COVER PAGE

Research Paper Title: Utilising the benefits of COVID-19 disruption for the betterment of open and distance learning (ODL)

Theme of the Paper: Utilising educational technologies for ODL

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DECLARATION

I, the undersigned, hereby would like to explicitly state that the research article titled "__**Utilising the benefits of Covid-19 disruption for the betterment of open and distance learning (ODL)"** is original and has not been published earlier, or that it is not under consideration for possible publication elsewhere.

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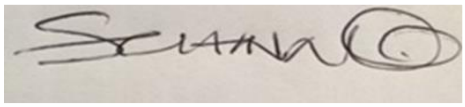

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Utilising the Benefits of COVID-19 Disruption for the Betterment of Open and Distance Learning (ODL)

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Abstract

The emergence of coronavirus (COVID-19) has affected the quality of interaction between universities and their students. As a result of this, the normal mode of teaching and learning delivery, as well as students' support systems, has been interrupted. As the world explores solutions, the objective of this paper is to harness the benefits of this painful disruption by shifting the current paradigm to a sustainable alternative paradigm in open distance learning institutions. The study examined the COVID-19 using the Bronfenbrenner Ecological System Theory as a lens to provide a better understanding of the students' environment and to identify ICT qualities, which could bridge the gap between how the students interact with their university environment. This paper indicates that the education system need to recognise emerging ICT devices, their qualities and the implications of adaptation. The study focuses

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only on exploring in-depth knowledge on the effects of the disruptive nature of COVID-19 on the university and students' environment. The study makes suggestions as to how open distance learning institutions can adopt a more sustainable approach in the present or future pandemic. This information provided in this paper also applies to the education system that uses ICT to achieve the university objectives of reaching all students. Additionally, the value of this paper is the call for more focus on students' environment and the applications of knowledge derived from students' environment to design sustainable ICT programs in future.

Keywords: COVID-19, environment, harnessing the benefits of painful disruption, open distance e-learning, shifting the current paradigm, students, sustainable alternative paradigm, Unisa

INTRODUCTION

The new coronavirus is a virus that is affecting the lower respiratory tract of patients and causing breathing difficulty, fever, lung infection and pneumonia (Wuhan Municipal Health Commission, 2020) in patients in Wuhan, China in December 2019 (Centers for Disease Control and Prevention, 2020; Li et al., 2020; World Health Organization [WHO], 2020). The new coronavirus is commonly referred to as COVID-19 (WHO, 2020). There is evidence that the virus is in animals, and human to human transmission has been confirmed (Corman, Bleicker, Brünink, Drosten, & Zambon, 2020; Huang et al., 2020; Lin et al., 2020). The outbreak of COVID-19 and its pandemic nature led to the total lockdown of many nations of the world and their education systems. COVID-19 is a paradigm shift for higher education institutions. The COVID-19 pandemic has played a

major role in increasing the call for partial or full lockdown, which is deemed important in curtailing the risk of contracting and spreading COVID-19 (WHO 2020).

Lockdown, the act of staying at home is characterised by a significant focus on physical and social distancing together with hygiene practices (WHO 2020). Physical and social distancing entails staying 6 feet away from people (Vally, 2020) to reduce the number of people contracting and dying because of the virus. In addition, the social and health problems associated with COVID-19 are forcing institutions of higher learning to undergo a paradigm shift to accommodate more sustainable alternative means of engaging and providing needed academic support to students (Christine, 2020). This change in the academic paradigm is the principal disruption of the global education system due to the scourge of COVID-19 (Tara, Nectar, & Swarti, 2020).

Ilieva and Raimo (2020, p. 1) report that “more than half of the world’s learners are affected (51%, 890.5 million students) by the impact of COVID-19." Likewise, Sharma (2020) identified that major international and national school examinations have been postponed. Given the ongoing nationwide disruptions that are creating delays and cancellations in the examination, Sharma (2020) poses that there may be enormous logistical difficulties when the schools resume, leading to frustrations in the staff and students. Martin and Furiv (2020) concur and suggest that to curb the frustration and disappointment experienced by staff and students, several higher education institutions have shifted to distance and online education. However, some institutions worldwide have found that they are ill-prepared and incapable of lessening the effects of COVID-19, resulting in complete closure. Yong (2020) adds that universities should strengthen confidence and harmony between individuals and cooperatively increase the human

potential to deal with future problems concerning online teaching and learning.

In the context of an open distance e-learning (ODL) institution, the effects have demonstrated the need to address the inequality between privileged and less privileged students, the geographic locations of the urban and the rural communities, and the learners who experience ICT problems. The concept of privileged and less privileged characterises the students by their socio-economic background and geographical location. The socio-economic background considers students' ability to acquire laptops and data bundles to access the internet (Department of Higher Education and Training, 2012). The geographic location explores the presence of students in extremely rural communities with limited access to the internet and academic resources, which reinforces academic failures and throughput. This group of students may benefit the least from the opportunity gained as an outcome of the COVID-19 pandemic, especially the students in rural communities with limited access and funds to acquire data.

For several years, the education system has witnessed a social and health epidemic that disrupted the normal form of engaging students and attending to their academic needs. However, the institutions of higher learning failed to harness the benefits of these disruptions and to identify a sustainable alternative mode of engaging students that considers both privileged and less privileged students (Silinda, in press). Moreover, given the unpreparedness of the education system in many countries and the current problems with student support systems, there is fear that the COVID-19 disruption could aggravate students' need for support. This paper describes how harnessing the benefits of disruption in social and health issues can help the education system to redesign new and sustainable alternative means of teaching and provide web support

to students during a social and health crisis. Such a sustainable alternative must envisage and accommodate the constant interruptions of the social and health issues that influence and determine the functioning of the institution, the experience of students and the challenges of students as they strive to navigate these interruptions in the teaching and learning space.

Challenges from interruptions in the functioning of the institutions influence students' emotional, physical and social lives (Joyce, 2020), thereby affecting their academic performance negatively. This could result in students' delay in graduation or withdrawal from their studies, encouraging the perception that institutions do not provide adequate support to improve students' academic performance. Altbach and de Wit (2020, p. 1) examined the post-pandemic outlook for higher education and identified that the "fundamental elements of the global macro-environment in general and of higher education are being threatened by the COVID-19 crisis. This might negatively impact on support for internationalisation, while international cooperation is needed more than ever." This assertion of Altbach and de Wit (2020) is largely due to the global transformative attack on humans and the economy.

With the pre-existing challenges of inequality within the education system, COVID-19 may exacerbate the disruption in four major ways: reduce the opportunities to access education using online platforms for disadvantaged students; widen inequality by increasing access to education of advantaged students with purchasing power to acquire laptops, data and internet; increase the need for learning materials, data and internet for both advantaged and disadvantaged students in rural areas (Department of Higher Education and Training, 2012); and increase the dichotomy of students' conversant learning environment such as the university

and the emerging learning environment. Consequently, the understanding of students' pre-existing challenges can ensure the suggestion of sustainable alternatives to minimise any difficulties and lasting impacts for students in any educational crisis. In this line, the paper discusses South African higher education to deepen the understanding of the pre-existing teaching and learning contexts of students.

South African Higher Education context

The legacy of apartheid in South Africa has promoted inequalities in the South African education system. The apartheid system denied access to educational opportunities for disadvantaged students (Department of Higher Education and Training, 2012). However, there has been an increase in the number of students from less privileged backgrounds accessing higher education in post-apartheid South Africa. According to the Department of Higher Education and Training (2018), between 1994 and 2016, enrolments in institutions of higher learning in South Africa reached 1.1million. Although access to higher education has increased among students from less privileged backgrounds, their throughput remains relatively low (Scott I, personal communication; July 17, 2014). Students who persist to strive to adjust because of inequality (Carvalho & Hares, 2020; Langella, 2020), may experience several challenges at university because of inequality.

The prominence of online interventions and the reliance on them strongly correlate with the increasing inequality and exclusion throughout the world (Castells, 1998). Inequality can be in the form of access to resources such as the internet and data, even including technology such as laptops, tablets and advanced cell phones (Li, & Lalani, 2020). Another form of inequality can be seen in the skills required to

operate information technologies. Studies have shown that many students enrol in the university without technology skills (Li, & Lalani, 2020). Now that the University of South Africa (Unisa) has adopted the online approach in offering its programmes, this approach is not without challenges. Some of the challenges include students' access to technology, their basic skills to operate technologies, and their emotional state to study online. Although numerous students have access to technology, it is worth noting that access to a computer does not imply inclusion and meaningful access to ICT in the South African context (Czerniewicz & Brown, 2009). Inclusion requires deeper notions of access incorporating the full range of resources in which informed understanding of access and use require meaningful value. Inclusion also means an informed understanding of the factors that enable and constrain ICT take-up within higher education. This means a deeper understanding of what access entails to understand the challenges that students encounter. Understanding these challenges will assist universities in alleviating anxieties experienced by students and encouraging meaningful online learning experiences. For example, students who live in remote areas and who have limited internet access may encounter challenges in the programmes for which they are enrolled and, therefore, may undergo a negative learning experience.

Students with limited access to technology or who lack basic computer skills may experience low self-esteem when required to participate in online learning. Self-esteem is the overall emotional evaluation that individuals have of their worth. Thus, such experiences have the potential to force students to abandon their studies. Hsieh, Rai and Keil (2008) conducted a study to determine the digital inequality and reported that students' satisfaction, confidence in using ICT, access and perceived behavioural control are key factors

in shaping the continued use of ICT in the disadvantaged. Crawford and McKenzie (2011) assessed the SMARTS outreach programme of the University of Western Australia to determine the advantages and disadvantages of online learning. Crawford and McKenzie (2011) found that the location of students' residences and the types of schools they attended had an impact on the reliability and speed of their internet connections and their confidence and ease with using computers and the internet. This indicates that students who have access to wireless internet due to the location of their residences and students from well-resourced schools may feel more confident in using computers than their counterparts. This suggests that students from less privileged educational backgrounds generally enter higher education with gaps in their knowledge and skills for studying. As a result, many students from less privileged backgrounds find it challenging to have meaningful learning experiences in their educational settings (Silinda, 2017).

Online Education: Advantages and disadvantages

South Africa is still addressing the inequalities of the country in its higher education sector. To help alleviate the anxieties experienced by students during this challenging time, management at Unisa may use both the disadvantages and advantages of online learning. Online learning involves conducting the learning of students via electronic media, particularly using the internet. Compared with face-to-face learning, online learning is firstly convenient, that is, it reduces the amount of time needed and the costs for a student to travel to and from campus. Secondly, different students have different learning styles and, thus, they may use learning materials that are suitable to their learning styles. Thirdly, students who are

not campus bound can study anywhere if they have access to a computer and the internet (Rohleder, Bozalek, Carolissen, Leibowitz, & Swartz, 2008). In addition, students can learn at their own pace and can interact freely with their online tutors. Finally, students can develop skills during the process of studying their online courses. These skills involve computer and internet skills that students can use in their daily lives and careers. This is in line with the statement of the Department of Education (Department of Education, 2001) that information technologies serve to develop the type of graduates and citizens that are required for the current information society.

However, online learning also has disadvantages. Some students who lack motivation or discipline may find it challenging to study their courses online and may, therefore, fall behind (Sahin & Shelley, 2008). Students who are new to studying their courses online may feel isolated from their online tutor or peers because the online tutor and peers may not be available online when the student needs help or encounters challenges. It is believed that when students work in groups or face to face, they learn much from the interactions and discussions. Therefore, online learning for such students means isolation. Also, students may feel frustrated when they encounter challenges with the internet or when they must download files from various servers (Zembylas, 2008). Finally, there are also inequalities among students who do not have the necessary skills and resources to participate in online courses (Rohleder et al., 2008). Such inequalities can be frustrating to students and may encourage students to abandon their programmes. This may be linked to the delivery methods for programmes, which differ between programmes. For instance, the delivery method for a Mathematics or Accounting course will be different from that of an English programme. The same applies to the skills required to participate in the various courses. Mathematics

and Accounting students will require different skills from English students to participate actively in their online courses.

Although COVID-19 is a novel disease that affects humans within different environments, how to utilise the benefits of the disruptions in a higher education setting has not been studied in detail. This study tried to fill the gap using Bronfenbrenner's (1979) Ecological System Theory.

THEORETICAL FRAMEWORK

The Ecological System Theory was developed by Urie Bronfenbrenner to offer a better understanding of the way systems interact to promote or hinder humanity's progress (Bronfenbrenner, 1979). According to the Ecological System Theory, human development is embedded in their relationship within different environments "resulting in change, growth and development" (Swart & Pettipher, 2011, p.3). This theory states that circumstances that affect individuals have effects on the systems because of the interaction and relationship within and among the systems (Bronfenbrenner & Evans, 2000). The circumstances from the direct environment (within systems like the university or home) and indirect (external environment such as the society) could affect systems, individuals and development (Bronfenbrenner, 1979). This implies that disruptions or struggles in one system will affect the other systems. A key characteristic of the Ecological Systems Theory is that it provides an opportunity to study humans, institutions and society critically to understand how reciprocal relationships contribute or hinder the progression; this thorough examination of both human and environment guides the design of an appropriate solution to an identified problem (Stokols, 1995). The five systems identified by Bronfenbrenner are the

microsystem, the mesosystem, the exosystem, the macrosystem and the chronosystem (Bronfenbrenner, 1979, Paquette & Ryan, 2001) and the five systems are discussed in the following section.

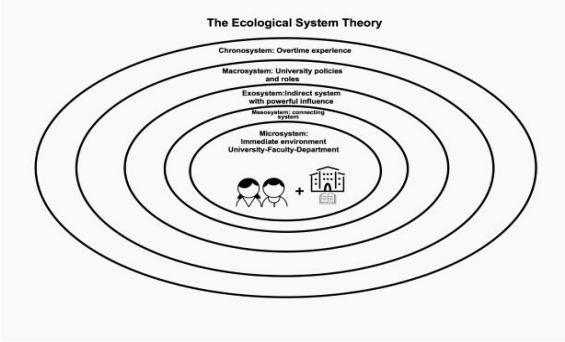

Figure 1. The proposed conceptualisation of the ecological system theory.

The microsystem: The microsystem is the first and immediate environment of the individual and consists of interaction and relations between the structures such as university-faculty and academic departments (Berk, 2000). The microsystem is where students interact with the university through the faculty and academic department to acquire the necessary skills to graduate (Bronfenbrenner, 1979). The university provides students access to knowledge, skills and resources in addition to any other support that the university offers to students (Radhe Shyam, 2015). The university also provides relevant innovative, modern e-learning tools and standards that students require to graduate.

The microsystem is also characterised by activities and roles (administrative) that occur daily to ensure the progress of the university and students (Paquette & Ryan, 2001; Swart & Pettipher, 2011). The microsystem could become a system characterised by pressure and overwhelming emotions when challenged with disruptions (Lerner, 2005). The microsystem is also expected to provide support to individuals when there are problems that interfere with their normal daily activities (Bronfenbrenner, 1979) because it is the environment in which the organism (students) functions and relate with the external issues distinct from

intrinsic 'genetic' factors that affect the student's development or behaviours (Coleman, 2015). COVID-19 is affecting the microsystem by disrupting the traditional model of teaching and learning, introducing online learning that is producing challenges for the universities and students (Burns, 2020; Chaudhary & Aanya, 2020; Dawit, 2020). COVID-19 has also made students' environment as their living abode a prominent learning environment. This is because the home is where local realities and experiences could motivate or demotivate students from effectively accessing the structures of the university.

The mesosystem: The mesosystem comprises the system in which interaction and relationships occur between two or more settings to ensure development, for example, the university and the home (Bronfenbrenner, 1979). The mesosystem connects the activities and experiences of one microsystem to the other, for example, students' homes and the university. Swart and Pettipher (2011) explain that experiences of the mesosystem could expose an individual(s) to problems if there is limited support and nurturing. COVID-19 is disrupting the activities of the university, which is affecting the students online learning process because of access to laptops, data and the internet.

The exosystem: The exosystem refers to the social system in which the individuals do not function which, influences their ability to succeed or fail (Berk, 2000). The exosystem is described as an indirect system with powerful influence because the exosystem reflects societal influence in the functioning of the university. An example, problems in society can affect levels of students' interaction and the use of university structures to acquire graduate skills. Disruption can be local, when it involves common challenges within the institutions (Glass, 2014), for example, strike action by employees and students (Muswede & Sebola, 2018) that

disorganises the academic calendar, and students' problems such as learning problems (Chen, Heritage, & Lee, 2005). Disruption can also be global, for example, the COVID-19 pandemic, which is causing deterioration in the functioning of the education system and negatively affecting the mental, physical, emotional and social lives of humans (WHO, 2020).

COVID-19 pandemic is a societal health pandemic with a powerful influence on the functioning of the university. Studies reported that COVID-19 is disrupting the education system, affecting over 98.5% of students (Burgess & Sievertsen, 2020; UNESCO, 2020) and educators (Bao, Qu, Zhang & Hogen, 2020). The novel COVID-19 virus is from an indirect environment with consequences on education. COVID-19 is a disruption, an interruption in the normal course of an activity or the continuation of some issues (Merriam-Webster.com Dictionary, 2020). COVID-19 is an exosystem induced problem (societal health epidemic) but has an overwhelming effect on education institutions and students (Tarasawa, 2020). With the impact on disadvantaged students (Driessen, 2017), and the nation's striving to develop technologies such as "digital, video, and audio content for students (Vijay, 2020). Thus, highlighting the importance of technology as a disruptor (Arnett, 2020; Christensen Aaron & Clark, 2002; Clayton, Aaron & Clarke, 2007), when adopted by universities (Julia, 2020) to promote teaching and learning.

The macrosystem: The macrosystem is characterised by given principles, ideologies, forms of information, material resources, customs, lifestyle structures, hazards and life course options that are embedded in broader systems (Berk, 2000; Bronfenbrenner, 1993). The macrosystem is often regarded as the outermost system in an individual’s environment; the policies influence the activities of the systems (Bronfenbrenner, 1979). The macrosystem of this

study is influenced by the COVID-19 virus which led to the closure of the universities. The societal belief that COVID-19 is deadly and a pandemic requiring to protect people (WHO, 2020) has framed the action policies, types of physical and material resources universities are using during the lockdown. The macrosystem encourages institutions to innovate the policy to accommodate the COVID-19 disruptive pandemic.

The chronosystem: According to Bronfenbrenner (1994), the chronosystem encompasses to change over time not only in the characteristics of the person, but also of the environment in which that person lives (e.g., changes over the life course in family structure, social and economic status, employment, place of residence, or the degree of hecticness and ability in everyday life. (p. 40). The ecological theory helped to understand the importance of reciprocal relationships in the learning environment.

Understanding COVID-19 Using the Ecological System Theory's Reciprocal Relationships

According to Bronfenbrenner (1979), Ecological System Theory, reciprocal relationships between the university environments and students promote support. The environment must acquire the structures that are vital for the consistent progress of students. This section explores the university and the student's environment to extend the knowledge of how universities can innovate ICT devices to support students effectively in disruptive moments.

The reciprocal relationships

On March 26, 2020, President Cyril Ramaphosa imposed a national lockdown in response to the COVID-19 pandemic in South Africa. The lockdown is affecting the reciprocal relationships

between the university and students (Brooks, Smith, & Webster, et al., 2020). The purpose of the reciprocal relationships between the university and students is to collaboratively achieve national and international development (the Federal Republic of Nigeria, 2004). The teaching and learning function of the university is to develop human capacity for the achievement of the national goals of education (Igbafe, 2009). To enable universities to achieve national goals, the university should build a relationship with the students to influence their development (Rochford, 1998). However, COVID-19 has disrupted the functional relationships required to achieve teaching and learning, especially in the provision of educational materials and immediate support to the students (UNESCO, 2020).

A reciprocal relationship defines the process of interaction in which an individual(s) and the environment such as the university actively listen, addresses the problems without delay and support each other (Bronfenbrenner, 2001). Reciprocal relationship advances teamwork (Montgomery, 2020) and promotes synergy between the students and the university resulting in success in solving problems (Swart & Pettipher, 2011). According to Ainscow (2007), ideologies and principles are a strategy to build relationships and targeted support for individuals within the systems (Bronfenbrenner, 1979). Given the COVID-19 pandemic, the lockdown has disrupted the relationships between students and the university, shifting learning to the home environment. The universities are trying to maintain the interaction between the students and their departments to ensure they obtain the needed learning materials and support. The study sought to understand the relationships between the university and student environments to enable the harnessing of the benefits of the COVID-19 pandemic.

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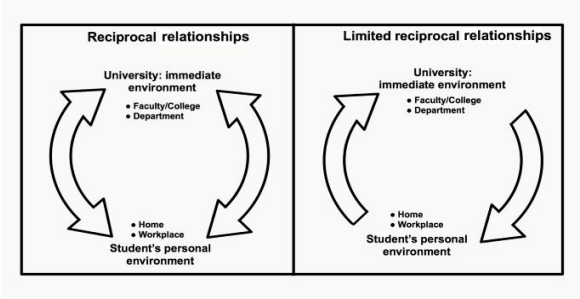

Figure 2: The reciprocal and limited reciprocal relationships.

A reciprocal relationship is illustrated in figure 2. This relationship between the university and students is guided by effective governance in the provision of quality teaching and learning, regardless of problems (Rochford, 1998). The relationship is expected to be characterised by quality communication in the provision of educational experiences and support to ensure students respond with appropriate behaviour (Sung & Yang, 2009). To build a quality relationship with the students, the university provides academic (libraries and learning material) and social resources, innovative services and physical environment (Arpan, Arthur & Zivnuska, 2003; Dukerich, Golden & Shortell, 2002; Kazoleas, Kim & Moffit, 2001; Paden & Stell, 2006). The university through the faculty/college or department provides opportunities and services that the students access and respond to, the feedback from the students enables the universities to redefine the services. Studies have shown that the relationships between the university and students are reducing because the lockdown is affecting physical interactions (Eames, Tilston, White, Adams, & Edmunds, 2010; Hens et al., 2009), resulting in "larger equity gaps, substantial learning loss for many students, and continued economic turmoil for our most disadvantaged families" (Tarasawa, 2020, p.1). According to Nganga, Waruru, and Nakweya (2020), the COVID-19 pandemic has forced educational institutions to turn to online learning to ensure that students finish their courses on time, but preparedness varies from one institution to the next. Nganga et al. (2020) add that most students do not have laptops or the money

to buy internet bundles to sustain a three-hour online course.

Limited reciprocal relationship in figure 2 with one-point arrow illustrates the direction of the relationships in the access of university structure for learning resources and basic information. One-point arrow depicts possible challenges because of inadequate access to university resources using ICT devices. One of the common prominent problems disrupting reciprocal relationships is that students who live in remote areas and do not have access to the internet are expected to come on board (Nganga et al., 2020). Martin and Furiv (2020) suggest that universities should adopt flexible learning pathways (FLPs) to meet the needs of various students in the continuing COVID-19 pandemic. The strong emphasis on online learning is also increasing the gaps in education because only an estimated 29% of countries characterised as low income can afford Distance Learning (Carvalho & Hares, 2020). There are lots of technologies educational institutions are adopting in response to the need to bridge the gap between the universities and students, created by the COVID-19 pandemic. The study explored a few of these technologies currently used in teaching and learning delivery to navigate the COVID-19.

Teaching and learning delivery approach to navigate the COVID-19 pandemic

Worldwide and locally, education institutions are experiencing challenges in education deliveries because of the COVID-19 pandemic. Information Communication and Technology (ICT) is communication devices such as radio, television, cellular phones, computers, satellite systems (Carvalho & Hares 2020; Martey, 2004; Sakshi, Matt, Nicolas, & Suguru, 2020) including WhatsApp (Igbafe & Anyanwu, 2018) for the teaching and learning delivery approach, particularly in several open and distance learning institutions. With

the invasion of the COVID-19 pandemic, several new trends in ICT have emerged such as reviewing videos and audiotapes recorded by online learning platforms together with slides and interactions with instructors through Blackboard, Facebook, WhatsApp, Zoom, Webinar and Skype. Existing Massive Open Online Course (MOOC), Platforms and Open Educational Resources (OER) have improved to accommodate more learning platforms (UNESCO, 2020).

Huang (2020, p. 5) provided an example of a more advanced action plan implemented for addressing the effects of COVID-19 in China for the Education Sector in Wuhan, such as the provision of free-of-charge three-month digital resources (e.g., e-textbooks). Also, the National Center for Educational Technologies delivered 6808 state-of-the-art online courses through its national resource platform to education institutions in Hubei. The core, enduring, practical solution initiated by the Chinese education sector in resolving the education problems of COVID-19 comprise a) launching of the Disrupted classes, Undisrupted Learning initiative, b) providing flexible online learning to over 270 million students from their homes, c) The Open University of China is a free service programme to support Home Study Initiative, d) opening of the online learning platform, National Online Cloud Classroom (www.eduyun.cn), to facilitate home study, including epidemic prevention education, moral education, course learning, life safety education, mental health education, family education, classic readings, studying and learning audiovisual and digital textbooks,) issuing of guidance for the protection and support of teachers (Huang, 2020, p. 6).

According to UNESCO (2020) e-learning devices have been introduced such as digital learning management systems, systems built for use on basic mobile phones, systems with offline functionality, MOOC Platforms and self-directed

learning content to ensure distance learning in COVID-19 lockdown. Digital learning management systems are software applications for documentation, reporting, tracking and management to facilitate knowledge, skills and attitude, seminar/workshops, or knowledge and progress programmes (Ellis, 2009) and include the following:

- CenturyTech: This is individual learning pathways with micro-lessons to bridge the gaps in knowledge and to challenge students. This intelligent learning device promotes long-term memory retention and supports teacher interventions.

- Edmodo: This is an e-learning device that enables educators to manage their classrooms by sending messages, sharing class materials and making learning accessible anywhere. It helps educators to engage learners remotely in diverse languages.

- Google Classroom: This device helps classes to connect remotely, communicate and to maintain focus.

- Moodle: This is a community-driven and globally supported open learning platform.

- Paper Airplanes: This device is to match students with personal tutors for 12−16-week sessions through video conferencing platforms.

- Schoology: This learning tool is to support teaching and learning in addition to classifying, collaborating and assessing results or marks.

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- Seesaw: This device permits collaboration and the sharing of digital learning collections and learning resources.

- Skooler: This tool employs Microsoft Office software as an education platform.

- Zoom: This is cloud-based videotelephony and online chat service for video conferences of up to 100 participants. The platform is free, with a 40-minute time limit (Graham, 2020).

Additionally, UNESCO (2020) identified systems that have been built for use on basic mobile phones to include the following:

- Cell-Ed: This is a phone-based, learner-centred, skills-based learning platform with offline options.

- Eneza Education: This device provides revision and learning resources for basic feature phones.

- Funzi: This is a mobile learning service that supports teaching and training for large groups.

- KaiOS: This software gives smartphone capabilities to inexpensive mobile phones and helps open portals to learning opportunities.

- Ubongo: This device uses entertainment, mass media and the connectivity of mobile devices to deliver learning on a small scale at a low cost to African families.

- Ustad Mobile: This device enables students to access and share

educational content offline.

There are systems with offline functionality to enable lifelong learning such as Kolibri, a learning application to support universal education (available in more than 20 languages) and Rumie, an educational tool that delivers digital learning resources to underserved communities (UNESCO, 2020). MOOC Platforms and self-directed learning content is a massive open online course (MOOC), an educational technology that uses computer hardware, software, and educational theory and practice to facilitate unrestricted involvement and access via the information system (Kaplan, Andreas; Haenlein, & Michael 2016; Robinson, Molenda, & Rezabek, 2016). Although the lists of old and emerging teaching and learning modes are inexhaustible, this paper purposefully sought to select the above ICT devices aiming to provide a link to the point of delivery in response to the COVID-19 disruption.

HARNESSING THE BENEFITS OF PAINFUL DISRUPTION

In this paper, harnessing the benefits of painful disruption in education entails shifting the current paradigm to a sustainable alternative in ODL. Harnessing the benefits of COVID-19 is a topic the authors of this paper developed to explore the impacts of the COVID-19 pandemic, using the lessons for the new ICT products to transform the educational system. The painful disruption produced by the COVID-19 pandemic highlighted the importance of a student's environment, an environment that is completely outside the university environment. Hence, ODL institutions need to merge the present and the emerging ICT devices successfully to accommodate the student's environment and avoid future disruptions. However, to harness

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the benefits of the painful disruption caused by the

COVID-19 pandemic, institutions need to be conscious of emerging ICT devices and the quality thereof:

1. The first quality is that the ICT device must meet the needs of students in their environment without unnecessary restriction of networks, especially the needs of students in rural communities. The assumption is that unrestricted networks should enable students to access learning materials and supportive information. This implies that harnessing the benefits of COVID-19 would entail further documentation of students according to their environment of origin (permanent stay/living) and choice (current stay/living). The aim is to ensure that the university effortlessly connects and delivers learning materials during disruption moments such as the COVID-19 pandemic.
   Documentation of the place of abode (labelled personal environment) would readily provide information on network availability in the region. Knowledge of network availability would help universities to strategise the mode of delivery of learning materials in such locations. Enabling students in locations without network access to download resources from the university website would bridge the dichotomy between the university and the student's environment.
2. The second quality depends on the student’s

economic status. For less privileged students living in rural communities without access or funds to purchase data, the university should consider using ICT with offline devices or drones to ensure the delivery of learning materials to students. The universities should also explore ICT devices with the capacity to act as assistive devices to ameliorate the challenges of reaching the students. Possibly one of the greatest fears of students is the inability to access learning materials. The aim is to reduce inequality in access to learning material caused by economic and geographic location.

3. The third quality is that the ICT device should be easy to use to ensure students' adaptability and adjustment cognitively, affectively and physically. This device should reduce the anxiety and frustration that students experience as a result of trying to adapt to new technology. The application reality should be more personal environment orientated in the overall quality assessment. Hence, the quality of ICT to be used should no longer consider only the university environment; ICT devices should be acquired based on mutual benefits, with further consideration of the students' environment during disruptions.

4. The fourth quality is that the ICT devices must ensure easy communication and interaction between the

> students and their lecturers and tutors. This will enable the students and the lecturers and tutors to gain an understanding of each other's problems and challenges to enhance mastery of the learning materials, to complete the assignments and obtain responses without delays. An analytical consideration of the qualities of the ICT device from the student's environment will enable shifting the present paradigm of teaching and learning delivery to a more inclusive ICT approach with larger functional activities.

Points 1-4 align with studies that discussed inequalities in education and how to incorporate ICT in teaching and learning to address the needs of students (Carvalho & Hares, 2020; Department of Higher Education and Training, 2012; Igbafe, 2009; Khirwadkar, 2007; Langella, 2020; Silinda, 2017). These studies also highlight the importance of understanding student's needs in their environment and their university experience for students to feel a sense of belonging in the university environment. When students' needs are addressed, they will feel a sense of belonging in a university environment and will be more likely to feel motivated to study and adjust to the university requirements and thereafter perform well in their academics (Silinda, 2017).

The COVID-19 pandemic is characterised by sudden disruptions in usual activities leading to the increasing gap between universities that offer online courses and those that do not; between students that are privileged to have laptops, access to data and internet and those that do not, particularly students in the rural environment. COVID-19 has further buttressed the need to recognise the students'

environment which is completely different from the university environment. COVID-19 highlights the importance of ICT, the present and the emerging ICT devices that have successfully exposed the dichotomy of the vulnerability of the students by considering its qualities and implication for adaptation. This could potentially breach the gap between the students' environment and the university environment, thereby leading to less impactful future disruptions. To ensure the above qualities are not ignored or undermined, this paper hereby suggests implications for ODL with a special focus on Unisa.

IMPLICATIONS FOR ODL

The idea of harnessing the benefits of COVID-19 disruption, shifting the current paradigm to a sustainable alternative in open distance learning discussed in this paper reveals that institutions need strategies to help students navigate through this time of unprecedented change and compulsion to respond quickly to the demands of teaching and learning. For many ODL institutions, the COVID-19 pandemic is a challenge that demands the combination of all the resources of the entire teaching community. The challenges include acquisitions of modern ICT devices, developing and strengthening the capacity of the university employees as a crucial strategy to ensure dissemination of teaching and provision of support with limited hindrance as well as vital step to bridge the gap in the interaction between the university and students. These challenges are intensifying the existing problems in educational institutions with limited resources to address them as such the paper thus presents the following implications for ODL:

- The acquisitions of new ICT devices, developing and strengthening the capacity of ICT employees could face challenges because of COVID-19 induced budget cuts to

higher education institutions. Studies have confirmed that COVID-19 is affecting university budgets and the acquisition of new ICT devices for emergency online classes and building the capacity of instructors (Naidu & Dell, 2020; O'Malley, 2020). The implication is that the understanding of the disruptions of the COVID-19 pandemic and the impact on students' support helps to identify the capacity needs of the ICT users. Thus, there is a need for the development of diverse and alternative long-term and short-term goals and plans by ODL institutions. The ODL institutions should begin with exploring the disruptions produced by COVID-19 lockdown of educational institutions as relates to availability and unavailability of required ICT devices to meet the demands of the university, the financial power of the institutions to acquire the needful ICT devices to promote eLearning and support students. The ODL institutions must focus on a process that includes phase by phase acquisition of ICT devices and strengthening the capacity of ICT users to ensure quality and affordability. The process must enable institutions at faculty or departmental levels to identify their specific needs based on the diversities of their students. The ODL institutions at faculty and department should "get political and build support among the general electorate by organising seriously well-funded campaigns in schools, shops and community centres and the media to show people the value of science and technology" (O'Malley, 2020, p. 1). This campaign will aim to raise awareness and advocacy to address

the challenges of acquiring new ICT devices, financial and capacity needs of the users and students created by the COVID-19 pandemic.

- COVID-19 lockdown created a gap in the pattern of interaction between the university and students. Harnessing the benefits of COVID-19 disruption implies that there is a need for the ODL institutions to provide opportunities for families to learn about ways to support their family members studying at the university. The involvement of the families is because COVID-19 has made the home environment the new learning environment provoking needs for family support in scheduling study time amidst house chores to help them manage pressure and adjust effectively. Family involvement could inspire investment in students' learning materials, encourage working on assignments and submitting on time. Family involvement will help students' transitioning to emergency online classes. According to Gale and Parker (2014, p. 737), transition "as the capacity to navigate change' in addition to the university's support to the students, family support will reduce pressure during interruptions such as the COVID-19 pandemic lockdown.

- Students have become the central focus of teaching delivery as COVID-19 continues to ravage educational institutions. The ODL institutions are making efforts to revisit the quality of ICT access, the supply of students' learning materials and the support in moments of interruption that challenges regular ICT procedures. There is a need

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for ODL institutions to engage in an examination of students' experiences in the home environment to provide information that will aid the institutions to commit to improving ICT quality in future strategies. The ODL institutions should also integrate the present with the emerging devices and envisage a future of online, blended and e-learning approaches. For the students to adjust to ICT devices introduced by ODL institutions, there is a need for institutions to build and strengthen the ICT capacity of their students to harness the full potentials of the ICT to improve learning.

- In collaboration with academics, the ICT department should guide university management in acquiring new quality devices aimed at bridging the gap between the university environment and the student's environment. The ICT department should encourage the formation of several committees to discuss the change. Representatives at faculty/college and departmental levels should influence the practical implementation.

  Information obtained from researching students' experiences and influences of their environment should guide institutional ICT decisions.

LOCAL ADAPTATION

In harnessing the benefits of the COVID-19 pandemic for the local level, there is a need to address the issues of COVID-19 presented in this article as the effects on students and their relationship with the university discloses the need for local application of strategies to include

the disadvantaged students. For many universities and students, consistent access and use of technology for learning have become a basic need (Chaudhary & Aanya, 2020). COVID-19 is compelling universities to adopt ICT devices as learning tools, reinforcing the need to consider the implications for local adaptation. As such local adaptation of ICT devices should include the following:

- Universities should engage in learning pathways that can increase the inclusion of disadvantaged students to connect locally, access learning materials with limited interruptions. The universities should identify vulnerable students, their locality to target sustainable support to students.
- The universities should also determine the assessment criteria for disabled students.
- The universities should acquire appropriate ICT devices for inclusive online learning, implying the universities should identify ICT devices that are available, accessible and cost-friendly in rural communities to establish clear and operative functional procedures. There is a need for the universities to acquaint themselves with students online learning challenges to reduce the disruption students experience. There is also a need for universities to set up students' platforms. The information generated from the platform should be used by the university and academic department to address student

The local adaptation should include:

- Universities should liaise with the government, private institutions and

local communities to design means of resolving electricity problems to meet the needs of students in the rural communities. There is a need for the government to encourage investment in electricity generation using wind, biofuels and solar as a means of power plants. These are renewable energy and economic friendly in production,

- The government can decide to manufacture batteries with a longer lifespan or solar energy radios for students to use for aired programmes. The government can negotiate with battery manufacturers through tax reduction to enable mass production of quality cost friendly lifelong batteries,

- Students should be encouraged to develop a self-study method of learning, personal libraries and a conducive corner at home as the reading environment. The reading corner can act as a motivator to increase attention and improve study habits and,

- Telephone counselling services should be encouraged to address the transitioning and adjustment issues of students, to reduce the problems created by isolation, alienation, unpleasant experiences and other personal-social problems (Igbafe 2009, p.9-10).

CONCLUSIONS

The ICT department of the university should have well-trained professionals who inform university management of the emerging ICT devices that have been developed and improved to enable institutions to adjust to the

COVID-19 pandemic. Local adaptation must fit students' present experiences, using the COVID-19 as a strategic sample to mitigate future disruptions and as an example of how ICT should address students' needs. Several university students were unable to manage the issues and problems of the disruption in their environment. The current paper identified the students' environment as the determinant of how ICT should address disruptions. Thus, this paper suggests that information gained on students' COVID-19 experiences and on the role that their environment played in intensifying their experiences is used to challenge and change the existing ICT structure to accommodate any future pandemics.

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