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INFORMATION AND COMMUNICATION TECHNOLOGY [ICT] CHALLENGES CONFRONTING MULTI-CAMPUS INSTITUTIONS GIVEN SOCIAL DEVELOPMENT LACUNA

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ABSTRACT

This qualitative study examines the experiences of undergraduate students at the University of The Free State to ascertain ICT teaching-learning challenges resulting from the abrupt switch to e-learning in developing countries vis-à-vis the effects of social development lacuna. The finding revealed a lack of learning devices by some students, internet connectivity issues, high data cost, need to upgrade the technological knowhow of education participants, limited classroom engagements due to large classes, and a lack of foundational social development facilities that can augment smooth transition into the post-pandemic predictable future of education. The study recommends that (1) disadvantaged background students lacking learning devices be assisted; (2) the University continue to strengthen blended learning; ICT upskilling for the students and staff; increase investment in ICT and maintain continuous training to improve staff's technological skills; (3) reduce large class sizes; and (4) indulge in more collaboration towards solving the problems of resource constraints. The also recommends that the mental health of students be monitored frequently given the pressure of enduring hectic COVID-19-induced challenges relating to the abrupt switch to e-learning. The study anticipates setbacks regarding the use of ICT in teaching and learning going into the post-pandemic. It, therefore, recommends an upgrade of social development, especially in the area of ICT infrastructure and digitalisation in developing nations.

KEYWORDS: digitalisation; education and development; higher education; e-learning; transformation; teaching and learning; multi-campus

INTRODUCTION

The challenges facing South African higher education institutions (HEIs) are often linked to the widening challenges the country is currently facing. These include increased poverty, slow economic growth, escalating unemployment and political instability. There has been a significant growing popularity of multi-campus institutions in Africa which has increased the need for blended learning. Blended combines the use of traditional face-to-face learning and the use of ICT, which have become vital components of teaching and learning. The assumption is that the ICT would enable flexible teaching and learning beyond the time and spatial confines of the physical campus. The use of ICT would provide synchronous and asynchronous instructional methods for multi-campus education. Simply put, the asynchronous allows students to view instructional materials at any time they choose which does not include a live video lecture component. Whilst the synchronous requires the students to log in online and participate in class at a specific (or set) time. Most South African higher education institutions [HEIs] regardless of the model (single or multi-campus) make use of the blended learning approach (Delport et al., 2014). The aim was to allow ample time for a gradual transition to digital learning until the COVID-19 necessitated unprecedented changes (or an abrupt transition to e-learning). This study asks the question of whether South African HEIs are ready to make the transition into a predictable future of teaching and learning in the post-pandemic.

Moreover, part of the study's significance hinges on its sincere attempt to highlight the basic but nevertheless critical economic and technical resource challenges facing the pace of digital transformation within the context of Higher Education Institutions (HEIs) in South Africa. The study is expected to spur discussion around who is responsible for the transition. The study also calls on the incumbent democratic governments in developing nations to undertake necessary development steps towards facilitating the future of education development. The study was conceptualised to add to the existing literature on the use of technology in HEI teaching and learning. The University of the Free State [UFS] was used as a case study because it has qualities shared by its sister institutions in developing nations, and it has characteristics needed by this study. As the traditional face-to-face learning methodology has been abruptly replaced by e-learning, the need for a continuous re-evaluation of online learning, as well as teaching and learning processes has increasingly become a sinequanon. The developing nations (South Africa included) grapple with what the next line of action and necessary policy decisions should be against the ravaging effects of the abrupt switch to e-learning in HEIs (Okoye & Mensah, 2021). As such this study asks the question: *What are the ICTs challenges facing HE teaching and learning?* The aim is to suggest the way-forward *vis-a-vis* the state of social development in South Africa.

The undergraduate students of the University of The Free State (UFS), and their lecturers were also interviewed to ascertain how these challenges could be circumvented through social development

interventions or upgrade. The study employs social constructivist theory. This is a social learning theory developed by Lev Vygotsky (1987). The social constructivist theory posits that individuals are active participants in creating their knowledge, and their challenges can best be obtained through them (Schreiber & Valle, 2013). The theory focuses on people who are learning and sharing knowledge primarily through interaction with their peers, teachers, or more intelligible person(s) as the facilitators. Whilst social constructivism is a widely applied framework for studying traditional face-to-face classes (Kukla, 2013; Powell & Kalina, 2009; Vygotsky, 1987), little is known about the process through which students (who have been used to face-to-face instruction) co-construct knowledge in the absence of a shared physical space.

LITERATURE

While there are some historical antecedents associated with reasons for creating HEIs with multi-campus in South Africa, other African countries such as Mozambique, Kenya, Uganda, Ghana, Nigeria, Tanzania, Zimbabwe struggle to address existential challenges facing higher education sector (Dinye, 2018; Langa, 2017; Munene, 2015; Dhliwayo, 2014). These challenges include (but not limited to) increased demand for access, use of technology, financial constraints, competition between and among institutions, and government demands. One of the major challenges facing HEIs in Africa is that “in most cases, the expansion of high education involves the replication of the same type of institutions and programmes” given lack of needed technological and financial resources to effect diversification (Langa, 2017: 26). An analysis of the literature from different contexts indicates multiple approaches and/or modes used in improving teaching and learning in face-to-face HEIs set up. These approaches can be grouped into two categories, namely information and communication technologies (ICTs) and the elements of blended learning. These broad approaches combine a variety of methods such as e-learning, video streaming and conferencing, and hard-copy resources (Anderson & Date-Huxtable, 2011; Ebden, 2010). Blended learning combines the use of e-learning and face-to-face teaching which had been the dominant approach in African HEIs. The rationale was to allow developing nations an ample time to develop its ICT infrastructure until COVID-19 happened (Okoye & Mensah, 2021). Whilst the ICT approach became rampant with multi-campus institutions (Szeto, 2014).

ICTs approach to teaching and learning in multi-campus institutions: The use of ICTs facilities, tools and digital learning technologies is increasingly becoming the common approach and vital component to teaching and learning in multi-campus institutions settings even in Africa and other developing nations (Bahmani, Hjelsvold, & Krogstie, 2019; Cox, 2019; Tikoria & Agariya, 2017). In fact, some believe that ICT revolution is one of the principal drivers of the growing multi-campus institution systems globally (Azziz et al., 2017; Pinheiro & Berg, 2017; Krause et al, 2012). According to Anderson & Date-Huxtable (2011), ICTs can enable flexible teaching and learning beyond the time and spatial confines of the physical

campus. Hence, ICTs are used for synchronous and asynchronous multi-campus education (Sheth et al., 2013; Moridani, 2007; Szeto, 2014). Also, within the ICTs approach, several methods or platforms are used for teaching and learning purposes that enhance multi-campus systems. For instance, video-streaming and video conferencing are two primary technologies used for multi-campus teaching and learning in countries such as Australia and Norway (Cox, 2019). These technologies can be used to capture video and audio from one campus, and then distribute to other campuses in a live or near to live manner (Bahmani & Hjeslvold, 2019; Reilly et al., 2012). The ICT-enabled classrooms require a video-conferencing facility with high definition cameras for entire class view with zooming feature, audio – video facility, content and lecture sharing facility, microphone facility and camera zooming facility at each seat in the classroom, classroom networked with such other similarity equipped classroom irrespective of their location (Tikoria & Agariya, 2017). Apart from video streaming and video conferencing, recorded lectures have also been central to creating effective teaching and learning environment in multi-campus spaces. The recorded lectures comprise recordings of face-to-face lectures that are made available as a supplement to students directly after the lecture (Bos et al., 2016). The recorded lecture indicates the process of recording the content of the lecture (audio and video) to archive it for later use and they largely need some hardware and software devices to synchronize the recorded audio with the video (Bahmani & Hjeslvold, 2019). The recorded lectures have been heralded for eliminating differences between students from different campuses who take multi-campus courses (Reilly et al., 2012). Specifically, recorded lectures enable students in the distance to supplement their paper-based learning resources with that of electronic (Bahmani & Hjeslvold, 2019; Morris et al., 2019). There are several examples of multi-campus institutions that are using video-streaming, video-conferencing and recorded lectures.

Meanwhile, without ICT the discussion on ‘tele teaching’ would be mere conjecture. Tele teaching is a form of instruction that transmit images and speech back and forth between two or more physically separate locations (Morris et al., 2019). Teleteaching uses video conferencing technology to conduct live, cross-campus teaching between lecture theatres and is a relatively new style of teaching and learning (Morris et al., 2019). Thus, teleteaching seems to be a useful approach to teaching across multi-campus and it can be applied in different ways. Beyond video streaming, video conferencing and recorded lectures, there is another ICTs method commonly known as “mirror class” which is used by the multi-campus Universidad Cooperativa de Colombia (UCC) in Colombia. The mirror class is an academic resource that uses a digital platform shared between professors and students from two or more universities, to participate in the synchronous and asynchronous development of a complete course or a session of a course (Buitrago García, 2020). The mirror class is characterised by a blended learning model that combines virtual and face-to-face instruction. The mirror class relies on technological tools such as WhatsApp, Outlook, Microsoft Team and Zoom (Buitrago García, 2020).

Blended learning approach to teaching and learning in multi-campus institutions: The ICTs approach to teaching and learning in multi-campus institutions set up is often discussed in conjunction with the ‘blended learning’ and/or hybrid model. Blended learning is understood as an educational method that combines the traditional face-to-face instruction with computer-based instruction (Downey & Brown, 2009; Stacey & Gerbic, 2008). It can be accomplished through face-to-face and online activities in course design and may vary depending on the educational context and the information technology tools available (do Amaral et al., 2018). Blended learning can be facilitated using different learning platforms such as Moodle, Google, Blackboard, Microsoft Teams, Rcampus, and Learnopia and can be accessed from the computer, tablets or mobile devices (Smith et al., 2017). The blended learning approach allows the use of different learning tools, such as pre-recorded video lectures, collaboration software, electronic forums, mixed reality, video games and simulations (do Amaral et al., 2018). Most South African HEIs regardless of the format (single or multi-campus) make use of the ‘blended learning’ approach, and grapple with resource constraints (Majolar, 2021). These resources include physical infrastructure, ICTs facilities and enablers, teaching and learning resources and materials (Williams, 2013). There are also challenges of creating career development and support opportunities for academics to manage the demands of teaching in a multi-campus using ICT or blended learning approach (Furco & Moely, 2012). Of critical importance is deploying more resources on remote and/or rural campuses that are often resources constrained and under pressure especially with technology and infrastructure development.

METHODOLOGY

The researcher interviewed 79 students and 37 staff members from various UFS campuses to gather the necessary data. The individual interviews took between 30 to 45 minutes each whilst the focus group interviews took between 60 and 75 minutes. The entire interview process was conducted online using platforms and/or applications such as Skype, Microsoft Teams and WhatsApp. Thematic analysis was used to analyse the collected data. The data was organised and presented as themes based on the study’s sub-research questions they tend to address. Ethical clearance was sought and obtained before conducting the interviews. Individual and focus group interviews were used as data collection instruments. The qualitative sample size is not contingent on the number of interviews because as a qualitative study acquiring more data does not necessarily lead to more information being obtained (Multerud et al., 2015). According to Charmaz (2014), sample sizes are typically smaller in qualitative; this is because one occurrence of a piece of data, or a code, is all that is necessary to ensure that it becomes part of the analysis framework (Guest et al., 2006). The principle used for determining sample size and evaluating its sufficiency is that of *saturation*. In other words, it does not matter how ‘small’ the sample size is numerically (Guest et al., 2006).

DATA PRESENTATION AND ANALYSIS

The data was presented using the sub-research questions of this study and the findings were summarised at the end. The letters 'L' and 'S' were used to represent comments by the lecturers and students respectively *vis-à-vis* the themes addressed by the comments.

- ***What are the academic challenges faced by students in relation to ICT? The students highlighted the following:***

- a. **Fear of underperformance given resource constraints:** The participants emphasized their fear of underperforming in their studies due to resource constraints thus lack of necessary technological devices as these two participants precisely put:

S1—It does affect my studies because sometimes I cannot always borrow my friend's laptop to do my schoolwork....

S14—Due to my dedication I have not failed but.... I would have failed dismally...we need a laptop (or at least a tablet); without it, we are doomed....

S14—We applied for these laptops on the 11th of May 2021.... as the university directed but up till now, it has been five (5) months yet nobody has received any....

S24—I never received any support from the government...they did call last year and asked if I needed a laptop and I responded in affirmation since then nothing had happened.

- b. **Lack of learning devices or tools:** Participants indicated that they lack major teaching and learning devices such as laptops, tablets, and reliable cellphones. According to participants, there have been initiatives from the university, NSFAS, and other relevant stakeholders to resolve this problem as these participants echoed:

S23—No, I have my cellphone, but it is not good...it does not have good quality; it breaks up whenever I take it off the charger. And my laptop, well, was once my father's and it is the one that I am using now. It was bought a long time ago, like years ago hence it is an old machine... and apparently, I do not even have earphones....

S31—Sometimes it is difficult to borrow laptops from other students, they also may be using their laptops. I applied for a laptop with NSFAS but have not received it although some of my colleagues have received theirs.... I write my assignment using my phone sometimes.

- c. **Global Protect limitations:** The participants unanimously assert that the Global Protect has challenges or limitations when it comes to connectivity and the scope of websites one can visit for research. The participants highlighted the challenges of Global Protect to include its dependency on the strength of the network coverage or connectivity. Also, the Global Protect allows one to

assess only the recommended websites. Thus, it limits the scope of websites one can visit. This point was vividly expressed in the comments by these selected participants:

S13—...another one is Global Protect, since we are at home, I am forced to use it. It is not working; it is limiting our research; we are going to be told to do certain research but when we go to a certain website looking for answers we cannot access that website. It is very limited also now I heard that people cannot use it due to poor connectivity and that Vodacom has recognized Global Protect as an illegal VPN, so Vodacom is blocking our (students) sim cards because of that.... So, that is why I refrain from using my Vodacom sim card. I now have to use another network because of that....

S32—The Global Protect does not work over here, especially during the storm and when internet connectivity is down or when it is raining. Sometimes, I would go to the mountain to get a stronger signal or connectivity that can allow me to download study materials using the Global Protect....Eish! (exclamation), it has not been easy.... In my place because am studying from home, we always end up climbing the mountain to have reception (or connectivity)

- d. Lack of access to data by corresponding students: The lecturer participants highlighted challenges associated with limited access to data as a nationwide concern, as it continues to affect academic activities, as well as education development in the continent. This situation COVID-19 circumstances allowed the international students to work from their various countries, but high costs of data remain critical as highlighted in the comments of the following participants:

L5—We have many international students...students from Lesotho, Namibia, and Botswana who are waiting to see if we can make a plan for them regarding data as had been done in the case of Zimbabwean students....but until then, the situation remains a thing of concern for teaching and learning at UFS....

L9—I think the biggest issue is not what we can do as lecturers but from the students' side if they have access to what we can offer online...with insufficient data they cannot have access or keep up....

- **What are the classroom teaching and learning challenges in relation to ICT?** Both lecturer and student participants were synonymous regarding the following points:
 - a. First-year students blame underperformance on e-learning difficulties: The participants who were mostly first-year students blame their underperformance on e-learning difficulties and/or challenges. These participants described the point so well:

S28— I think...I was not used to the whole online learning. So, I think it is the reason why my marks are low. So sometimes I used to forget my assignments, and I think that is the main reason

why my marks are low...

S8—Yes, I had lower marks in that module because of online learning I think because I still do not understand things happening there.... As a new student...the online classes are a bit useless especially tutorials because I did not understand them.

b. Large class sizes limit efficient planning and classroom engagement: The participants during the interviews highlighted the magnitude of frustration that goes with planning for a large-sized class when it was face-to-face learning let alone now that e-learning has surpassed everything. The level of engagement is reduced with e-learning as these participants affirm:

L1—With my smaller group we can make them go to the museum, we can have that sort of, like workshops. It depends on the size. And I think the best thing is to give good feedback on the assignment....

L28—Small-sized classes are easy to plan for, as well as to teach...

How can these challenges be remedied? The lecturer participants unanimously agreed on the need for a continuous upskilling of technological ability as could be seen in the comments below:

a. Continuous ICT upskilling for academic staff: *L1—you need to upskill in the use of teaching and learning technologies...because things go wrong very easily in an online environment...we (lecturers) should be on our guard always. So, a continuous opportunity to upgrade ICT or technological skills would always be significant....*

L3—...a colleague and I were talking, and she says she is now starting to see the importance of attending workshops regarding how to use technology...even the Blackboard workshop as always being provided by UFS, and I said yes, I did that last year. The university may need to keep that up until....

b. Strengthen blended learning: The participants were unanimous about blended learning persisting even after the COVID-19 pandemic. The participants suggested that in the UFS context, the university should continue to align its policies around sustaining and reinforcing blended learning. This would serve as a steppingstone toward the pursuit of the ongoing digitalization drive at UFS.

L23—blended learning is going to continue... UFS needs to channel its policy and implementation strategy towards reinforcing blended learning....

L14—the university (UFS) and its management know that e-learning would continue even after COVID-19...there would be no going back to the pre-COVID-19 situation. The university should strengthen blended learning and pursue its digitalisation goals...

- c. Increase investment in blended learning and digitalisation: The participants agreed that the UFS management, the government, and other relevant stakeholders should collaborate to ensure that resources are channelled to improve blended learning, ICT human resources, and digitalisation as reported by the following participants:

L9—You know if you have got a big class to teach and now struggle with the technological devices and the ICT is online, they would immediately rescue the situation....so this department needs a continuous reinforcement and sponsorship hence more resources should be committed to

L23—the students who lack access due to the unavailability of technological devices need an immediate rescue plan. The investment in ICT should increase exponentially from all.... this however gives credence to the ongoing digitalisation drive at UFS....

- d. More collaboration with government and stakeholders: The participants unanimously agreed that both the government and the university should open up for more collaboration as these participants precisely put it:

L1—this problem would not be solved by one person or rather the university alone.... more collaboration should take place....

L23--...my departments bought tablets for their students who were bereaved or in need of it.... Collaboration is necessary, especially in solving the challenges relating to resource constraints....

- e. Cut down on large classes: Participants unanimously emphasised that dealing with smaller classes is more ideal and effective in terms of online teaching and learning. Although this point may not concur or agree with the university's business model needs to come up with a plan to effect:

L8—So when I speak of old habits, this idea that there should be 800 people in a class needs to go...the system has shown that the smaller the class the better to offer effective (teaching and learning). I know this might not resonate well with the previous institutional setup and business model....

L2—We should be intentional about getting more smaller classes, enrollment approach and management, student support, and teaching with technology....

L17—I have not dealt with a large class.... I heard another lecturer complain about taking 300-400 students....

L22— The university structures kind of don't allow for that free flow of social interaction and engagement and I understand it on some level for us as staff members, if you have like 500 students, right. And you are in a team of two lectures. So, in a way you are responsible for 250 students.... It is impossible to have that kind of free flow of interaction and social relationships without it having a negative impact on your other work because you are still responsible for 249 other

students outside of the one sitting in front of you....

f. **Reduce data costs:** The participants agreed that data is expensive in South Africa and so affordable to HE students. The present government needs to figure out how best to reduce the costs of data in the country, especially now virtually every aspect of human life has become data-intensive due to COVID-19. The following participants stressed:

S2— The government needs to resolve the high cost of data nationwide. I have this class I signed up for....so every day, I have been missing the last hour because the online classes end at 7 pm but the internet access to the data stops at 6 pm...

S29—Sir, I think that they can start giving us data since the Global Protect...we are struggling a lot with this Global Protect. We need data so that we can be able to attend classes...data needs to be affordable, at least, to the students, free data should not be the only option for the students in a country like South Africa....

o. **Resolve load-shedding issues:** The participants expressed their apprehensiveness regarding the looming continuation of the load-shedding and its effect on teaching and learning, as well as education development in general. According to the participants, government intervention is highly needed to rescue the situation.

S19—It is not easy since here at QwaQwa we have electricity problems. There is always load shedding. So, it's not easy at all. All you have to do is make sure your phones are always charged. But as for the network issue, there is nothing one can do about that.... It usually happens during the cold weather, even now that it is raining the electricity might not work and does network connectivity.... The Load shedding requires urgent government attention....

S5—I am afraid the Load shedding would continue, and we all know the consequences or the effect on education, especially with the current trend in education....

SUMMARY OF THE FINDING:

What are the academic challenges faced by students in relation to ICT?

- Fear of underperformance given resource constraints
- Lack of learning devices or tools
- Global Protect limitations
- Lack of access to data by corresponding students

What are the classroom teaching and learning challenges in relation to ICT?

- First-year students blame underperformance on e-learning difficulties
- Large class sizes limit efficient planning and classroom engagement

How can these challenges be remedied?

- Continuous ICT upskilling for academic staff
- Strengthen blended learning

- Increase investment in blended learning and digitalisation
- More collaboration with government and other stakeholders
- Cut down on large classes
- Reduce data costs
- Resolve load-shedding issues

DISCUSSION OF FINDING

This study's findings feed into the attempt to solve the problem of environmental factors, large classes and inefficiencies relating to the use of ICTs. For instance, the Global protect (i.e., government-provided free internet application for education practitioners) does not work efficiently where the internet connectivity or network coverage is weak, as it restricts one to a specific website. Although the government has tried to provide free broadband internet connectivity for higher education students, the issue of network coverage remains a concern (Wehab, 2020). Free internet access should be provided for all students up to the high school level with necessary precautions in place. The students may need allowances to procure necessary devices such as laptops, possibly tablets specially designed for learning purposes, but increasing the computer lab facility goes a long way in helping those students on the campus. The relatively low level of public funding is making higher education translate into higher fees thereby shutting out the poor students from previously disadvantaged backgrounds (Okoye & Mensah, 2021). Obviously, some families cannot afford the necessary technological devices necessary for teaching and learning, especially with the current socio-economic realities associated with COVID-19 circumstances. The universities and HEIs from developing nations should align the ICT capacity support programmes with the modules that have a high failure rate to help students to achieve their outcomes and to progress (Crawford et al., 2020).

According to Okoye and Mensah (2021), the present government must provide its communication network targeting the rural and township areas. This development project should target increasing access to information, internet connectivity and affordable communication costs with the sole aim to uplift the disadvantaged communities (Okoye & Mensah, 2021; Majola, 2021). Still, an important question remains whether South Africa is prepared to embrace the future of education in the post-COVID-19 era given the existing social development lapses in the country (Wehab, 2020). In the South African context, the transformative measures toward reducing the university dropout rate need to be framed around new discoveries and recognition of new empowerment possibilities and/or new capability options (Okoye & Mensah, 2021). In order to ensure effective use of technology during online learning, the university may need to determine how best to reduce large-sized classes. The compulsory use of online learning due to COVID-19 has precipitated the increasing importance of reducing overpopulated classes. Wehab (2020) claims that large classes reduce efficient planning and engagement in an online learning platform. For

instance, it is harder to plan for a largely populated class of 200 to 400 students than a normal-sized class of 75 (Crawford et al., 2020). The staff participants in their perspectives unanimously support this assertion of reducing large-sized classes although numerous factors need to be considered to avoid an adverse effect on the business model of most institutions.

Technology-based learning and blended learning have suddenly intensified leading to situations where learning becomes more student-centred (Wehab, 2020) This implies that the most important task lies within the student in terms of problem-based learning (PBL). At the institutional level, blended learning offers a way to enhance the organization's reputation in a digital world, provide access to segments of students that would not have taken particular qualification, and increase student satisfaction and retention (Camilleri, 2021). Going forward into the post-pandemic, proper establishment of effective blended learning and creation of classroom efficiencies, management, effective and efficient use of social media, digitalisation, technology and communication are required (Cox, 2019). Thus, like any other educational technology project, blended learning requires a robust technical infrastructure and support mechanisms to be accomplished, as well as proper or active leadership to be accomplished (Poonam & Rajesh, 2019). There are understandably costs associated with technology upgrades. This gives credence to the line of argument presented in this article; are the institutions and communities equipped to should these costs. The issue of the high cost of data and low network or internet connectivity has a direct correlation to the current state of social development in South Africa and other developing nations. The complexities surrounding the creation of development partnerships, as well as co-opting the government and relevant role-players is an issue; coupled with internal management conflicts, governance and politics (Okoye & Mensah, 2021). Although the government has been responsive to the development challenges that affect township and rural areas in South Africa, going into post-pandemic, more still needs to be done by the government.

The issue of connectivity, high cost of data, lack of learning gadgets and the Global protect limitations all hinges on the strength and scope of development in South Africa. This however highlights the importance of socioeconomic status in education. Recent years have seen a greater integration of students from different socio-economic backgrounds in HEIs in South Africa. This has, of course, become more conducive to achievement as the government's investment or interventions in education increase. Also, the motive to increase access to education since the dawn of the current democracy became viable but not without cost. The HEIs are filled with a high concentration of different calibre of students with varied cultural and educational backgrounds leading to the proliferation of multi-campus systems. According to Amundsen and Wilson (2012), the term development is vital in today's society, education and commerce as it affects every aspect of everyday life. In South Africa, certain factors have a huge influence on development or the lack thereof. These factors need to improve in order to facilitate development,

educational development and the country's ranking on the human development index (HDI). Educational development as the name suggests is a growing and vibrant field of learning which is defined as the process of helping colleges and universities function effectively as teaching and learning communities to enhance knowledge sharing (Amundsen & Wilson, 2012).

In the South African context, we are not referring to economic growth which implies an increase in the country's GDP or an increase in the size or pace of the economy. The term development, as used here, refers to economic development (i.e., development of the individual per capita). Conventionally, there is a common assumption that economic growth would translate into an increase the living standards which does not happen automatically. So, in South Africa, the conventional approach to development has been to increase economic growth with the hope that economic development would follow suit. Of course, without substantive change in the fundamental economic processes involved, then, economic development would inevitably remain stagnant (Okoye & Mensah, 2021). Given the ravaging effects of the COVID-19 pandemic information, education and commerce have increased in data intensiveness. Social distancing has necessitated the importance of access to reliable internet connectivity, communication network coverage and affordable data costs. South Africa is currently among the countries with the highest cost of data in the world (Majola, 2021; Okoye & Mensah, 2021). Globally, Brazil remains the most data-expensive country followed by South Africa (Majola, 2021). Thus, data costs an average of \$2.67 (or R38.93) for one gigabyte in South Africa whilst the lowest cost of data is \$0.12 and the most expensive \$34.95 (Majola, 2021). For effective Covid-19 prevention strategies and campaigns to happen access to information remains vital. In terms of ensuring effective online teaching and learning, digitalization, distance learning and the running of a multi-campus model, the communication network coverage of the country needs to expand or improve (Okoye & Mensah, 2021). The 'substantive change in fundamental economic process' would be for the present government to provide its communication network targeting the rural and township areas (Okoye & Mensah, 2021). This development option would aim to increase access to information, internet connectivity or network coverage and the reduction of communication (or data costs) to uplift the disadvantaged and rural communities. Only then would we be able to answer the corollary question of whether South Africa is prepared to embrace the future of education during and after the COVID-19 era (Wehab, 2020). The South African policymakers, skills providers and relevant stakeholders should deliberate on the best approach to take or collaborate to ensure that the dividend of our democracy should be geared toward ensuring equity, inclusion and education for all (or for the wider African community). Globally, the COVID-19 experience was cathartic to all institutions and organisations; going forward the world must figure out how to regroup. This article thus recommends that:

RECOMMENDATIONS:

- Digitalisation drive and its importance cannot be overemphasised; therefore, various HEIs need to pursue digitalisation with rigour, well-coordinated collaboration and networking with the relevant stakeholders.
- Continuous ICT training and investment need to be done.
- The HEIs should consult experts in terms of how best to support the digitalisation drive to enhance e-learning.
- The use of technology in teaching and learning needs to be re-introduced right from the primary school stage through government (or education) policy.

CONCLUSION

This treatise explores ICT-related challenges facing HIEs in creating effective teaching and learning environments, especially in developing nations. It also indicates that the onus to actualize smooth transition of education into the post-pandemic requires social development interventions without which the vision and future impact of ICT in education development may become a herculean task. The use of technology challenges in the post-pandemic remains a concern. It requires a high-level dedication, leadership and management, as well as social development upgrades to support the foreseeable future of education (or teaching and learning) into the post-pandemic.

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