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Globalisation and Localisation of Engineering Education in Africa

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ABSTRACT

The problem of globalisation and localisation of engineering education in Africa is discussed in this paper. This is because, as compared to other continents, engineering education in Africa is still far behind in terms of quality and importance and is considered outdated and has no place in global engineering. To this impact, authors have argued that the globalization of African engineering education could be a possible solution to this anomaly facing the continent's engineering education. It is on this note that this research argues that it is important to globalize engineering education in Africa. This study further argues that while it is important to globalize engineering education, it is also relevant that it is localised alongside. To this end, this study believes that engineering education on the continent needs to undergo a 'localized globalization' for engineering education in Africa to take its correct place and role in global engineering. It is through this notion that this research is organized. Based on the analogy of this report, it is concluded that engineering education on the continent must be 'globalized locally' in order for engineering education in Africa to take its rightful place in world engineering. Therefore, this study recommends that local engineering values should be mixed together to achieve successful localized globalization while globalizing engineering education in Africa.

Key words: Globalisation, localization, Engineering Education, Africa, Education

1. INTRODUCTION

Engineering education is the training of engineers who are supposed to be the initiators, facilitators, and implementers of technological development of a nation. Engineers are supposed to solve societal problems in sustainable ways. For them to do so they need to be sufficiently informed in engineering concepts and application of engineering theoretical principles to practical problems. The desire of the stakeholders to achieve this has been met by lots of challenges. Our failure to properly resolve the problems in Africa has placed us at a low level in terms of technology. The disparity between developed, developing, and undeveloped countries borders on the capacity of developed countries to transfer science ideas to technology using engineering locally, whereas developing and undeveloped countries have not yet been able to do so effectively. According to Falade (n.d.), many but a few of the key problems mitigating the training of engineers in Africa are funding; facilities; brain drain; training and retention of employees; and outdated curriculum.

In Africa, all of these obstacles have limited engineering education, and thus struggle to compete with other parts of the world more effectively and efficiently in terms of quality engineering education. Consequently, this has contributed to the continent's churning out of half-baked engineers. In addition, in recent years, Africa, particularly Sub-Saharan Africa, has experienced robust economic growth, attracting substantial foreign investment. However, Mohamed Bhai (2016) argued that an acute shortage of domestic skilled labour disadvantages foreign investment ventures, making it necessary to import foreign skills. To this end, Mohamed Bhai concluded that the development of its human capital is paramount for Africa to sustain its unprecedented economic growth and become competitive, especially in the areas of engineering.

It is believed that Africa is suffering from a significant shortage of trained and skilled engineers. Consequently, according to Mohamed Bhai, there is, in particular, an urgent need for engineering skills in Africa for many reasons (2016). First, to accompany its growth trajectory for its infrastructural production. Such construction involves constructing highways, bridges, buildings, airports, ports, etc. Secondly, to accelerate its industrial growth, in particular in the manufacturing sector, so that it becomes a net exporter rather than a manufactured goods importer. Third, to fulfil its ever-increasing energy needs in order to address the acute power shortages it frequently experiences. Fourth, to allow it to take charge of the exploitation of its rich natural resources,

in particular minerals, oil and gas, and of the processing of those resources prior to export.

As pointed out earlier, the use of outdated curricula in teaching prospective African engineers is one of the major issues mitigating engineering education in Africa. Akomolafe (2019) supports this claim, claiming that there is a disconnect between engineering education and its direct impact on the continent, noting that training centres and universities in Sub-Saharan Africa are, by extension, engaged in teaching engineering students with an obsolete curriculum in Africa, making them redundant and unfit to meet current labour requirements.

Therefore, it is not news that engineering education in Africa is hindered by the use of outdated curriculum, as the curriculum lacks modern materials and content that today's engineers need to work seamlessly. To this end, this study suggests that engineering education in Africa should be globalized as a potential route to ensure that engineering education in Africa effectively competes with other continents around the world.

Globalization is characterized as a systemic process of growing interdependence between different parts of the world, which has created a number of economic, cultural, and social changes that have changed the world over the past 50 years because of the impact of an action at a distance. Gupta (2017) pointed out that Africa's globalization of engineering education interconnects teaching methods from global structures to support the international growth of environmental sustainability, as well as to contribute to strengthening global industries. From primary to university levels, these educational programs emphasize global access to school, instigating learning opportunities that prepare students for international leadership roles. Globalizing engineering education, however, does not imply a complete neglect of local awareness and best engineering practices in Africa. That is to say, local staff, stakeholders and organisations, sections, or components of the curriculum at community/local or school level should be involved in globalizing the engineering curriculum in Africa, in order to resolve concerns that are important locally and allow for more meaningful learning experiences. To this end, this research believes that Africa's engineering curriculum is globalized in a localized way to ensure that the curriculum is responsive to the current demands of African communities and organizations.

This paper is therefore divided into various parts. The first part of the study is used as a concept to deconstruct globalization and localization, while the second part of the study is used to explain in depth what the concept of 'education globalization and localization' implies. The third part of the research is used to explain why the curriculum for engineering education in Africa needs to be globalized and localized in the same vein. The fourth segment of the report explores in depth how it is possible to globalize and localize the engineering curriculum in Africa. The final part of the paper concludes the study.

2. DECONSTRUCTING THE IDEA OF GLOBALISATION AND LOCALISATION

Globalization is a collection of economic and political frameworks and processes that emerge from the evolving nature of the goods and assets that form the foundation of the international political economy, especially the growing structural distinction between those goods and assets (Reich, 1998). Global education is funded by multi-lateral international organizations such as the World Bank and the Economic and Cooperation Development Organization (Salmi et al, 2009). Normally, these institutions finance tertiary education centres that adhere to a neo-liberal education agenda. According to Salmi et al. the World Bank, for instance, produces policy reports, provides financial support (for example, loans and other funding initiatives), collects and analyses data, offers policy advice, sponsors international/regional conferences and offers technical assistance.

Globalisation is the cooperation and convergence process between individuals, corporations, and governments around the world. Since the 18th century, globalization has intensified because of developments in transport and communication technology (Duncan, 2018). This rise in global interactions has caused international trade and the exchange of ideas and culture to develop. Globalisation is mainly an economic exchange and integration mechanism which is related to social and cultural aspects. Controversy and diplomacy, however, are still an important part of the history of globalization and current globalization. According to Duncan, the past of globalization is thought to be guided by technology, transport, and international cooperation (Bridges, 2002). Markets in which globalization is especially relevant include financial markets such as stock markets, money and credit markets and insurance markets, commodity markets such as oil, coffee, tin and gold markets, and commodity markets such as motor vehicle and consumer electronics markets. A hallmark of the late 20th and early 21st centuries is the globalization of sport and entertainment.

The rate of globalization has increased, according to Economics online, for a number of reasons: Over the past 40 years, advances in IT, transport and communications have increased the speed of globalisation. The internet has made it possible to communicate easily and 24/7 globally, and the use of containerization has allowed vast quantities of products and services to be transported at extremely low costs around the world. More recently, the emergence of social media means that, in many ways, national borders have become obsolete as marketers use new modes of communication and marketing to reach foreign customers, including micro-marketing. Overland (2016) said that the widespread use of smartphones has also allowed global shoppers to have easy access to 'virtual' global markets. Increased global trade

is also encouraged by the proliferation of modern electronic payment systems, including e-Wallets, pre-pay and mobile pay, e-Invoices, and mobile pay applications.

The emergence of complex financial instruments, such as derivatives, has allowed for rapid growth in global credit markets. Following the fall of communism, which opened up many former communist countries to inward investment and global trade, expanded trade has become increasingly unrestricted. Trade openness, described as the ratio of exports and imports to national income, has risen from 25% to around 40% for developed economies over the last 30 years and from 15% to 60% for emerging economies (Salvatore, 2008).

The proliferation of multinational and transnational foot-less companies (MNCs and TNCs) and the growth in popularity of global brands such as Microsoft, Apple, Google, Sony, and McDonalds have been central to the emergence of globalization. The drive to reduce tax burdens and circumvent regulation has also meant the development of complicated foreign business structures.

To this end, according to Pettinger (2019), globalization provides a range of possible benefits to foreign manufacturers and national economies, including: offering an opportunity for countries to specialize and profit from the implementation of the comparative advantage principle; access to broader markets means that companies will experience higher demand for their goods as well as benefit from the benefit of the comparative advantage principle; Globalization enables businesses to access cheap raw material suppliers globally, and this allows companies to be cost-competitive in their own markets and in overseas markets; global sourcing is called the hunt for the cheapest products from around the world; globalization will produce increased income for shareholders due to cost savings and increased revenue; and avoidance of localities regulation (LCDs).

There are different forms of globalisation – political globalisation, social globalisation, and economic globalisation. The amount of political cooperation that occurs between different countries refers to political globalization. It refers to the development, both in size and complexity, of the worldwide political system. This structure involves national governments, their political and intergovernmental bodies, as well as elements of global civil society separate from the government, such as international non-governmental organizations and organizations of social movements (Salvatore, 2008). The decreasing relevance of the nation-state and the emergence of other players on the political scene is one of the main aspects of political globalization. One of the classical examples of political globalization is called the development and life of the United Nations.

This is related to the assumption that "umbrella" multinational institutions are better placed to deter conflict than individual states. The League of Nations founded after WW1 was undoubtedly one of the leaders in this. International organizations such as the World Trade Organization (WTO), the United Nations (UN) and more international organizations such as the EU have also helped to raise the level of political globalization (Fairhead, 2020).

On the other hand, social globalisation refers to the exchange of ideas and knowledge between various countries and through them. The Internet and social media in today's world are at the centre of this. Globally famous movies, books and TV shows may be strong examples of social globalization (Fairhead, 2020). All over the world, the Harry Potter/ Twilight movies and books have been popular, making the characters featured globally recognizable. This cultural flow, however, appears to flow from the centre (i.e., from developed countries such as the USA to less developed countries). For eroding cultural distinctions, social globalisation is also criticized.

Finally, one of the three key dimensions of globalization widely found in scholarly literature is economic globalization, with political globalization and social globalization being the other two (Salvatore, 2008). The widespread foreign movement of commodities, money, services, technology, and information refers to economic globalization. It is the growing economic integration and interdependence of the world's global, regional and local economies by intensifying cross-border movement of goods, services, technology and resources (Joshi, 2009). The globalization of manufacturing, banking, markets, technology, organizational regimes, organizations, businesses and labour is mainly part of economic globalization (Dunphy, 2020). Although economic globalization has developed since the advent of transnational trade, it has grown at a growing pace as a result of improved long-distance transport efficiency, developments in telecommunications, the importance of information rather than physical resources in the modern economy, and advances in science and technology.

Localisation, on the other hand, refers to the modification of a particular resource or commodity to meet the requirements of one locale. Localizing the materials means making appropriate revisions to existing content to ensure it is understood by an audience in a targeted locale. This implies that it is the method of bringing a commodity to a particular locale/market and adapting it to it. Localization is more than translation; it has to be said. It requires physical, linguistic, and even cultural adaptation (Loklise, 2019).In short, localization is the process of putting the world into the context of relevant local knowledge and values through curriculum with localized content focused on cultural, economic, political, social and learning aspects of society: local significance and legitimacy decentralization for self-determination in education (Altbach 1999).As a result, teachers and classrooms will no longer be alienated from the dynamism of the local community in terms of localisation, because they will no longer be constrained by standard information enforced by the central authority. To this end, the

main point is that education reform should increase the importance of education to local growth and attract community support, learning collaboration, and teaching.

3. UNDERSTANDING THE GLOBALISATION AND LOCALISATION OF ENGINEERING EDUCATION

Higher education globalization means the mobility of students, institutions, instructors, and services that transcend national borders. To this impact, globalization has become a market-driven phenomenon involving numerous providers and attracting thousands of internationally priced students who are willing to purchase these services. A big global industry has become higher education. It recognizes that in the globalized market for talented students, money, and prestige, the "international knowledge order" has become a powerful determinant (Weiler, 2001). The reasons for promoting and accelerating the process of higher education globalization are: the need to deepen and expand the economic knowledge base; well-educated individuals should be open to ideas, not limited to any national boundary; increasing demand for international degrees from students; financial attractiveness of many universities to enrol foreign students; reputation sought by institutions (Wildavsky, 2010).

To this end, in terms of engineering education, the globalization of engineering education in Africa includes deepening and extending the knowledge base in Africa. That is to say, the globalization of engineering education in Africa will mean ensuring that Africa's engineering curriculum follows current world best engineering practices with a broader and deeper reach, thereby making the engineering curriculum sensitive to today's engineering demands. Moreover, the globalization of engineering education in Africa will mean that various engineering ideas that are not limited to the African continent will be exposed to engineering students in Africa. As a result, African engineering students will be exposed to mixed local and foreign engineering concepts, thus ensuring that they have the required engineering skills that will make them competitive in the current marketplace.

The localisation of education, on the other hand, refers to the process of taking educational tools created in one context and adapting them to other contexts (Hyatt, 2017). Such contexts may be geographical, pedagogical, political, or technical, for example. Localization of education in terms of engineering education in Africa would mean combining and adapting the engineering curriculum developed for other clines in the world for local use by engineering students in Africa. According to Hyatt, the reasons why educators locate instructional materials are: addressing a particular type of teaching or learning style; adapting to a certain discipline; adapting to a different learning environment; addressing diversity needs; addressing a cultural preference; encouraging a specific pedagogical need and addressing the uniform curriculum of either a school or a district. With this said, the engineering curriculum has to discuss the African teaching and learning style to localize engineering education in Africa. That is to say, in terms of the teaching styles to be used by engineering tutors in Africa, the adapted global engineering curriculum should be localised. Moreover, with regard to engineering education in Africa, there are various disciplines, such as civil engineering, agricultural engineering, chemical, electrical and mechanical engineering. Localizing engineering education in Africa would require applying a globalized curriculum through engineering education across the various disciplines in Africa. More significantly, adapting a globalized engineering curriculum to meet the demands and to adapt to the African learning environment would mean localizing engineering education in Africa. The learning environment style has a huge effect on learning, so it is only important for the globalized engineering curriculum to be localized by taking the peculiarities of the African environment seriously into account. To this end, by adapting the engineering curriculum to the African learning environment, the needs of engineering education for diversity can also be met. Furthermore, localizing engineering education in Africa would also involve modifying Africa's engineering curriculum to overcome the cultural gaps between the African continent and other continents. Due to cultural requirements, the quality, scale, types, lessons and curriculum functions may all require adaptation (Hyatt, 2017).

4. WHY ENGINEERING EDUCATION IN AFRICA NEEDS LOCALISED GLOBALISATION

For the purposes of initiating, promoting, and enforcing the technical development of a country, engineering education is concerned with training engineers. The training of engineers who are expected to be the initiators, facilitators and implementers of a nation's technical advancement is engineering education. Rather than any other discipline, engineering has a greater direct effect on national health. Technology contributions from chemical engineering, civil engineering, electrical and computer engineering, aeronautics, etc. are widespread and noticeable. Consequently, not just for technological systems but also for many other social changes, engineers may serve as change agents. In terms of content and approach, the scientific nature of engineering education makes it exceptional and therefore demands special care and attention. To the degree that even the illiterate can see when 'failures' occur, the inputs of engineers are so obvious. Engineers are expected to solve problems in society in sustainable ways. In order for them to do so, engineering concepts and the application of engineering theoretical principles to practical problems need to be properly educated. Lots of problems have met the ambition of the stakeholders to accomplish this. Our failure to

properly resolve the problems in Africa has placed us at a low level in terms of technology. The disparity between developed, developing, and undeveloped countries borders on the capacity of developed countries to transfer science ideas to technology using engineering locally, whereas developing and undeveloped countries have not yet been able to do so effectively.

According to Falade (2016), the training of engineers in Africa has therefore encountered daunting obstacles, ranging from insufficient funding to inadequate quantitative and qualitative facilities, lack of sufficient human resources, brain drain and poor training and retention profiles for employees. Others include inadequate university/industry collaborations, poor curricula, conventional teaching methods, poorly designed facilities, lack of local codes and monitoring requirements for training prospective engineers, and insufficient lCT environments.

Furthermore, for two reasons, Sub-Saharan Africa is severely lacking in engineering ability and relies heavily on imported expertise: inadequate production from training institutions, low quality education and lack of practical experience among graduates. But Africa has pressing needs for growth that need engineers as well. Second, infrastructure, including highways, bridges, houses, airports, and harbours, needs to be constructed in line with the region's economic growth trajectory. Secondly, industrial growth, especially in manufacturing, should be accelerated to make the region a net exporter rather than an importer of manufactured goods. Third, to address acute power shortages, Africa's ever-increasing energy needs should be met. Fourth, the region should control the mining of its rich natural resources, especially minerals, oil and gas, and before export, these resources should be refined. Finally, it is projected that in order to meet a single Millennium Development Goal, a whopping 2.5 million new engineers and technicians would be required to increase access to clean water and sanitation.

More and more importantly, Africa's engineering curriculum is outdated in that it is not substantially useful today. According to Mathews, Ryan-Collins, Wells, Sillem and Wright (2012), approximately 40% of skilled engineers believe that engineering education cannot provide the requisite skills in Sub-Saharan Africa that are important to the demands of engineers in this current technological age. One of the problems highlighted in the literature that affects the quality of engineering education is that the engineering curriculum in Africa lacks responsiveness and relevance (Shay, 2016).

The engineering curriculum in Africa must be applicable to the current situation, according to Shay (2016), and must be ideal for meeting students' learning needs. Fomunyam (2020) argued that society and the job market have changed and that graduates need to have the skills that fit into this evolving position that an insufficient curriculum does not provide, and that this exacerbates the need to foster curriculum versatility and adaptability to the current situation. In a nutshell, Africa needs globalized engineers, who are engineers with global technical experience. Global engineers would have global best practices for African society in terms of engineering needs on the continent, as Pacho correctly argues (2020). Pacho further pointed out that globalization challenges educational institutions to motivate students to become active global citizens; students who are able to recognize that, because of their ripple effects, factors such as illnesses, global economic crisis, refugee crisis and climate change threaten conventional borders.

According to Pacho, Africa's advantages from the globalization of engineering education include improving the growth of the global and intercultural competence of students, implementing elements of other educational systems with the desired goal of improving one's own. Furthermore, according to Pacho, globalization affects international academic mobility-students, workers, credit mobility, trade and study abroad; international research collaboration-expanding interest in international engineering research; engineering education as a commodity-export industry; increased international student enrolment; Virtual access to engineering education-mass engagement in engineering education; exchange of information and knowledge-textbooks, journals; global networking-professional organizations and conferences; curriculum creation-requires the need to incorporate global problems into the curriculum; transnational education-globalization improves education delivery through off-shore campuses; collaborative curriculum development Finally, globalization has an impact on brain gain, and globalization facilitates the foreign migration of professional workers. This reflects the brain gain for countries benefiting from their expertise, knowledge and experience while representing their countries of origin with brain drain. All of these possible advantages of globalization for engineering education in Africa will greatly increase the standard of engineering education in Africa, thus raising the strong call for an urgent start to the process of globalizing engineering education in Africa.

Fomunyam (2020) argues, however, that globalization of engineering education is significant, but the need to tailor engineering practice to fit local needs above the western approach seems reasonable. Fomunyam further argued that Western worldviews are preserved over indigenous experiences that do not allow Africa's culturally recognized values, experiences, and viewpoints to be reflected by the engineering curriculum. In this view, while the globalization of engineering education is necessary for the standard of engineering education in Africa to be undermined, local elements should not be fully ignored. To this end, this study argues that engineering education on the continent needs to

undergo local globalization in order for engineering education in Africa to deliver the necessary results. The next segment of the study lists in detail how localized globalisation can be accomplished by engineering education in Africa.

5. ACHIEVING AFRICA'S LOCALIZED GLOBALISATION OF ENGINEERING EDUCATION

Geo-Jaja (2013) argued that there is a complex and collaborative partnership in education between localization and globalization. To this impact, if local innovation and adaptation can be induced in a process of transformative change, localizing globalization in education can create more value for local growth. However, it is important to address first how the African continent can accomplish the globalization of its engineering education before delving into how engineering education can be globalized and yet localized in Africa.

There are four main methods by which education can be globalized, according to Knight (2002). These include: the cross-border provision of a service in which customers stay within the region. Good examples of this form of cross-border education are e-learning-based distance education services. Technological advancement has provided space for the establishment of online universities and vast open online courses, according to Knight; consumption abroad, where students cross the border. This involves a full-time study at home for a degree portion of the study and the remaining part in a foreign country and exchange and joint degree programs; the provider's commercial presence in another country in the form of branch campuses or twinning and franchising agreements between developed and developing world universities, but also between developed world universities as well as between developed world universities The mobility of professors from one country to another as an employee of a foreign university, as part of an academic relationship, or to teach at a branch campus, is the most obvious form of this mode.

To this end, more and more higher education institutions on the continent should participate in distance learning in order for engineering education in Africa to become globalised. Distance learning is a study method in which lectures are broadcast or correspondence lessons are performed without the student having to visit a school or college. Learning institutions in Africa can engage tutors from different regions of the world to take engineering courses on their behalf by offering distance learning degrees in engineering. These tutors from various parts of the world will bring in their respective engineering concepts, thus exposing the students of these distance learning programmes to best practices in engineering worldwide.

According to Knight, the intake of education by students abroad by crossing the border is another important mode of globalizing education. Therefore, to globalize engineering education in Africa, it is vital that students and engineering tutors from other continents are drawn to them. This can be accomplished by providing part of the research to international students for engineering courses in their home country and completing the remaining part of the engineering course in Africa. To demonstrate, international engineering PhD students may enrol in African universities, but do not necessarily need to come over to begin writing their thesis. In their home country, they may begin writing their thesis, but will be supervised by African university tutors. To make the final presentation and defence of their thesis, students will only be obliged to come to Africa. This can be achieved at all engineering education levels and not alone at the PhD level. Consequently, this would allow citizens outside Africa to engage more in engineering programs in Africa, since they will only be allowed to join the country at the conclusion of their respective degree programs. However, several universities in South Africa and Egypt have suggested that they are buying into this idea by providing postgraduate programs in which students do not have to travel to their countries before their programs have finished. To this end, in order to enjoy a globalized engineering education, more and more universities in Africa should adopt these kinds of programs for their engineering courses.

In addition, African universities should have a commercial presence on other continents to globalize engineering education in Africa in the form of branch campuses or twinning and franchising agreements between universities in the developed and developing world, but also between universities in the developed world as a whole. It will ensure that engineering education in Africa is globalized by providing satellite campuses offering engineering education on other continents. It is also possible to achieve franchise agreements between universities in Africa and universities on other continents. This would mean that students do not actually have to move to Africa to receive engineering degrees but can remain in their countries of origin and still have engineering degrees from African universities.

The most common ways of globalizing education, according to Knight (2002), are through student mobility and institutional mobility. The same style of student learning abroad or within one's own country implies these two components. Choudaha (2013) found that student mobility targets global students while "glocal" students are targeted by institutional mobility. Consequently, it is important to make concerted efforts to achieve student mobility and institutional mobility in order for engineering education in Africa to become globalized.

According to statistics, engineering education in Africa is yet to be globalised in terms of student mobility. This is because, from developing to developed countries, the most familiar pattern of cross-border student flow is. For most students, North America and Western Europe appear to be favourite destinations. They host 58 per cent of cross-border students, according to Knight (2002), followed by East Asia and the

Pacific (21 per cent) and Central and Eastern Europe (21 per cent) (9 per cent). Together, these regions represent 88 percent of the cross-border students. To this end, in order to globalize engineering education in the region, there is an urgent need for universities in Africa to attract more foreign engineering students.

Institutional mobility, on the other hand, is the second most popular form of educational globalization. This happens by branch campuses, franchising, or twinning agreements in various types. A branch campus is an offshore project of a higher education institution run on its own or through a joint venture that awards students a degree from a foreign institution upon successful completion of the study program (Knight, 2005). Franchising denotes in-country distribution by an approved domestic institution; and twinning denotes shared ownership and delivery by home and host country institutions. Therefore, for engineering education in Africa to be globalized, the development of engineering education hubs is necessary for higher learning institutions in the region. The engineering hubs will provide educational opportunities for international students in their home countries to have access to African engineering education, thus establishing a global presence for African engineering education. Established regions around the world are setting up branch campuses that act as educational hubs that draw students pursuing cross-border education at home and abroad. To this end, it is important that these education hubs are created in other continents of the world for African engineering education to meet up.

It is, however, risky for engineering education to be totally globalized, as argued earlier in this report. In four scenarios, this study argues that engineering education in Africa should not be "totally isolated," "totally globalized," "totally localized," but "highly localized and globalized." In order for engineering education in Africa to achieve higher standards in terms of quality and service, it is assumed that engineering education on the continent must be highly localized and globalized. In a nutshell, this study is of the opinion that in order to achieve new heights, engineering education in Africa requires localized globalization. Earlier in this section, the study explored how to globalize engineering education in Africa. How will engineering education achieve a localized globalization in Africa then?

To summarize, localization is the process of putting the world into the sense of relevant local knowledge and values through curriculum with localized content focused on cultural, economic, political, social, and learning aspects of society. Local significance and legitimacy decentralization for self-determination in education (Altbach 1999). As a result, classrooms are no longer alienated from the local community's dynamism, as they are no longer constrained by standard information enforced by the central authority. It is therefore important to note that, in order to localize engineering education in the face of globalization, changes should be undertaken to increase the relevance of engineering education to local development by providing community support, learning cooperation, and teaching. According to Geo-Jaja (2013), de-robotized and liberated teachers who are aware of evolving local societies and international contexts are paramount for engineering education in Africa to achieve localized globalization, shaping the characteristics of engineering education in the classroom for active learning and self-actualization.

Effective ways of achieving localized globalization of engineering education in Africa can include community participation in engineering education; public-institutional collaboration; decentralization of institutional management; and a new model of education that maximizes learners' opportunities to benefit from a broader curriculum for education and culture (Wang 2006). To this impact, local development needs to be respected in the engineering curriculum used in Africa, local knowledge needs to be preserved, including local languages, and engineering students in Africa need to be prepared for the future in a language that facilitates understanding (Babaci-Wilhite 2012).

6. CONCLUSION

It is a matter of urgency for engineering education to become globalised in Africa. It should be noted that education is currently driven by neoliberal globalization, which has inevitably forced countries with different academic needs and resources to adhere to frameworks designed to serve the interests of external economies and to experience a paradigm shift in content among academic institutions. This is because of the immense advantages embedded in educational globalization.

The globalisation of engineering education in Africa sees the overall view of globalization put forward in this study as containing both opportunities and challenges to continental growth in terms of infrastructural and societal development. This study therefore supports a localized route to the globalization of engineering education in Africa, encouraging cultural and politically oriented economic competitiveness. This sort of localized globalization in engineering education, with a wider reach of teaching both the instrumental and the intrinsic in engineering education, would extend the capacity for freedom and ensure sustainable socio-economic rights. In addition to best engineering practices internationally, providing a localised engineering curriculum would ensure the addition of local engineering practices. In terms of engineering education, a successful combination of both local and foreign engineering expertise would ensure that Africa is at the top level.

REFERENCES

1. D. Akomolafe. Obsolete curriculum responsible for unemployment says Deji Akomolafe. Retrieved from Read more at: https://www.vanguardngr.com/2019/09/obsolete-curriculum-responsible-for-unemployment-says-deji-akomolafe/, 2019.
2. P. G. Altbach. Private prometheus: Private higher education and development in the 21st century. Contributions to the study of education. Connecticut, Greenwood Press, 1999.
3. Z. Babaci-Wilhite. An analysis of debates on the use of a global or local language in education: Tanzania and Malaysia. In D. B. Napier & S. Majhanovich (Eds.) Education, dominance and identity, Rotterdam, Sense Publishers, 2012.
4. R. Choudaha. Know your International student – Global or glocal? University World News, 269, 28 April 2013.
5. C. Duncan. The advantages and disadvantages of globalization for the workplace. Retrieved from https://www.alert-software.com/blog/the-advantages-and-disadvantages-of-globalization-for-the-workplace 2018.
6. S. Dunphy. Is globalisation compatible with sustainable and resilient supply chains? European Scientist. Vol no. 4 2020.
7. R. Fairhead. Types of globalisation. https://www.tutor2u.net/politics/reference/types-of-globalisation , 2020
8. F. Falalde. Challenges in engineering education in Africa. Retrieved from http://196.45.48.59/bitstream/handle/123456789/2805/Challenges%20In%20Engineering%20Education%20in%20Africa.pdf?sequence=1&isAllowed=y 2016.
9. K. G. Fomunyam. The future of engineering education in South Africa. International Journal of Engineering Research and Technology, vol. 13 no. 4, pp. 797-801, 2020.
10. M. Geo-Jaja. Education localization for optimizing globalization's opportunities and challenges in Africa. In Economics, Aid and Education: Implications for Development, pp. 159–182, Rotterdam Sense Publishers, 2013.
11. P. Gupta. Impact of globalization in education. Retrieved from https://edtechreview.in/news/2730-globalization-in-education#:~:text=%2D%20Globalization%20enhances%20the%20student's%20ability,make%20sense%20of%20new%20situations, 2017
12. P. Hyatt. 7 cultural factors you need to consider when choosing your next export market. Retrieved from https://www.tradeready.ca/2017/topics/researchdevelopment/5-cultural-factors-need-consider-choosing-next-export-market/ 2016
13. R. M. Joshi, (2009). International Business. Oxford, Oxford University Press, 2009.
14. J. Knight. Trade in higher education services: Implications of GATS. London: Observatory of Borderless Education, 2002.
15. J. Knight. Cross-border education: Programs and provisions on the Move. CBIE Millennium Research Monograph. Ottawa, Canadian Bureau for International Education, 2005.
16. D. Loklise. What Is Localization, and Why It Is Important to Grow a Global Business in 2019? Retrieved from https://medium.com/swlh/what-is-localization-and-why-it-is-important-to-grow-a-global-business-in-2019-10ee61891076 , 2019.
17. P. Matthews, L. Ryan-Collins, J. Wells, H. Sillem, H. Wright. Engineers for Africa: Identifying engineering capacity needs in sub-Saharan Africa. London, Royal Academy of Engineering, Africa-UK Engineering for Development Partnership, 2012
18. G. Mohamedbhai. Engineering education in Sub-Saharan Africa: Quest for quality. International Journal of African Higher Education, vol. 2, no. 1, pp. 1-24, 2016
19. I. Overland. Energy: The missing link in globalization. Energy Research & Social Science, vol 14, pp. 122-132, 2016.
20. T. O. Pacho, (2020). Impact of globalisation on African and its implications to education. Social Science, Humanities and Sustainability Research, vol. 1 no. 1, pp. 81-93, 2020.
21. T. Pettinger. Costs and benefits of globalisation. Retrieved from https://www.economicshelp.org/blog/81/trade/costs-and-benefits-of-globalisation/ , 2019
22. S. Reich. What is Globalization? The Helen Kellogg Institute for International Studies, Working Paper No. 261, 1998.
23. J. Salmi, R. Hopper, R. Bassett. Transforming higher education in developing countries: The role of the World Bank. In R. Bassett & A. Maldonado (Eds.). International organizations and higher education policy: Thinking globally, acting locally? (99–112). New York, Routledge, 2019
24. B. Salvatore. Studying Globalization: Methodological Issues". In George Ritzer (ed.). The Blackwell Companion to Globalization. New York, John Wiley & Sons, 2008
25. S. Shay. Decolonising the curriculum: it's time for a strategy. The Conversation. https://theconversation.com/decolonising-thecurriculum-its-time-for-a-strategy-60598 , 2016
26. L. Wang, N. McCulloch, A. McKay. Globalization and curriculum studies: Tensions, challenges and possibilities. Journal of the American Association for the Advancement of Curriculum Studies vol. 2, no. 1, 2006. B. Wildavsky. The great brain race: How global universities are reshaping the world. Princeton, Princeton University Press, 2010