

RESEARCH ARTICLE:

The Itinerant Curriculum as an Alternative Pathway for Responsiveness in African Higher Education in the Era of the Fourth Industrial Revolution

George Fomunyam Kehdinga¹

Abstract

The Fourth Industrial Revolution is upon us, and it has serious implications for education globally. The educational curricula used in the first, second, and third industrial revolutions may not necessarily be useful in this era of the Fourth Industrial Revolution (4IR), as societal and organisational demands have changed. Curricula in African higher education needs therefore to adapt to the changing demands of the Fourth Industrial Revolution, or else students may be unprepared for the demands of future organisations and the society. Therefore, to enhance the responsiveness of the curriculum in Africa, this paper examines the itinerant curriculum as an alternative pathway to other highlighted curricula in the literature. The study posits how the itinerant curriculum can be used to achieve curriculum responsiveness, economically, culturally, disciplinarily, and in learning. The study concludes that the itinerant curriculum is an important tool that can help African higher education achieve curriculum responsiveness in the era of the Fourth Industrial Revolution.

Keywords: African higher education; curriculum responsiveness; itinerant curriculum

Introduction

The world is undergoing a technological revolution that is fundamentally altering the way we live, work, and relate to one another. The transformation that will come alongside this technological revolution will be so drastic that it will be unlike anything humankind has experienced before. Schwab (2016) propounds that we do not yet know just how the revolution will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academia and civil society. The Fourth Industrial Revolution is upon us; therefore, it needs a response from academia. The Fourth Industrial Revolution is the current and developing environment in which disruptive technologies and trends such as the internet of things (IoT), robotics, virtual reality (VR), and artificial intelligence (AI), are changing the way we live and work (Ayentimi and Burgess, 2019). Since the way we live and work is a product of how we are trained and socialised both in school and in the society, higher education needs to respond to changing times. The Fourth Industrial Revolution comes with implementation of smart technologies in our factories and workplaces, connected machines will interact, visualising the entire production chain, and making decisions autonomously (Marr, 2018). The Fourth Industrial Revolution is expected to impact all spheres of human life, from various disciplines to industries, economies and very importantly, the sphere of education. This is happening at an exponential rate. Therefore, governments, educators, and parents alike must ask how they can prepare both present and future generations to thrive in this transforming world (Brown-Martin, 2018).

¹Durban University of Technology, GeorgeK@dut.ac.za

The Fourth Industrial Revolution has a great impact on education, as graduates of today will, in a short space of time, face a future in an uncertain and technology-driven labour market. The Fourth Industrial Revolution will favour automated job activities. McKinsey, as cited in Schwab (2016) predicts that 800 million workers or a third of the workforce could be displaced in 42 countries, through the 4IR. However, Carruthers (2018) argues that graduates equipped with the correct skills in this era will enjoy endless job opportunities. The challenge for schools is how to prepare students well for the coming prolific job automation. Higher education in Africa must urgently respond to the power of the Fourth Industrial Revolution technologies as such, either positive social impacts will follow, or devastating environmental damage is upon us (Penprase, 2018). Substantial change is needed to the curriculum currently used, as the current curriculum precludes students from developing capacities required for the new era of genomics, data science, artificial intelligence, robotics, nanomaterials, and 3D printing. Hence, educational curricula in Africa must prepare to change in accordance with technology.

Schleicher (2019) points out that students will need skills for future job and labour markets, and they will need the ability to navigate the increasing uncertainty and potential precariousness of the gig economy. According to Carruthers (2018), little has been done to prepare future workers through school curricula, as the currently used curriculum is obsolete, and does not meet the demands of the Fourth Industrial Revolution workplace. The itinerant curriculum may be a pathway that will ensure that the curriculum in Africa responds to this current era of rapid globalisation. The itinerant curriculum is a destabilising epistemology that aims to defamiliarize the canonical tradition of monocultures of 'scientific' knowledge, crucial to the ecology of knowledge (Paraskeva, 2018). The itinerant curriculum does not abolish the past but assumes and redeems the past by swerving from it. The itinerant curriculum will push educators and students to think in the light of the future, and not in the light of the past. This paper, therefore, proposes the itinerant curriculum as the superlative alternative in making African higher education responsive to the Fourth Industrial Revolution.

To achieve this objective, this paper is divided into four parts. The first part of the paper focuses on the drawbacks of African higher education, while the second part centres on curriculum responsiveness and its dimensions, and why the curriculum in Africa must be responsive in light of such dimensions of curriculum responsiveness. The third part of the paper discusses extensively the itinerant curriculum and the itinerant curriculum theory. The fourth part of the paper explains how the itinerant curriculum can be used to achieve the dimensions of responsiveness in the Fourth Industrial Revolution. This part presents in detail the processes or steps that will encourage higher education in Africa to achieve responsiveness to this technological era using the itinerant curriculum.

African Higher Education

African higher education needs strong collaboration and partnership among concerned stakeholders to address the multiple challenges confronting higher education in the continent. Mba (2017) points out that Africa has an estimated 1,650 higher-education institutions, many of which face challenges that require the intervention of various stakeholders, national governments, and development partners. Such interventions he continues would allow students to maximise their learning outcomes, and contribute effectively to the workforce, especially in this era of the Fourth Industrial Revolution. One of the issues facing higher education in Africa, according to Mba (2017), is the current pattern of skills production in Africa that does not match the labour market demand or development needs. Higher institutions of learning in Africa produce millions of graduates annually. Despite this, many graduates remain unemployed because they have a substantial shortage of skills (particularly certain soft skills needed within this era of the 4IR, as well as other hard skills particularly relating to the use of computers) needed for the current work environment. This happens because there is a disconnect between the skills African graduates have, and the skills needed to flourish in the Fourth Industrial

Revolution work setting (Fomunyan, 2019). Higher education in Africa suffers mostly from poor content, outdated curriculum, inadequate materials, and untrained teachers.

Ayentimi and Burgess (2019) argue that most countries in Africa still compel students to memorise facts and figures from overloaded curricula with outdated content. This leaves students insufficiently skilled to meet the demands of the workplace. Hence, Kayembe and Nel (2019) assert that there is a danger that African young people – half the continent’s population – could become frustrated with their education systems, especially at the post-primary level. Providing a solution to this, Rehorn (2017) states that Africa must launch a new education model to meet the current technological advancements. Thus, there is an urgent need for curriculum reform among African countries, as this will expand access to and democratise education, while ensuring quality learning opportunities through relevant and pertinent curricula for this era of globalisation. A few countries in Africa have started reforming their curricula by moving away from those which are overloaded and outdated. Countries are trying to move in line with recent changes in the world. South Africa, Rwanda, Tunisia, Gambia, and Ethiopia are favouring curricula that focus on competencies in key knowledge and skills areas (Kayembe and Nel, 2019). Despite such changes by these countries, they are yet to seriously consider how the Fourth Industrial Revolution will shape the workplace; and the effect it will have on future workers.

Curriculum and Curriculum Responsiveness

Much has been said about curriculum and curriculum responsiveness. What does this actually mean? Fomunyan (2014) argues that curriculum is often understood as a framework that sets expectations for students’ learning, and it serves as a guide for teachers, establishing standards for student performance and teacher accountability. He goes further to articulate what he thinks is a more accurate definition of curriculum by seeing it as a series of potential experiences organised in a school for disciplining students in ways of thinking and acting. A curriculum not only provides students with the knowledge required; it shapes the way they behave and view scenarios. The fundamental purpose of an educational curriculum is to ensure that students receive integrated, coherent learning experiences that contribute towards their personal, academic, and professional learning and development (Wedekind 2019). The curriculum therefore extends beyond the classroom, because it affects the personal lives of students by developing them, making them a better version of themselves.

According to Linda (2009) and George (2009), there are four basic types of curricula used by educators. These are the traditional, thematic, programmed, and classical curricula. Linda (2009) asserts that the traditional curriculum is the traditional workbook/textbook approach; it is grade-specific and may be expensive. The traditional curriculum focuses on a specific body of knowledge to be transmitted to students; and relies heavily on memorization and drilling of facts and formulas. The curriculum does not take into consideration the specific needs of students, as the curriculum ensures that all students are taught the same content in the same time frame. No adjustments are made for students who have difficulty with the material, or for those who find the material easy and are ready to move on ahead of the rest of the class. The traditional curriculum is not a responsive curriculum; nevertheless, it is regarded as the most widely used curriculum in African higher education (Bleazby, 2015). Bleazby supports this when he says that the traditional curriculum favours the same course content being taught to students from one decade to the next, without any modifications. This implies that the curriculum is old, and irrelevant; it does not, and cannot prepare African students for the demands of the future workplace. This therefore calls for enormous changes to the curriculum being used in Africa.

Conversely, the thematic curriculum is the organisation of a curriculum using themes. Thematic instruction integrates basic disciplines like reading, mathematics, and science with the exploration of a broad subject such as communities, rain forests, river basins and the use of energy (Tessier and Tessier, 2015). Ashokan (2014) explains that a thematic approach is a way of teaching and learning, in which many areas of the curriculum are connected and integrated

within a theme. The idea of thematic curriculum is that students will acquire more knowledge when they can connect what they are being taught in the classroom with real-world events. Educators, instructors, and teachers often try to connect themes used in lessons to students' everyday lives. Therefore, a thematic curriculum will allow learning to be more natural and less fragmented, unlike the traditional curriculum in which a school day is time-divided into various subject areas. Children practise exercises frequently related to nothing other than what the teacher has decided on while writing on the chalk board (Ashokan, 2014). Although the thematic curriculum has a few benefits, it has certain drawbacks. First, some students could lose interest in the theme, which means less motivation to participate. Second, a student missing a day is missing a major connection, becoming lost in class when a different topic is introduced. Most important, the thematic curriculum focuses mainly on the needs of students, ignoring societal needs (Pirinen, 2009). Right now, the societal need is for the development of students that will be able to function in this era of the Fourth Industrial Revolution. The thematic curriculum does not guarantee this. Therefore, higher education in Africa must move away from the use of a thematic curriculum. Such a curriculum leads to mass-producing graduates that will struggle to operate in the current technological era.

American behavioural psychologist, B. F. Skinner, is the major contributor to programmed learning. Programmed learning is an educational technique characterised by self-paced, self-administered instruction presented in logical sequence, and with much repetition of concepts (Rolandsson, 2015). Therefore, programmed learning can be said to be an individualised and systematic instructional strategy for classroom learning and self-learning (Seel, 2012). The basic requirement of programmed learning is breaking up study material into small steps, giving immediate feedback and confirmation of every step. This is achieved by means of information presentation, questions, and learners' response (Hošková-Mayerová and Rosicka, 2012). Lessons are broken into various smaller sections containing information. Each smaller section is followed immediately by comprehension questions to be answered by students. Immediate feedback is then received from students on the correctness of the answers. Seel (2012) avers that programmed learning is a small step, self-pacing, and a kind of learning that gives immediate feedback. Some of the textbooks being used by students recently are structured in a programmed learning format. Despite its usefulness, it is very difficult to develop instructional materials using programmed learning. Only cognitive objectives can be achieved; there is no chance for students' creativity, as their responses are highly structured. It is important to note that programmed learning cannot be applied at higher-education level. Programmed curriculum cannot work in higher education, therefore is not an option for African higher education in this era of globalisation.

The classical curriculum is a complete classical Christian curriculum that emphasises the traditional liberal arts of language and mathematics and the cultural heritage of the Christian West, as expressed in the great works of history and literature (George, 2009)). The curriculum focuses on basic skills of reading, writing, and arithmetic laying special emphasis on Latin. The classical curriculum is designed to develop students, both academically and spiritually, training students to think critically, and teaching them to speak and write persuasively. According to Boutin and Rodgers (2011), the classical curriculum serves several purposes. It focuses on the highest spiritual, literary, and artistic achievements of Western civilization, elevating the mind and soul; it introduces students to the greatest books in their original sources, not biased textbook summaries; it integrates the study of various subjects, showing the interrelationships that exist among them; and provides a solid grounding in the basics, emphasising the technique of learning by memorization in the lower grades. The major drawback of the classical curriculum as far as this paper is concerned, is that it focuses mainly on languages and history, hence, classical education tends to be a bit weak on science (Witmond, 2008), and science is the order of the day in the Fourth Industrial Revolution. This means that classical education will not help prepare African students for the Fourth Industrial Revolution. Moreover, Africa is a secular continent. A curriculum with Christian roots, therefore, may not be favoured in some parts of the continent.

No matter the kind of curriculum used in a particular region, curricula must be responsive to the needs of students and the society in which these students find themselves (Fomunyan & Teferra, 2017). Moll (2004) explains that curriculum responsiveness is the ability of curricula taught in schools or universities to address students' needs as well as societal circumstances. For a curriculum to be responsive, students should be able to become productive members of the society when they graduate, by continually solving societal problems with relative ease. In the context of this study, curriculum responsiveness means the ability of the higher-education curriculum in Africa to produce students with the capacity to be productive in the era of the Fourth Industrial Revolution. Fomunyan and Teferra (2017) relate that, for a curriculum to achieve full responsiveness in this Fourth Industrial Revolution era, it must be economically responsive, classroom or culturally responsive, disciplinarily responsive, and learning responsive.

Fomunyan and Teferra (2017) see economic responsiveness as dealing with the ability of a curriculum to train skilled professionals in the various sectors of the economy. Therefore, a curriculum is said to be economically responsive when graduates are highly skilled and ready for the job market. Being ready for the job market means that students can develop long-lasting solutions to organisational problems. An economically responsive curriculum will not just satisfy the current job market but will be able to proffer solutions to anticipated organisational problems, contributing immensely to the development of the general economy (Wedekind, 2019). It becomes imperative that the African higher-education curriculum become economically responsive to the Fourth Industrial Revolution. This is because, in this era of technological advancement, organisations will be confronted by new technological challenges that will threaten, affect, and change their business processes from less automated to highly automated business processes. This will make organisations yearn for employees that are highly skilled and that have the capacity to operate within automated organisations.

On the other hand, cultural responsiveness is the curriculum's ability to access and respond to the cultural dissonance in the classroom (Moll, 2004). A classroom is always divided along cultural lines: this could be in the form of race, ethnicity, religion, age, and sometimes gender. Ladson-Billings (1995) argues that culturally responsive pedagogy is a student-centred approach to teaching that includes cultural references. It recognises the importance of students' cultural backgrounds and experiences in all aspects of learning. A culturally responsive classroom will promote engagement by embracing classroom diversity, nurturing students' cultural strengths. Brown-Jeffy and Cooper (2011) explain that culturally responsive teaching is concerned with using cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning more relevant and effective for students. Thus, a culturally responsive classroom will see diversity and cultural differences as assets and values; it will challenge racial and cultural stereotypes, prejudices, racism, injustice, and oppression; and it will promote social justice and academic equity. Globalisation and internalisation have made the classroom more culturally diverse than ever before. Classrooms must therefore be culturally responsive: researchers have discovered that culturally responsive classrooms motivate students to learn and help them become effective learners.

A disciplinarily responsive curriculum offers a type of responsiveness cogent to this era of the Fourth Industrial Revolution. Ferdinand (2009) states that disciplinarily responsiveness is the ability of a curriculum document to be up to date with the research in the field, while promoting new discoveries within the discipline. For a curriculum to be disciplinarily responsive, it must continually incorporate new knowledge of the field into the curriculum. A disciplinarily responsive curriculum allows for specialization, depth of content knowledge; it is specific, current, factual, and it develops skills in students as it emerges from experts in the discipline (Fomunyan and Teferra, 2017). As a result of the current technological advancement, there is the need for new knowledge to be continually embedded into the curriculum, for it to remain responsive to the drastic changes in the workplace caused by technological advancement. Moja

(2004) posits that disciplinarily responsiveness will ensure that what is happening locally and internationally, as far as any discipline is concerned, is duly embedded into the curriculum. This will encourage students to think globally, and act locally, to develop the discipline, and to solve current and anticipated organisational problems.

Finally, learning responsiveness, otherwise called pedagogy, is the curriculum's ability to respond to the needs of the student (Fomunyam and Teferra, 2017). Pedagogy must take into serious consideration the individual needs of students, because, without this, students may find it difficult to learn. Here, the idea is helping students to develop their academic, social, and emotional skills in a learning environment that is developmentally responsive to their strengths and needs. In this age of technological advancement, it is important that learning becomes responsive to the respective needs of students, so that students do not become uninterested in class lessons. Students need to be excited and keen to learn the rudiments of becoming successful employees in the workplace.

The ultimate question therefore is: how can the African higher-education curriculum in Africa achieve economic responsiveness, cultural responsiveness, disciplinarily responsiveness and learning responsiveness to prepare students in Africa for the Fourth Industrial Revolution? Earlier studies proposed some alternative pathways to achieve curriculum responsiveness in African higher education during this fourth era of globalisation. However, this study proposes the itinerant curriculum as the alternative to make African higher education responsive to the demands of the workplace in this era of the Fourth Industrial Revolution.

The Itinerant Curriculum Theory

The Itinerant Curriculum Theory (ICT) attempts to create an itinerant path to address a problem (Paraskeva, 2017). Paraskeva (2017) defines an itinerant as a person who moves from place to place, typically for work, such as the itinerant preacher who moves to a new community every few years. An itinerant person could be a labourer or an employee who moves from place to place as demanded by employment. However, an itinerant curriculum is a deliberate disrespecting of the canon (Süssekind, 2014b). The itinerant curriculum is a radical means of changing the archaic curriculum used in African higher education developed by their colonial masters.

The ICT, according to Paraskeva (2016: 16), is "a new path that is sentient of the functionalism of both dominant and counter-dominant Western Eurocentric positions, of the richness of non-Western epistemological platforms, of the fallacy of the history fabricated by Western Eurocentric dominant and specific dominant traditions, of the fascism of the Western Eurocentric epistemological coloniality that failed, and it failed greatly, not only because of its crude limitations and fallacies but also given the immense power of non-Western epistemological ways of reading and being in the world that always challenge Western Eurocentric dominant position". The ICT will produce curricula in Africa driven by emancipatory epistemologies of contrasting and reverberating otherness, and this according to Paraskeva (2016) will give us the space in which to (re)imagine, what we do, change the unbending, and reductive philosophies that plague our education and our lives. Thus, through such emancipatory labour in African schools and communities, Africans will open themselves and their students to new possibilities for working across their differences, as they name, resist, and disrupt old ways of knowing, that formerly rendered their lives silent and invisible. Hence, the ICT is a radical way of changing the Western-centric curriculums used by Africans. The ICT is influenced by the importance of non-Western curricula in the struggle for a more relevant and socially committed education and curriculum.

African colonial masters epistemised Africa, meaning that they killed off African knowledge systems. For example, most countries in Africa adopted the language of colonial masters as their lingua franca. Students are mandated to speak either English or French, undermining African indigenous languages. African colonial masters thus, epistemised African epistemology by making Africans believe their language to be inferior, complicated, and impractical in institutions

of learning. African governments are also reluctant to radically change the curriculum used in Africa, because there is still a strong belief in the curriculum that the colonial masters left behind (Fomunyan & Teferra, 2017) and African nations would have to articulate their own path and ensure that they create an alternate future for themselves. This is particularly critical because the curriculum left behind for African higher-education institutions generally dismisses the intrinsic value of African culture, customs, and practices, favouring mostly Western culture, customs, and practices, not minding the suitability of the curriculum to the African environment (Fomunyan and Teferra, 2017). This has made learning in Africa stationary, non-progressive, redundant, and irrelevant. The African continent only transfers technology, and mostly never produces globally acceptable innovations in biology, technology, mathematics, and medicine. Hoskins (1992) rightly argued that Africa's contribution to the body of knowledge has been denied altogether with the dominant culture presented as the only authentic producer of knowledge.

The ICT is an incredible method of winning the battle against African curriculum epistemicide. It is a clarion call to challenge curriculum epistemicide by completely engaging in the mind-boggling battle for social and cognitive justice. Paraskeva (2016) adds that the ICT likewise cautions on the need to challenge any type of indigeneity or the romanticising of the indigenous societies and knowledges. This is not confined to any dichotic skeleton of West–Rest. Masaka (2018) adding to this stated that this will allow the people of Africa to tell their own story from their own standpoint, thereby contributing to knowledge production. The ICT pushes the field of curriculum studies along a totally different, creative, inter-, and transnational path (Oliveira, 2017). Oliveira (2017) demands that curriculum studies solidly draw epistemologies and scholarly customs that, until now, has been totally overlooked. In this sense, curriculum developers in Africa are expected to fine-tune the already existing curriculum, to ensure its relevance to the African continent and its relevance to the Fourth Industrial Revolution.

Süssekind (2014b) argues that the ICT drives a post-abyssal, non-abyssal and non-territorial curriculum for the benefit of all. The ICT therefore emphasises that to destroy epistemicide in Africa, the current curriculum used in the continent must be abolished. A new curriculum devoid of epistemicide which would encourage forward thinking should be developed. From the foregoing, it can be concluded that the major objective of the ICT is to fight against epistemicide and ensure curriculum relevance. The major objectives of this research are considered very significant to the Fourth Industrial Revolution and to students and graduates studying or graduating within this era. To prepare African students for the future workplace, there is need for curriculum change in line with the demands of today's world of high automation and globalisation. With these, the major objectives of the ICT (i.e., fighting against epistemicide and ensuring curriculum relevance) will be achieved in African higher education. There is no single accepted method of adopting and using the ICT in ensuring that its objectives are achieved.

Sloterdijk (2013) articulates that the ICT does not come with an endorsed formula nor prescribed recipe. It challenges the scripted nature of our curriculum crisis and emergency driven by the standardization momentum. Sloterdijk (2013) further adds that the ICT is not an assault or attack on specific epistemologies, but rather a procedure of mindfulness that challenges epistemicide. Assaults and attacks are pre-planned; they have a prescribed recipe, an endorsed formula, and a programme of events. However, the ICT is not an assault, nor an attack; it does not have a programme of events nor a standardised global process. It is based on contingency. The ICT is usually applied based on the situation, and the objectives it is hoping to achieve. This study proposes the ICT as an effective pathway to making African higher education responsive to the demands of the Fourth Industrial Revolution.

Itinerant Curriculum as a Panacea for Curriculum Responsiveness

The importance of achieving curriculum responsiveness in African higher education in this current era has been earlier discussed and cannot be overemphasised. As pointed out earlier, a curriculum will only afford responsiveness if it achieves economic responsiveness, classroom or

cultural responsiveness, disciplinary responsiveness, and learning or pedagogical responsiveness. This section of the paper details how the itinerant curriculum can be used as an alternative pathway in achieving these four types of responsiveness to the Fourth Industrial Revolution. Advances in technology, biology, and medicine have improved quality of life, yet it has made life more complex. Recent developments in technology around the globe have affected and will continue to affect organisations and society at large (Penprase, 2018). Schleicher (2018) that organisational processes and procedures will continually be modified to adapt to these changes and developments in technology. Even society at large will be affected, as artificial intelligence is unleashing a whole new level of productivity and augmenting our lives in many ways. According to Schleicher (2019), these changes and developments mean that workers with less education and fewer skills are at a disadvantage as the Fourth Industrial Revolution progresses. How then can the itinerant curriculum make learning in African higher education become economically responsive in this era?

As earlier explained, economic responsiveness involves not only satisfying the job market but creating sustainable solutions to future challenges, while growing the economy (Fomunyan & Teferra, 2017). Spector (2021: 78) argues that there is “critical need for curriculum to become more responsive and proactive, perhaps even refocusing curricular time away from traditional school subjects towards timely topics, which would be informed by traditional school subjects”. This is to say that most of the curricula in use especially on the African continent needs immediate attention if they are to effectively prepare students for this era. Fomunyan and Teferra (2017) confirms this when they argue that if a change is not made, African graduates may become redundant in the current and future organisational work settings. Business processes are now being gradually automated, and in no distant time, business processes and procedures may well become fully automated. The curriculum in most parts of Africa still favours the analogue methods of carrying out business operations, which in a few years will be totally out of place. Many traditional courses, such as Biology, Business studies, and Accounting are still taught in higher institutions of learning without incorporating new courses relevant to this era of globalisation and the Fourth Industrial Revolution (Spector, 2021).

Many graduates from Africa may become totally irrelevant in the workplace. If curriculum review and or change is not initiated swiftly to correct this anomaly, multinationals may, in no distant time, resist employing graduates from Africa, who lack the capacity and skills to operate in Fourth-era organisations. There are already complaints about some graduates from Africa: multinationals believe that they are not properly trained to fit into the world of work in terms of desirable knowledge and skills to operate in an automated organisational setting (Iruonagbe and Egharevba, 2015). The curriculum in Africa is plagued by several challenges and this has slowed the growth and development of the region, while other regions like Asia and South Africa which are largely made up of third world countries have enjoyed steady growth and development. They have developed technologies that suit their environments perfectly. On the contrary, Iruonagbe and Egharevba (2015) argue that most African countries only wait for the transfer of technology, instead of being committed to a system in which they can copy, adapt, and fabricate foreign technology through an inward-looking strategy to suit their own cultures, environment, and needs. Africa hardly develops her own technologies, rather, technologies are being transferred to the continent, not regarding its suitability to the environment. This happens because the higher-education curriculum does not favour technology development, but rather technology imitation.

To buttress this point, till 2022, Africa was unable to manufacture a single dose of the Covid-19 vaccine and had to wait for Europe and America to provide the vaccine. It was not until 2022 that the president of South Africa announced the first vaccine manufacturing plant in South Africa. A change in curriculum would improve capacity and ability on the continent to ensure that Africa can meet its own needs. Speaking on education in Africa before colonialism, Abdi (2012: 12) posits that the African system of knowledge exposes a “particular philosophy of education, a sagacity that was less doctrinaire than, say the specialized categories of the philosophy of

education (e.g., idealism, realism, analytic, or behaviourist), but was based on needs identified for that given situation. That is, precolonial African philosophies of education were focused on the real lives of Africans and were not responsive [to] the problematic elaborations of Eurocentrism and the perforce peripheralization of the rest of the world". This education was relevant and adequate and spoke to responsiveness and particularly economic responsiveness. Abdi (2012: 19) categorically states that, "an education that is not relevant for people's cultures and needs is an inadequate education" and colonialism as well as its vestiges which lies at the heart of the rise of Europe, sucked as much as it could from this humanistic system and dismantled it, making it irrelevant (Paraskeva, 2016).

The propositions of the ICT can be used to create this change. Although, the ICT is a radical theory, it has shown itself to be effective. First, the current curriculum used in most of Africa need review or change to ensure it does not continue slowing down the growth of the continent in this era of the Fourth Industrial Revolution. Schleicher (2018) posits that critical engagement on content around Big Data, Creative Studies, and Decision Sciences should be included in all curricula, irrespective of the course of study. These contents are enormously important and will expose students to basic knowledge they need in this current era. Background knowledge in technology by students will ensure they have the capacity and necessary skills to operate in future workplaces. Paraskeva (2016: 195) argues that "the task, therefore, is to think of education in general and curriculum in particular from a diametric perspective, ...for there is no greater crime than facing current intellectual challenges with the equipment of the past. We must deal with issues of interest, rather than with issues of fact, because reality is not just defined by issues of fact".

A change in approach, focus and content is needed to ensure we do not face current challenges with equipment from the past. This will also make certain that African students develop their own environmentally friendly technology, thereby reducing the transfer of technology from the Western world. By doing this, one of the major objectives of the ICT (i.e., opposing epistemicide, and ensuring curriculum relevance) will be achieved. It is imperative that the curriculum in Africa be culturally responsive to the Fourth Industrial Revolution. In this age, globalisation and internalization have made classrooms more culturally divided. Classrooms in Africa nowadays are filled with students from various parts of the continent, especially in higher-education classrooms. Culture must therefore be given serious consideration, since a culturally responsive classroom will make students comfortable to learn. On the contrary, a less culturally responsive classroom will dissuade students from learning, and hence, reduce students' performance (Lee, 2007). Of what use will an economically responsive curriculum be to the Fourth Industrial Revolution, if students are uninterested in learning?

As earlier highlighted, the current curriculum is not culturally responsive and must be changed significantly, in order to allow the curriculum to achieve relevance. Howard and Terry (2011) posit that a culturally responsive pedagogy is situated in a framework that recognises the rich and varied cultural wealth, knowledge, and skills that diverse students bring to schools. A culturally responsive pedagogy seeks to develop dynamic teaching practices, multicultural content, multiple means of assessment, and a philosophical view of teaching dedicated to nurturing students' academic, social, emotional, cultural, psychological, and physiological well-being. Therefore, to achieve this in this era, Harmon (2012) proposes that teachers draw on African culture and history; locate 'self' in a historical and cultural context; enable students to create new knowledge based upon life experiences; and view knowledge as reciprocal. Ladson-Billing (2010) asserts that to ensure a culturally responsive classroom, teachers should create a community of learners much like an extended family, perceiving teaching as a calling, and having high expectations for the success of all students.

Multicultural education should be part of the curriculum in African higher education. Harmon (2012) states that this will provide opportunities for students to view issues through multiple lenses; it will improve their problem-solving skills and help address issues of social justice.

According to Banks (1999), multicultural content has four approaches that ensure high curriculum responsiveness – contribution, additive, transformation, and social action. However, most researchers and scholars are of the view that the additive and transformation approaches are most effective. Harmon (2012) explains that the additive approach will see books and materials added to the existing curriculum in an attempt to add multicultural content, while the concepts and objectives of lessons are unchanged. However, this approach is not radical since lessons, objectives and concepts will remain un-tampered with. On the other hand, a more radical approach is the transformation approach that will see curriculum, concepts, and objectives changed to include voices that have previously been distorted or excluded (Harmon, 2012). This will sometimes make students examine and challenge their own sets of beliefs and values.

The transformation approach is in line with ICT and seeks a more radical solution to problems. Based on the purpose and the assumptions of the ICT, multicultural education, using the transformation approach, should inform the core curriculum of the African higher-education curriculum. This will achieve curriculum responsiveness and relevance; and will also make the classroom responsive to the growing cultural diversity in this era of globalisation and internationalization. By doing this, Africa will not only be critiquing dominant traditional positivist curriculum, but will also be countering dominant critical curriculum theories, denouncing how both perspectives were/are functionalistic (Paraskeva, 2016).

Each discipline in African higher education must be continually updated to make it responsive to the discipline itself, and relevant to society in this technological era. Fomunyam and Teferra (2017) state that for a curriculum to be disciplinarily responsive, it must respond to new knowledge produced according to the dictates of the discipline by the community of scholars in that discipline. Using ICT as the lens for this will mean to radically change the curriculum content of each of the disciplines studied in higher institutions of Africa, contextually, thereby, ensuring it is deterritorialised and previously epistemicide knowledge are included. This will be a step in the right direction, and the denunciation of the epistemicide within the epistemicide (Paraskeva, 2016). The curriculum used in higher education by the Western world is gradually changing because of the present globalisation (Schleicher, 2018). Many universities in the Western world have been introducing new and relevant contents to various disciplines that align with the current and future demands of the workplace. Africa needs to tap into the itinerant approach and deterritorialise curriculum “to address some dead ends with the radical critical platform and to lead the struggle against the epistemicides” (Janson and Silva, 2017: 1).

The curriculum in Africa must be learning responsive, because, if a curriculum is economically responsive, culturally responsive, and disciplinarily responsive, but it is not learning responsive, no serious learning will take place. Fomunyam and Teferra (2017) contend that without the curriculum responding to the needs of individual learners, no meaningful learning can take place. The curriculum can therefore be relevant and have content that will prepare students for the Fourth Industrial Revolution. Slonimsky, Lynne and Shalem (2006) posit that if students become disengaged during class lessons, the curriculum becomes redundant and irrelevant. This clearly depicts the importance of making lessons learning responsive. Ogude, Nel and Oosthuizen (2005) in this light outline a framework for pedagogical or learning responsive. The authors assert that responding to student needs through the curriculum entails specific approaches to the design of curricula, instructional systems, methods of assessment, techniques for appraisal, and approaches to student support.

To them, such approaches take the characteristics and context of target student groups seriously. Putting this in place will make learning responsive to the specific needs of students. This will ensure that students become interested in class lessons. It will motivate them to learn how to become better employees in the technological age. Janson and Silva (2017: 1) concomitantly state that within ICT, we need to “to redefine the struggle for social justice as a struggle for cognitive justice... and produce a new language that promotes new endless meanings for the field”. This will create endless possibilities for pedagogical or learning responsiveness as new meanings or

solutions to old and new challenges would be developed by fighting for a different research platform, one that pushes research to a “level of instability, not stability, generating concepts also, in itself, unstable” (Paraskeva 2016: 196). It is important that the African higher education achieve all four dimensions of responsiveness. This is because all the dimensions play important roles in preparing students for the demands of the Fourth Industrial Revolution. The ICT can play a major role in enabling the curriculum in Africa to achieve responsiveness. Therefore, to make the curriculum in African higher education responsive in this era of the Fourth Industrial Revolution, learning authorities must combat epistemicide, and make the curriculum relevant.

Conclusion

The changing times in which we currently are, demand for a change in curriculum to meet the demands of the times and seasons. Graduates sent out by African universities are struggling in the job market be it in the drive to find employment or create one for themselves. As stated by Zavale, and Schneijderberg (2022: 199) between 1980 and 2019 just about 6483 research articles have been published on higher education in Africa and these articles can be grouped into four communities of researchers, “the community researching teaching and learning issues, the community focusing on structural transformation of HE, the community focusing on the internal organisation of HE and the community focusing on societal engagement of HE”. They further state that a total of 22 African countries are home to less than 2% of the authors with institutional affiliations and conclude that scholars studying African higher education in Africa come from 34 out of 54 countries.

This means that a total of 20 countries are not represented. As stated earlier (Paraskeva 2016), ICT demands different research platforms which would push research to the point of instability especially because without new and alternative research, an itinerant curriculum cannot be developed. The absence of curriculum amongst the communities is also troubling and explains or speaks to the question of epistemicide which ICT seeks to destroy. The itinerant curriculum informed by the itinerant curriculum theory would work towards the production of graduates who are ready for the changing times. Curriculum responsiveness in this era can only be achieved if the African curriculum is economically, culturally, disciplinarily, and learning responsive. Many alternatives have been proposed in the literature to achieve this. However, this study examined this issue from a unique angle. That is, using the itinerant curriculum to achieve these dimensions of curriculum responsiveness.

This research therefore recommends that, for higher education in Africa to achieve economic responsiveness in this era, the current curriculum must be radically engaged with immediate effect. If a change is not affected, African students will find it impossible to solve organisational and societal problems. New content, relevant to this present age should be included in the curriculum. This will provide students with necessary skills and knowledge imperative for this era of technological revolution. Multicultural education is needed in the curriculum for the curriculum to become culturally responsive. African voices that were once conspicuously removed by the colonial masters should be added to the course contents and curricula.

References

- Abdi, A. 2012. Eurocentric discourses and African philosophies and epistemologies in education. In: Wright, H. K. and Abdi, A. A. eds. *The Dialectics of African Education and Western Discourses*. New York: Peter Lang, 12–26.
- Ashokan, V. 2014. Thematic approach for effective communication in early childhood education. *International Journal of Education and Psychological Research*, 3(3): 49-51.
- Ayentimi, D. T. and Burgess, J. 2019. Is the Fourth Industrial Revolution relevant to sub-Saharan Africa? *Technology Analysis and Strategic Management*, 31(6): 641-652.

- Banks, J. A. 1999. *An Introduction to Multicultural Education*. 2nd ed. Boston: Allyn and Bacon.
- Bleazby, J. 2015. Why some school subjects have a higher status than others: The epistemology of the traditional curriculum hierarchy. *Oxford Review of Education*, 41(5): 671-689.
- Boutin, S. and Rodgers, J. B. 2011. Jefferson's classical curriculum: An examination of the classical influences on Thomas Jefferson's educational philosophies. *American Educational History Journal*, 38(1/2): 399.
- Brown-Jeffy, S. and Cooper, J. E. 2011. Toward a conceptual framework of culturally relevant pedagogy: An overview of the conceptual and theoretical literature. *Teacher Education Quarterly*, 38(1): 65-84.
- Brown-Martin, G. 2018. Education and the Fourth Industrial Revolution. Available: [https://cdn.lgseta.co.za/resources/research and reports/4IR%20Resources/Education%20and%20the%204IR Graham%20Brown-Martin 2017.pdf](https://cdn.lgseta.co.za/resources/research%20and%20reports/4IR%20Resources/Education%20and%20the%204IR%20Graham%20Brown-Martin%202017.pdf) (Accessed 3 February 2022).
- Carruthers, H. 2018. Education in the Fourth Industrial Revolution: Relocate Global Online. Available: <https://www.relocatemagazine.com/articles/education-schools-relocate-global-international-guide-education-in-the-fourth-industrial-revolution> (Accessed 2 February 2022).
- Ferdinand, D. S. 2009. *Workforce Education and Development Curriculum Responsiveness to Culturally and Internationally Diverse Graduate Students: A Mixed Methods Study*. Carbondale: Carbondale Southern Illinois University.
- Fomunyam, K. G. 2014. Curriculum theorizing and individualism: An exploration of the curriculum's relation to the social, personal, and political dimensions of schooling. *Mevlana International Journal of Education*, 4: 122-131.
- Fomunyam, K. G. and Teferra, D. 2017. Curriculum responsiveness within the context of decolonisation in South African higher education. *Perspectives in Education*, 35(2): 196-207.
- Fomunyam, K. G. 2019. Education and the fourth industrial revolution: Challenges and possibilities for engineering education. *International Journal of Mechanical Engineering Technology*, 10(8): 23-25.
- George, J. W. 2009. Classical curriculum design. *Arts and Humanities in Higher Education*, 8(2): 160-179.
- Harmon, D. A. 2012. Culturally responsive teaching through a historical lens: Will history repeat itself? *Interdisciplinary Journal of Teaching and Learning*, 2(1): 12-22.
- Hoskin, L. A. 1992. Eurocentrism vs. Afrocentrism: A geopolitical linkage analysis. *Journal of Black Studies*, 23: 247-253.
- Hošková-Mayerová, Š. and Rosická, Z. 2012. Programmed learning. *Procedia - Social and Behavioral Sciences*, 31: 782-787.
- Iruonagbe, C. T. and Egharevba, M. E. 2015. Higher education in Nigeria and the emergence of private universities. *International Journal of Education and Research*, 3(2): 49-64.
- Janson, E. and Silva, C. M. 2017. Itinerant curriculum theory: Navigating the waters of power, identity, and praxis. *Journal of the American Association for the Advancement of Curriculum Studies*, 12(1): 1-16.
- Kayembe, C. and Nel, D. 2019. Challenges and opportunities for education in the Fourth Industrial Revolution. *African Journal of Public Affairs*, 11(3): 79-94.
- Ladson-Billings, G. 1995. But that's just good teaching: The case for culturally relevant pedagogy. *Theory into Practice*, 34(3): 159-165.

Linda, P. 2009. Five basic types of curriculums. Available: <https://theeducationcafe.wordpress.com/2009/11/12/five-basic-types-of-curriculum/> (Accessed 12 November 2019).

Marr, B. 2018. The 4th Industrial Revolution is here - Are you Ready? Available: <https://www.forbes.com/sites/bernardmarr/2018/08/13/the-4th-industrial-revolution-is-here-are-you-ready/#27596d5b628b/> (Accessed 12 November 19).

Masaka, D. 2018. The prospects of ending epistemicide in Africa: Some thoughts. *Journal of Black Studies*, 49(3): 284-301.

Mba, J. C. 2017. Challenges and prospects of Africa's higher education. Available: <https://www.globalpartnership.org/blog/challenges-and-prospects-africas-higher-education> (Accessed 3 February 2022).

Moja, T. 2004. Globalisation: A challenge for curriculum responsiveness. In: Griesel, H. ed. *Curriculum Responsiveness: Case Studies in Higher Education*. Pretoria: South African Universities Vice-Chancellors Association, 21-38.

Moll, I. 2004. Curriculum responsiveness: The anatomy of a concept. In: Griesel, H. ed. *Curriculum Responsiveness: Case Studies in Higher Education*. Pretoria: South African Universities Vice-Chancellors Association, 1-19.

Ogude, N., Nel, H. and Oosthuizen, M. 2005. *The Challenge of Curriculum Responsiveness in South African Higher Education*. Pretoria: Council on Higher Education.

Oliveira, I. B. 2017. Itinerant curriculum theory against epistemicides: A dialogue between the thinking of Santos and Paraskeva. *Journal of the American Association for the Advancement of Curriculum Studies*, 12(1): 1-22.

Paraskeva, J. M. 2016. *Curriculum Epistemicide: Toward an Itinerant Curriculum Theory*. New York: Routledge.

Paraskeva, J. M. 2017. Against the epistemicide: Itinerant curriculum theory and the reiteration of an epistemology of liberation. In: Uljens, M. and Ylimaki, R. eds. *Bridging Educational Leadership, Curriculum Theory and Didaktik*. Cham: Springer, 199-213.

Paraskeva, J. M. 2018. Against the scandal: itinerant curriculum theory as subaltern momentum. *Qualitative Research Journal*, 18(2): 128-143.

Penprase B. E. 2018. The Fourth Industrial Revolution and Higher Education. In: Gleason, N. W. ed. *Higher Education in the Era of the Fourth Industrial Revolution*. Singapore: Palgrave Macmillan, 978-981.

Pirinen, R. 2009. Thematic curriculum. *Proceedings of the 8th WSEAS International Conference on Education and Educational Technology*, 61-66.

Rehorn, L. 2017. Five ways to improve education in developing countries. Available: <https://www.borgenmagazine.com/education-in-developing-countries/> (Accessed 2 February 2022).

Rolandsson, L. 2015. Programmed or not: A study about programming teachers' beliefs and intentions in relation to curriculum. Doctoral dissertation, KTH Royal Institute of Technology.

Schleicher, A. 2018. *The Future of Education and Skills Education 2030*. Paris: OECD.

Schleicher, A. 2019. *What the Fourth Industrial Revolution could mean for Education and Jobs*. Paris: OECD.

Schwab, K. 2016. *The Fourth Industrial Revolution: What it means, how to Respond*. Geneva: World Economic Forum.

Seel N. 2012. Programmed learning. In: Seel, N. M. ed. *Encyclopaedia of the Sciences of Learning*. Boston: Springer, 1310-1313.

Slonimsky, L. and Shalem, Y. 2006. Pedagogic responsiveness for academic depth. *Journal of Education*, 40(1): 37-58.

Spector, H. 2021. The significance of sense in the time of plagues: Curricular responsiveness to the Covid-19 crisis. *Prospects*, 51: 77-93.

Sussekind, M. L. 2014. Why a Deterritorialized Curriculum? *Transnational Curriculum Inquiry*, 11(2): 67-75.

Tessier, L. and Tessier, J. 2015. Theme-based courses foster student learning and promote comfort with learning new material. *Journal of Learning through the Arts*, 11(1): 1-10.

Wedekind, V. 2019. Curriculum responsiveness and student employability: An institutional analysis. In: Kruss, G., Wildschut, A. and Petersen, I. eds. *Skills for the Future: New Research Perspectives*. Cape Town: HSRC Press, 79-90.

Witmond, L. 2008. The classical education method of home-schooling: What it entails, and the pros and cons of a Latin-centred curriculum. Available: <https://www.brighthubeducation.com/homeschool-methodologies/11604-classical-education-overview-plus-advantages-and-disadvantages/> (Accessed 12 November 2019).

Zavale, N.C. and Schneijderberg, C. 2022. Mapping the field of research on African higher education: A review of 6483 publications from 1980 to 2019. *Higher Education*, 83: 199-233.