

We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900

Open access books available

186,000

International authors and editors

200M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com



Relevance of New Higher Education Approaches in Zimbabwe's 'Second Republic'

Kudakwashe Keche

Abstract

Through face-to-face interviews with lecturers, this research explores the relevance of new higher education approaches in Zimbabwe, particularly Education 5.0 and virtual learning environments (VLEs). The interviewees are lecturers in the Department of Creative Art and Design (DCAD), School of Art and Design (SAD), Chinhoyi University of Technology (CUT), Zimbabwe. Purposive sampling was used to pick interviewees based on their knowledge and experience in higher education teaching and learning. The main finding suggests that the five missions of Education 5.0 are not new in higher education and training in the country. Thus, lecturers do not perceive the policy as new; however, the means and ways in which it is delivered to learners in the COVID-19 era are novel. The hype around Education 5.0 coming from the Second Republic government is factory made and politically calculated. In addition, it is difficult to underpin the development given the economic problems the country is currently facing. This research also finds that VLEs cannot be efficiently and effectively used in Zimbabwe's education sector because the country still lags behind the world order of the Internet of Things (IoT). However, interviewees were of the view that teaching and learning through virtual means and ways is not different from the old face-to-face model.

Keywords: Second Republic, curriculum, virtual learning, education 5.0, teaching

1. Introduction

Poor economic performance and a lack of a focused national education policy in Zimbabwe have seen the country hopping from one policy to the next. This has been largely influenced by the country's unstable politics experienced under the ruling Zimbabwe African National Union Patriotic Front (ZANU-PF) party since the arrival of independence in 1980. Inter alia, the abrupt revision of the foundations, principles, and issues of the curriculum of education and training became one of the prominent flagships of the ZANU-PF's maladministration. Recently, the education sector has slowly turned virtual, a development that further gives teachers a feeling that they are being forced to subsidise teaching and learning exercises. This is so because they must go out of their way, using their meagre earnings to buy state-of-the-art information and communication technology (ICT) equipment to use for the teaching and learning of students and pupils. Transforming to virtual learning environments (VLEs) is yet to yield meaningful results. However, the Second Republic's government's abandonment of Education 3.0 for Education 5.0,

which ignores all preliminary levels of education outside of tertiary and higher education, is enough to prove that in the modern world it is difficult to follow a fixed education guide forever. At the same time, the revolution has been hampered by the outbreak of COVID-19. The disease has brought new dimensions to the face-to-face forms of teaching and learning in higher education institutions (HEIs) in Zimbabwe. The outgrowths coincided with the adoption of Education 5.0, which is built around the following key components: teaching, research, community service, innovation, and industrialisation. This chapter discusses the relevance of Education 5.0 and VLEs. It also suggests the way forward post Education 5.0. The study adopted a qualitative research approach during fieldwork, utilising face-to-face interviews with five lecturers in the Department of Creative Art and Design (DCAD), Chinhoyi University of Technology (CUT), Zimbabwe. Purposive sampling was used to pick the interviewees based on their knowledge and experience in HEI teaching and learning. The main discovery suggests that Education 5.0 is not new, particularly at CUT. Hence, the lecturers argued that HEIs are biting off more than they can chew as they have been struggling to meet the billing of the previous education model, Education 3.0, within which innovation and industrialisation were cherished, particularly at CUT. In short, the new Education 5.0 doctrine is neither more advanced than its predecessor nor sustainable given the lack of a straight policy framework that guides higher education and training in Zimbabwe. A similar post-Government of National Unity (GNU) policy, Science, Technology, Engineering, and Mathematics (STEM), soon became a white elephant after the unprecedented November 2017 coup d'état. Though the policy was started from the grassroots, it excluded the arts, which made it rather problematic because it was not holistic. This scenario has been commonplace in most pre- and post-multiparty republic of 2009–2013 educational policy initiatives. Former minister Lazarus Dokora's curriculum review for primary and secondary education is another example of uncherished educational policies implemented almost at the same time as STEM in Zimbabwe. STEM has already been suspended by the new dispensation. One good reason for that has been the need to rubber stamp political muscle by the incumbent government from time to time. The developments explain what was happening during the late and former president Robert Gabriel Mugabe's regime; a fact that cannot be proved or disproved in black-and-white terms. Since achieving independence, Zimbabwe still lags behind the world order of the IoT. A handful of the interviewees were of the view that teaching and learning via VLEs was not different from the traditional face-to-face model. The majority claim that through the utilisation of VLEs, HEIs are simply flogging a dead horse since the cost implications that characterise Internet access in Zimbabwe are heinous. Only a few students attending higher education and training have surplus income to purchase digital equipment and access the Internet.

2. A brief overview of the new approaches to higher education

It may be necessary to review a curriculum to fulfil new needs, develop a new program, reach new goals, accommodate a new dean or chair, restore the original emphasis of the program and rationalise years of untamed growth [1], meet newly defined expectations and standards, and/or improve student and faculty satisfaction [2].

The postmodern curriculum has influenced professional considerations that guide decisions made by lecturers in curriculum reform [3, 4]. As a result, extensive research into 21st-century skills is being conducted to gain some insight into higher education curriculum [5]. Refs. [6–9] argue that there are three aspects of the

postmodern core curriculum. These include a focus on civic teamwork and not band rivalry, a rounded process position rather than distinct parts, and a multi-layered, cross-cutting, or interdisciplinary curriculum, which includes integration of societal values. Through different state-controlled mass media channels, the government of Zimbabwe justified Education 5.0 as endogenous, not loaned out, and avant-garde to Western values of higher education delivery in the country. On that basis, the state concluded that innovation and technology policy must pay attention to the kinds of incentives one would eventually get after the creation of a product that actually solves a problem in a particular sector or industry to enrich the lives of ordinary people [9]. However, it appears as though the calibre of Zimbabwe's education path has had questionable relevance. When modifying the curriculum, it is important to consider the difference between making minor and comprehensive alterations to the curriculum review.

Dill [10] posits that Education 5.0 has been informed by the sense of contemporary competitive markets, the application of inducements for exceptional innovations and industrial activities, and the process of professional self-regulation. While belief and esteem for certified decisions must be earned and justified, valuable declaration and validation systems must support, not impede, that professionalism. Institutional self-improvement enhancement and innovation must be balanced and vice versa. It could be argued that an inward-looking profession that learns from encounters, an active and self-regulated system, is more sustainable than one that is both imposed and external. Such education control mechanisms will never be successful. Thus, the ballistic nature of the uptake of Education 5.0 in universities and other tertiary institutions tends to force lecturers to simply scratch the surface. This is so because educators do not perceive themselves as part of the curriculum reforms.

Many state-run systems have launched a coordinated set of education policy initiatives and reforms aimed at fine-tuning what Harvard Professor Elmore refers to as the "hub of learning practice." That is, "how teachers understand the nature of knowledge and the student's role in learning, and how these ideas about knowledge and learning are manifested in teaching and classwork" [11]. Thus, a complete and collaborative curriculum demands a "full examination of how academics conceive their role and how the curriculum itself is defined, analysed, and changed" in the process of curriculum reform, especially [12]. Hence, the invention of higher education has evolved over the years from one generation to the next [13]. This is due to changes in the nature of economic problems being faced by people the world over and the need to provide solutions to challenges. This is the reason why the postmodern era curriculum has been changing over the years.

As such, [14] note that the postmodern curriculum is a "curriculum-in-action," as it is fluid and flexible in nature. Similarly, [12] asserts that curriculum variations are also imaginative and molten. This means that curriculum review and revision are not cast in stone. Elsewhere, curriculum reforms have yielded positive results [15–18]. Thus, Education 5.0 is non-linear because it is difficult to come up with a master plan and rationale for a fixed core curriculum. This is because global problems change every now and then. By default, they require different creative, innovative, and enterprising ideas and solutions. Public education started off benchmarked on teaching, specifically the "basics," around the 1780s [19]. Technology was remotely used in this education system as an aide by educators in the teaching and learning process [17]. Research was introduced later in the beginning of the 20th century [20] and then came community service. The kind of education that depended on these three variables became known as Education 3.0, which later led to the development of Education 4.0 and 5.0 [17].

In 1956, Bloom outlined the taxonomies of foundational stances that can be promoted to effectively make lesson plans in any course at different levels of teaching [21, 22]. The differences and densities of thought, branded by Bloom and later updated by other scholars [15, 23], continue to play a role in teaching and learning.

An advocacy and lobby entity based in the United States, the Partnership for 21st Century Skills and Learning (P21), argues that learners need proactive skills, knowledge, and professional conduct to successfully enter the current competitive industry. This enables them to provide solutions to the ever-evolving economic challenges of the time. The fast-track land reform program (FTRLRP) was implemented in 2001 after an auspicious year for the Zimbabwean economy in 2000. Since then, the country has been struggling to provide the basics, including education, to its citizens. The country's tension with the West grew to an extent that even the Bretton Woods Institutions, namely the World Bank (WB) and the International Monetary Fund (IMF), seized to avail funding to Zimbabwe. As a result, the country's critical sectors were left to rot or some have been slowly collapsing, including the tertiary and higher education sector reforms, due to a lack of stable funding except for selected humanitarian causes. To make matters worse, the magnitude of local educational decomposition grew after White commercial farmers and investors backed off in retaliation to the FTRLRP. Higher education students' outcomes include foundation subjects and 21st-century themes; learning and innovation skills; information, media, and technology skills; and life and career skills [24]. However, there are different ways to emphasise students' capabilities and how they use what they learn in real life. In the evaluated literature, there is common consensus across studies on the desire for new forms of education and training to deal with global problems. Despite this contract, there is no one-of-a-kind and unique approach to what are known as "21st-Century Skills" [11, 25].

The spread of technologies, increasing globalisation and internationalisation, and the shift of industrial social communities to knowledge-based social economies have all contributed to the 21st-century skills education discourse. Therefore, demand for innovation and industrialisation and its diversity in education may be informed by variations in developmental situations. The large and probable demands of "21st-century skills" should be known in the broader spectrum of development across the globe. The absence of facts about the effective delivery of "21st-century skills" also points to the need to come up with new educational paradigms. It remains a huge task to obtain information on the brunt of the sorts of system-wide intrusions linked with their release.

It appears innovation and industrialisation are not new "21st-century skills". Rather, some may see them as "newly important." Industry today wants workers that are able "to find and analyse information from multiple sources and use this information to make decisions and create new ideas" [26], p. 631. Educational philosopher John Dewey proposed education "grounded in experience" [27], p. 13. This suggests students should learn skills for the future, usually those that enable them to be inventors, so that through interaction with phenomena they can eventually solve the ever-evolving problems of life. Furthermore, [27], p. 14 argues that Dewey was a visionary who defined an educated person as someone who thinks and reflects before acting, as someone who also responds intelligently to a problematic situation and finally assesses the consequences of the shown plan of action. This outlines the nature of the new millennium learner.

In 2009, the United States Secretary of Education Arne Duncan was quoted in the press as arguing that 21st-century skills "... increasingly demand creativity, perseverance, and problem solving combined with performing well as part of a team" [19], p. 121. After all, the continuum of the development of the education system has transformed slowly while the groundwork for wider change has been in

the cards. Major changes were necessitated by technological advancements, social networking, and a deeper understanding of educational processes as well as new legal and economic frames of reference, resulting in the birth of Education 3.0 [28]. Education 3.0 was fluid and was strongly distinguished by teaching, research, and community service [29]. The system, like the former education paradigms, treats students as the same but allows for a mutual learning community.

Additionally, [30], p. no page claims that this third educational landscape was centred on

...rich, cross-institutional, cross-cultural educational opportunities within which learners themselves play a key role as creators of knowledge artifacts that are shared, and where social networking and social benefits outside the immediate scope of activity play a strong role.

Also, [29] shared similar views about the state of Education 3.0. They argue that students can be creators of knowledge, which they can then share with society to solve problems. However, distinctions between artefacts, people, and processes are distorted, as are distinctions between space and time. HEI positioning, including policies and strategies, changes to meet the challenges of prospects presented by changes in the world, such as the need to create new products and improve standard of living. In addition, Education 3.0 held much promise for higher education in general. It poses serious challenges to existing universities, including their failure to groom creators of goods and services [29].

Yet, [29] argues that administrative challenges intensify as teaching becomes more and more linked to technology. To offer and share knowledge, e-learning is often used as the technology of utility. Several e-learning platforms such as Moodle, Eagle, and Changamire have been developed and are ready to use. This development led to a dualised teaching and learning approach, that is, a combination of e-learning routines and traditional face-to-face teaching and learning methods [29]. This implies that somehow circumstances forced lecturers at CUT to design a curriculum fit for the virtual mode.

In broad terms, the first, second, and third education paradigms downgraded the academic apprentice to a submissive function whereby the student was treated as an empty slate to be filled with knowhow rather than as a decisive and inventive crisis resolver [28, 31]. The models force differences in stages of mastery among learners and frown at guaranteeing proficiency in education for all. Resultantly, the three generations of education grew irrelevant in the current post-industrial society globally and have been accused of “failing, or passive and unmotivated learners” [31]. This is because technology was used by teachers to enhance the learning process rather than to change how things were done in teaching. Learning is supposed to be individualised, learner centred, made to order, and impressionable so that learners can show mastery of skills and knowledge during and after higher education and training.

Over the years, world problems have become increasingly tense and thus the shortcomings of Education 3.0 led to the development of Education 4.0 [32–34]. Through Education 4.0, students are allowed to learn in solitude with the aid of the Internet. This enables critical and creative thinking as well as societal interaction in inquiry-based learning. Creative thinking concerns thinking beyond the bounds of convention so that learners can solve challenges they face in life [20]. Societal interaction is about how learners involve themselves in teamwork or collaborative skills necessary for the functioning of the communities they live in [35].

In Malaysia, Education 4.0 has been used as the starting point for the revision of the tertiary education curriculum [20]. The Malaysian Ministry of Higher Education

tabled the 2015–2025 Malaysia Education Blueprint (MEB) with the intention of aligning the country's education system with global trends. The MEB aims to revamp the Malaysian higher education paradigm with the desire to “balance between both ethics and morality along with knowledge and skills” [6, 20]. It is in the interests of the MEB that students are supposed to carry the country's flag high and understand Malaysia's international relations with other states regionally and overseas. This is one attribute MEB shares with the fifth ontological and epistemological educational approach adopted in Zimbabwe in 2020. It is based on indigenous knowledge systems (IKS) or local heritage with a desire to produce products using resources that are available in the country [36].

On the contrary, several programmes and technologies have been included in the redesigning of the university curriculum in Malaysia. Business communities, both local and international, were invited to webinars, seminars, and workshops that discussed how the country should proceed technologically and industrially [20]. Malaysia held fruitful stakeholder consultations before the adaptation of the fourth education reform. Thus, the reform blueprint was clear and professionally guided by competent process leaders and curriculum review committees. To that end, Education 4.0 in Malaysia has been argued as the future for creative education that responds to the needs and expectations of industry and commerce, where people and equipment align to allow new potential. Similarly, as early as 1980, Zimbabwe's first education and culture minister, Dzingai Mutumbuka, argued that the post-independence government's dependence syndrome on theory-based education policy inherited from the Rhodesian government was a time bomb and that there was an urgent need to do away with it. The minister left the post, but his legacy continued into the 1990s. The Chetsanga Report of 1995 and the Presidential Commission into Education and Training (CIET), also known as the Nziramasanga Commission (NC) of 1999, were sanctioned by the government. The two considerations became keynote efforts meant to revolutionise the country's post-independence Western-based education system. By then or at that time, both explorations concluded that Zimbabwean education should be driven towards the production of goods and services. Some of Zimbabwe's neighbours, such as Zambia and Malawi, as well as a few other Southern African countries, have already adopted the NC recommendations and found them to be fruitful. However, Zimbabwe, as the think tank of noble high-end higher education skills, has so far refused to accept NC's recommendations. This anomaly has seen the country's economy fall. The effects forced the government in 2020 to fast track the tertiary and higher education sector teaching, training, and learning from Education 3.0 to Education 5.0. However, the development coincided with the need to limit or abolish face-to-face teaching and learning and replace it with online means and ways, whether synchronous or asynchronous. Thus, this study seeks to establish the relevance of the Education 5.0 policy in Zimbabwe. It also investigates the importance of VLEs in teaching and learning in higher education graduate programmes.

3. Methods

The study adopted a qualitative research method in this study to understand the relevance of new higher education approaches in Zimbabwean HEIs. This enabled us to avoid making preconceived judgements as to why certain arguments were raised during data collection [37]. The chosen methodology offered depth in understanding experiences through interviews rather than simply dealing with the rank-and-file of recorded approaches, feelings, and actions of study participants. Importantly, research quality relies on researchers' abilities and weaknesses. The

target population was lecturers from all HEIs. The entire sample was drawn from CUT and was assumed to be “representative” of HEIs’ teaching staff. The professional practices, morals, skills, and socio-political inclinations of the teaching profession were the basis for the selection, exclusion, and inclusion of samples in the research. Individual research participants’ understanding and experience in higher education teaching and learning guided data collection and data analysis. Thematic analysis was used to present the data and discuss generic views from interviewees. This was possible through the coding and indexing of transcriptions. Purposive sampling techniques were used to identify and choose sampling elements. As noted by [38, 39], the investigator’s view on the attributes of a representative sample played a central role in probing the samples by focusing on lecturers’ experiences, qualifications, and known incidents of exposure to curriculum reform and adaptation to new forms of higher education techniques over the years. Notably, they were found at CUT. Within a study, there is a need to clarify the sample size to ensure validity and reliability of findings. The DCAD has twelve lecturers, five of which had higher education teaching and learning experience in the DCAD; thus, we chose these individuals to interview. Their experience was used to solidify the results of the study. The findings became generic after the fourth interviewee. We conducted the fifth interview only to be sure of the saturation of data gathered. Using face-to-face interviews, we solicited answers to the research questions. However, it was not unqualified, which is a prominent weakness of the data collection method.

4. Value of education 5.0 in Zimbabwe

Generally, all interviewees argued that Education 5.0 and VLEs are steps in the right direction for the tertiary and higher education sector in Zimbabwe. These policies and practices are needed to provide solutions to mounting economic problems that have lowered the standards of living of ordinary people not only in Zimbabwe but the world over. Education 5.0 is perceived as a solution to the economy’s waning fortunes. However, lecturers in the DCAD at CUT do not view the Education 5.0 policy as novel. Interviewee 2 noted, “I think it’s not new. It has always been important for graduate students to be taught skills in addition to theory.”

Interviewee 1 noted, “It’s what we have been doing in the School of Art and Design (SAD). The nomenclature speaks for itself. We were ahead of the announcement by the government. We are not even surprised or scratching our heads about what to do. We know what to do. We have been doing it.” Interviewee 3 stated, “I do not see anything new about Education 5.0 for our school and CUT. It has been the order of the day before all this hype about Education 5.0. It has been the culture at the university.” Interviewee 4 observed, “Maybe it’s only the title that has been improved to be specific. In our department, we have always talked about design, creativity, innovation, and commercialisation. Again, it’s the university’s motto - technology, innovation, and wealth.” Interviewee 5 said, “I can’t distinguish the difference between what we have been doing (Education 3.0) since the school was founded and the new tertiary and higher education teaching and learning or discourse (Education 5.0). Our students have been producing goods. We are an innovation and technology institution.”

On a positive note, all interviewees (100%) agreed and valued the worth of the dogma of Education 5.0. However, interviewees also held a general feeling that the Ministry of Tertiary and Higher Education Science and Technology Development (MTHESTD) hindered the curriculum review. This means that HEIs have lost their autonomy in designing degree or diploma programs based on their understanding of graduate needs and desires.

In Zimbabwe, Education 5.0 builds on the new dispensation's (Second Republic) political ambitions to control all critical sectors of the country's economy and the need to prove a difference to the ex-president's (the late Mugabe's) era. Because of this, among other reasons, lecturers in tertiary and higher education institutions could not receive the new education policy with honour, as they felt politicians continually interfere with their work and consider little or no input at all from them.

The subsequent views from the research participants reflect on the need to produce graduates with high-end skills that are required for Zimbabwe to trigger sound teaching, research, community service, innovation, and industrialisation.

Interviewee 1 noted that Education 5.0

...is an area that focuses on the acquisition of both theory and skills with a thrust, enabling students to develop creativity and innovation skills. Besides being creative, they need to have the ability to produce, to come up with artefacts, to come up with products that will have an impact on technology or technological development. It's more like experiential learning. You don't want your student to just master your theory or content, but they must be able to apply that content to make a difference in the area of industrial development.

Interviewee 2 said:

So, the issue of innovation is about problem solving. When you innovate, you are solving problems. Problems are solved by people who create new ideas, and these ideas are turned into products and services. They may eventually be mass produced, thus saving the communities. They solve problems that are faced by the communities... so as the five pillars: teaching, research, community service, innovation and industrialisation.

The preceding sentiments present the interest of the dogma of Education 5.0 as a panacea to the practical deficit that has been inherited in most universities in Zimbabwe since colonial times. It is argued that innovation and industrialisation are ideal missions that can facilitate teaching and learning in HEIs. Beyond the two comments from Interviewees 1 and 2, generally, Education 5.0 is glorified by HEI educators because it allows the application of theoretical content to produce tangible goods and services. The teachers interviewed feel that teaching and learning should not end with the articulation of bookish text, as that translates to a waste of time in the process. Rather, book learning should be transformed into real products that can be put on the market for sale. Production of new goods and services through the facilitation of creativity, innovation, and industrialisation in the higher education and training sector may possibly bail out emerging economies like Zimbabwe's from local and international debt. This, in a way, agrees with [3]'s view that postmodern curriculum reforms have had a significant influence on the development of higher education and training. Hence, [3, 14] have observed that the up-to-date curriculum is a "curriculum-in-action" as it mutates.

It was discovered that students need to be given a hands-on education that sustains their lives in the long run. In addition, failure to nurture higher education students in ways that equip them with practical skills will intensify global economic problems. This explains the need to modernise our societies via collaboration and comprehensive curriculum reform with the intention of identifying problems and providing solutions. That means new ideas are brought up in the process of teaching and learning, which has a propensity to lead to economic development. This is unlike the third generation of education that did not include creativity, innovation, and industrialisation as key elements in higher education and training. That shows how

the Zimbabwean higher education curriculum was contrary to Bloom's taxonomy. It only short-changed the learners. The (revised) Bloom's taxonomy states that the purpose of higher education and training is to gain cognitive abilities and affective and psychomotor skills, which was not the case with the precursor to Education 5.0. Within the context of a three-tier education philosophy, Zimbabwean higher education learners suffer from limited post-graduate practical skills, which have become the cornerstone of modern-day industry. This identifies with the views [3, 5, 18] that the 21st-century curriculum reforms try to promote creativity, innovation, and commercialisation through higher education experience.

The DCAD lecturers aspire to produce graduates who work to solve problems in their communities. Interviewee 4, who is also a senior lecturer in the DCAD, stated:

As an academic, what it means is that whatever we teach our students, they have to have the skills to apply — the knowledge of doing things, especially when they start to work in the industry. We have students that are going to be designers. Either way, they are going to be industrial designers or multimedia designers. So, we expect our students to have an impact wherever they go by bringing in something new wherever they will be. Whether one is a product designer or not, we expect them to be innovative in coming up with new ideas. We expect them to be creative. In particular, we expect industrial designers to come up with new products that can meet a need in society.

However, the same interviewee also stated that Education 5.0, particularly in the DCAD at CUT, was not at all new. "Speaking as a designer, Education 5.0 is almost right in the middle of what I do. We design and come up with new innovations, whether it's multimedia design or industrial design," noted interviewee 4.

With an undertone of protest, the interviewee insinuated the non-existence of a clear education policy in Zimbabwe from independence. Creativity, innovation, and industrialisation are believed to have been embedded in the Education 3.0 philosophy, though they were not distinctively mentioned as missions of the doctrine. The interviewee further stated:

As a concerned citizen of Zimbabwe, I would say that we have been talking about Education 5.0 from different points of view. Every minister that has come on the scene has come up with their own version of innovation and industrialisation. So, it's not new to us. We have been practicing this.

This view attempts to highlight a pang of guilt over the lack of a national education policy in Zimbabwe. The interviewee further lamented wholesale curriculum reforms that are influenced by the need to score political goals by different political players that come and go into power in Zimbabwe, or out of the need to be different from one's predecessors, as noted earlier. Political scores are mentioned by Interviewee 4 as being prime in the way the Second Republic has been trying to govern and control the flow of higher education systems. The current regime came into power following a coup d'état in November 2017 [40, 41]. What is noble, however, is that policy, whatever its thrust, should be seen to contribute to the resolution of national problems. The interviewee also confirms the view that policy alterations are done haphazardly and with impunity in Zimbabwe.

For example, in our department, we train our students to be innovative, whether we are talking about Education 5.0 or even if it were reminiscent of the now defunct Science, Technology, Engineering, and Mathematics (STEM) policy of Mugabe's era. The policies expect students to contribute to the nation through the

work they do. In other words, how they can make an impact when they leave university. Can they be seen to be coming up with new ideas, new products, or thinking outside the box for the purpose of commercialising their ideas?

STEM died after the “soft coup” that deposed former and late President Mugabe and was replaced by Education 5.0. However, the argument is an indirect attack on the government for failing to acknowledge publicly that some higher and tertiary institutions were the founders of Education 5.0, opting to claim parenthood of the doctrine without pity. This implies a lack of collaboration between the government and the education sector in Zimbabwe. It existed well before STEM came into force in the post-GNU. However, the interviewee bemoans the lack of a specific higher education policy in Zimbabwe that glorifies the five missions of higher education and training at once. This equally identifies with Burgess [42], who stated that curriculum reviewers should desist from the practice of calibration of teaching and learning to satisfy the control mechanisms of the day.

From all the interviews conducted, it was also discovered that innovation and industrialisation are paramount in cultivating a higher education student to become an asset in society. In simple terms, Education 5.0 is progressive. Interviewee 4 observed that sharing the skills of creativity and industrialisation with learners is essential to the success of the world as a whole and encourages innovations to be cross-pollinated. This confirms sentiments by [7], who said that innovation and entrepreneurship in higher education are the cornerstones of a holistic graduate in any given community. That takes communities to greater heights when it comes to the depth, breath, and width of creativity, production, and commercialisation of ideas that start off as academic.

Interviewee 3 observed that Education 5.0 is progressive in that:

Innovation comes first, then industrialisation later... The thinking of Education 5.0 then says, in addition to the learning experience that produces academic knowledge, let the learning experience be able to promote innovation. In other words, let the student or learner be encouraged, or be groomed to be able to create new things. Suppose it's a module that is being taught, let it be able to usher the student into exploring ideas that are new. We are looking at the possibility of students breaking new ground by introducing products that are new. That's the dimension of innovation; products that may answer the needs of the community. So, having produced those new products, those ground-breaking inventions or ideas, then... will be industrialised.

The interviewee went on to say:

With industrialisation, other than training students to come up with researched knowledge presented in written documents and other platforms, that would make it generally academic. Education 5.0 brings in industrialisation where the learning experiences result in the production of products and goods... Let them be goods that are usable and that will attract the market, so that's the industrialisation aspect being emphasised through the (new) learning experience. Suppose there is a company that is interested in adopting that idea, technology, or whatever is produced. The company can actually be able to adopt that and produce the goods continuously.

From the preceding arguments, it can be noted that lecturers in the DCAD are prepared to intensify teaching and learning that is bound to produce goods and

services that can be used in people's everyday lives. The views suggest that the process of creativity, innovation, and industrialisation at HEIs should be continuous if the gains of Education 5.0 are to be realised in Zimbabwe. Once a product or good or idea is developed through higher education and training, it should be patented. Thereafter, its production should not halt but needs to be constantly improved or sustained with the input of the learning institution, students, and company that would have adopted it. On the contrary, when learners graduate, they may set up their own companies or industries that produce and sell goods, breaking new ground. It is against this backdrop that higher education and training should work illustriously to provide new and competitive goods and services with the view of boosting niche or existing business lines. This again extends to the view that universities should closely work with industry in its bid to sustain high-order cognitive, affective, and psychomotor skills as provided by Bloom in 1956 among graduates. The feeling agrees with [24, 43–48] as the way to go towards inculcating hands-on skills among tertiary institute graduates.

Furthermore, it was discovered by one of the interviewees that ancient or historical development education systems share similarities with Education 5.0. In the past, individuals created products such as hoes, bows, and arrows without having gone to a formal higher education setting to learn the necessary skills. This means that Education 5.0 is an undisputable extension of the IKS in Zimbabwe. IKS refers to locally based forms of knowledge production using available resources. The bond that exists between Education 5.0 and IKS was raised by Interviewee 1, who said:

I think innovation is needed for any country or institution. Innovation is not new, as people have been innovating from the time they were put on earth. That's why we have developed countries and developing countries, and some that are in between developed and developing, because people need to grow with technology to make life easier. So we need to innovate.

This finding suggests that countries and their education systems evolve at different times. Some countries have already introduced and benefitted from Education 5.0, while others are midway through realising the fortunes of the doctrine. The belief mimics [9]'s view that innovation and technology policy pay attention to the kinds of benefits that will inevitably be earned after the production of a commodity that genuinely solves an issue to enrich the lives of ordinary citizens. The interviewee further pointed out:

I will take an example. Going back to the Industrial Revolution, people produced products. Had they gone through an undergraduate programme? They hadn't, but because it was within themselves. That's what we are simply doing in universities to nature and support, so that we can see results. But, if they don't produce, that's fine, because they would have at least produced something. It may not be patented, but we will see a product. We will have engaged our students to focus on the importance of production.

These arguments by Interviewee 1 also show that Education 5.0 should not be presented as the Second Republic's creation or virgin education policy or rather a niche idea because it has roots in the primordial society, among other epochs of human development. This means that, as an educational approach, Education 5.0 is a back-to-basics teaching and learning system. The interviewee feels universities should not make a fuss about students' failure to produce something patentable at every level of learning. It is not always that students will come up with new ideas

and make products that can be put on the market, but the very fact that during teaching and learning they will have produced something useful is commendable. What is important is to ground students with real-life experience. This pinpoints what was projected by the renowned education philosopher John Dewey [27]. This means that creativity, innovation, and industrialisation should not be overly underlined through curriculum reform, but rather via the ability to develop graduates that have practical skills that can lead them to develop tangibles in the real world. The interviewee also suggested that higher education and training should not put students under pressure to produce patentable products. The same interviewee pointed out that “without the industry, you cannot process anything.” From this view, it is evident that students should not just create new things for the sake of a display of their abilities but rather for the purpose of making a living out of them. This research outcome proves to be consistent with [20, 31] who proposed that the predecessor of Education 5.0, Education 3.0, pacifies higher education learners as their learning capabilities do not go beyond documented research, which does not at all avail solutions to people’s problems.

Education 5.0 also helps people to appreciate the values related to hands-on education in the 21st century. Interviewee 5 noted:

People should be taught about industry in the same way that they are taught about tourism or geography, such as the existence of Great Zimbabwe and Victoria Falls. People know there exists a company that produces specific and unique goods or services wherever they are, and that information is not in our curriculum. People just know sweets and milk, but they don’t know where they are produced. They also know the Great Zimbabwe, Mosi-oa-Tunya, only theoretically. They also know the geographical sites, the heritage, and the natural sites of the country. That is what has been emphasised more in our curriculum all this time, but there has been nothing telling us about innovation and industrialisation.

This interviewee also laments that Education 5.0 skipped the grassroots to focus solely on higher and tertiary education. The arguments complement the 2019 strategic plan pronouncements [37] from the Ministry of Higher and Tertiary Education, Science and Technology Development (MHTESD). It is the finding of this study that there is a need to ensure that Education 5.0 should begin at the kindergarten level. This would see students develop strong values that support innovation and entrepreneurship in their teaching and learning up the ladder. This study also shows that interaction with creativity, innovation, and industrialisation needs to be continuous in the teaching and learning cycle. The components should be designed to start with early childhood development (ECD) and progress to university. At the same time, concern should not be limited to the appreciation of access to finished goods or the use of already set up services. Generally, all forms of education should not narrow students’ knowledge acquisition abilities to the existence of finished products such as milk, bread, and other goods and services. Known service places like Mosi-oa-Tunya, for example, do not at all expose students to processes that trigger and lead to production. These places have already been captured by investors who are also grappling to survive under the current global conditions. The income being realised by these businesses, for instance, has not been felt to provide solutions to the country’s evolving economic problems. But through higher education, innovation, and industrialisation, the nation’s economic status can be realised. This finding agrees with sentiments by [20], who observed that the Malaysian government came up with education reforms that were not exclusionary of paediatric teaching and learning.

5. Virtual learning environments (VLEs)

Among other things, Education 5.0 has been rocked by the need to encompass technology. All over the world, the insurgence of COVID-19 has made it even more necessary to work with and use technology in education. Technological development can be argued as a paradigm shift in the world education order. Pandemic lockdowns worldwide have made a mess of education delivery systems in a short space of time. Worthy of note, all learning institutions and most industries were temporarily placed under lock and key due to the virus. The disease made all physical forms of work that did not respect social distancing undesirable, including the education system. Traditional face-to-face teaching and learning suddenly became immaterial and invalid. During the COVID-19 period, old forms of teaching and learning were halted in Zimbabwe and elsewhere. Midway through the first semester of 2020, all teaching and learning went online. First-year students were yet to come in later in August of the same year.

This development prompted all the interviewees to acknowledge that Education 5.0 came with higher-order demands. It was observed that the initial curriculum review started with a focus on face-to-face teaching and learning; nothing more, nothing less. Fate has since taken its toll. At once, the local Education 5.0 decree was caught unaware by the need to embrace the IoT: online teaching and learning. When asked to clarify how Education 5.0 had responded to the emergence of COVID-19 in teaching and learning, interviewees stated it was problematic.

Interviewee 3 argued that:

It's a situation which will require the demonstrator to spot where the student is failing... There is a need for repetition, and there is a need for a stretch of time to allow the skill to actually get into the student's system. This can only be perfected by the regular intervention of the demonstrator, and in the case of virtual learning, there is a total absence of that.

Similarly, Interviewee 1 said:

We reviewed the curriculum before the pandemic... We were focusing on emphasising Education 5.0 in the classroom... We had not focused on moving into a mode where they were not in the classroom. We were only complementing the classroom teaching when we reviewed our curriculum to emphasise Education 5.0.

The preceding sentiments are a direct confirmation that online-assisted Education 5.0 in higher education has a long way to go in Zimbabwe. Nonetheless, the need to produce industrialists through higher education training remains unwavering. This complements [3] views that 21st-century curriculum reform is mindful of the value of didactic aims and instructional methods that prepare learners for real industry experience. This led the MHTESTD to adapt to Education 5.0. Yet, Interviewee 1 further noted that help services for VLEs in Zimbabwe are low. One scholar's projection is that for globalisation and industrialisation to take place, ICT should be part of everyday teaching and learning [26].

Interviewee 3's view was also inconsistent with [17, 15], who argued that the inclusion of advanced ICT was a prerequisite in higher education and training for innovation and industrialisation to be realised. It was noted that most students cannot afford to go online for teaching and learning purposes. Access to and use of VLEs, for example, has proven difficult as a practical requirement of Education 5.0. Both lecturers and students are financially handicapped and cannot necessarily

use VLEs for the purpose of teaching and learning. Network and power outages in Zimbabwe are serious issues that hamper the full, efficient, and effective use of VLEs, even for those few students and lecturers who can afford it. Beyond the reach of many are the technological gadgets they need to help them maximise the effectiveness of online teaching and learning, such as computers and smart phones. Interviewee 1 mentioned:

Accessing resources from a student perspective is a problem. I'm a parent. I'm a lecturer. I look at the cost involved in this whole idea of VLEs. How many Zimbabweans can afford to buy the equipment; a laptop for a student; a smart-phone; and then the Wi-Fi; the same student requires fees, food, and housing; and he or she is not the only child in the family. Look at the incomes of the majority of people in Zimbabwe. My challenge is determining how to meet the student halfway while also addressing the issue of resource availability versus income levels in our population.

The interviewee added:

I want them to read my notes on the portal. They need to buy data bundles to access the Internet. How much is the mobile data plan per day? Can a student have money to spend on data? Can we afford that? As a university or country, we are challenged. What are we doing to help the situation? We have heard about provincial resource centres to alleviate or meet half the challenges we are meeting on VLEs. There is nothing. I think there is a lack of support in the area of VLEs. For our population, it is missing, and it is very difficult for us to help our students. For example, regardless of the size of the class, only a quarter can complete the assignment online while the rest prefer to submit hardcopies or wait until they return to campus and have access to the Internet or Wi-Fi to complete the assignment(s). That makes it very difficult for me to mark assignments on time and prepare for exams at the same time. So, the reality of what we think we can achieve with VLEs is different from what is on the ground. The reality is that most of our students cannot access learning materials on their online portals due to the cost implications that characterise online teaching and learning.

The relevance of VLEs is also hampered by a lack of financial support from the government in the form of student grants and sponsorships in HEIs for them to learn online. This further points to the fact that Education 5.0 during COVID-19 remains largely unattainable. This agrees with [17]'s projection that African governments still find it difficult to commit resources towards the evolving models of education. Interviewee 1 also admitted all this disaster is being experienced because the government of Zimbabwe imposed VLEs upon educational institutions. However, it was not like CUT was totally taking a new route.

I would want to say, yes it was prescribed, but it does not mean that the school or the department was looking totally in a different direction from that. As a school or department, we were also looking at using the VLEs for teaching. In fact, we have been using VLEs in the past. But, where we are now speaking of these things being prescribed to us is when we were asked to speed up the use of VLEs. Before the coming of COVID 19 and Education 5.0, we were using VLEs. We were not following the 80 percent to 90 percent proportion that is now followed. In the past, we would use VLEs to distribute the notes and assignments and some of the general discussions with students. However, we reserved the demonstrations and serious lectures for in-person encounters. When VLEs came, we found ourselves in

a situation where we were told to do most of the things or everything through VLEs. That's where we end up talking about this thing being prescribed for us.

In the teaching and learning processes, the feasibility of the government's statement on the adoption of Education 5.0 was tantamount to the infiltration of VLEs. Further, Interviewee 3 lamented the disgust that came after the outbreak of COVID-19 with the imposition of VLEs and Education 5.0. Interviewee 3 also said that both students and lecturers lack ICT skills, therefore it is difficult to regularise VLEs at HEIs quickly.

The two exist; they may be oil and water in the sense that if you want somebody to be practically sound in terms of skills, then there is the issue of online learning. It is not feasible; somebody has to be there simulating, and that does not always work. Somebody has to be there face-to-face with learners. Yes, there are aspects that we can say with VLEs can be possible, but for some, life is very difficult; it doesn't work.

Zimbabwe still has issues with nationwide Internet access. Students travel long distances to study at local HEIs. These areas have few or no Internet-access facilities installed, nor do they have the electronic gadgets needed to run VLEs. Distance education demands that colleges and universities be technologically rich. The inaccessibility of digital resources makes VLEs irrelevant in the education sector. However, to further guide the overhaul of virtual higher education teaching and learning, the issue emerged as one of the major challenges that impinged upon Education 5.0 after the outbreak of COVID-19.

6. VLE support systems

The interviewees also lamented how VLEs can support the practical constituents of Education 5.0. They all held that the government is not concerned with issues of research on the viability of VLEs in Education 5.0 exercises in the country.

In different interview sessions, Interviewees 1 and 2 were worried about the absence of proper research on the inclusion of Education 5.0 and VLEs. Interviewee 1 observed:

In terms of support, I don't think we are serious as a country. We are not creating a conducive environment for us to use VLEs. What we are doing is pretending that things are moving when they are not. You need to do research so that you don't produce substandard students at the end. From the... VLEs lectures conducted so far, learners have grasped or learnt nothing at all. And we insist we want VLEs without having evaluated the VLE lecture experiences so far. We should have evaluated how students who participated in such online classes grasped both the theoretical and practical teaching virtually. Then we could see how effective it is and move.

Interviewee 1 added:

So, we need to make concerted efforts where the institution, the ministry, and the government look at things objectively. Yes, we are rushing to say they must cover all the learning virtually. But we are flogging a dead horse. With VLEs, we are finding it foolhardy to make learning a continuous process. Learning must be continuous, but my experience with VLEs is that it's continuous academic coaching with little

or no effective learning taking place. This is because we do not have adequate resources to support our VLEs. Look at the practical subjects.

How are VLEs supporting the practical component? Yet, these are the courses that help us make the products that are going to emphasise innovation and industrialisation. What skills have we given them online? What have we done to impart the skills? Even if we go through our VLEs, what is there to impart skills or support skills acquisition? There is nothing. What you get is the theory or methodological component. We have a skills deficiency and that deficiency will kill innovation and industrialisation.

From the evidence gathered, the MHTESTD opted to go it alone in deciding how Education 5.0 should be executed virtually in HEIs. Lecturers from different local HEIs should have been taken for exchange programmes on how Education 5.0 and VLEs can be attached. That has been pertinent in countries like Malaysia, Germany, and China. This would have gone a long way in equipping higher education and training educators with the VLE skills needed to make them able to teach online effectively and efficiently, particularly for Education 5.0. Notably, the modernisation of the university curriculum in Malaysia has been characterised by the inclusion of a variety of projects and technologies for it to be a success. Unlike in Zimbabwe, as stated by Interviewee 1, Malaysian local and international industry groups were invited to give webinars, seminars, and workshops to academic practitioners so that they would turn out to be technologically and industrially compliant [20].

The interviewee argued that research is key when it comes to the need to merge VLEs with teaching, research, community service, innovation and industrialisation. When it comes to VLEs, there was supposed to be enough research in terms of the person who is going to deliver and the person who is going to receive via these platforms to be all equipped. At the same time, whatever we are going to use as a medium for communication, is it effective enough so that whatever we want to do succeeds? So, the issue of VLEs at a localised level may work, especially for a few well-resourced people. At the moment, there are many hitches.

Interviewee 3 said:

I admit, we still have challenges. Of course, as we prepare our module outlines, lecturers are encouraged to design them so that students are guided on the activities that they need to do to build on their skills, particularly hands-on skills. But, the challenge is that the nature of some of the modules is such that as the student is taught new skills and given an instruction, a syntax of how an operation is done is also given. The gist of teaching when it comes to practical skills is in allowing the student to do an operation while the lecturer or demonstrator watches.

In the process, lecturers will identify in which areas the student is doing it correctly and in which areas the student is doing it incorrectly, and then they will re-demonstrate again and again. It is not something that can be done through a syntactic manual, and it allows the students to perfect their skills without the regular intervention of the demonstrator. The situation requires the demonstrator to spot where the student is struggling or failing. Also, some skills require high mental engagement and psychomotor skills from the student.

Interviewee 3 further noted that:

Of course, some lecturers have tried to demonstrate using films, sometimes borrowing films from YouTube here and there. Some lecturers have tried to upload films that they have made. But, still, they will not be able to do it the way it will be done in face-to-face interactions between students and lecturers.

From the preceding statements, it appears that online and offline-assisted teaching and training have a long way to go in Zimbabwe. The interviewee mentions the need to virtually give students skills that will help them innovate and industrialise in the future. Interviewee 1 stated:

Our students were exposed to these (VLEs) before COVID 19, and we were interacting with them all the time on WhatsApp. To give them notes, to give them assignments, and that's part and parcel of the VLEs ... If you look at this new thing now, we are saying more than 75% of the time they are learning online. I think we need to look into the challenges as universities. What are the challenges our students are facing? Are they really benefiting from VLEs? How many of them are benefiting? To what extent? This is because, in the current situation, we have seen so many challenges in online teaching and learning.

So, let me answer the how part of it. We have incorporated the VLEs at our university. Besides, we use their personal emails. Why personal, individualised instructions? Some students may not be able to grasp what I have given via the university portal, and they may want to interact with me on a different platform. We go ahead and do that. One other student may not be able to access his or her university portal but may check his or her email. That can also complement our use of social media.... Looking at our resource constraints as students and lecturers, we all know that at times we cannot get the Internet or Wi-Fi. But, when you get it, then you can use any platform that is easier for you or more accessible to you.

Currently, VLEs are not effective and efficient for the purpose of Education 5.0 teaching and learning at CUT. However, 20% of interviewees contended that there was no difference between face-to-face teaching and online teaching. Whether you teach face to face or online, it makes no huge difference to the content that you teach. "I teach the same content in both instances," argued Interviewee 1. This implies some lecturers have no problems when it comes to conducting both online practical and theoretical lectures. In this instance, VLEs are not entirely a threat in the DCAD at CUT.

7. Conclusions

The relevance of new higher education approaches in Zimbabwe has been proven to be unstable following the outbreak of COVID-19. Education 5.0 still demands a lot in terms of commitment on the part of the lecturers in HEIs, though they argue it is not a new development in their day-to-day work. It further emerged that Education 5.0 was adopted without considering unplanned developments such as COVID-19, a disease that changed the status of teaching and learning. The pandemic called for the use of VLEs since all teaching and learning has become predominately virtual. The disease has made online teaching and learning mandatory in Zimbabwe. The cost implications of VLEs are extensive and only a few learners can afford the resources needed to participate in VLEs. Supporting digital equipment for the purpose of teaching and learning is expensive. This research concludes that a handful of graduate students may finish their higher education and

training with the requisite skills needed in industry. It is therefore recommended that Zimbabwean HEIs return to the previous Education 3.0 model until the global economy has been balanced.

A. Appendices and nomenclature

What is your professional understanding of Education 5.0 in higher education?
What aspects of Education 5.0 are emphasised in the curricula?
What is its importance?
What strategies did you use to make Education 5.0 suitable for VLEs?
What is the relevance of VLEs in higher education and training?
In what ways did your academic experience influence the selection and exclusion process of VLEs?

Author details

Kudakwashe Keché
Chinhoyi University of Technology (CUT), Chinhoyi, Zimbabwe

*Address all correspondence to: lkkeche@gmail.com

IntechOpen

© 2022 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. 

References

- [1] McNay M. Western Guide to Curriculum Review. London, Canada: The University of Western Ontario, Teaching Support Centre; 2009
- [2] Dyjur P, Kalu F. Introduction to curriculum review. In: Taylor Institute Teaching and Learning. Calgary: University of Calgary; 2018
- [3] O'Neill G. Curriculum Design in Higher Education: Theory and Practice. Dublin: UCD Teaching & Learning; 2015
- [4] Parsons J, Beauchamp L. From Knowledge to Action: Shaping the Future of Curriculum Development in Alberta. Canada: Alberta Education Planning and Standards Sector; 2012
- [5] Oliver SL, Hyun E. Comprehensive curriculum reform in higher education: Collaborative engagement of faculty and administrators. *Journal of Case Studies in Education*. 2011:1-20
- [6] Shizha E, Kariwo MT. Education and Development in Zimbabwe: A Social, Political and Economic Analysis in Zimbabwe. Canada: Sense Publishers; 2011a <http://www.sensepublishers.com/media.297-eduaction-and-development-in-zimbabwe.pdf>. [Accessed July 1 2021]
- [7] Slattery P. Curriculum Development in the Postmodern Era. New York: Routledge; 2006
- [8] Dakwa, F. M. The Nziramasanga Commission of Inquiry of 1999: Implications for social needs education. *International Journal of Innovative Research and Development*; 2016:383-388
- [9] Bartzokas A, Teubal M. A framework for policy oriented innovation studies in industrialising countries. *Economics of Innovation and New Technology*. 2002:477-496. DOI: 10.1080/10438590200000009
- [10] Dill DD. Through Deming's eyes: A cross-national analysis of quality assurance policies in higher education. *Quality in Higher Education*. 1995:95-110
- [11] Tan JP, Choo SS, Kang T, Liem GAD. Educating for twenty-first century competencies and future-ready learners: Research perspectives from Singapore. *Asia Pacific Journal of Education*. 2017:425-436. DOI: 10.1080/02188791.2017.1405475
- [12] Newlyn D. The process model of curriculum in the planning and teaching of legal units of study. *International of English and Education*. 2016b:247-255
- [13] Lee M, Thurab-Nkhosi D, Giannini-Gachago D. Using informal collaboration to develop quality assurance processes for eLearning in developing countries: The case of the University of Botswana and the University of the West Indies distance education Centre. *International Journal of Education and Development using ICT*. 2005:108-127
- [14] Barnett R, Coate K. Engaging the curriculum in higher education. In: *The Society for Research in Higher Education*. Maidenhead: Open University Press; 2005
- [15] Gleason NW. Introduction. In: Gleason NW, editor. *Higher Education in the Era of the Fourth Industrial Revolution*. Singapore: Palgrave MacMillan; 2018. pp. 1-11
- [16] Joynes C, Rossignoli S, Amonoo-Kuofi EF. 21st Century Skills: Evidence of Issues in Definition, Demand and Delivery for Development Context (K4D Helpdesk Report). Brighton, UK: Institute of Development Studies; 2019

- [17] Jakovljevic M. A model for innovation in higher education. *South African Journal of Higher Education*. 2018;109-131
- [18] Ornstein A, Hunkins F. Curriculum design. In: *Curriculum: Foundations, Principles and Issues*. 5th ed. Boston, MA: Pearson/Allyn and Bacon; 2009. pp. 181-206
- [19] Larson LC, Miller TN. 21st century skills: Prepare students for the future. *Kappa Delta Pi Record*. 2011;47(3):121-123. DOI: 10.1080/00228958.2011.10516575
- [20] Maria M, Shahbodin F, Pee NC. Malaysian higher education system towards industry 4.0 current trends overview. In: *AIP Conference Proceedings*. No. 1. AIP Publishing, LLC; 2018. p. 020081
- [21] Bloom BS, Engelbert MD, Furst EJ, Hill WH, Krathwohl DR. *Taxonomy of Educational Objectives: The Classification of Educational Goals*. London: Longmans; 1996
- [22] Bloom BS. *Taxonomy of Educational Objectives: The Classification of Educational Goals*. New York: Longmans, Gree; 1956
- [23] Anderson LW, Krathwohl D, editors. *A Taxonomy for Learning, Teaching and Assessing*. New York: Longman; 2001
- [24] Partnership for 21st Century Skills (2009). *A Framework for 21st Century Learning*. Tucson: AZ: P21; 2009
- [25] Geisinger KF. 21st century skills: What are they and how do we assess them? *Applied Measurement in Education*. 2016;2016:245-249. DOI: 10.1080/08957347.2016.1209207
- [26] Silva E. Measuring skills for 21st century learning. *Phi Delta Kappan*. 2009;630-634
- [27] Johnson TW, Reed RF. *Philosophical Documents in Education*. 3rd ed. Boston: Pearson; 2008
- [28] Songkram N, Chootongchai S, Khlaisang J, Koraneekij P. Education 3.0 system system to enhance twenty-first century skills for higher education learners in Thailand. *Interactive Learning Environments*. 2019;1-17. DOI: 10.1080/10494820.2019.1592197
- [29] Utomo HP, Bon AT, Hendayun M. The integrated academic information support for education 3.0 in higher education institution: Lecturer perspective. In: *International PostGraduate Conference on Applied Science & Physics*. IOP Publishing, Journal of Physics; 2017. DOI: 1088/174265/1049/1/012102
- [30] Keats D, Schmidt JP. The genesis and emergence of education 3.0 in higher education and its potential for Africa. *First Monday*. 2007;3-5
- [31] Waston WR, Waston SL, Reigeluth CM. Education 3.0: Breaking the mold with technology. *Interactive Learning Environments*. 2015;332-343. DOI: 10.1080/10494820.2013.764322
- [32] Salom G. May the fourth be with you: Education 4.0. *Journal of Learning for Development*. 2019;95-115
- [33] Hussin AA. Education 4.0 made simple: The ideas of teaching. *International Journal of Education & Literacy Studies*. 2018;92-98
- [34] Pangandaman HK, Nessaf AD, Lamboyang JHC, Ergas MLG. Philippines higher education Vis-à-Vis education 4.0: A scoping review. *International Journal of Advanced Research and Publications*. 2019;2019:65-69
- [35] Mourtzis D. Development of skills and competences in manufacturing towards education 4.0: A teaching

factory approach. In: International Conference on the Industry 4.0 Model for Advanced Manufacturing. Cham: Springer; 2018. pp. 194-210

[36] Larson L, Miller TN, Ribble M. 5 considerations for digital age leaders. *Learning & Leading with Technology*. 2009/2010;37(4):12-15

[37] MHTESTD Strategic Plan, [Internet] 2019-2023 <http://www.mhtestd.gov.zw/?wpdmpo=strategic-plan-2019-2023> [Accessed: June 28 2021]

[38] Edmonds WA, Kennedy TD. *An Applied Guide to Research Designs: Quantitative, Qualitative, and Mixed Methods*. 2nd ed. Los Angeles: Sage Publications Ltd; 2017

[39] Bigsby E. Sampling non-probability. In: Allen M, editor. *The Sage Encyclopedia of Communication Research Methods*. Thousand Oaks: Sage Publications; 2018. pp. 1537-1538. DOI: 10.4135/9781483381411

[40] Bless C, Higson-Smith C, Sithole SL. *Fundamentals of Social Research Methods: An African Perspective*. Cape Town: Juta and Company Ltd; 2013

[41] Chitagu TP. *The Dangerous Game: Relations between Zimbabwe's Independent Media and ZANU-PF*. 2-44, Reuters Institute Fellowship Paper. University of Oxford; 2018

[42] Burgess H. Redesigning the curriculum for social work education: Complexity, conformity, chaos, creativity, and collaboration? *Social Work Education*. 2004;163-183

[43] Hodgkinson D. The Mnangagwa era? Periodisation and politics in Zimbabwe. *Journal of Southern African Studies*. 2019;981-992. DOI: 10.1080/03057070.2019.1660572

[44] Naude W, Nagler P. *Industrialisation, innovation, inclusion*.

Vienna: UNIDO research. Statistics and Industrial Policy Branch Working Paper. 2015

[45] Kurasha P, Gwarinda TC. Financing a sustainable quality assurance model for national development through open and distance learning in higher education: The Zimbabwean experience. *International Journal of Open & Distance Learning*. 2011:1-9

[46] Benton A, Kats L. *Waves of Innovation: Creativity and Community at Pepperdine University*. New York, NY: TIAA Institute; 2016 <https://www.tiaainstitute.org/public/pdf/waves-of-innovation.pdf> [Accessed June 28 2021]

[47] Brennan J, Broek S, Durazzi N, Bregtje K, Ranga M, Ryan S. Study on innovation in higher education: Final report. In: European Commission Directorate for Education and Training Study on Innovation in Higher Education. Luxembourg: Publications Office of the European Union; 2014

[48] Tierney WG, Lanford M. *Cultivating Strategic Innovation in Higher Education*. New York, NY: TIAA Institute; 2016