

CHALLENGES TO DEVELOPMENT AND INDIGENOUS KNOWLEDGE MANAGEMENT: INFORMING UNIVERSITY ICT PEDAGOGICAL FRAMEWORKS IN AFRICA

T. D. Kanakulya

Abstract

This paper holds that ICT can enhance authentic African development but the emergence of Indigenous Knowledge (IK) within development discourse presents considerable challenges. IK could significantly contribute to sustainability of development in Africa if incorporated into the ICTs framework of tools but incorporating IK into ICTs presents challenges. We need to understand that this paper lies in the general domain of development discourse within which we analyze the contribution of IK. We examine how challenging it could be in terms of the African university curriculum. We appreciate that IK can enhance local human capacity building; community based decision-making and participatory approach to development. IK is taken to play a value-adding role to local development efforts. But since higher institutions of learning play a key role in local development and their courses and research ought to reflect local situations, the contribution of IK to development needs serious consideration. It therefore calls for appreciation of IK, curriculum innovativeness, and epistemological and pedagogical adjustment. But such curriculum innovations present a number of challenges. It involves adjusting to new paradigms in development discourse while at the same time considering the possible contribution of new technological innovation. With the basic assumption that social advancement ('development') is founded a given community's epistemology we argue that authentic development must necessarily consider the nature of knowledge that prevails. We appreciate the increasing disillusionment in Africa over the Naturalist knowledge project and therefore propose 'knowledge-mode' dialogue as a possible synthesis. We conclude that whereas IK can help significantly in local emancipatory development, there are still major challenges that call for more analysis and research.

Keywords: development, indigenous, pedagogy, and epistemology

"Indigenous Knowledge is an integral part of the culture and history of a local community. We need to learn from local communities to enrich the development process" - Wolfensohn J.D. President, World Bank.

1. Introduction

The whole of Africa is making phenomenal and commendable progress towards combating the adverse negative effects of illiteracy and innumeracy so as to realize authentic development. The last seven years have been witness to substantive change in education in Uganda (and Africa at large), not only in primary education [1] but also in University education. Actually, Africa has 130 universities, as well as additional colleges and other postsecondary institutions. Expansion has been a constant feature of African higher education over the past three decades. According to a recent estimate, Sub-Saharan Africa has over half a million students enrolled in higher educational institutions. The demand for higher education greatly surpasses the supply [2]. Taking an example of Makerere University, with only 6,352 students in 1992 the number rose to 23,000 by 2000 [3]. With such tremendous growth, we can easily see that universities in Africa have to play a key role in the development of the continent. This has necessitated adjustment not only in physical and technological infrastructures but also in University epistemology and pedagogy and one of them is the increasing interest in an area that has come to be called 'Indigenous Knowledge' (IK). As this area of inquiry emerges, there is increasing emphasis on incorporating it into the pool of educational technologies especially with the view of, "...bridging the digital divide..." [4], that exists be-

tween the more and less technologically advanced countries.

This increasing attention towards the IK has emerged as traditional development discourse has been undergoing 'soul-searching' because of the imbalances in material and human development that have persisted between the North and the South up to the last century. It has dawned on us that our traditional conception of development can no longer be viable. Most countries especially of the South (Africa inclusive) have not benefited much in human and material terms as a result of earlier development discourse. Increasingly, development discourse is incorporating ideas that were until recently considered peripheral such as environmental sustainability [5], human rights, the human person, human freedoms [6], indigenous knowledge systems, spirituality [7], and others. As the concept of development has undergone adjustment so are the tools for its analysis and realization. Here the analytical tools refer to pedagogical and conceptual paradigms while realizational tools refer to the technological and other infrastructural instruments. Under the technological category we find ICTs [8], a term which is so much in currency at the moment. But all in all we have to note that these considerations and adjustments show that development should be of the human person and towards local participatory emancipation.

In lieu of all the issues pertaining to development especially in Africa, alternative theoretical and technological tools have been sought to address the perennial development crisis on the continent. Indigenous Knowledge and ICTs are examples of those tools respectively. In this wTj-0.2418e w -0.72 -0.821 j1682

Knowledge Management (KM): KM is the process through which organizations generate value from their intellectual and knowledge-based assets. Most often, generating value from such assets involves sharing them among employees, departments and even with other companies in an effort to devise best practices. It's important to note that the definition says nothing about technology; while KM is often facilitated by IT, technology by itself is not KM [9]. It caters for the critical issues of organizational adaptation, survival and competence in face of increasingly discontinuous environmental changes. Essentially, it embodies organizational processes that seek synergistic combination of data and information processing capacity of information technologies, and the creative and innovative capacity of human beings [10]. Ways of KM include; datamining, intranets, videoconferencing and, web casting, among others.

University: Etymologically, this word is derived from the Latin, *Universitas*, which denotes a group of scholars, but whose original meaning was the whole, totality or even universe. Today a university is an institution of higher education usually having research facilities and with authority to award bachelors and higher degrees [11]. An institution organized and incorporated for the purpose of imparting instruction, examining students, and otherwise promoting education in the higher branches of literature, science, art, etc., empowered to confer degrees in the several arts and faculties, as in theology, law, medicine, music, etc [12].

ICTs: Some understand it to mean Information Communication Technologies while to others it stands for Information Community Technologies. They range from old telephone systems (POTS) to new pretty amazing networks (PANS). These include tools like; TVs, video-players, walkie-talkies, radio, landline phones, cell (mobile) phones, computers, Internet, satellites, and others.

Pedagogy: This refers to the art or profession of teaching and sometimes it is called preparatory training or instruction. Its etymological roots are in the Greek word, *paidagogia*. In recent times it has come to mean the principles and methods of instruction.

Epistemology: This comes from the Greek word *episteme*, which denoted the search for pure knowledge by philosophers. Today it means the philosophical theory of knowledge involving methodological analysis. It is that branch of philosophy that deals with the definition, origin, nature and scope of knowledge. Plato, for example, defined knowledge as 'justified true belief but for long this definition has been subject of contention. For most of philosophical history, "knowledge" was taken to mean belief that was justified as true to an absolute certainty. Any less justified beliefs were called mere "probable opinion." This viewpoint still prevailed at least as late as the early 20th century. In the decades that followed, however, philosophers came to think otherwise and the notion that the belief had to be justified *to a certainty* was forgotten to a great degree.

Early development discourse

The term development has been adjusted and redefined so much because of differences in spatial and temporal environs within which a given thinker approaches it. We shall therefore have to look at the discourse that has surrounded development if we are to properly analyze the meaning of the phenomenon vis-a-vis incorporating Indigenous Knowledge in Information Communication Technologies.

From the earliest times in the history of development discourse, the concept was clothed with a unidirectional view. From its inception, scholars presumed that there existed patterns (or a pattern) in humanity's social advancements and this was what they set out to discover as they tried to shTj-0.024 Tc -3

later transformed the Hegelian dialectics into the Marxian stages of slavery, feudalism, capitalism, socialism and communism [10]. And not long ago, Walt Rostow also attempted the same generalization and came up with his 5 stages of growth. We realize then that the concept was designated a unidirectional movement and the history of humanity was viewed in similar terms.

The idea of 'progression' came to be central in the development discourse. To that effect, the so-called 'progressive names' were tagged to different communities (or cultures). Through the 19th century, we notice some communities named 'rude and barbaric', then later elevated to the stage of 'backward'. By the pre-war period, they were now being referred to as 'underdeveloped' and today we hear of the same to be 'less developed countries'.

With that observation in mind, we need to note that development discourse gained its proper characteristics at the time of the industrialization. It was the precursor of modern development technology. This emerged at a time when discoveries as that of the natural law of gravity and men like Galileo, Copernicus and others were commanding a mammoth following. Industrialization was promising man new horizons; at last, man could control nature as he discovered laws of nature and made machines.

The economists also wanted to discover natural economic laws that could make prediction of economic growth possible. If these laws would be discovered, then many communities would develop fast and mankind would get rid of the sting of material want. At the same time, Darwin, inspired by the discoveries of the industrial revolution, had claimed that the law behind human biological growth and development was 'natural selection'. So, inspired by Darwin, the economists draw "...an analogy between Darwin's natural selection -which, like any natural law, [taken to be] ethically impartial - and human economic activity, which can not be morally neutral." [11] This analogy was to influence development discourse greatly and it was the biggest misconception.

Meaning of development

The original word from which development derives its etymological roots is the Latin, 'veloper' meaning to wrap up. So to 'de - velope' becomes to unwrap or to unfold what is within. So implicitly, development is an endogenous process of bringing out the inner potential. It is therefore the enhancement of the capacities that are within and inherent in the human person or a

2. The University and Development

The idea of a university is an old one. Universities have existed for centuries, from Plato's Academy to the present formal arrangement. They have undergone many fundamental changes over the years. Many universities have changed their curricula, disciplinary scope, pedagogy and other domains as necessity has dictated. As the demand for higher education greatly surpasses the supply, it is becoming increasingly obvious that African universities ought to necessarily take an active role in the continent's development. While most African higher education systems stem from colonial implants, much has happened since independence to shape indigenous academic institutions and emerging systems. This process needs to continue especially to address the developmental imbalances on the continent.

In the early times, universities were known as *stadium generate* [13], where scholars came from various parts of the world to study. The opposite of that is (was) *stadium particulare* [14], where scholars were from the locality. In contemporary times due to various influences and reasons the university, especially in the South, has become more inclined towards a *stadium particulare* to cater for national (or regional) interests. A stadium particulare will for strategic reasons facilitate the flow of knowledge and the building of man power for the locale. Whether a particulare or generate, a university in contemporary times has an expanded and intricate role to play [15].

The university's most prominent role is tailoring education to suit the society's needs in time and space. Research done at this level of education aims at simultaneously fuelling the necessary changes and conserving the valuable knowledge in the society. Obviously such a task requires positive criticalness and evaluation from all disciplinary stances. In discussing the university's role in development, Byaruhanga [16] has identified some modes of the relationship between university education and development i.e. *inter-subjectivity and simultaneity*. In the first instance both concepts converge on man as their subject and agent; the goal of education and development is man. In the second instance, he refutes the popular view that education is a prerequisite to development. Instead by his 'paradox of priority' explanation and by appealing to Dewey, he argues that both are one and the same. True, the issues surrounding university disciplines may be controversial but by and large, the university is basically concerned and therefore involved in human resource enhancement for development purposes. This means that the curriculum ought to use the local human resource albeit borrowing from foreign sources for indigenously sustainable growth and advancement culturally, politically, economically, and otherwise.

To fulfil the above role the university develops a curriculum that basically answers the perennial epistemological questions such as: what is knowledge? How do we know that we know? What is the purpose of knowing? Etc. We need to note that these questions are perennial and philosophically fundamental because they have remained resilient over time and space. They assume different faces in different epochs. Likewise today they still necessitate pondering over. As political, social, ethical, environmental, and other related challenges emerge within traditional development discourse, need arises to look through our curriculum for modification to suit today's human and general environmental needs. Development as known earlier is increasingly being questioned so university curriculum cannot remain unchanged. The traditional taxonomy ought to undergo changes to cater for changes in development discourse as reflected by the increasing emphasis on IK as a valuable frame for locally sustainable development. It doesn't appear to be plausible anymore to uncritically hold that, "...greater attention should be accorded the cognitive domain at the university level" [17].

There are other taxonomical dimensions that IK is advancing which traditionally were not considered useful in formal education. For example the *mystical* element in taxonomy; then there's the

discourse element of taxonomy, which has especially gained currency in post modernity. The six major categories of traditional taxonomy (knowledge, comprehension, application, analysis, synthesis and evaluation) are still relevant but have to face one fundamental challenge today i.e. they are not linguistically well suited for most of Africa's contemporary development needs. This may explain better why most African university products end up being 'developmental-misfits' in much of Africa even when we need them most. The human resource enhancement done at most of our universities is done within a discourse that is alien hence producing for foreign economies. Could it not be that herein lays the cause of the problem of African brain drain?

21 Development epistemological discourses and the emergence of IK paradigm

Much of traditional development discourse is considered as an integral part of that period in human philosophical and anthropological history that has come to be known as modernity. Starting from the Enlightenment slogan of '*dare to reason*', this epoch gradually turned into a time characterized by rationalization, systemization, institutionalization and industrialization of society, among others things. Because of the new discoveries by men such as Galileo, Copernicus, and others, humanity, especially in the western world, at that time came to place a lot of faith in naturalistic scientific reasoning and research. Natural scientists designated themselves the pursuers of natural laws of nature so as to make manipulation of nature and the prediction of human development easier. Consequently man's modes and avenues of interaction with nature underwent revolutionary changes. So rational, systematic and predictable theoretical and practical innovations had to be invented to realize the dream of complete control over nature for predictable development.

Out of this phenomenon, two major benefits were realized: humankind managed to forcefully bend nature to serve our needs and there was increased material production or output. However, all this was at the price: environmental damage, moral challenges due to urbanization, natural resource depletion, and human resource damage plus industrial catastrophes whose extent of damage may never be fully ascertained. This mode of development and industrialization failed to eradicate poverty despite all the promises. Worries about the damage of technological industrialization on agriculture and the environment led to wide spread calls for new paradigms that would embrace sustainable development not only at international but also at local level; not only a material but also spiritual and ethical. This is because it could not establish global human security; failed to bring economic equity; destroyed local cultures and communities; failed to integrate economic and ecological concerns; and therefore could not provide depth of meaning of existence to many [18], especially from the South.

It was the above considerations that brought in various calls for fundamental changes in the discourse, thus paving the way for the incorporation of the idea of '*sustainability*'. The concept of sustainable development entered the development discourse as an effort to address the mistakes of earlier paradigms. It was officially coined by the Brundtland Commission in 1987 and popularized by the United Nations Conference for Environment and Development (The Earth Summit) in 1992, which defined it as, 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. Many countries realized that pursuing development in the traditional sense of basic materialism was not bringing forth desired results; instead they were increasingly becoming dependent and underdeveloped. The poor were getting poorer and the rich, richer yet more and more statistics were showing that humanity was better off materially than 50 years ago. When it came to much of the South, especially Africa the situation was worse. The capacities needed to sustain authentic development have chronically remained inadequate. Development needs to be not only globally sustainable but most importantly, locally sustainable. This means that local capacities have to be engaged actively in the development process so as to have a local foundation for sustainability. This has emerged in the philosophy of development as '*Locally Sustainable Development*'.

2.2 Locally Sustainable Development

Local sustainability is a concept that is gaining currency in many African development circles today. It entails using local materials and resources that can easily be acquired and replaced in case of need. These resources include human and ecological resources plus analytical and epistemological ones. But unfortunately much of what has been traditionally presented as formally educated human resource has created deep scepticism towards formal education due to perennial development and moral crises in much of Africa. Human resource is produced but detached from the social reality in most of African communities. They are perennially left to depend on foreign goods and services to maintain themselves. Such a situation could not take Africa very far in terms of development, material or non-material.

2.3 Sustainable development and Indigenous Knowledge in Africa

IK emerges as the traditional development discourse was seen to be lacking in a fundamental way. The pursuit of sustainable development on the African continent has recently become a key issue. We have already seen how traditional development discourse was found to want thus paving the way for alternative development paradigms. In Africa this call for alternative paradigms emerges within the matrix of the *African Renaissance*.

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They are not only enormously expensive to acquire but more so to maintain. And as such more and more people are increasingly depending on local resources for survival. For example the World Health Organization (WHO) estimates that 80% of the world's people rely on traditional medicine for their primary health care needs [21]. It is therefore important for us to consider IK and look into the challenges it poses to us as we try to incorporate it into ICTs.

3. ICTs and IK in Africa's Development

Information Communication Technology centres on the technical evolution of electrical and electronic information technology. The telegraph began a revolution in communications by transmitting information in electrical form instantly to distant locations. This new phenomenon of instant information was later expanded by the telephone, radio and television. Then the digital electronic com-

mation technology

stakeholders to foster development in Uganda through ICT, hence the creation of a "knowledge and information-sharing community"[25]. From such studies and efforts as that of Ofir's, I-network, and others we can highlight the following as the modes by which ICTs may enhance development in African situation:

- Informing decision makers and policy implementers both at national and grassroots levels.
- Improving service delivery via improved communication between main centres of administration and local governments.
- Helping speed up information flow between experts and rural farmers.
- Supporting disease surveillance and health monitoring both locally and regionally.
- Enhance information acquisition and ease information storage.

As we can observe, ICTs can enhance development in African countries. But as Ofir shows us, in spite of the significant ICT activity in Uganda (and Africa at large) during the past decade, a lack of capacity and resources for accelerated development in the ICT arena remains. This necessitated financial and technical intervention and assistance from international donors and consultants, thus increasing their influence - a situation common in developing countries [26]. This brings us back to the development challenge of local sustainability. The reliance on donor funded ICT programs still remains a pertinent problem. And apart from general problems of infrastructure, skills, and others, there are two specific ones that have been useful in arguing for incorporation of IK: the first is lack of genuine local ownership [27] and long-term sustainability [28].

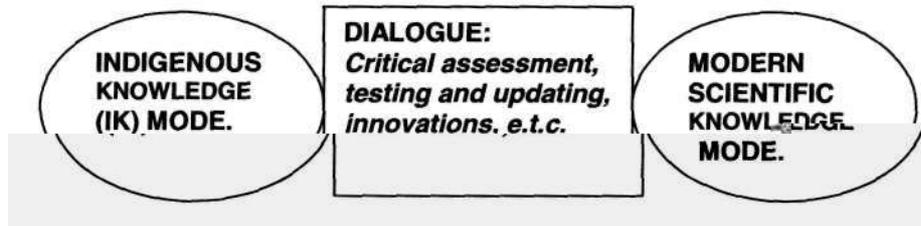
We thus find a widening gap between the donors (who are in most cases from a Western scientific epistemological setting that implicitly or even explicitly calls for the application of natural scientific ways of knowing) on one hand, while on the other hand there are local peoples who bring their local knowledge which in some cases is apparently a contradiction. This contradiction comes in because in most cases the two epistemological traditions rarely encounter each other on dialogical terms. This may as well actually be found among the fundamental challenges to development efforts in most of Africa. It therefore becomes imperative that we explore possible avenues of realizing dialogue between the two epistemological traditions.

3.1 Knowledge-mode dialogue

It is that consideration that makes us consider the merging of ICTs and IK in Africa such that there's an element of local ownership and sustainability. The principle that we are actually considering is that of "**knowledge-mode dialogue**". Sometimes it is referred to as exchange between indigenous and modern knowledge. This principle means exchange across knowledge-milieus to provide for the preservation of local time-tested wisdom and skills while still reaching out to modern developments. The exchange may be perceived as some form of interaction between local knowledge and foreign knowledge. Some scholars refer to it in terms of comparison between Eurocentric and indigenous ways of knowing so as to include both in contemporary education [29]. The aim is to bring about a blended educational context that respects and builds on both indigenous and Eurocentric knowledge systems.

This is a principle that is utilizable in responding to the challenge of developing further indigenous epistemological and learning concepts in an inter-cultural dialogue with those modes of knowledge that are alien or foreign. One of the aims is to guard against the Utopian and elusive pursuit of, "...an exclusive African learning approach..." [30]. This model of 'knowledge-mode' interaction helps us guard against the excesses of an isolationist African epistemology and curriculum. This is simply because epistemological standpoints can no longer be held in seclusion. Below is a model representation of that dialogue:

Fig. 1



In this figure we try to represent a mutual form of dialogue between local indigenous ways of knowing or epistemological traditions and alien ones. The dialogue involves critically assessing either epistemological tradition. This criticalness is not in the negative sense but a kind of evaluation, assessment with the conviction that we could find and utilize the useful elements in each of them. This involves testing the various hypotheses that emerge from each tradition and being innovative in our application of that knowledge.

This interaction across knowledge-modes is informed by the thinking that scholars such as Houtondji [31] have advanced. He calls the production of knowledge in present Africa a 'two-fold' task. This involves on one hand the critical appropriation and assimilation of the international scientific knowledge heritage available to us today and on the other hand it entails critical assessing, testing and updating plus re-appropriation of our own ancestral knowledge heritage.

Another stream of theoretical framework that informs this dialogue, which may be necessary to highlight, is that of '*Reconstructive Hermeneutics*'. This stream comes from the understanding that hermeneutics can considerably enrich our knowledge because of its emphasis on the fact that the human agents who are the knowledge generators are situated within particular cultural practices and traditions [32]. Basic hermeneutics scorns the pursuit of culture-free, a historical and universal knowledge. This position may be criticized on the grounds that it tends towards the logical conclusion of hyper-sceptical post-modern epistemology, which just dooms us to bad learning a *la* Aristotle. But reconstructive hermeneutics goes beyond that and holds that we need to go above recognizing the key role of cultural and historical factors in knowledge generation and develop knowledge that is more culturally and historically enriched.

3.2 The Cartesian-Hegelian tradition in epistemology

As we explore ways of dialogue between modes of knowing or epistemological traditions, we may as well look at some ex-African modess

conclusions were fundamentally epistemological than otherwise. Hegel was most probably the epitome of Cartesianism. And this is what modern scholarship entailed: individualistic pursuit of true knowledge. He had lonely discovered the spiritual dialectics as the basic principle behind history: the self-actualization of the spirit. Hegel had, through individual efforts, discovered the 'secret' behind human history! This individualism in epistemological terms has haunted most of the humanity that came under the influence of Western modern scholarship and most if not all universities in Africa are still under the same spell. We may not mention all the problems associated with this epistemological tradition but one of the results, due to identifying objectivity with the above perspective of knowing, has been the post-modern epistemological confusion. We therefore increasingly see the need for a more humane and down-to-earth mode of knowing.

Whatever the logical conclusions of Hegel's position, the point is that knowledge was presented to be dependant on academic individualism. The British empiricists just added a variety of a like mode of knowing. The lone scientist would spend enormous time in secluded laboratories in the pursuit of discoveries. Knowledge that was to be applicable by big numbers was coming from individualized efforts. To encourage and reward these efforts, scientists were granted copyrights/intellectual property rights thus entrenching this mode further and socializing each subsequent generation into it.

But on the contrary, Africa was found to be notoriously communal. Even knowledge is communally owned with no individual claims to it. So two modes of knowing have been in encounter and in most cases, it has been antagonistic rather than a mutual dialogue. Now we realize the disadvantages of each mode and would prefer to benefit from the advantages that come from the two. We need to explore ways of utilizing the local knowledge systems in conjunction with the Western individualistic one to realize maximum benefit. This is because an exclusively African education system that only relies on indigenous ways of knowing would turn into academic isolationism, which may not be desirable now. But at the same time to completely abandon local knowledge would be rather an alienating move, which may jeopardize Africa's scholarly identity. We need to encourage dialogue between these modes of knowing.

This principle of knowledge-mode dialogue is being piloted in many places and fields of study. For our purposes we may consider two cases, which apply the principle to foster interaction across IK on one hand and curriculum development and ICTs. One example of how ICTs can be applied to local development efforts such as in agriculture, is that one of how an Indian, Ayyar from diaspora is innovatively using his IT knowledge to connect farmers to agricultural experts at low cost. The increasing need for agricultural extension services coupled with the rising costs involved in providing them requires technological innovativeness, especially for purposes of making the cost lower. It is increasingly being realized that using cheaper Internet based technology can do this. Already some technological innovation that is cheaper has been tried out successfully in remote farming communities in the region of Tamil Nadu, India, connecting them with agricultural experts. Ayyar is using low-bandwidth Internet connections to do this. This makes it cheaper than using the increasingly expensive high-bandwidth connections because it can even enable, "...multi-point video conferencing through normal dial-up telephone connection..." [33]. This type of technology can help Africa decrease costs and maximize results from agriculture by establishing a central way of informing the local farmers. The unfortunate thing is that due to current global economic regime, such technology is not 'marketable'. Actually in this particular case, the innovator has failed to find a market for a product that is, "100 per cent Indian"! One of the key features to take note of in this case is that both the channel and the content are locally and innovatively generated. This increases the probability of authentic local ownership and sustainability.

Another example is in the area of IK and curriculum innovativeness. At the University of the North (South Africa), for example, there's collaboration with the University of Groningen in the Netherlands

to foster dialogue between Indigenous ways of knowing and modern scientific ones. They have established the department of Adult Education to pilot this curriculum innovation [34]. They have applied three 'vital concepts' to guide the innovation: *Contextualization*, *Social Learning* and *Action Research*. By using those concepts they apply cultural and historical dimensions of local ways of knowing to modern scientific ones. They 'deconstruct' the unviable myths of local knowledge, negative self-images, while conducting dynamic research (action research) among the communities to co-develop the curriculum. In encouraging this dialogue, issues of the dominant language, the epistemological and ontological beliefs of the participants and gender and power relations are considered seriously.

However this paradigm of knowledge production presents considerable challenges especially when it comes to Africa. Dialogue between IK and modern scientific knowledge can be of much help and incorporating it into mainstream university curriculum and into the ICTs domain can add great value to development efforts. But if we are to realize authentic locally sustainable development with IK playing a key role, these challenges need to be highlighted.

4. Challenges to 'knowledge-mode' dialogue in Africa

This dialogue is sometimes referred to as 'knowledge transformation'. But in our case here, we are not referring to the interplay between tacit and explicit types of knowledge. Rather, we are referring to the dynamics of the interaction between given epistemological traditions of knowing and knowledge generation, and particularly, between the African communal indigenous knowledge systems and the Western individualistic tradition of knowledge generation.

This dialogue has and is being explored in a number of experiments but in this particular study we would like as far as it may be possible to highlight the challenges that arise as various entities try to encourage this dialogue. This is most especially from the stance of incorporating indigenous knowledge into ICTs. These challenges may be categorized to be theoretical (epistemological), infrastructural, and others.

4.1 Theoretical challenges

The key epistemological challenge that IK presents to university curriculum and development discourse is the conceptual one. This also involves the nature of IK. First of all definition-wise it presents considerable problems. Sometimes it is defined as local knowledge which definition begs so many questions especially about the understanding of 'local'. It is also known as 'knowledge that is communally held'. This poses a problem of whether there exists any knowledge that is not generated by individual efforts. One of the features attributed to IK is that it is 'tacit knowledge' and this presents the problem of codifying it. This problem of codification is particularly relevant if our intention is to apply it to modern ICTs, which mostly deal with codified information.

Perhaps, the greatest epistemological challenge that IK presents is that of its 'mystical' or mythical nature. The claim is that it is embedded in community practices, and behaviours. Precision in definition of IK is hard. In attempting to retain its mystery and yet assume a scientific face, some refer to it as 'mystical, experiential and rational comprehension (apprehension) of reality'. But this mystery logically implies epistemological intuitionism, which places objectivity in jeopardy. When educational objectivity becomes uncertain, the resultant effect is unpredictability in our development discourse and to found our development efforts on such grounds may be problematic. For development to proceed in a manner that is certain there must be a sense of predictability in the society, which ought to first of all have epistemological roots.

Another challenge is that of methodology. In referring to this Vilakazi has said that, "the peculiar situation here is that knowledge of the principles and patterns of African civilization remained with ordinary, uncertified men and women...especially in rural areas" [35]. To him the biggest 'spiritual

and mental' challenge to African intellectuals is that, as they re-educate themselves about the 'principles and patterns' of African IK, their only teachers are the rural uncertified men and women. This presents the challenge of transition from orality to literacy; from innumeracy to numeracy. This presents many challenges, namely, "...the identification of sources, the reliability of sources, the critique of sources, oral tradition as a critique, corrective, supplement, or confirmation, of written and archaeological evidence; written and archaeological evidence as a critique, corrective, supplement, or confirmation of oral tradition" [36].

4.2 Infrastructural challenges

When it comes to infrastructural challenges, problems such as inadequate equipment, connectivity problems and developing a skills base feature prominently [37]. In many rural places optical fibre cables are virtually lacking and this makes connection quite expensive and difficult. Many towns and municipalities lack strategic planners for the generation of ICT master plans, which can map out the feature trends of ICTs in the locality. Although some localities are trying hard to develop their ICT master plans such as the district of Tororo in Uganda [38], many lag behind. In Tororo some efforts are being put in place to correct these anomalies, for example the TOSINET which is a network of Tororo civil society organizations that aims at harnessing efforts for installation of infrastructure for ICTs. But much still needs to be done.

A similar challenge is the possibility of highly technological countries turning African countries into dumping grounds for unwanted ICT equipment. The problem was that at the time of liberalization of the economy, enough time was not allocated to institute regulations of the ICT industry. To handle this, the Ugandan government is in the process of introducing anti-trust laws and regulations to guide and streamline the information and communication technologies industry [39].

Another challenge in this category is the institutional one. There is need for central and local institutional frameworks that can promote the use of ICTs in development efforts and many such institutions are being created. The challenge however lies in the nature of IK. The generation of IK is not institutional but basically sporadic and not imbued with systematic rules of procedure. This is both a strength and problem of IK. It is a strength because it fosters independent *non status-quo* (or 'non-politically correct') knowledge to be generated. But at the same time as institutional frameworks are put in place to order the incorporation of IK in development discourse and curriculum, it is likely to lose its uniqueness and dynamism, which makes it relevant to the efforts towards development in Africa. This is particularly in reference to *disempowering institutionalization*. There are two types of institutionalizations: empowering and disempowering. In the former case the institution is in the hands of the local people as well as in the latter case some regime or bureaucrat(s) is placed at the top of the institution to safeguard institutional integrity rather than consider the local dynamics. If the latter direction is pursued, IK is likely to lose its local and communal nature and also become institutional like modern scientific knowledge with all the undesirable trends.

4.3 Other challenges

We should also mention the challenge of the hyper-dynamic cultural trends of the information age. The speed at which the technology is changing is phenomenal and that makes it difficult for African countries to keep up with the pace. For example it is estimated that within every two months the connection speed of a PC via Internet can double [42] and this necessitates changing the software that is being used. But that can be quite problematic and challenging for countries with meagre technological bases.

5. Conclusion

This paper lies in the general domain of development discourse in Africa. It focuses on the role of Indigenous Knowledge in development, the challenges that it poses and the possibility of incorporating it into mainstream ICTs and applying it to university-led development efforts. Recently the World Bank launched a project called *Indigenous Knowledge for Development Program* as part of wide spread efforts to generate 'Alternative' development paradigms. We have taken up our responsibility as an epistemological *avante garde* to examine the meanings of this paradigm shift and the challenges thereof to African development.

ICTs can enhance authentic African development if the developmentally enriching role of Indigenous Knowledge is merged with it. But incorporating IK into mainstream development discourse presents considerable challenges. IK could significantly contribute to sustainability of development in Africa if incorporated into the ICTs framework of tools but we need to ensure that the conceptual, epistemological, infrastructural and like problems that it presents are handled properly, especially in a local context. Therefore there is still need for research in the direction of the new paradigm shift in Africa's development efforts and explore whether adopting an 'alternative' paradigm to our development is the right direction and what it entails.

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'Mind' or the 'Spirit' that was thinking itself out and attaining increasing self-realization as Hegel had claimed. Rather, the basis of these dialectics is matter. So Hegel's *'Thesis + Antithesis = Synthesis'* came to be interpreted by Marx into these stages.

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