
Competency-based entrepreneurship education: analysis of the ‘disruptive innovation’ theory in African HEIs

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Abstract: As a direct consequence of new modes of teaching, higher education has evolved tremendously leading to innovative scholarships that unsettle established institutional structures and academic practices. Within the African context, entrepreneurship is gaining increasing mention as a discipline at HEIs given the potential employment and GDP contribution benefits. Recently, a curriculum delivery shift from traditional coursework to a variety of experiential learning options seems to be the trend. In this high-quality, personalised approach, the focus is not only on the level of competency achieved by the student but also on validating the learning experience. Aiming to contribute to knowledge in this area, the purpose of this paper is two-fold. First, it evaluates the impact of innovative learning initiatives on the current model of entrepreneurship education. Second, it highlights organisational factors and change management practices that facilitate effective adoption of CBE by HEIs. Being qualitative, this study reviews literature on innovative entrepreneurship teaching approaches; considered along with competency-based education and pedagogy in the HEIs; and the four elements of the disruptive innovation theory. Towards facilitating disruptive innovation that transforms entrepreneurship education; relevant recommendations are offered for policymakers.

Keywords: competency-based education; CBE; disruptive innovation; entrepreneurship education and higher education institutions; HEIs.

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1 Introduction

Academic discourse has lauded the importance of entrepreneurship as economic activity (Opute, 2019; Ratten et al., 2017). Given this importance, entrepreneurship education is gaining prominent attention (Anderson, 2015; Iwu et al., 2019; Fayolle, 2008). Within the African context, this trend is also evident – there is a recent surge in higher education institutions (HEIs) offering entrepreneurship education. Irene (2016) attributes this trend to the increasing wave of unemployment as the public sector is no longer able to meet the job demands. The employment substance is further underlined a recent South African study (Iwu et al., 2019) which submits that entrepreneurship can become an alternative for traditional employment. Maximising the employment impact of entrepreneurial activities however hinges on entrepreneurial competencies/skills, for as noted by general education maps and markers (GEM) (cited in Iwu et al., 2019) business success will depend on the competencies/skills of the graduands.

Interestingly, despite the proliferation of entrepreneurship education, studies have shown that 1.7% are graduate entrepreneurs (Matlay et al., 2015). This therefore raises the question of the effectiveness of current structure/approach of entrepreneurship education programmes to meet the challenges of the current socio-economic climate (Volchek et al., 2015). This study was therefore conducted on the basis of evaluating current struction of entrepreneurship education in African HEIs juxtaposed with the innovative learning approaches and the disruptive innovation theory to propose a new approach to entrepreneurship education in African HEIs.

The 21st century is largely defined by a digital revolution and has come to be known as the information age, where rapid advances in technology have engineered a global,

knowledge economy (Irene, 2019; Opute, 2017). These advances shape the content, delivery, and value of higher education. According to Hawkins (2007), there is a persistent and dominant paradigm shift in the educational sector where economic development has become the primary motivation for higher education. To this end, Moravec (2008) incorporates this economic exigency into his paradigm of knowledge creation, stating that the broad medium of exchange in higher education is now goods and services that are designed, customised, and co-created.

Furthermore, stakeholders in HEIs involved in these exchanges require value-added features and returns on their investments (Hanson, 2016). Such technological and cultural changes can be difficult for HEIs, particularly as they occur in an economic crisis environment. This situation is exacerbated by the fact that governments are continuously reducing their educational expenditure. Consequently, students bear more of the tuition costs as stakeholders on all sides advocate for increased accessibility, affordability and quality in HEIs (Immerwahr et al., 2008).

According to scholars (Marshall, 2011; McFarlane, 2011; Norris et al., 2013), technology is poised to become a bifocal driver of organisational change in HEIs. Most HEI leadership seek to address issues of how to improve the learning process of students while addressing the need for students, faculty and parents to be able to select an appropriate learning path that is tailored to individual learners. By so doing, they will be able to fill the gap created by the shortage of teachers and make HEIs viable for stakeholders (Hansen, 2016). Indeed, the 21st century has seen technologies-driven disruptive changes in HEIs and in organisations globally (Irene, 2019). Particularly, online learning has become a common component of higher education in the 21st century (Christensen, 2016).

Presently, HEIs are undergoing fundamental disruptions vis-à-vis the various new tools and virtual learning environment (VLE) as a result of the rapid development of ICT which has inevitably brought about changes in education and therefore the structure of HEIs (Hilmi, 2016). According to Christensen (2008), HEIs are "...moving up the quality chain and losing touch with the mainstream...", and are undergoing a sort of "disruptive innovation and catalytic change". To this end, Christensen et al. (201, p.2), argue that "the theory of disruptive innovation has significant explanatory power in thinking through the challenges and changes confronting higher education.

However, some technological changes have been more short-lived or faddish, causing temporary disruptions in higher education practices only to fade away shortly (Hanson, 2016). One such fad is the massively open online courses (MOOCs). Although it busted into the HEI scene with fervour in 2008, it has since declined and only 8% of HEIs have MOOCs (Allen and Seaman 2015), while a tremendous 87% are either unsure or reluctant to adopt this model.

Nonetheless, there is a myriad of technological innovations in HEIs (Magaña, 2017), and online competency-based education (CBE)¹ is one of the latest in this line of disruptive technologies. The CBE is gaining in prominence, unlike MOOCs, due to the US Department of Education approval (Bergeron, 2013), and is becoming well-known in Africa as a result of current funding streams from the US Government and foundations like Lumina and Bill and Melinda Gates specifically allocated for piloting CBE in HEIs (Bergeron, 2013). Primarily therefore, this research aims to answer the question: can African HEIs improve their value proposition by adopting disruptive technologies especially the CBE for entrepreneurship education?

2 Literature review

African HEIs are currently plagued by numerous challenges such as meeting the learning needs of a student population that is ever increasing in its heterogeneity. Ensuring affordable and accessible higher education for this student population is another challenge. A further notable challenge relates to the need to remain accountable to both domestic and global stakeholders, (which includes students and their families, businesses, professional associations, governments, accrediting bodies, and funders).

Increasingly, CBE is becoming a viable alternative to the traditional model of education, i.e., time-based credit hour model. Conspicuously, the US Department of Education acknowledged CBE in the form of direct assessment as a learning model (see Figure 1) that could be accredited thereby making it eligible for Title IV Financial Aid² in 2013 (Hanson, 2016). Various education associations and regional accrediting agencies, along with prominent funding sources (such as the Lumina Foundation and the Bill and Melinda Gates Foundation), have joined forces to advocate for HEIs to transform CBE into sustainable practice with the intention of totally replace the credit hour model with CBE (Bergeron, 2013). Supporters of the CBE model argue that it gives students a high degree of control over their own learning, consequently allowing them to control the kind of learning experience they have (Hanson, 2016). It also enables them to ‘fast track’ course material where they can demonstrate mastery or have existing skills and high levels of knowledge, and focus more on areas where they do not have mastery.

2.1 History of CBE

CBE became prominent and relevant in the medical profession around the 1960s and 1970s owing to educators trying to integrate scholarly, knowledge-oriented curriculum with vocational training/practice. However, certain aspects of CBE have existed in the USA for the most part of the 20th century (Boritz and Carnaghan, 2003; ten Cate and Billet, 2014; Frank et al., 2010). It was also evident in general education, especially in the Pennsylvania five-year educational plan known as Project 81 (Zaenglein, 1977). The intention was to develop a wide-ranging curriculum with implications for both K-12 and post-secondary education, with focus around the question: “What should a high school diploma guarantee?” [Zaenglein, (1977), p.120]. As Zaenglein (1977) further note, one of the main objectives of Project 81 was to transform the answers to these questions from focus groups and municipal town hall meetings into statements of competence. The outcome was the definition of competence as “the application of a process or skill to knowledge in life situations” (p.120).

The emergence of CBE in the recent history of post-secondary education has become a topic of academic interest and is in line with the ICT revolution, which has given rise to diverse ways of delivering education and data collection on learning experiences of students (Hanson, 2016). This phenomenon was examined by analysing the practices of eight organisations in a 2002 US Education Department sponsored study carried out by the National Post-secondary Education Cooperative affirming that:

“Access to learning opportunities is greater now than at any previous time. The learning paths created by advances in information technology no longer lead solely to postsecondary institutions. Organizations outside of postsecondary education have made significant inroads by providing performance-based learning opportunities built on competencies” (p.8).

According to Morris et al. (2013), one of the institutions studied in the above mentioned sponsored study was Western Governors University (WGU), an online university where teaching is done by means of technology and students' advancement is based on their mastery of content in contrast to the amount of time spent on the course. This initial model of CBE has been improved to the newer models that are currently in operation such as the Carnegie Mellon Open Learning Initiative and Sophia Learning which is a social learning, CBE platform. In addition, there are many other innovators across the country embedding elements of a CBE into their curriculum (Morris et al., 2013).

Although the effort of WGU to design and implement the competency-based model was lauded in many quarters, its influence across the US academic spectrum was very slow. Because of the unconventional nature of CBE and the lack of state funding, there was very little student enrolment until 2003 (Kinser, 2007). It was not until 2008–2009 that there was a real push for the expansion of CBE due to the recession that forced many colleges and universities to embrace CBE's basic concepts of (Hanson, 2016). There were also criticisms by the Center for American Progress levelled at the traditional credit hour and terming it as obsolete in comparison with the WGU's new educational module (Kolowich, 2011). In addition, there was the NBC Nightly News program 'What Works' which was used to promote the CBE model. The Degree Qualifications Profile (DQP) was also released by the Lumina Foundation spelling out reference points for what students should be learning HEIs. This included five different areas of applied learning i.e., broad and integrative learning, intellectual skills, specialised knowledge, broad knowledge, and civic learning (Johnstone and Soares, 2014). Fully dedicated CBE programmes are currently being implemented by more than 200 HEIs (or in the implementation phases). CBE is expected to become disruptors in post-secondary education, delivering high-quality educational experiences that at an affordable price lead to demonstrable learning and mastery (Hanson, 2016).

While there is extensive literature on the CBE model from US and European HEIs, very little knowledge exists from South Africa or other African countries on the CBE model of education. During the last 30 years, the South African Government have attempted to manage the relationship between education, training and work through the national qualifications framework (NQF). Over the years, there has been a rapid increase in the number of NQFs due to fundamental changes in the global economy which have highlighted the growing divide between education, training and the formal recognition of life and workplace experience (Illeris, 2003). Particularly, the South African Government saw the NQFs as a 'steering mechanism' with which the state could achieve the social objective of educational reform and equity (Lugg, 2007). On the one hand too, the post-apartheid NQF was largely an embodiment of the aspiration of the government to transform the apartheid education system into a system that redressed the injustice of apartheid. It addressed issues of access and progression as well as enabled South Africans (particularly minority groups) to become life-long learners (Allais, 2007).

As Allais (2007) and Lugg (2007) pointed out, there was a need to review the NQFs after 13 years due to external factors such as changing dynamics of global business – a demand on skilled and flexible workforce. This then required an integration of education and training, underpinned by systematic coordination, coherence and resource alignment to create a South African culture of lifelong learning. Between 1998 and 2003, all FEIs and HEIs were mandated to submit registration qualifications that must be consistent with NQF requirements and include outcomes-based format. This format was expected to

provide a basis for comparing learning achievements that could create a platform for mobility, portability, progression and recognition of prior learning (RPL).

In the early years of South African democracy, educators and policy-makers drew strongly on developments of CBE in USA, Europe and Australia to set the stage for the implementation of the outcomes based education (OBE) approach. Drawing on this approach, it is generally accepted that competence could be expressed in qualification statements without “prescribing any specific learning pathway or programme” (Schmidt, 2017).

However, according to Steiner-Khamisi (2014), the CBE debate in South Africa has raised some concern that CBE could be too ‘behaviourist’ and ‘atomistic’ and narrowly focused on specific ‘items’ of skills performance. It highlighted the probability of knowledge and skills referring only to performances that is observable and measurable, thereby excluding the ‘interiority’ of the learner and reducing assessment to a checklist approach of ‘correct behaviours’. Consequently, in the mid-1990s, the South African Department of Education adopted a policy to use the term outcomes based education to ensure a more inclusive and ‘constructivist’ approach to learning that does not only reduce competencies to merely ‘observable performance’ but emphasises the learner’s consciousness and awareness (Keevey, 2013; Keevy and Bolton, 2011). With regard to psychological learning theories, this was a paradigm shift from the behaviourism advocated by Skinner to the constructivist learning theories advocated by Piaget and Vygotsky (Chisholm, 2007).

2.2 *Competency-based entrepreneurship education*

According to Igwe et al. (2019), understanding entrepreneurship in HEIs is a core research space that is not only ‘interesting’ but also ‘challenging’ for universities, governments and the business sector. Primarily, entrepreneurial education seeks to train people with entrepreneurial intentions (Rasmussen and Sørheim, 2006). Traditional methods therefore, were designed for the transfer of knowledge through a lengthy process of providing necessary information to learners, having them memorise the information and providing them with examples that illustrates the application of the information through case studies (Igwe et al., 2019). As documented by Igwe et al. (2019), this method does not allow learners to individually develop skills needed for problem solving without the aid of their teachers. Consequently, they are unable to think entrepreneurially upon graduation (Igwe et al., 2019). These arguments among many others have led to many criticisms of existing business education programs especially for not being dynamic and transformational enough to meet the demands of the business environment demands. One such criticism is that business education is task-oriented and does not highlight the multi-dimensional complexities of business issues (Solomon and Tarabishy, 2005). In a study of entrepreneurship education in South Africa, Igwu et al. (2019) found that curriculum and course content may be relevant but not adequate.

In various fields of study, the general consensus among scholars is that academic programs should be designed to meet societal needs (Mulder et al., 2010). This view is also supported by Dana (2001) who inferred that in order for training programmes to be successful, it should also be relevant to the host environment. In his study of entrepreneurship education and training across Asia, Dana (2001) found that the learning objectives and methodologies were varied across the countries surveyed (i.e., India, Indonesia, Malaysia, The Philippines and Singapore). He therefore concluded that there is

a need to develop alternative methodologies for teaching entrepreneurship in transitional economies (p.413). Accordingly, Shinato et al. (2013, p.204) concluded after reviewing the current state of entrepreneurship education in Japan that there is a need to improve the quality of entrepreneurship education by developing methodologies which will enable ‘information to be examined and teaching skills to be shared among people concerned all around the country’. These differing views have led to the push for the application of the CBE model to entrepreneurship (entrepreneurial and enterprising) education not just in HEIs but also in other educational settings (Izquierdo, 2008).

Current debate on CBE still does not answer the question of whether educators can teach entrepreneurial education. In the literature, the definitions of ‘entrepreneurial’ and ‘enterprise’ education are ambiguous and misleading. For example, Erkkilä (2000) conceptualises entrepreneurial education as encompassing both enterprise education and entrepreneurship education. To this end, enterprise education is more focused on personal development, mindset, skills and abilities in many European countries, whereas entrepreneurship education is more focused on specific context of setting up a business and becoming self-employed (QAA, 2012). On the other hand, the USA places more emphasis on entrepreneurship than on business education. There is also the unanswered question of whether or not the model of entrepreneurial education is fit for young learners as more in the HEI domain is taught entrepreneurship. According to Morris et al. (2013), the current model empowers HEI students theoretically and practically, particularly those with business/entrepreneurial intentions. However, the mode of delivery varies depending on the module. For instance, Madichie and Fiberesima (2019) suggest that the curriculum for business modules (in the context of the institution surveyed) is structured in the traditional time-based format with extra time allocated on separate business modules considered a progression route.

With the increasing academic focus on teaching the basics of ‘entrepreneurial’ education in a primary or secondary school setting, some researchers have proposed a new action-based approach that suggests ‘learning by doing’ (Rasmussen and Sørheim 2006). According to Krecara and Coric (cited by Igwe et al., 2019), entrepreneurship education should include activities that allow students to engage with entrepreneurial practices and gain vital experience using the ‘learn-by-doing’ concept, an approach captioned ‘experiential learning’ by Cooper et al (2004). Hoover and Whitehead (1975) describe experiential learning thus:

“Experiential learning exists when a personally responsible participant(s) cognitively, affectively, and behaviorally processes knowledge, skills, and/or attitudes in a learning situation characterized by a high level of active involvement.” (p.25).

There is also a need to establish the connection (if any) between skill-based, experiential and entrepreneurial approaches as well as business approaches. This will include a validation process ensuring the inclusion of faculty members delivering both enterprising and entrepreneurial models of competency education. Traditionally, the core values associated with entrepreneurship/enterprise education are response to challenges, creativity and independence, mastery of new things, initiative taking and extending learned skills beyond the learning environment [Seikkula-Leino, (2007), p.50]. These ‘acquired’ traits are the leveraging input from social interaction, education and value-based schooling (Pulkkinen and Launonen, 2005; Laukkanen, 2008). Thus, the core values linked to entrepreneurial and enterprise education could be fostered through the

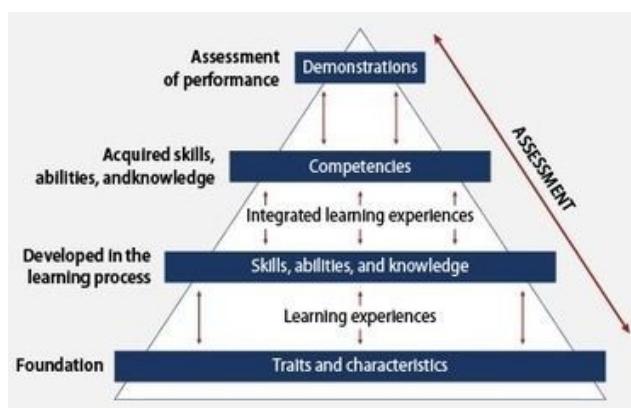
CBE system. This approach is promoted by the Finnish Ministry of Education. In their policy document ‘Yrittäjyyskasvatuksen suuntaviivat – Guidelines for Entrepreneurship Education (2009)’, the Finnish Ministry of Education identified the core values that the primary education system needs to promote in order to foster the development of an entrepreneurship-like attitude in the future of the schools. They include; “innovativeness, ability to take risks, responsibility taking, problem-solving ability, catching challenges, thinking and cooperation” (Kyrö et al., 2007). This approach is also supported by the Japanese Government with the enactment of the National University Reformation Law. This law revolutionised entrepreneurship education and led to the creation the professional graduate school system in 2003 (Shinato et al., 2013). According to Shinato et al. (2013), the policies were aimed at reforming national universities to significantly drive new ventures, especially university-originated ventures in order to address the problem of low rate of entrepreneurial activities.

Table 1 Levels of performance model

Level	Title	Description
1	Novice	Someone with little or no experience in a given field and can only perform under direct supervision, tutelage and guidance.
2	Learner	Someone with some experience a given field that is able to perform with minimum supervision, tutelage and guidance.
3	Competent	Someone who can perform in a given field regularly and effectively without supervision, tutelage and guidance but from time to time require support and retraining in order to tackle new challenges.
4	Skilful	Someone who is skilled or experienced in a given field and can not only performs without supervision, tutelage and guidance but occasionally need a supervisor and is also able to teach and provide technical support for others on the job.
5	Expert (specialist)	Someone who is very skilful and very experienced in a given field, possessing high intuitive understanding, does not need a supervisor, and can act as a supervisor and mentor or innovator.

Source: Adapted from Banner (1984)

Figure 1 A conceptual learning model (see online version for colours)



Source: US Department of Education (2001)

Various degrees of entrepreneurial skills such as entrepreneurial motivation, characteristics, social role, personal development, knowledge and skills should be considered in applying the CBE model to entrepreneurial education (see Figure 1). These entrepreneurial skills are expressed in different degrees at start-ups, growth, expansion or social responsibility (Izquierdo, 2008).

The competencies model can be used to measure levels of mastery or expertise achieved by students, according to Benner (2009) (see Table 1). Supporting that viewpoint, Gillies and Howard (2003) add that the model can be used to determine areas and mastery levels to identify areas of entrepreneurial skills to prioritise.

2.3 Theory of disruptive technology/innovation

Disruption is a term used to describe a process where an established business can be effectively challenged by a small business with little resources (Christensen et al., 2015). In particular, while the larger established companies focus on improving products and services for their most demanding and/or profitable customers, they tend to exceed the expectations of some segments while overlooking the needs of the less profitable segments (Christensen et al., 2015). New entrants or existing competitors that prove disruptive start by successfully targeting those overlooked segments and gain foothold by delivering more appropriate products and services at a lower price (in terms of functionality and frequency) (see also Opute, 2019). As a result, disruption occurs once mainstream customers embrace the offerings of the entrants on a large scale.

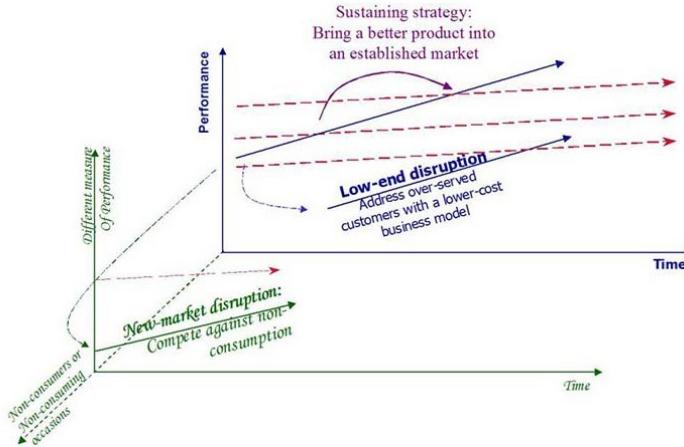
Disruptive innovations therefore occur in two types of markets that existing larger organisations overlook (Christensen et al., 2011). These are:

- Low-end footholds which exist because organisations typically try to meet and exceed their most profitable and demanding customers' expectations while paying less attention to less profitable customers. This opens the door to disrupters that initially focus on servicing the disregarded, low-end customers with a 'good enough' product/service.
- New-market footholds occur when a blue ocean market is disrupted and essentially a way of turning non-consumers into consumers is found. A good example is that Xerox developed the photocopying technology that targeted large corporations and charged high prices to deliver the performance those customers needed. This made it impossible for school librarians, bowling-league operators and other small clients to compete. Thus, they had to deal with carbon paper or mimeograph machines until the late 1970s when a new market was created by challengers who introduced personal copiers and offered individuals and small organisations an affordable alternative.

By definition, a disruptive innovation starts from one of these two footholds (see Figure 2) and it is misleading when the term is used to refer to a product or service at a specific point in time, rather than referring to the evolution of that product or service over time (Christensen et al., 2011). Minicomputers, for example, were disruptive when they first appeared on the scene not only because they were low-end upstarts, nor because they were later considered superior to mainframes in many markets; they were disruptive because of the way they evolved from the low end of the market to the mainstream. Nearly all innovations start as a small - scale experiment, disruptive or not. Disrupters,

however, tend to focus on getting the business model right, rather than just the product (Christensen et al., 2011).

Figure 2 Market entry for disruptive innovators (see online version for colours)



Source: Christensen et al. (2011)

Currently, higher education is fundamentally being disrupted by various innovations (Irene, 2019). Rapid advancement of ICT has brought about various changes in education and HEIs. According to Christensen (2008), colleges and universities are "...moving up the quality chain and losing touch with the mainstream...", they are undergoing a form of "disruptive innovation and catalytic change" (p.43). Disruptive innovation is poised to change social practices, the way we live, work and learn. Christensen et al. (2011) identify two vital features of disruptive innovation with regards to HEIs:

- 1 Technology enabler: Online learning is considered as a technology driver in terms of technology enablers, which is disrupting the business model of HEIs and rapidly influencing the educational landscape. Another disruptor enabled by technology is the MOOCs that are freely available worldwide, encouraging peer learning and awarding certificates upon completion (Hilmi, 2016). MOOCs also have the added benefit of unlimited participation making it viable for all stakeholders (high returns for the institution and cost effective for the student).
2. Business model innovation: CBE is considered a disruptor as it forces HEIs to rethink their strategy in terms of business model innovation. CBE is capable of changing the existing business models of educational institutions and bringing the educational enterprise a different value proposition (Christensen et al., 2011).

2.4 CBE as a disruptive innovation

Since the 1980s, HEIs have increasingly adopted and administered business principles and corporate management practices (Alfred, 2006; Cohen and Kisker, 2009). According to the report of Norris et al. (2013) for the Society for College University and Planning (SCUP), the adoption of such principles is part of higher education's transformation into

the knowledge age, which Slaughter and Leslie (1997) suggest involves the packaging, commodification, and capitalism of academic knowledge. Some of the features of the knowledge age include: “technology synergies; just-in-time learning; perpetual learning; unbundled learning experiences based on learner needs; seamless, integrated comprehensive and open systems; and point-of-access payment for exchange of intellectual property based on value added” [Norris et al., (2013), p.21]. The US Department of Education (2006) suggests that value, as a function of educational access, cost, and quality has become a primary concern for HEIs and their stakeholders. In order to acquire, maintain, and demonstrate this value in the face of burgeoning competition from other colleges, universities, and third-party providers of education, the 21st century HEIs must continually reinvent itself (Norris et al., 2013).

To this end, Christensen and Eyring (2011) propose the use of disruptive innovation theory in the 21st century to explore such university adaptation. This theory highlights two types of innovation:

- 1 sustaining innovation which makes an existing product ‘bigger or better’
- 2 disruptive innovation, which “disrupts the bigger-and-better cycle by bringing to market a cheaper alternative that is not of the same quality as the traditional or original version and more user friendly” (p.xxiv).

Rather than compete with the mainstream market, by introducing an appealing alternative to underserved or non-consuming customers, a disruptive innovation disrupts it. Disruptive innovations comprise four interrelated elements:

- 1 technology enabler – refers to automated and integrated processes
- 2 business model change – increased process delivery efficiency and affordability due to innovation
- 3 new value network – innovation’s ability to complement other business services
- 4 cross-industry standards (Christensen et al., 2011).

Online learning is a disruptive innovation model (Soares, 2012) and while fully-online CBE can be seen as a sustaining innovation in terms of online learning, it is also disruptive in providing an alternative that integrates two separate ideas, i.e., online learning and competency-based learning. The ability to deliver fully online programs means that the online CBE (both the WGU and direct assessment models) can be considered a technology enabler.

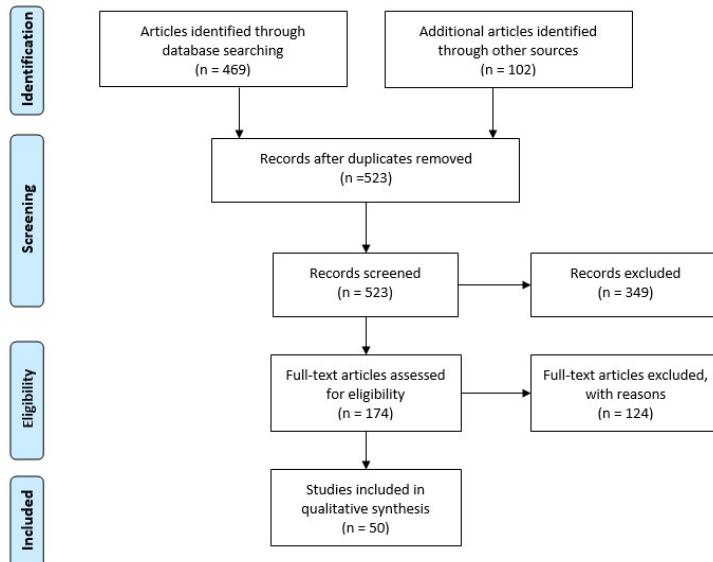
Furthermore, CBE enables working adults to have a customisable and flexible learning experience suited to their needs. Accordingly, Cavanaugh (2013) asserts that, “each student comes to us at a slightly different place on the continuum of learning,” and CBE’s goal is to meet students “at the edge of their learning” (p.3). By allowing students to work at a self-directed pace and schedules, the CBE is a more efficient and effective approach to educate. Also, this approach has costs reducing potential for students who are technologically savvy, independent, and disciplined learners. Therefore, CBE is poised to change the existing business models of educational institutions and bring a different value proposition to the educational enterprise.

Finally, while CBE has effectively enabled new technologies and stimulated changes in the functioning of HEIs, its value network and industry-wide standards still need to be

validated. According to Hanson (2016), this process continues in seven regional accreditation commissions that developed the Competency-Based Education Framework (published in June 2015). In September 2015, the US Department of Education also published its Competency-Based Education Experiment Reference Guide. Other initiatives such as the 21st Century Skills Partnership and the Future Work Skills Institute for the Future 2020 highlights the work of strategic partners in defining student outcomes. The Degree Qualifications Profile (DQP) was developed by the Lumina Foundation in partnership with regional accreditors. The goal is to provide “a baseline set of reference points indicating what students should know and be able to do at each degree level, regardless of the study field – a framework that can be used across the country to define learning outcomes” (McKiernan, 2011; Lin et al., 2018). In line with the DQP and its own valid assessment of learning in undergraduate education (VALUE) rubrics, the Association of American Colleges and Universities (AAC&U) is using funding from the Bill and Melinda Gates Foundation to develop GEMs’ primary goal is to “help diverse and mobile students today acquire skills and demonstrate the competencies outlined in the DQP”, with emphasis on demonstration of skills through hands-on activities, projects and portfolios (AAC&U, 2014). Many institutions have begun using these resources to develop and integrate competencies and corresponding student assessments with the ultimate goal of standardising and assuring the CBE programmes’ credibility. Soares (2012) therefore advocates ongoing experimental collaboration to develop the business models and value networks needed to realise CBE fully on a national scale. In essence, the involvement of so many stakeholders working to validate and standardise CBE further reinforces this phenomenon as a disruptive innovation that could have a lasting impact on HEIs.

3 Methodology

This qualitative research uses a systematic review (Silverman, 2016) to present a detailed review of articles published in various academic journals focusing on education, pedagogy and technology over the past decade on the competency-based model of education in HEIs. The qualitative strategy is employed in this research because according to Dana and Dana (2005), using a quantitative strategy sometimes limits the ability of the researcher to explore context and environment. A qualitative approach also affords researchers some flexibility as the research plan can be adapted or modified as required (Dana and Dana, 2005). This is particularly important as this study utilised only secondary data and it was vital that we employ a strategy which involved an inductive approach with some form of qualitative interpretation to enable an understanding of the phenomenon being investigated (Dana and Dana, 2005). Therefore, systematic review was chosen for the purpose of this paper to enable the researchers use a precise question to produce evidence that can underpin issues concerning disruptive innovation in HEIs and make a case for the introduction of the CBE model in African HEIs. According to John and McNeal (2017), systematic reviews use systematic and transparent methods to identify, select, and evaluate relevant published literature on a specific topic or question. Moreover, when undertaking an exploratory research in developing fields, it is necessary to utilise different strategies than those employed in classical research of familiar domains or phenomena (Dana and Dana, 2005).

Figure 3 PRISMA flow diagram (see online version for colours)

There is an overwhelming retrospective amount of literature on Entrepreneurship Education (EE) (Fellnhofer, 2019). This paper systematically explored literature on EE in peer-reviewed published work between 1975 and 2019. Commencing with a quick electronic search, it was found that CBE has been the focus of many scholarly research with growing interest as a consequence of growing challenges facing HEIs and the need to provide quality and affordable education. Various databases were scanned using specific and precise search terms (Silverman, 2016). A similar systematic search of grey literature was also carried out. The Scopus database was chosen primarily to ensure that only high-quality studies were included. Therefore, only peer-reviewed articles excluding books, book chapters, conference papers and other non-referred publications were considered for review. The inclusion criteria included peer-reviewed, Scopus indexed articles that have been published in English over the past decade. However, we have opted to include Hoover and Whitehead (1975) as the propositions and assumptions deduced from their research still hold and more recent studies have continued to recognise their pioneering effort. The terms used for these searches included ‘disruptive innovation in HEIs’, ‘competence-based education’, ‘technological approaches to entrepreneurial education’, ‘competence-based entrepreneurial education’ and several other phrases. Next, full-text research papers were extracted using data extraction tools such as Google Scholar, Science Direct, Springer link, Emerald insight, research gate. In order to validate the articles, rigor of conduct and strength of evidence were assured by cross-referencing and undertaking a duplicate check.

According to Moher et al (2009), when undertaking a systematic review, a preferred reporting items for systematic reviews and meta-analyses (PRISMA) statement is necessary. The PRISMA statement details the evidence-based minimum set of items used for reporting in this systematic review as shown in Figure 3. Finally, the actions and

directions of this paper are based on evidence from the reviewed articles selected for this paper.

4 Findings

Many African HEIs (colleges and universities) – referred to here as ‘traditional universities’ are tumbling into economic crisis despite consistent increases in overall spending across higher education. Analysts have recently raised concerns that higher education costs are rising faster than health care costs (Christensen et al., 2011). Over the past three decades, undergraduate tuition has risen at an alarming rate annually. This is not unique to African HEIs as the American Institute for Economic Research reported that from 1990 to 2009 college tuition fees increased by 274.7 %, making it the fastest rate of increase for any product or service other than cigarettes and tobacco products (AIER, 2010). This makes the rate of rising HE costs higher than hospital services, nursing homes and day care for adults, which had an increase of 245% over the same period. It should also be noted that in the same period, the overall consumer price index increased by 71%. To help reduce the higher education cost burden, HEIs benefited from supports in the form of alumni gifts, private university endowment earnings, state tax revenue subsidies, and federal subsidies used (Christensen et al., 2011), As a result, the costs borne by the students in many cases are not actual costs. However, since HEIs exhaust these funding mechanisms, the tuition burden is imperatively shifted to the students. This situation is further exacerbated by severe government budget crises, thereby increasing the likelihood of more radical and drastic future increases (Christensen et al., 2011).

Despite the annual increase in tuition fees, African HEIs are facing outdated economic models that are no longer fit for purpose. This means that HEIs are increasingly out of reach for individuals from low-income families and other minority groups who have long been marginalised and unable to afford education (Friedrich, 2014). This raises new issues of accessibility as well as affordability. These shifting dynamics make it imperative to shift the focus of higher education policy from how to make higher education affordable to how to deliver affordable quality higher education that can improve the students’ lives together with the fortunes of their country. When higher education is fundamentally affordable (lower in cost, not just price) it increases accessibility (Christensen et al., 2011).

As documented earlier, African HEIs currently faces multiple challenges, from the point of meeting the learning needs of an increasingly diverse student population, keeping higher education affordable and accessible to this student population, and being accountable to stakeholders, both domestic and global, that includes students and their families, businesses, professional associations, governments, accrediting bodies, and funders.

To meet these challenges, it is argued that African HEIs should discard the traditional, time-based education credit hour model and embrace CBE, which is widely accepted by US and European HEIs.

4.1 The value proposition and structure of African HEIs

HEIs are traditionally organised in departments as it optimises the ability of faculty members to interact and have research outputs (in academic journals) around similar interests (Christensen et al., 2011). Depending on their interests and needs, students move from one academic department to another for modules. Furthermore, the fact that good HEIs have one of everything means the faculties can serve a wide range of students' interests. HEIs currently allow students to co - create learning through involvement in curriculum design in some instances (Hansen, 2016).

According to Christensen et al (2011), only few HEIs actually calculate the "direct labour content" of their services. There is no known measured 'burden rate' that encapsulates the portion of total costs incurred in the process of teaching students and conducting research compared to the complexity-driven overhead expenses required to manage the admission- graduation process. Therefore, they concluded that attempting to calculate this cost will be particularly difficult because the 'direct labour' in a university (faculty) spend most of their time in 'Pontiac-esque' overhead activities such as scheduling, expediting, repair and re-work, record keeping; and moving, storing, and managing human and non-human resources. To this end, Allen and Seaman (cited in Christensen, 2011) suggest that the overhead burden rate could be between 4.0 and 5.0 in traditional HEIs. This means that for every dollar spent on teaching, evaluation, and research, HEIs spend about four to five dollars on overhead.

Christensen et al (2011) used the business model of the plants in Pontiac and Maysville to explain the 'Pontiac-esque' model. According to them, traditional HEIs seeking to imitate prestigious institutions such as Harvard are adopting the Pontiac plant structure to optimise their faculty's 'solution shop' activities. In this instance, value-added activities such as teaching are trivially forced to fit into this structure. On the other hand, the low-cost HEIs³ or low-price HEIs are structured like the Maysville plant. They are designed not as solution shops to enhance the faculty's ability to produce research outputs, but as value-adding process organisations designed to boost students' flow through the university. While typical traditional HEIs incur operating deficits of approximately 10% or more of their revenue, low-cost or low-price HEIs report operating profit of approximately 30% (Christensen et al., 2011).

The cost advantage of these disruptive low-cost HEIs, is further estimated at 40% when they implement the CBE model of education rather than the traditional time based/ credit hour model (Christensen et al., 2011).

4.2 The quality of African HEIs

There is no consensus on the definition of quality in terms of HEIs as the meaning evolves from the point of view of the consumer simultaneously with the wave of disruptive decentralisation in the education sector (Christensen et al., 2008). Indeed, African HEIs are increasing coming under criticisms from the point of view of the faculty (the key constituent group and in a sense the customers) because their faculties conduct little research and have less comparative publications in high impact academic journals. More often than not, African students tend to define quality in terms of cost and convenience (including opportunity costs). According to Botha (2010) in terms of lowering tuition, for-profit African HEIs and other online/distance learning disruptors have not effectively competed. To the contrary, many of them charge higher tuition fees

than state-supported schools, which are heavily subsidised so they appear to be low-cost (especially in places like Nigeria and South Africa). This means that students are satisfied and actually pleased that low-cost HEIs offer courses all year round regardless of the disparagement of traditional HEIs. Consequently, over 80% of African students attend low-cost HEIs (STATSA, 2017).

Second, it is important to examine the expectations of students about their HEIs in terms of value proposition. Taking the case of most 18-year-old graduates of high school, most of them regard the HEI as an out-of-home transition to independent adulthood and desire the institution to provide this service. Learning and graduating from a highly regarded institution are simply dimensions of their expectations. On the other hand, students typically look up to these low-cost HEIs with a laser-centric expectation: “help me to get better jobs” (Christensen et al., 2011). Therefore, students who ascribe to these HEIs do so for different reasons and as a result the meaning of quality differs significantly to them. It should be noted, however, that the value placed on the certificates of various organisations makes it imperative that employability be considered a major factor in the choice of HEIs for students.

Third, online learning technologies are now an upwardly scalable mechanism in their caches in relation to the quality of low-cost HEIs (Estelami, 2017). This therefore indicates that, over time, the African HEIs will have to figure out how to do better and better the “transition to independent adulthood” work. African HEIs urgently need to redefine their value proposition and adopt a student-centred approach that is more likely to cause disruption. This disruption will upset the status quo, focus on student-centred learning, change relationships, sharpen our insight, and design instruction to increase learning and lower costs (Morris et al., 2013).

4.3 Disruption and the future of African HEIs

African HEIs are under enormous pressures from all sides which shows the pertinence for strategic change. Typically, the HEIs are affected by daunting challenges: dwindling financial support by government due to budgetary concerns, affordability of tuition, and stakeholders demanding HEIs to be more efficient, innovative and productive in terms of learning and retention of students.

At the onset of the technology boom, government and policy makers viewed technology as a vehicle to transform higher education (Robinson et al., 2016). However, equipping the HEIs with computers has not enabled the desperately need magical transformation in African HEIs. Technology has potentially disruptive power and can cause interruptions to usual practices and policies. By introducing technology to African HEIs, faculty and students are forced to think differently about ways to achieve course aims and objectives instead of continuing with old unproductive curricula and methods of delivery. Technology encourages reflections and stimulates new patterns of thinking (Christensen, 2011). Eventually, a new understanding of the learning process is triggered and new curricula emerge. This is essentially what the disruptive innovation theory encapsulates.

In view of the above discussion, it is necessary to understand what disruption theory and technological tools with the potential to disrupt existing teaching and learning models would mean for African HEIs’ future. ‘Disruptive innovation’, as already established in the literature, transcends software and technological programmes, but includes models and approaches. Disruptive innovation in HEIs will upset the status quo, focus on

students -centred learning, change relationships, sharpen our insight, and design curricula to increase learning and reduce costs. While not all tools will be truly disruptive, disruptive ones will likely require a change in our usual thinking, reviewing procedures, disregarding certain assumptions, and introducing new perspectives that will open up new pedagogical approaches and models (Christensen, 2011). True disruptive innovations enabled by technology in African HEIs will engineer new ways of thinking, provide opportunities for the changes desperately needed for higher education to survive and thrive in Africa.

The most acceptable disruptive innovation in terms of education thus far has been online learning (especially in the African context). This disruptor in its purest form is seen in the form of the internet, wikis, blogs, social media, mobile devices, open source tools, open education, round the clock borderless education, social bookmarking, site sharing (for photos, videos, music, files of all sorts), RSS, wireless connections, Google, Creative Commons, instant messaging, internet telephony, social networks, free software, digital cameras and recorders, cloud computing, cheap storage, groupware, broadband, and virtual worlds (Hilmi, 2016). According to the US Department of Education, online students performed better in comparison to contact students, while blended learning produced the most reward in terms of (Friedrich, 2014; Morris et al., 2013; Hanson, 2016):

- time spent on tasks
- students having more control over their learning
- providing more opportunities for reflection.

While online and blended learning have become commonly accepted models of learning in the developed countries, Africa still lags considerably behind in the implementation of this model. This is largely due to the lack of infrastructure to implement this model of education in most African settings. As commonplace as the internet has become, it is still a luxury that most African students cannot afford even in countries like South Africa where there is still a wide gap between the rich and poor (Irene, 2019). South Africa has the highest urbanisation rate in the continent, but the internet penetration rate of the total population remains at 27% with the choice device being the mobile phone (OECD, 2017). While South Africa has one of the highest mobile penetration rates in the world with (78% of the population using mobile phones), not all mobile phone users have access to the internet due to cost. The 2011 report of Digital Statistics SA shows that 70% of internet activities in South Africa are social media related.

Given therefore the challenges faced by African HEIs to effectively implement the blended learning model, the competency-based model (especially in entrepreneurship education) could become a viable disruptor and can transform higher education in HEIs. By adopting the competency-based model, degrees will be awarded based on competency, rather than on the number of hours spent in classes and exams passed. Students can therefore move at their own pace, and instead of being charged by the credit hour, they are charged a fixed rate for a six-month term. The student progresses upon demonstrating mastery of a skill or a set of knowledge. Students can learn when it is convenient for them (given that it is online) and at the pace that is right for them. The learning can therefore be constant, so that students only progress once they have fully

understood a set of concepts or a given unit. The benefit of adopting this model will be increased for four reasons:

- Continuous improvement will be guaranteed.
- Students, faculty, and parents can select a learning pathway that suits individual learners.
- Issues of teacher shortages will be addressed.
- Falling costs will no longer be a factor

5 Conclusions and implications

CBE as a practice in higher education offers an alternative learning model with operational implications around the roles of faculty and staff, the use of technology, student engagement and assessment, and the influence of external stakeholders. The literature review situates direct assessment CBE as a disruptive innovation. In addition, it builds a theoretical framework around the diffusion of innovation with the aim of exploring how HEIs have adapted their operations to implement CBE.

Understanding how CBE has been propagated in the US and European countries through HEI may enable African HEIs to determine whether to adopt this innovation and its operational strategy. Such knowledge may further benefit the higher education industry, creditors, and policy makers in their quest to standardise and evaluate the implementation of CBE effectively.

As stated earlier, the evolution of HEIs is best managed at the corporate level rather than at the level of the business unit because business units are not structured to evolve. Consequently, officials (i.e. elected state officials and boards of higher education) are vital stakeholders in responding to this crisis and they need to honestly engage with two vital questions:

1 *Is the traditional universities' business model sustainable in the African context?*

Traditional HEIs have not been disruptable historically, therefore they have competed only on a sustaining-innovation basis, which essentially involves increasing tuition by 10% per academic year in order to remain competitive. Until now, students are not bearing the full associated cost because the HEIs have succeeded in subsidising tuition through donations from alumni, endowment earnings, and government funding. With the donations and grants/funding dwindling, the tenability of this approach is uncertain, particularly as evidence shows that online education is a disruptive technology that can be upscaled. It is our view that only very few HEIs would suggest 'yes' to this question.

2 *Is providing the best possible postsecondary education and training the primary obligation of African HEIs?*

To understand their roles as caretakers of institutions that have historically provided higher education, officials (i.e., elected state officials and boards of higher education) need to determine primary stewardships. Historically, as the HEIs' mandate was clearly expressed, this was not an either – or decision, but one of 'it should be now'. If officials frame their responsibilities to align with the electorate's needs, then HEIs that implement technology-enabled models including the CBE must be seen as allies in the struggle to

effectively provide higher education and training. Essentially, if officials view their responsibility as one of ensuring the health of today's higher learning institutions, then cost reduction and quality education through the adoption of disruptive innovations such as CBE must be considered vital, particularly in terms of African HEIs survival.

While entrepreneurship education has been delivered in the traditional credit hour model for the most part, the emerging approaches identified in this paper, such as online learning, blended learning and CBE, can dramatically and rapidly change the way students are trained in entrepreneurship. One might argue that these changes do not reflect an evolutionary outlook for education in entrepreneurship, but are of a more revolutionary nature. It is for this reason that the rate of change resulting from the use of these educational technologies may not allow many instructors and business schools to undergo a slow evolutionary transition, but rather demand a rapid response to revolutionary market changes triggered by a handful of institutions that proactively take advantage of these emerging disruptive innovations. In addition to the disruptive innovations discussed in this paper, distance learning for business schools is continually improving as this mode of teaching is increasingly gaining public acceptance. Consequently, the adoption of the CBE model will provide the students with additional benefits. While many people may have discounted the idea of earning an online entrepreneurial or business degree two decades ago, research has shown a shift in online degree perceptions by employers and academics (Allen and Seaman, 2015; Metrejean and Noland, 2011).

Despite this shift in perceptions and the growing trend in higher education, the acceptance and implementation of disruptive innovation in business and entrepreneurship education has unfortunately been difficult for many business faculties. As discussed earlier, the majority of faculty in business schools were themselves trained in the traditional credit hour model, and many may be unfamiliar and uncomfortable with emerging disruptors such as the CBE. Consequently, they are reluctant to adopt these new non-conventional models of education leading to lack of faculty participation in the CBE initiatives with nearly half of university faculty questioning the legitimacy and actual relevance of disruptive innovation (Allen and Seaman, 2015). According to Christensen (2016), failing to embrace disruptive innovation in higher education will be equivalent to the failures by industry practitioners in many failed industries.

Finally, it must be noted that it is no longer the case that technological barriers or lack of student access to the Internet are the primary challenges facing African HEIs. Rather, human factors associated with faculty training and motivation seems to be one of major factors. Most dominant factor is the cultural and technological gap that exists between teacher and student. Therefore, while the disruptive innovations are enablers, it is crucial that business school administrators proactively and assertively familiarise their faculty with these innovations in order to motivate and mobilise them to recognise and embrace the benefits of the CBE not only to the students but for the survival of African HEIs with utmost consideration for the technological revolution that is still active and dynamic.

5.1 Recommendations for HEIs

For traditional HEIs, the cost is mostly in the overhead due to the complex nature of their business models. The major factor influencing the cost position is that they are organised to optimise the completion rate of students, rather than being organised to optimise

faculty's ability to do research. There is an urgent need for restructuring to optimise the completion rate by focusing more on one value proposition i.e. quality. African HEIs need to aspire for excellence in every field of research and teaching and to provide any course of study that students may want. Choosing an area of excellence could well be the beginning of a permanent solution for almost all African HEIs as through this focus they can reduce complexity. Such complexity reduction will lead to substantial cost reduction. Reduction of staff will not solve the economic viability problem in the short or long run, rather it may drive out quality faculty and exacerbate and accelerate the demise of HEIs. HEIs in the US and other European countries that have chosen this approach appear to have kept down fee increases below the 10% annual increase; however, they are still not competitive and are currently rethinking their strategies to adopt and implement disruptive innovations.

There is great opportunity for HEIs that seek to become the best teaching universities in Africa. Established HEIs do succeed, however galvanised through sustaining innovations. Administrators in traditional HEIs therefore need to structure online learning and CBE as a sustaining innovation that helps meet the quality needs of students. They need to essentially use it to disrupt the traditional classroom experience (Christensen, 2011). Adopting this approach offers a good strategy to leverage existing resources to implement the CBE and online model at a marginal cost and grow significantly.

5.2 Recommendations policy makers

It has already been established that African HEIs are faced with enormous challenges that may lead to their collapse, if not looked into. Policy makers, as core stakeholders must therefore take an active stand in this regard. As stated earlier, the time has come to award degrees based on competency, rather than on the number of class hours and on passing exams. By so doing, students can progress at their own pace, and instead of being charged by the credit hour, they are charged a flat rate for a six-month term. This will enable the HEIs to provide quality and affordable higher education to African students.

The CBE and Online models are fast becoming the models of choice for several HEIs overseas who are rethinking the funding strategies of traditional institutions and looking to continue to be self-sustaining and competitive. Therefore, adopting these models for African HEIs will be beneficial for all stakeholders. The CBE and online models also allow actionable assessments to be easily embedded into learning courses and make it possible for students to advance past concepts and skills they understand and have mastered, and rather focus their time where they need. Currently, most of the conventional ways of measuring education cannot be applied to this disruptive innovation as they focus on inputs such as time spent on modules, money spent per student (thereby affirming institutions that are expensive), and the ratio of students to teachers. Policy efforts from the Departments of Education in Africa that intentionally lock in the credit hour as the unit of measure based on seat time, hold back innovation to the detriment of students (Robinson et al., 2016).

Veering toward the recognition of mastery of specific competencies where time is variable could potentially make the recognition of lifelong learning a possibility, whereby people accumulate expertise over time through both formal and informal means. Policy makers need a shift in focus from how to make higher education affordable, to how to make a quality post-secondary education affordable. The way forward is disruptive innovations such as the CBE.

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Notes

- 1 Competencies defined through multiple stakeholder input (e.g., employers, accreditors, academic subject matter experts) and with real-world application.
- 2 Title IV Financial Aid is federally funded aid such as Federal Pell Grant, Federal Supplemental Educational Opportunity Grant (SEOG), Federal Perkins Loan, Federal Subsidized and Unsubsidized Direct Loans.
- 3 Low-cost refers to the amount of spends per student, and is significantly different from low-tuition.