloi (2020), Al Khasaweh and Obeidallah (2019)
Lack of, inadequate, or incompatible technological structure	Software, hardware, internet, network resources, and other digital facilities lacking within universities	Almaiah and Al Mulhem(2018)
Security and privacy fears	Stakeholders having concerns about the impact of online learning systems on the protection, security, and privacy of their personal data	Almaiah and Alyoussef (2019)
Increased workload	The workload became heavy for both students and lecturers as well as the ICT technical staff. Lecturers are expected to customise or adapt their course contents to online teaching and learning and to make the assessment criteria suitable. Students had their workload increased. They no longer used online occasionally it was the main method. For technicians, the demand for technical support heightened.	Adediyon &Saykon (2019)

Source: Author's compilation from various sources

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2.4 Theoretical Framework

The study adopted the Diffusion theory (Rodger, 1962) and the Change Theory (Fullan, 2007). The former theory was viewed as appropriate for this research because online learning itself is a novel innovation for institutions that were using face-to-face teaching and learning. Covid-19 compelled an urgent and unplanned shift from the commonly applied pedagogical teaching and learning modes to technology-driven teaching and learning methods. Some of the challenges for African challenges would originate from the unplanned nature of the implementation. While in developed countries e-learning was fully funded and supported by investments in equipment, and technology as well as by financial budgets set aside to fund such initiatives over time which supported the planned behaviour theory, developing countries found themselves forced to haphazardly adopt e-learning. The Change Theory was considered applicable also as it can inform education reform measures and how stakeholders accept this change based on the knowledge they have of the change, how they accept the change, and how they perceive the outcomes of this change (Fullan, 2007; Mpofu & Tfwala, 2021).

2.4.1 Diffusion of Innovation Theory (Rodger, 1962)

This study is supported by the diffusion of innovation theory that was propounded by Rodger (1962). It elaborates on why, how, and at what rate can innovations be implemented and accepted in society. The key proposition of diffusion of innovation theory is that individuals are more likely and able to welcome innovations and ideas as a way of coping with high degrees of external turbulences (Rogers, 1962). In the situation of higher education, universities have transitioned away from the conventional face-to-face mode of teaching and learning to online learning platforms to embrace novel innovations in the educational sector (Yakubu et al., 2020). In fact, with the outbreak of the deadly disease of COVID-19, innovation concerning information technology appears to have become widely accepted in modern higher learning and education contexts (Pinho et al., 2021). Therefore, the theory of diffusion of innovation can be applied in higher education contexts as a base for research on e-learning (Buc & Divjak, 2015).

2.4.2 Change Theory (Fullan, 2007)

The change theory encompasses elements such as the strategy, identification of acceptable or ideal standards in literacy, curriculum development to meet the standards, a way of appraisal, founded on the standards and investment in training, professional development, and empowerment of educational institution administrators, educators, and students as well as investment in infrastructure to make the change smooth, acceptable, and effective (Fullan, 2007; Mpofu & Tfwala, 2021)

3.Methodology

While Kerres and Buchner (2022) put forward three types of articles that are prevalent on education and the Covid-19 pandemic research, that is theoretical, prescriptive, and empirical research, this research is an empirical article, it builds on theoretical and prescriptive papers as well as other previous empirical studies to situate the debate and research gaps as well as show the state of knowledge in the area to guide the current research.

The study adopted the pragmatism research philosophy as it allows for the mixed method research design, combing both qualitative and quantitative approaches for an in-depth investigation of a phenomenon (Clark & Ivankova, 2015; Creswell, Fetters, Plano Clark & Morales, 2009). The study employed a sequential exploratory mixed-method research design. The impact of the Covid-19 pandemic introduced new and unexpected challenges which are yet to be explored. The study contributes to research on the digital transformation of tertiary institutions learning due to the Covid-19 pandemic. The design

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was suitable for the study due to the exploratory nature of the study (Fetters, Curry & Creswell, 2013). The intensity of the implementation of online learning was driven by the Covid-19 pandemic which was a new phenomenon. Studies on online learning adoption are still in their infancy and ongoing especially in the African continent (Mhlanga, 2020). The mixed methods approach was adopted where interviews were conducted first with 30 participants (10 masters students, 10 undergraduate students, and 10 lecturers). The themes and codes emerging from the interviews were used to design the questionnaire instrument (Creswell & Creswell, 2017). The sample was considered appropriate to attain saturation point as posited by. The researchers argue that small samples are recommended where participants have relevant knowledge and experience on the matter being studied (Blaikie, 2018; Malterud, Siersma, & Guassora, 2016; Mpofu, 2021; Sebele-Mpofu, 2020, 2021). Guest, Bunce, and Johnson (2006) recommend 6 to 10 interviews to attain saturation point when interviewees are competent and knowledgeable while Blaikie (2018) argues that what is critical is the knowledge richness of the participants. In this case, the students and lecturers were the important stakeholders to get an in-depth analysis of online learning. Hennink, Kaiser, and Marconi (2017) and Sebele-Mpofu (2020) described saturation as that point where no new information is found from further interviewing. Thematic analysis was used to present qualitative findings as pointed out by Braun and Clarke (2014), while integrating them with quantitative findings. Google forms provided the distribution method for the questionnaire to all respondents. SPSS provided the tools for the analysis of quantitative questions with themes drawn from the interviews providing the framework for analysing the qualitative data gathered through interviews (Rodríguez-Ferrer, 2022; Malan, 2021; Kuo & Belland, 2016). The student population of a local university formed the core of the respondents. A total of 152 primarily undergraduate respondents completed the Google online distributed questionnaire. This became educational research ethics of research was upheld. Ethical clearance to conduct the research was sought. Informed consent was sought from both interviewees and questionnaire respondents. The participants were informed of the benefits and contribution of the research and assured that their privacy and confidentiality and anonymity were upheld as demanded in ethical research.They were also appraised of their rights to withdraw at any time from participating in the research (Connelly, 2014, Walker, 2007). In presenting the findings anonymity was preserved by using codes, Lecturers-L, Masters Students-MS, and Undergraduate Students-US. The findings were integrated and discussed in such a way that harnessed the mixed method research advantages such as support, expansion, divergence, diversity, collaboration, and confirmability as well as diversity owing to the mixing (Fetters et al., 2013; Gobo, 2015).

The findings presented in section 4 provide valuable insight into digital transformation in the tertiary learning environment with the perspectives of both the lecturer and student in the new online tertiary learning experience. Having both master's and undergraduate students was essential to capture diversity in the assessment of online learning. The postgraduate students are more experienced and knowledgeable of technology and have higher expectations of lecture delivery. The postgraduate students most likely completed their undergraduate studies in a normal face-to-face context whilst their postgraduate studies have relied primarily on online learning. Their comparison of the face-to-face and online learning environments was vital. On the other hand, the undergraduate students were mixed, first years, second years, and fourth years (while first years and second years have only been exposed to the online environment, fourth to sixth years were exposed to face-to-face in their first through to third year depending on the degree programme being pursued. While some programmes have a duration of fours, engineering programmes are five years and medicine seven years).

4. Findings

This section presents the findings of the study. Generally, the participants of the study (both interviewees and questionnaire respondents) expressed mixed emotions about the adoption of online learning. While some lecturers and students were enthusiastic about the implementation of online learning, others were sceptical of its effectiveness and its impact on the quality of education, inclusiveness, and the quality of graduates produced. Proponents of online learning leaned more on the

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opportunities emerging from online teaching and learning, while opponents of online learning pointed out the weaknesses or challenges of using online in developing country contexts such as Zimbabwe where financial and technical resources are limited, government support to universities is minimal and poverty and inequality are traditionally high. For example, L3 expressed

> *"Resources are an irrefutable constraint. Most students don't connect to online classes, that is if you decide to use google classroom or zoom. They will tell you that they have no gadgets such as laptops or smartphones that are compatible with the platforms, they prefer that we upload videos or use WhatsApp. Therefore, we have no option but to send them audio or upload videos on google classroom. In my opinion, online learning is an unavoidable measure due to Covid-19 but not an ideal or reliable one in the Zimbabwean context".*

In support of online learning, L5 stated *"Online learning is more flexible, convenient, easily accessible to the students and even for us lecturers you can prepare and record your lecture at your own time and can revisit it to see gaps that can be followed up on the next video or audio recording".* Interviewees raised several reasons that influenced their perceptions of online learning. It was largely evident from the interviews that the advantages and disadvantages of online depend on the mode of delivery used, that is synchronous or asynchronous, the quality of the content of the lectures, the nature of the courses or module, the timing and quality of feedback from both the student and educators as these were the most topical factors.

To better understand the findings of the study, Table 2 presents the demographics of participants. Many questionnaire respondents were between the ages of 18 to 21 years which is generally reflective of undergraduate students, while for interviewees most of them were between the ages of 26 to 40 years (75%). While undergraduate students were yet to acquire their first qualifications, for interviews, a qualification mix is presented for 20 interviewees (Lecturers and master's students).

Table 2: Demographic of study participants

		Questionnaire	**Interviews**
Age	18-21 years	66% (101)	
	22-25 years	30% (46)	5% (2)
	26-30 years	3% (4)	35% (10)
	31-40 years	1% (1)	40% (12)
	41 years+		20% (6)
Gender	Female	61% (92)	60% (18)
	Male	39% (60)	40% (12)
	Engineering	15% (23)	10% (3)
Faculty	Commerce	52% (79)	47% (14)
	Education	6% (9)	13% (4)
	Applied Sciences	27% (41)	30% (9)
MSc Students & Lecturer Qualifications	Professor		5% (1)
	PhD		25% (5)
	MSc		60% (12)
	Undergraduate		10% (2)
Years at University	Below 1 year	3% (5)	
	2-3 years	95% (144)	
	4-6 years	2% (3)	40% (12)
	7-9 years		36% (11)
	10+ years		24% (7)

Source: Author's Compilation

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4.1 Factors Affecting the Effectiveness of Online Learning

The study found that several factors affected the implementation and effectiveness of online learning. These factors extracted from interviewees include attitudes towards transitioning from online learning and the willingness to accept this change (how well is this accepted, and embraced), availability of digital tools and technological requirements to enable online learning (Infrastructure, internet data, electronic gadgets, and internet connectivity), Competences (do lecturers & students have the right competencies), financing (how available is funding for digital transformation), and lecture environment suitability (Is the student accessing from home or the lecturer delivering from home, are their disruptions and distractions). Other factors revealed included the sufficiency of skills, competencies, and capabilities(access to technicians, adequacy skills for both learners and lecturers), methodology for teaching (tools, techniques & approach), preparedness (administration preparedness to finance online lectures' delivery, administrative readiness to implement and monitor, funding preparedness, arrangements for data access and the lecture) and online lecture approaches (participation, mode of delivery, feedback, interaction, and engagement. Questionnaire respondents were asked to assess the relevance of these factors (using the broad categories) in influencing the implementation and productiveness of online learning the results were as presented in Table 3. Internet access was the dominating factor 96% of respondents (Strongly agree and agree) acknowledging that it affects online learning, 94% affirmed that the availability of online tools and the preparedness of stakeholders affect the implantation and productiveness of online learning, while 86% concurred on the lecture environment and 84% agreed (strongly agreed and agreed) on digital skills and competences being a factor.

Table 3: Factors Affecting online learning in Zimbabwean State Universities

Factor	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Change Acceptance	50%	20%	-	6%	24%
Availability of online tools	76%	18%		2%	4%
Financial resources	60%	12%	6%	12%	10%
Lecture environment	54%	32%	-	8%	6%
Lecturer approaches and online learning methods used	38%	32%	20%	6%	4%
Digital skills and competencies of lecturers and students	60%	24%	8%	6%	2%
Internet access	90%	6%	4%	-	-
University, lecturer, and student Preparedness	72%	18%	-	10%	-

Source: Authors' Compilation from Primary Data

4.2 Modes of Online Learning Delivery

The shortage of resources for both the lectures and students determined the mode of online delivery According to both lecturers and student interviewees some lessons were conducted on zoom and Google classroom when lectures have the data, but when they don't have it, they utilise WhatsApp. There was consensus among all interviews that most of the lectures were conducted through audio, videos, lecture notes, and slides presentation being uploaded by lecturers to be accessed by students as and when they can. This points to the prevalence of asynchronous learning as opposed to synchronous learning. Student and lecturer interaction is very minimal. According to L10, "Even when we resort to WhatsApp participation is very low, in a class of 300 students, you can find that only 80 students are connected. This is due to network challenges in remote areas, unreliable Internet, and expensive Internet from services providers". The most prevalent modes of lecture delivery as shown through questionnaire

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responses were the use of emails, uploaded lecture notes slide presentations, WhatsApp, slides with attached audios, and uploaded videos on Google classroom. This is shown in Table 4.

Table 4: Modes of online teaching used by Lecturers

Online delivery method	Agree	Neutral	Disagree
WhatsApp	80%	-	20%
Google Classroom real-time interactions	20%	-	80%
Uploaded slide presentations and Lecture notes on Google classroom	78%	4%	18%
Uploaded Videos on Google classroom	58%	6%	26%
Slide presentations with audio	60%	18%	22%
Microsoft teams	-	-	100%
Video Conferencing	22%	18%	60%
Emails	100%		

Source: Authors' Compilation from Primary Data

4.3 Opportunities Emerging from the Transition to Online Learning

From the interviews the opinions on the possible opportunities, strengths, and benefits linked to the use of online learning were mixed. Despite the contention around these, the views of those who advocated for online learning coalesced around four possible benefits. These are (1) likely improvements in the quality of learning (2) flexibility and access to learning from anywhere (3) the possibility of synergy benefits (4) anonymity.

4.3.1 Quality of Learning Has Been Improved by E-Learning Technology in Student-Lecturer Interaction

Table 2 below presents findings of the interrogation of e-learning technology and student-learning interaction. Of the total respondents, 62% disagreed that student-lecturer interactions have been improved by e-learning technologies, whilst 38% affirmed that there was an improvement in student-lecturer interactions by the use of e-learning technologies. For a clearer appreciation of the nature of the responses, among the respondents who indicated that student-lecturer interaction is fair 32% indicated that e-learning technology did not improve student-learning interactions. In contrast, 27% of total respondents indicated that student-lecturer interaction was poor whilst the e-learning technologies were considered ineffective in improving the quality of learning.

Only 2% of total respondents did not consider the quality of learning as having been improved by e-learning technology whilst considering student-lecturer interaction to be good. Among the total respondents who affirmed that the quality of learning has improved through the employment of e-learning technologies, 23% considered interactions between students and lecturers to be fair, 9% pointed out that student-lecturer interactions were good and 7% considered student-lecturer interactions to be poor. Of a total of all respondents, 55% considered student-lecturer relations to be fair, 11% to be good and 34% to be poor in online learning environments. The importance of student-lecturer interaction was also reflected in the following interview responses.

According to MS1 "*E-learning is good since I can access lecture material remotely. This is good for us as masters' students, especially where the lectures are recorded, or videos are uploaded as one can access them at a time convenient to them as most of us are employed. There is no work disruption or need to apply for leave. However, more focus should be put on student-lecturer engagement as some issues are complex and need to be interrogated through interactions even virtually.* In affirmation of the

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importance of effective delivery of lectures to improve the quality of learning, US1 asseverates that *"Some lectures were doing well in terms of posting lectures and conducting them however some felt like a self-study"*. L1 tabled that it was difficult to say whether the quality of education was improved through online learning because due to data challenges and internet challenges, lecturers used asynchronous learning as opposed to synchronous learning. This meant that there was no same-time interaction and immediate feedback. The lecturer expressed *"There is very little or no interaction with the students due to the costly nature of internet data in Zimbabwe, internet challenges and electricity challenges, and load-shedding. Therefore, it is difficult to tell if the lecturer is understood or not, you can gauge students' appreciation of the concepts and their problem areas"*. It is therefore clear that there were mixed feelings about online learning effectiveness. While asynchronous learning offered flexibility, and convenience and was economical for both lecturers and students, it robbed both learners and students of a chance to interact leading to a lack of personal touch and attention. Furthermore, live collaboration is not available, and the type of learning generally requires commitment and self-drive from the student. These disadvantages of asynchronous learning were highlighted by Mhlanga (2020) and Mhlanga and Moloi (2020).

4.3.2 Quality of Learning Has Been Improved by E-Learning Technology by the Level of Self-Drive

Of the total respondents as in Table 6 below, 62% of total respondents indicated that there was no improvement in the quality of learning through the employment of e-learning, with 38% indicating that there was an improvement. In terms of self-motivation, 71% of total respondents indicated that they were self-motivated, 37% were not self-motivated and 15% were neutral. One percent of the respondents did not indicate their level of self-motivation but were equally spread between the improvement and no improvement of quality of learning due to e-learning technology use.

Among the self-motivated individuals (of total respondents), 39% did not consider recognise any improvements in the quality of learning due to e-learning technology use, whilst 31% of the same respondents considered the quality of learning to have been improved using e-learning technology. In contrast, among the respondents who are not self-motivated, 18% considered that there is no improvement in the quality of learning due to e-learning technology employed whilst a similar portion (18%) of the same profile group viewed e-learning technologies as a positive influence in the quality of learning. Among the non-committal respondents in terms of self-motivation, 13% did not recognise the improved impact of quality of learning to be brought about by e-learning technology, whilst 3% saw a positive impact on the quality of learning brought about by e-leaning technologies.

4.3.3 Flexibility and Access to Lectures from Different Locations

Ninety percent of interviewees adduced that online learning especially asynchronous learning helped students overcome the challenges posed by distance and time for learning but indicated that was dependent on the availability of technological equipment such as laptops and computers as well as reliable internet connections. Concern was high on the two prerequisites as all interviewees agreed that the two factors posed the greatest challenges for students in Zimbabwe. The interviewees attributed this to poor economic conditions in the country, low disposable income, high inflation rates that erode the purchasing power of the currency, unemployment, poverty, and inequality. Eighty percent of MS interviewees pointed out that asynchronous online learning made it possible for them to balance work, university, and family responsibilities more easily and hence they considered online learning convenient for them. It was easier to revisit the recorded lectures and videos for complex concepts and reflect on them over and over.

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4.3.4 Synergy

Lecturer interviewees expressed that online learning brings about dynamic interaction. Sharing of resources and ideas becomes a continuous process. L3 expressed that cooperation and interaction were enhanced as students had an opportunity to take time to reflect on the subject under discussion and make an informed and researched response as opposed to the situation in the conventional face-to-face setting where responses are to be given spontaneously without time to think deeply. This is more applicable to asynchronous learning as synchronous learning takes place in real-time just like face-to-face engagements. The difference is that the other is virtual.

4.3.5 Anonymity

According to eight of the lecturer interviewees, online learning offers students some degree of anonymity. L6 states that anonymity brings some level of comfortability among learners, thus increasing the level of interaction as factors such as gender, physical appearance, age, and disability that are normally discouraging to participation in face-to-face engagements are closed out. Even those students that are generally shy or would ordinarily not participate in face-to-face classes due to discriminatory factors are free to engage virtually.
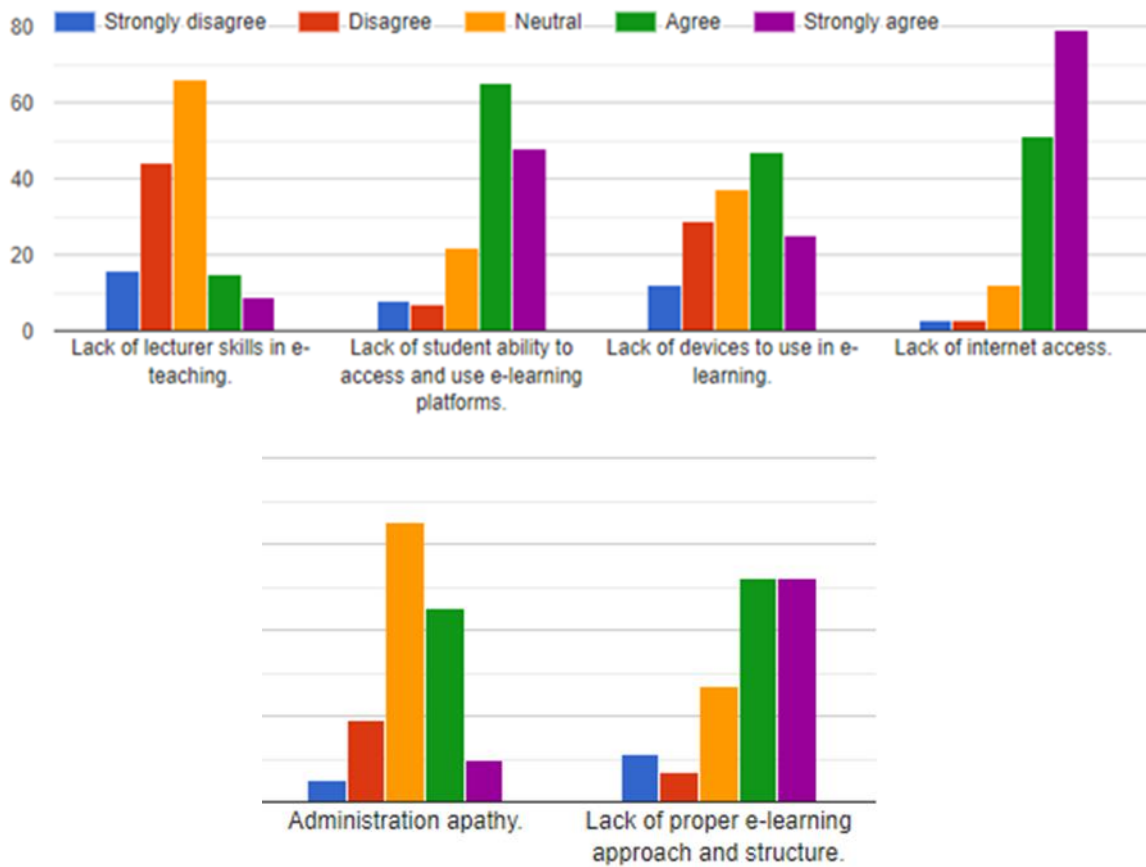
4.4 An Overview of Challenges Towards Implementation of Online Learning

Various challenges to the implementation of online learning were raised by interviewees and the emphasis on their importance differed among the three groups (Ls, USs, and MSs). The diversity in emphasis reflected their diverse experiences and perspectives. These challenges include inequalities, lack of accessibility to technology, digital and computer literacy, general technology limitations, distractions due to the challenges of using home environments, and lack of lecturer and student skills as well as the lack of commitment at times from both students and lecturers. While the lecturers' concerns were more on the issue of institutional support and preparedness, especially concerning technical support, availability of technological equipment, training, and funds for data as well as the lack of student commitment, for the USs the problems were more to do with the absence of lecturer interaction, lack of appropriate gadgets, internet problems, and data shortages as well as lack of emotional support and too much work. For MSs issues to do with data and internet challenges were not major concerns as they indicated that they normally circumvent the challenge by using the internet from their workplaces after work or during weekends. For the MSs interviewees, the most topical challenges were the lack of depth in the course content and the infrequency of lecturer feedback.

4.4.1 Lack of Lecturer and Student Digital Skills, Internet Access Challenges, Lack of Technological Devices, Administration Apathy, And Unclear Lecture Approach

Figure 1 below depicts the questionnaire respondents' lack of lecturer skills in e-learning, lack of student ability to access and use e-learning platforms, lack of devices to use in e-learning, and lack of internet access as challenges to e-learning implementation. Most respondents were of the view that the lack of internet access, is significantly the biggest challenge to e-learning with 84% strongly agreeing and agreeing to this assertion. Similarly, lack of ability to access and use e-learning platforms was also considered to be a challenge to e-learning with 31% agreeing and 17% strongly agreeing to this assertion. Neutral responses made up 25% of total respondents and 27% disagreed that students cannot access and use e-learning platforms. The importance of the internet to online learning and how access challenges impede the productiveness of online learning is indeed reflective of an African country context as similar conclusions were drawn by Mpofu & Tfwala (2021) in Swaziland and Mhlanga (2020) in South Africa.

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Figure 1: Challenges in the Implementation of e-learning

Source: Primary data (2022)

Lack of lecturer skills in e-learning elicited the highest lack of commitment among the respondents at 44% of the responses reflecting uncertainty among respondents on lecturer skills. Lecturer skills were considered a challenge by 16% of respondents with 40% of the respondents affirming that lecturer e-learning skills were not considered a challenge to e-learning implementation. Administration apathy elicited a non-committal response from 45% of all respondents, with 38% of the same respondents recognised that management apathy constituted a significant challenge to e-learning. Of the respondents, 70% indicated that the lack of a proper e-learning approach and structure is one of the major challenges to e-learning implementation. Lack of access to devices for use in online learning was considered an important factor by 48% of the respondents, 27% disagreed with 25% of respondents were neutral and thus uncertain.

For interviewees, eighty percent of USs pointed out that online learning led to an overload in terms of learning material from lecturers because the component normally taught face-to-face was also now included in asynchronous learning. Financial resources to acquire data and proper gadgets. Lack of network for students in remote areas Poverty. Most MSs tabled that the lack of comprehensiveness in the slides uploaded, the lecture notes and videos as well as audio made online less effective. MS9 submitted "Lecturers are not thorough in whatever is used for online learning, they overlooked that previously the face-to-face complemented the material they gave us". This points to the course content challenges alluded to by Adediyon and Saykon (2019

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Lecturer interviewees alluded to a lack of motivation among lecturers in conducting online lectures due to the lack of proper supportive initiatives from the administration in the university. L7 asseverated that *"The general attitude of administrators is not encouraging as they expect results without proper input in the form of internet data, electronic gadgets, and training. There was no proper training to equip lecturers on online teaching, there we just too many assumptions from the administration regarding capabilities, competencies, and the capacities"*. According to L4, "*Generally, students have an attitude towards online learning perhaps due to the costs involved, the inadequacy of resources and gadgets as well as the lack of preparedness for both students and lecturers. The absence of interaction and lecturer monitoring demotivates students I guess"*. These challenges could point to the challenges of change management that are done haphazardly without sufficient planning and resistance to change problems. The lack of preparedness and resistance problems were raised by Almaiah &Al Mulhen (2018) and Khasaweh and Obeidallah (2019).

4.4.2 Lack of Self-Discipline and Motivation Among Students

Sixty percent of Ls interviewees suggested that online learning placed a lot of responsibility on students. This requires self-discipline, commitment, and self-motivation, which is generally lacking for undergraduate students who easily get distracted by the internet and end up browsing and searching for things not relevant to their course or spend a lot of time browsing irrelevant things. Seventy percent of USs pointed out that students are indeed prone to distractions, especially in asynchronous learning, and suggested that if resources were permitting it would be more ideal to ideal to have more lectures in real time to allow student lecturer engagement which is closer to face-to-face learning. It brings some degree of monitoring and commitment. L7 and US4 expressed that the lack of commitment on the part of undergraduate students should not be wholly viewed from the perspective of lack of self-motivation and disciple but also a psychological angle. The challenges and anxiety brought by Covid-19 lead to a lack of concentration. This was in line with submissions by previous researchers. Handel et al. (2021) argued that students were failing to cope with self-regulated learning leading to psychological challenges and stress-induced problems such as depression, tension, and feelings of being overwhelmed or overloaded with work and lack of emotional support. These psychological problems were also referred to by Mpofu and Tfwala (2021).

For MSs, self-discipline, self-drive, and motivation were not important factors, possibly because of maturity, responsibility, and the fact that they ate now learning with self-set objectives or expectations of career growth and anticipated work promotions

4.4.3 Administration Apathy

Interviewees from both groups (lecturers and students) pointed out to university administration's apathy. The concern was that there is a lack of administration or faculty support. According to L5 *"The university found the implementation of online learning as a way of saving as they now save on water, electricity, booking of venues and internet usage, but is not willing to invest money from the saving into the procurement of gadgets, training, and technical support."* The lack of administration support was also pointed out by USs interviewees, US2 asseverated:

> *"The university administration is not worried about whether we have the necessary equipment or not or the data to log in for the lectures. In some countries like South Africa, universities give students data and laptops that they can pay for instalments as part of the fees. South African university students can also access the internet through the eduroam facility from anywhere in the country using their student credentials".*

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4.4.4 Non-Suitability of Online Learning for Some of the Courses

The study also revealed that online learning is not suitable for some courses, while students from the Faculty of Commerce were somewhat comfortable with online learning, those doing programmes such as medicine, engineering, sports science, and surgery revealed that online learning was not wholly ideal for their studies. According to the students these courses required practicals and experiments which in turn require face-to-face interaction with patients or with instructors, lecturers, and demonstrators. Online the theoretical part of the courses could be delivered online.

5. Implications of Implementing Online Learning

The stakeholders interviewed tabled various implications of adopting online learning. These implications were mixed. While some felt online learning ensured continuity of education under difficult circumstances of a pandemic and digitally transformed education at that moment and going forward, improving student-educator engagement and communication as well as improving the delivery and quality of education (90 % Lecturers, 80% MSs and 50% USs), some felt that online learning negatively affected the quality of education and the output (graduates).

The questionnaire respondents' assessment of these implications is presented in Table 5. All respondents acknowledged that online learning helped the education sector to continue serving stakeholders in a time of crisis, 94% concurred that the educational sector transformed digitally and 78% confirmed that communication was improved while improvement in education was lowest with 54% in agreement.

Table 5: Implications of Using online learning

Implication	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Digital transformation of the education sector	58%	36%	4%	2%	2%
Improvement in the quality of education	32%	22%	-	26%	20%
Continuity in education during an uncertain time	100%				
Improvement in communication	58%	20%	4%	16%	2%

Source: Authors' Compilation from Primary Data

5.1 Digital Transformation of Education Now and into the Future

According to L6, 7, and 9, MS 3, 5, 8, and 9, exploiting and harnessing the advantages of online learning such as convenience, cost-effectiveness, flexibility, and internet accessibility as well as the procurement of equipment to use for online learning during the covid period could improve education. L7 states "Though this transition was unplanned and kind of forced by circumstances, it could digitally transform our education system forever and improve access to education for many, especially the underprivileged who are often discouraged by costs such as rent, transport, and upkeep to be close to universities. They can learn from home". MS8 concurred asserting that governments should just fund the upgrade of technology and technological infrastructure in universities and give students grants or loans to procure laptops to make online learning real and effective.

5.2 Improvement in Teaching, Learning, and Quality of Education

This was a bone of contention. While some participants felt that there was an improvement in learning, teaching, and the quality of education some felt that online learning was "pretend to learn" as it

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was not organised, done when the skills and competences were inadequate for both the student and lecturers. MS4 contended

> *"To be honest, for me, I have mixed emotions, while some lecturers uploaded slides with audio attached to them or followed up with videos and at times google classroom engagements where they interacted with students directly in a lecture and explained the notes, some just uploaded slides, and no explanations. There was no close monitoring of who delivered what and how. I guess it was a learning curve for everyone. I'm just grateful we continued learning after losing a semester"*

5.3 Continuity of Education in Times of a Pandemic

All interviewees and questionnaire respondents agreed that despite weaknesses, challenges, and negative implications of online learning, the transition allowed education to continue at a time when its future was bleak and that more needs to be done to improve the implementation and effectiveness of online learning to make it worthwhile in the future.

6.Conclusion, Limitations, Areas of Further Research, and Recommendations

The study concluded that while digital transformation in higher education was taking place in Zimbabwean universities was taking place, it was doing so at a slow pace. It was largely heightened by the Covid-19 pandemic which left most sectors, institutions, and businesses with no choice but to go fully digital. The Covid-19 pandemic forced institutions of higher learning to accelerate online learning and use it as the exclusive mode of learning during the pandemic period. The implementation was a difficult process with a variety of challenges. Due to the scarcity of financial resources, the implementation of line learning has not been easy for Zimbabwean State Universities, they have largely used asynchronous means of online learning as opposed to synchronous means. The most used platforms are WhatsApp and uploading videos in Google Classroom. The study found that opportunities emerging from the use of online learning include easy accessibility, convenience, flexibility, synergy, anonymity, and improvement in the quality of education as well as allowing for continuity in the education sector during a pandemic. The implementation of online learning has been met with a variety of challenges and these include inadequacies in digital tools or infrastructure being used, limited digital experience and exposure for both educators and students, expensive data, internet connectivity, the ill-preparedness by both students and lecturer and the that students are not equipped for online learning who also struggle with understanding the online platforms themselves. Implications of the implementation of e-learning, virtual or online learning include. Having an appreciation of critical success factors in making the adoption of online learning productive is essential in improving the learning process and handling education in future pandemics. The implementation of online learning is not a one size fit all, as different disciplines, programmes and institutions have varying resources, capabilities, capacities, and challenges.

6.1 Limitations and Areas of Further Research

The paper focused mainly on two forms of online learning, synchronous and asynchronous, yet there are other forms such as flipped classroom, blended, and ICT-supported. Future researchers could focus on these three forms not explored in this research. On methodology the study employed a sequential mixed exploratory research method that was predominantly qualitative in analysis, future researchers could lean more toward the quantitative approach.

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6.2 Recommendations

To make recommendations for the study, a question was posed. What can we discern from the pandemic online learning-driven experiences and how can these experiences be used to contribute to the future of digital transformation in higher education, bearing in mind the variations in national contexts, availability, breadth, and scope of technological resources, differences in skills, competencies, and capabilities linked to institutions, countries, regions, and continents?

- **Self-Discipline and Motivation Among Learners**

Students should find ways of building self-disciple and motivation to commit to online lectures as digital transformation is an ongoing process and most activities have been digitally transformed owing to the 4IR, the Covid-19 pandemic, and the upcoming fifth industrial resolution.

- **More Resources to Be Committed to Making Online Learning a Success**

Most of the challenges to the implementation of online learning were inextricably linked to the scarcity of financial resources. For example, the lack of internet data, lack of equipment, lack of training, and poor technological infrastructure. Governments, the private sector, and universities need to invest more resources in making online learning a success. For example, as part of corporate social responsibility companies could donate laptops or data to universities for use by students or lecturers. Stakeholder engagement and corporation are key to preserving the quality of education.

- **Training and Technical Support**

Universities must offer more training and technical support to both lecturers and students for online learning to achieve the desired outcomes. The lecturers must be trained on how to use the different online platforms, how to design online course contents, and how to assess and mark students' work and give feedback online while students need knowledge on how to use the online platforms.

- **Incorporation of IT and Digital Transformation Modules in Degree Programmes**

Students must be taught 4IR tools and digital transformation modules in their curriculum to equip them with skills and competences not only for online learning but for the future as most business processes, sectors, and areas that affect day-to-day lives such as banking, health services, and education are digitally transforming daily. Government, Ministry of Higher of Education, and Universities governance boards must take time to consider incorporating technology in teacher or lecturer training programs and how to use the 4IR tools in education. This calls for the need to re-evaluate and amend teacher training or the post graduate diploma in education programs that are normally directed at equipping lecturers with teaching skills to address the content, skills, and competencies required in a digitally transformed education sector.

- **Universities Should Continue with Blended Learning to Make Online Learning a Part of the Education System**

To successfully incorporate online learning into higher education, psychological support must be offered to students and lecturers. Even in future pandemics, any responsive measures must be accompanied by emotional and psychological support to help citizens in their various capacities, as students and employees deal with the crisis-induced psychological pressures.

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