

# The Impact of Digitalisation on Higher Education in Africa

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Digitalisation has had a disruptive and transformative effect on most modern industries, including the Higher Education (HE) sector. The advent of Massive Open Online Courses (MOOCs) in 2012 signalled the need for fundamental changes in this sector and is widely seen as a harbinger of the massive transformative societal impact digitalisation will have on this sector. Some people even predicted an end to conventional higher education institutions (Hochschulforum Digitalisierung, 2017). However, subsequent developments have shown that the effects of digitalisation have been mostly *evolutionary* in nature and that Higher Educational Institutions (HEIs) themselves are often the driving forces behind such evolution (Hochschulforum Digitalisierung, 2017).

HEIs today constantly need adapt how they deliver teaching, learning and research in response to unprecedented, market shaping changes to financing and student expectations (Cisco, 2017). This need to adapt has brought many challenges to the HE sectors but also presents many new opportunities. However, HEIs will only be able to benefit from these opportunities if they have the requisite level of digital maturity to do so. This paper explores the opportunities and challenges presented by digitalisation, and its potential impact on Higher Education in Africa.

## African readiness for Digital Higher Education

Africa is the world's youngest continent and sixty percent of all Africans are under the age of 25. Africa is also the continent with the greatest educational need, with sub-Saharan Africa listed by UNESCO as the region with the highest rates of education exclusion in the world. As such, the potential offered by digitalisation is especially important to this continent. Digital delivery can make higher education more accessible, both in terms of cost and by providing access in areas where it was previously impossible to deliver. Consequently, many African governments are optimistic about these opportunities. However, they often ignore the fact that the requisite ICT infrastructure might be too expensive even for universities to afford (Kigotho, 2018b). These costs will to some extent also depend on the underlying digital maturity and pre-existing infrastructure of the country within which the HEI operates.

There are vast differences in digital maturity between various countries on the African continent both in terms of supporting infrastructure and in terms of the requisite supporting skills and digital literacy of the population. According to a report by Siemans (2017) the infrastructure maturity of South Africa is at 82% and skills and digital literacy is at 53%, whilst in Ethiopia the infrastructure maturity is only at 33% and skills and digital literacy at 20% (Siemens, 2017). Similar differences exist across the African continent and highlight the need to avoid a one-size-fits-all approach to implementing digital education approaches. It is vital to ensure that strategies for digital higher education suit the needs of all the target countries and institutions, and do not further exacerbate pre-existing inequalities.

## Educational Content

Many factors need to be considered in the creation of suitable educational content for HEI in Africa. Firstly, as mentioned before, in the African context access to high bandwidth and affordable data cannot be assumed. This might necessitate trade-offs between content richness and topic coverage. This problem is further complicated

by the fact that the devices through which learners access content might be old and could potentially not support some modern delivery formats. It is therefore essential to ensure optimal usage of bandwidth. Educational content should be carefully designed to take into consideration not only the validity of the content itself, but also the efficiency of the content in terms of the context within which the education will take place. Many modern MOOCs are almost entirely dependent on bandwidth heavy streaming video as a delivery mode. This will not be suitable in many African countries where purchasing one gigabyte of data costs 8.76% of the average monthly income (Alliance for Affordable Internet, 2018).

Secondly, a vast skills shortage exists in many fields at HEIs in Africa. E-learning can provide a “brain gain” in a very cost-effective way (Rwirahira, 2018). Not only does it reduce the need for academics to travel to deliver lectures in African countries, it also provides an easy way for young African academics who have left the continent to pursue careers elsewhere to “return home” to lecture in their countries of origin (Rwirahira, 2018). However, efforts to promote such “brain gain” might be viewed by some as *intellectual re-colonisation* of Africa. It is vital to take sufficient care to include African scholars and African viewpoints in the design and creation of such material.

Thirdly, it is important to understand that Africa consists of many countries and many different ways of doing things. Even if subject content has been adequately contextualised for one context, it might need to be modified further before it would be suitable in another context. There are also a vast number of factors related to culture, religion, gender, and language that might need to be considered, depending on the context in a specific country. Ethiopia, for example has more 70 locally spoken languages (Siemens, 2017).

Finally, the skills needed to create high quality digital educational material extend beyond just the subject expertise needed. Many online courses fail to adhere to sound educational principles for the design of online educational material. In most cases, online material consists of large amounts of media that needs to be consumed with little or no user interaction. This results in a reduction in the Perceived Usefulness (PU) of the online content amongst learners and a subsequent reduction in the intentional use of the material and student motivation to learn. Online courses must be developed based on sound pedagogical principles that are suitable to the online medium (van Niekerk & Webb, 2016). As with the content itself, the chosen pedagogical approach should be appropriate for the specific contexts of the target learners.

### University Libraries and Supporting Resources

Successful higher education requires more than just the consumption of online learning content. In order to function in the modern business world students in higher education also need to be taught how to be lifelong learners. This requires the ability to conduct their own research and, as a minimum, access to information resources like university libraries. In many parts of the world university libraries have developed to operate in both the physical and digital worlds, however, in sub-Saharan Africa university libraries are still mostly physical with little or no virtual presence (Kigotho, 2018a).

There are also very few Open Access Repositories in Africa, the Directory of Open Access Repositories lists entries for only 18 countries, with a total of 120 repositories, in Sub-Saharan Africa (<http://www.opendoar.org/>). To place this number in perspective, one should consider that Germany alone has a 204 such repositories listed. Yet, such open access repositories are vital in disseminating a university’s research to a world-wide audience and should be seen a key component in any efforts to digitise higher education in Africa. Furthermore, the challenges in taking African university libraries online also extends to the high cost of digital material, the difficulties in managing copyright and digital rights in such libraries, and a general lack of trained academic librarians (Kigotho, 2018a).

In addition to libraries, learners in an online environment are usually engaged through some form of Learning Management System (LMS). To run and administer such systems have similar infrastructure, cost, and staffing problems as other ICT Systems. Content created for dissemination via one LMS is also not always easy to port to another platform. If content is to be used across the continent it is thus important to develop content in a format that is as portable as possible. Using an LMS appropriately also requires both academic staff and students to have a certain minimum level of digital literacy and familiarity with the LMS itself.

### E-learning Literacy

Many courses assume that the learners will have the pre-requisite skills that will enable them to learn in an online environment. This assumption is mostly incorrect. Even amongst academics very few adults have ever completed any form of online education. As such it is necessary to ensure that courses are designed and structured in such a way that they do not only convey subject relevant content, but also introduce the learner to online learning modalities in an approach which is scaffolded to build learner confidence and motivation to learn online.

Similar to the adoption of many other technological innovations, user acceptance of online learning is to a large extent governed by a balance between the learner's perception of the Perceived Usefulness (PU) of the course versus the Perceived Ease of Use (PEU) of the online content, as described by the well-known Technology Acceptance Model (TAM) (Cheung & Vogel, 2013; Ching-Ter, Hajiyev, & Su, 2017). A successful online course design would thus have to gradually introduce the learners to new ways of learning online in order to manage PEU and ensure the learners do not 'drop out' due to feeling overwhelmed. This is especially important in the African context where learners might already be faced with several other barriers to successful learning, such as low bandwidth, language problems, or a lack of culturally sensitive context in the content.

One of the reasons why online educational delivery is so attractive in the African context is that it is so well suited to the needs of adult learners who are geographically dispersed. However, a lack of human interaction, and subsequent feelings of isolation, can be a major contributing factor to course 'drop outs' (Hone & El Said, 2016). Human interaction commonly takes the form of interaction with instructors or collaboration with peers. However, in many online programmes this interaction is not developed in a meaningful way because of a lack of adequate technical, administrative, or personal assistance to the learners, which leads to a reduction in both the PU and the PEU of the course material. Once again, course designers need to take this need into consideration before designing interaction models for such digital courses.

### Micro-credentials, Accreditation and Quality Control

A final opportunity, and related challenge, that this paper will raise, is the question of accreditation and quality control within digital education. One of the benefits of online learning is that it allows learners from anywhere in the world to participate in courses offered by some of the top universities in the world. In most Western countries, students still prefer universities to focus on more traditional university educational approaches, even within digital offerings. This is different in Africa, where learners display a much stronger preference for micro-credentials, bootcamps and similar models of education (Navitas Ventures, 2017).

This preference creates a unique opportunity to introduce high quality, internationalised content into existing courses. By allowing students to do all, or part, of their degree through a digital medium, African universities can present students with a much more comprehensive bouquet of offerings whilst still maintaining their essentially African core to their coursework. However, this opportunity also comes with many unique challenges related to ensuring the quality of the courses and the accreditation of credentials that was earned online. Universities not only need to ensure that the additional digital content itself is of acceptable standard but are also faced with the challenge of ensuring that the course was completed by the student him/her self, and that the assessment

standards related to the course was of an acceptable level. A final challenge also exists in determining how much credit such an online offering should carry in relation to the rest of the student's coursework.

## Conclusion

Digitalisation offers many exciting opportunities to higher educational institutions on the African continent. Despite that current bandwidth and infrastructure related challenges, these opportunities could very well be key in addressing many of the educational inequities that still exist on this continent. However, in order to realise the potential of digitalisation, one has to understand that the challenge is not only an IT problem. It also requires HEIs to rethink their approaches to pedagogical design, their library and information resource strategies, their administrative processes, and the way in which educational programs are composed and accredited. The digital world has disrupted the way in which HEIs world-wide operate. It is up to the governments and HEIs in Africa themselves to ensure this disruption is used as a positive transformative force.

## References

- Alliance for Affordable Internet. (2018). New data: What's the price of 1GB of mobile broadband across LMICs? Retrieved October 26, 2018, from <https://a4ai.org/new-mobile-broadband-pricing-data-2018>
- Cheung, R., & Vogel, D. (2013). Predicting user acceptance of collaborative technologies: An extension of the technology acceptance model for e-learning. *Computers and Education, 63*, 160–175. <https://doi.org/10.1016/j.compedu.2012.12.003>
- Ching-Ter, C., Hajiyev, J., & Su, C. R. (2017). Examining the students' behavioral intention to use e-learning in Azerbaijan? The General Extended Technology Acceptance Model for E-learning approach. *Computers and Education, 111*, 128–143. <https://doi.org/10.1016/j.compedu.2017.04.010>
- Cisco. (2017). *Digitizing Higher Education to Enhance Experiences and Improve Outcomes. Whitepaper.*
- Hochschulforum Digitalisierung. (2017). The Digital Turn - Pathways for Higher Education in the Digital Age. *Hochschulforum Digitalisierung, Arbeitspap.*
- Hone, K. S., & El Said, G. R. (2016). Exploring the factors affecting MOOC retention: A survey study. *Computers and Education, 98*, 157–168. <https://doi.org/10.1016/j.compedu.2016.03.016>
- Kigotho, W. (2018a). Call for urgent 'e-evolution' of university libraries. *University World News*, (523).
- Kigotho, W. (2018b). eLearning – The challenges of implementation. *University World News*, (522). Retrieved from <http://www.universityworldnews.com/article.php?story=20180928141001549>
- Navitas Ventures. (2017). *Digital Transformation in Higher Education.*
- Rwirahira, R. (2018). E-learning boosts brain-gain and reduces costs. *University World News*, (523).
- Siemens. (2017). *African Digitalization Maturity Report.* Retrieved from [https://www.siemens.co.za/pool/about\\_us/Digitalization\\_Maturity\\_Report\\_2017.pdf](https://www.siemens.co.za/pool/about_us/Digitalization_Maturity_Report_2017.pdf)
- van Niekerk, J., & Webb, P. (2016). The effectiveness of brain-compatible blended learning material in the teaching of programming logic. *Computers and Education, 103*, 16–27. <https://doi.org/10.1016/j.compedu.2016.09.008>