

**Education Technology Design and Deployment in HCI4D:
A Nigerian Perspective**

Muhammad Sadi Adamu

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“Knowledge emerges only through invention and re-invention, through the restless, impatient, continuing, hopeful inquiry human beings pursue in the world, with the world, and with each other” (Paulo Freire, *Pedagogy of the Oppressed*, 2018 p.45)

“The difficulty - I might say - is not that of finding a solution but rather of recognizing as the solution something that looks as if it were only a preliminary to it. This is connected, I believe, with our wrongly expecting an explanation, whereas the solution of the difficulty is a description, if we give it the right place in our considerations. If we dwell upon it, and do not try to get beyond it.” (Wittgenstein and Zittel - quoted in *Heritage* 1984:103).

To the memory of Dr. Mahmud Ma'aruf

Thesis submitted to the student registry, Lancaster University, in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Computer Science

Doctoral Committee

.....
Dr Mark Rouncefield

.....
Dr Philip Benachour

.....
Dr Jacki O'Neill

.....
Professor Richard Harper

Declaration

I hereby declare that except where specific reference is made to the work of others, the content of this thesis is original and have not been submitted in whole or in part for consideration for any other degree or qualification in this, or any other university. This thesis is my own work and contains nothing which is the outcome of work done in collaboration with others, except as specified in the text and publications list. Most of the ideas in this thesis were the product of discussion with my supervisors on a range of topics. The list of publications below contributes to the chapter of the thesis, and also extend on each other, specifically those in chapter 5, 6, and 7. For example, publications 2/8/9 contributes to chapter 3, publication 4/5 contributes to chapter 5, publication 3//6/7/10 contributes to chapter 6 and 7, and publication 11 contributes to chapter 7 and 8.

- [1] Adamu, M. S. (2019, May). Designing Learning Technology: An African HCI Approach. *In Doctoral Consortium on Computer Supported Education (DCCSEU 2019, pp. 3–12)*. SciTePress. (Best PhD Project Award)
- [2] Adamu, M. S. (2019, May). Designing and Evaluating Learning Technology: An African Dilemma and Approach. In S. Zvacek, H. Lane, & J. Uhomoibhi (Eds.), *In Proceedings of the 11th International Conference on Computer Supported Education (CSEU 2019) (Vol. 1, pp. 184-191)*. SciTePress.
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- [10] Adamu, M. S. (2021, May). Towards a Transatlantic Approach to Cultural Engagement in African Design. *Decolonizing HCI Across Border Workshop Position Paper, ACM CHI 2021*.
- [11] Adamu, M. S. 2021. No More 'Solutionism' or 'Saviourism' in Futuring African HCI: A Manifesto. *ACM Trans. Computer. -Hum. Interact. 1, 2, Article 3 (December 2022), 34 pages*. Under review

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Muhammad Sadi Adamu
School of Computing and Communications, Lancaster University, UK

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Abstract

The decolonisation of knowledge has shown significant impact in reframing the understanding of technology as a means to the development of African communities. However, post-development narratives in HCI4D have failed to explicate how situated and grassroots alternatives can inform the innovative design of diverse perspectives and experience. As such, this thesis approaches this fundamental gap in our understanding of the practice of technology design and deployment by problematising conventional approaches for understanding, designing, and deploying educational technologies in the context of Nigeria. Through the adoption of a range of indigenous sensitivities, the thesis seeks to develop candidate approaches for analysing diverse cultural perspectives and for designing technologies that embody and extend them.

Through the thematic analysis of empirical data, the thesis shows how stereotypical approaches to educational research and technology design presents postcolonial narratives of innovation in Nigeria as neo-colonial design agenda's that needed to be appropriated in line with emerging conditions and relations in Africa. The interpretive analysis of the perspective of stakeholders in three Universities shows the relevance of developing context-specific pedagogical approach relevant to the politics of decolonialise blended education. The analysis also attempts to revive the arguments about the processes of technology diffusion and acceptance, showing the relevance and limit of traditional models for understanding the acceptance or rejection of technologies in an educational context.

Using the Wittgensteinian approach of Winch and a range of Feminist positionalities, I attempted showing how a situated epistemological orientation can bring about envisioning alternative's ways of articulating and translating transnational encounters and exchange of technological innovation. The sensitization and evaluation of the mundane practice of three software development firm shows the mythology of design innovation in/from Africa. This led to the consideration of how reframing the basic assumption about creativity from Africa could present African culture of innovation not merely as a passive space for the transfer and appropriation of technology but as a transitional space where innovate practices get regenerated and redistributed across already polarised boundaries of innovation.

Finally, the thesis argues for an 'ontological' framing of designing localised and indigenous technologies. Through critical reflection on a range of issues associated with post-colonialism and post-development, I examine the possibilities that various historical tropes might offer to the reinvention of the African perspective on innovation. This leads to the consideration of how engaging in critical discussions about the future dimensions of African HCI can allow for grappling with the effect of the coloniality of being, power and knowledge. Developing on the ideas of futuring as a way of dealing with the complexities of the present – in this case the coloniality of the imagination - the thesis ends by discussing three tactical propositions for 'remembering' future identities of African innovation where the values of autonomy are known and acted upon.

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Chapter 1:

What is it all about?

Simply put, this thesis is primarily concerned with developing candidate approaches to understanding, designing, and deploying educational technologies in Nigeria¹. The case attempt at decoding the implications of adopting well-known (and Western) approaches to understanding the plurality of the African perspectives in technoscience; and in developing sensitivities that could inform the re-design and re-deployment of educational technologies that embody situated practices of knowledge. It is interdisciplinary in nature, weaving through a range of arguments in the field of education technology research (ETR), human-computer interaction for development (HCI4D), and postcolonial science and technology studies (STS) to show how a collective of 'situated standpoints' provide a starting point for showing the 'fly out of the fly bottle' in the postcoloniality of power and knowledge (Ndlovu-Gatsheni, 2018, 2020). Specifically, it outlines the ideas of an African standpoint (Gutmann, 1935), its epistemological orientation, its political manifesto, and a set of generative tactics – termed 'play of possibilities' (Anderson, 1994) – that when carefully considered in the politics of designing indigenous technologies can make African knowledge systems evident in technoscience².

In his book 'Research is Ceremony', Shawn Wilson points to ideas that "research is about the unanswered question, but it also reveals our unquestioned answers...which brings to question some of the beliefs about the way research need to be conducted and presented...and recognises the importance of developing alternative ways of answering question" (Wilson, 2008 p. 6). Wilson was right to suggest that research is about the unanswered question and unquestioned answers, and as such some of the ideas explored in this thesis have stayed the same while others have changed over time. The direction of the research has remained the same, which is to develop a set of question that considers in a Nigerian context:

'What exactly might constitute indigenous technology design best practices that brings about understanding, designing, and deploying educational technologies to support diverse practices of teaching and learning³.

This is developed on the understanding that the place of technology in modern society cannot be overemphasised as it has brought about drastic shifts in the human condition of social living (Pepperell,

¹ Nigeria is widely considered as the 'giant' of Africa (or a geographical expression), its 'powerhouse', its largest economy, and surprisingly, the poverty capital of Africa. Nigeria was a former colony of the British empire, gaining its political independence in 1960 and practices a democratic system of government. Nigerian novelist Chinua Achebe noted that being a Nigeria is 'abysmally frustrating and unbelieving exiting' (Achebe, 2000).

² Some have argued that 'Africa' is a collection of 'imagined republics' or an 'imagined community' (Anderson, 2006) moving towards self-articulation and self-fulfilment, or rather a 'geographical fiction' triumph in 'cultural synthesis' (Mazuri, 2005).

³ What has changed over the course of the research is the framing of the questions, partly because the thesis is data driven. As the initial research questions were substantially answered, they produced new and interesting questions and ideas for future work, of which some were addressed rhetorically. In essence, the research process is continually experienced and reported, denoting how the trajectory of learning, unlearning, and relearning.

1997; Arendt, 2013). However, research in post-colonial and post-development studies has emphasized the need for critical questioning of the essence and implications of technology (Estera & Babones, 2013; Klien and Morreo, 2019). Such a project suggests that education is a practical form of liberation and empowerment (Freire, 2018); and an epistemic mode of transforming oneself within the discourses of the day (Foucault, 2012). Therefore, this thesis presents an attempt at decoding the practices of educational technology design and deployment as a political project that can either liberate and empower or enclose and conceal. Consequently, the thesis takes a critical but pragmatic stand towards questioning⁴ the underlying assumptions about technology as a *techne*' (both epistemological, political, conceptual, material, and educational) and as a means for the global development in every sector of the knowledge economy, specifically in Africa⁵

Earlier seminal works questioning the essence of technology have shown that the underlying principle guiding technological innovation is not technological but rather 'technicity', 'enframing', 'reframing' (Heidegger, 1957). For Heidegger, technology is a *techne*' (a technique), a mode of revelation and instrumentation, and a means to an end for understanding the conception of our being as social agents. Heidegger's critique against the common illusion of technology suggests how *techne*' comes to be through the 'ordering' of activity – i.e., the revealing of the instrumentality of man's activity towards revealing the implication of technology to modern ways of living⁶.

However, such a mode of questioning places technology as an essential and revolutionary cultural apparatus that could direct (and might continuously shape) human reasonings and actions. Although technology has revolutionised every sector of modern economies, research has emphasized the need for a continuous analysis of the assumptions that underpin the consideration of technology as one-all-fit instrument for global development (Sach, 1992; Estera & Babones, 2013; Klien and Morreo, 2019, Esteva & Escobar, 2017). Critics of development and post-development discourses have pointed to the dystopia associated with the globalist model of development⁷. This idea – that the utopia of technology

⁴ The ideas behind questioning conventional practices of technology design relate to how the field of computing has institutionally and categorically homogenised the plurality of the African experiences in relation to Eurocentric assumptions about social and economic 'development' (specifically in HCI4D). As Amrute noted, "we do not know what computing that divested itself from the structures of patriarchy, white supremacy, and capitalism would look like. We do not know this because computing is not isolated. It is not a source of unswerving opposition. Its oppositional practices are themselves fraught locations for the working out of knowledge, power, and materiality" (Amrute, 2020 p.2-5). These warrants questioning the underlying assumptions shaping the design and adoption of technology in postcolonial education while also reassessing its functions in improving (or impairing) the African knowledge economy.

⁵ The assumption is of viewing the technological issues problematically rather than questioning and answering dialectically can provide a vocabulary for examining design knowing/thinking as an emerging 'problem', a slippery 'creation', a political 'process', a pedagogical 'activity, and as a mode of understanding one's existence and in transforming oneself

⁶ However, Heidegger cautions that although the freeing of agencies of man through the instrumentality of technology can bring about alternative ways of questioning how technology might have alienated or empowered the imaginary of the mind, the essentialization of *techne* as the means to an end for revealing the destiny of man is the danger. Such ideas have been taken up by the transhumanist that has called for exploring technological singularity to its fullest potential (Shanahan, 2015; O'Connell, 2018). However, critiques of technological benevolence or techno-fixes have cautioned on how technology reinforce new forms of concealment (across the colour and epistemic lines) (Benjamin, 2018), primarily because the principle of technicity often distance man from the essence of life and might even distort the underlying principles of an ethical way of living. Although the Heideggerian questioning of technology might have focused primarily on understanding the conceptualisation of technology in relation to being, a closer examination of his arguments, as advanced within the framing of post-structuralism and orientalist discourse, is relational to ethical subjectivities, either through one's political activities of designing for the self or through one's pedagogical approach towards lifelong learning.

⁷ It appears that the term 'development' doesn't have a unitary meaning as it is often considered as a 'concept of monumental emptiness' (Sach, 1992) consisting of plural connotations. Critiques of the development enterprise have pointed to how its common approaches – from the economic and infrastructural projections of Goldman Sachs to the progressive and philanthropist

is merely a new form of enframing – is not a novel argument, but one that has been promoted in several areas that have examined post-colonial African social and economic development. As Alemezung puts it “the political and economic relationship between post-colonial Africa and the West have the same underpinnings and meet the same objective like the relationship of the colonial period” (Alemezung, 2010 p. 63). However, how these ideas are practiced and experienced in the design and deployment of technology in African communities are scantily addressed in HCI4D, and the framing of such argument is outlined below.

1.1. Outlining the Centrality of the Pedagogical and Political Project

The central focus of this thesis is to decode the underlying imaginaries that have shaped the understanding of the ‘African personalities’ in the modernist framing of technoscience⁸. The thesis considers developing candidate approaches for framing the re-design and re-deployment of educational technologies that can be adopted and used effectively by a range of stakeholders in Nigeria. Discursively, the thesis is underpinned by seminal argument concerning ‘power-knowledge’ in understanding the dynamics of coloniality/modernity. Such genealogical narratives have formed basis for postcolonial theories and perspective, especially in African studies (Diawara, 1990; Mudimbe, 2020), postcolonial studies (Said, 1967, 1985; Mbembe, 2010), cultural studies (Kendall and Wickham, 2001; Khan, 2004), and education research (Peters and Besley, 2007; Baker et al., 2004). What this might suggest is that the thesis is primarily examining how the critical analysis of post-colonial practices of digital education and technology design can allow for futuring African HCI discourses about technology, communities, and indigenous knowledge (i.e., people, places, and practices)⁹.

approach of Jeffery Sach, and the activist/intellectual position of Wolfgang Sach – oversimplifies probable future(s) of the world (Esteva et al., 2013).

⁸ The African personality, as in cultural socialities of the communal self, is considered as the psychological and physiological make-up that inform the interactivity of every aspect of people's lives. In citizenship studies, research has shown how the ethical framing of subjectivities shifted from 'character' to 'personality of the person in modernist societies (White and Hunt, 2000). For example, a character has been associated with the moral qualities a person conforms to in getting admission into (or in having the right to participate in) the composition of a community. Building character link to moral demand for caring for the self and others, thus creating a form of governmentality that is upon self and others. Personality on the other hand is more about the will to self-constitute and self-realised identity attributes that portray a productive version of oneself. The ethical framing of personality resonates with the liberal techniques of self-mastery in recognising transformative attributes of the self.

⁹ It is important to account for how specific terminologies are adopted in the context of this thesis. For example, the term decoding is utilised as a political tool for breaking down the rhetorical blind spots that underpin the description/representation of specific experiences. Imaginaries are considered as the building structures of the culture/civilisation of a community. Episteme is the theory of knowledge or the logical scheme that directs knowledge production. Power is considered as a strategy and a technique for the representation of discourses using some identified form of representation.

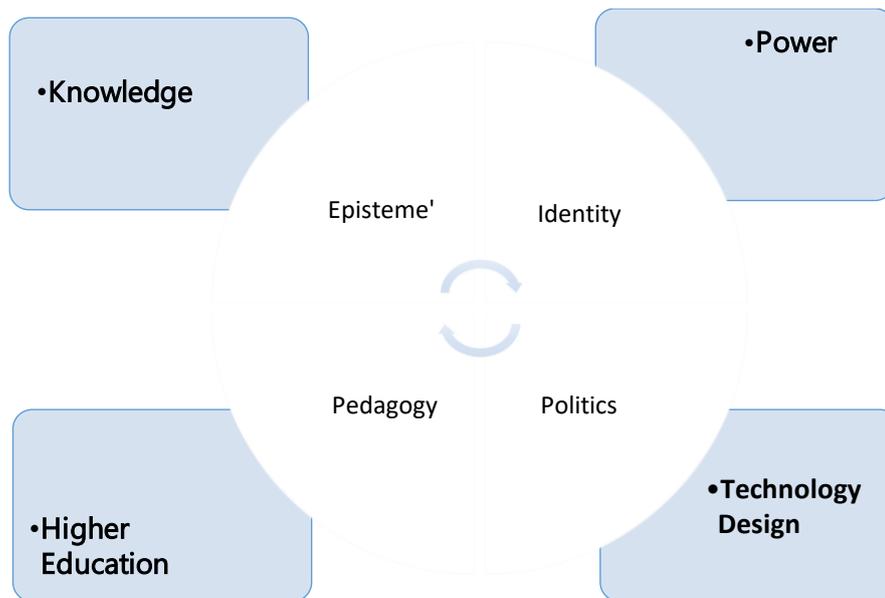


Figure 1: Vein Diagram of Field of Research

1.1.1. Revitalising Indigenous Subjectivities and Identities

In educational research, the theme of technology-enhanced learning is concerned with how the adoption and use of digital technologies can improve (or not improve) the practices of education (Tamim et al., 2011; Kirkwood and Price, 2014; Castro, 2019); how the adoption of educational technologies is determined by the design and development approaches adopted (Duval et al., 2017); and on what such an understanding might suggest to the essentialisation of technology in today's digitised society (Bernard et al., 2018). Developing on such background, some have argued that the global educational discourse is driven by dominant philosophies and traditions that are largely Eurocentric (Rizvi et al., 2006). Consequently, one might posit whether the use of technology in postcolonial education can bring about sustainable approaches to the framing of educational practice globally (Garrison and Kanuka, 2004); or whether the blended approach is another globalist appropriation of technological innovation in society (Gulati, 2008)?

In postcolonial African studies, there is also the consideration of how decolonisation efforts can support the call for developing alternative means of designing educational systems and platforms relevant to emerging challenges and conditions of living (Regan, 2005). Although the decoloniality has advocated for the juxtaposition of both colonial and postcolonial practices, recent studies have shown how stereotypical models and frameworks of digital education are not relevant to the educational challenges faced in sub-Saharan Africa (Gulati, 2008; El Bouhali and Rwiza, 2017; Shizha and Makuvaza, 2017). Considerable studies have pointed to the requirement for a closer examination of what the use of technology in education entails, and how it can be made relevant to the growing population in Nigeria (e.g., Oviawe, 2013; Adekola, 2020). What such accounts have demonstrated is that the renaissance of education is ongoing, but to what extent with the surge of technologies globally, and how appropriate would education technologies be to the decolonisation of higher education in Nigeria? As previous studies have yet to establish whether the blended approach to education supports

and promotes the decolonisation concepts prevalent in Africa¹⁰, some part of the thesis attempts to fill such a fundamental gap in our understanding of using digital technology in postcolonial education, particularly within the literature concerning blended learning (e.g. Drysdale et al., 2013; Drysdale et al., 2013; Spring et al., 2016; Spring and Graham, 2017; Bervell and Umar, 2017; Okaz, 2016; Selwyn et al., 2020).

1.1.2. Designing and Deploying Indigenous Technologies

As HCI is maturing in its interdisciplinarity, third waves of HCI have provided avenues for analysing how the multitude of theoretical principles, socio-technical practices, and network of actors can bring about a better understanding of how to design and deploy technologies to support diverse conditions of living. The field of HCI has been fundamentally concerned with the design, evaluation, and deployment of technologies in society, and how societal and technological issues can bring about changes to the practices of both technology and society (Dix et al., 2011). Recent developments concerning the implications of technology as a socio-economic apparatus for global development has brought about a crucial shift in the discourse of HCI through the analysis of a range of factors (aesthetic, social, cultural, linguistic, material, and design-related) and issues (infrastructure, literacy, educational, contextual, economical and so on) that could inform the development of context specific approaches for designing and innovating Africa – specific to ICTD (Walsham, 2017; Heeks, 2018) and HCI4D (Brewer et al., 2005; Chetty and Grinter, 2007).

Such narratives present a range of epistemological and methodological issues concerning how conflicting cultures are understood and translated in design work, and how specific cultural attributes are imprinted in the product of design. Such issues have also led to critical reflection on the appropriateness and applicability of stereotypical approaches to designing/making in line with emerging conditions that need innovative solutions (Shklovski et al., 2014; Bjørn et al., 2019). However, such fundamental issues to the development of an African approach to design and innovation can be regarded as a wicked problems of difference in imaginaries (Rittel and Webber, 1974). The rationale for considering these problems as such is that they are residual concepts; difficult to formulate and adequately frame and often led to diverse interpretation and potential (mis)understandings. However, viewing 'difference' in social imaginaries or the fundamental cultural civilisation of societies (Taylor, 2002) as do-able' problems (Fujimura, 1987) might suggest the need for continuous problematisation of the postcolony.

There is also the consideration of how the partitioning of interaction design and technological innovation in developing nations to issues of socio-economic development denote the insistence on an ideological positionality (Toyama, 2010; Dell and Kumar, 2016). Critically analysing its current framing might suggest discovering the former but covering the latter. Arguably, the discourse of HCI4D can be considered as a function of institutional and discursive segregation brought about by a regime of differentiation – i.e. the dualities of the Global North and the Global South, Us and Them, Developed

¹⁰ The blended approach is regarded as the combination of traditional ways of teaching and the adoption of some form of technology to assist the teaching process and learning activities. The approach combines a range of education perspectives (theories) and pedagogical approaches (the practice of teaching) to bring about a more flexible, affordable, and engaging experience of teaching and learning.

and Developing, and In Here and Out There to mention a few (Taylor, 2011; Dell and Kumar, 2016). It is argued that earlier framing of HCI4D was driven by a misguided assumption that the transplanting of Western technologies to non-western context might bring about the needed economic and social development of those communities (Toyama, 2010; Ho et al., 2009). However, the reductionist partitioning of HCI to specific histories, perspectives and futures has begun to widen our understanding of how technological discourses can reinforce epistemic discrimination, replicate existing stereotypes, and fortify the new 'Jim code' (Benjamin, 2018). This thereby necessitates elucidating the epistemic biases prevalent in the HCI4D discourse of 'development, culture, and design' by examining the epistemologies that underpin its concepts, its methods, its approaches, and its narratives within the emerging conditions of the global south, and specific to sub-Saharan Africa.

In addition, there is the prevailing issue of how, even with the resentment towards colonial epistemologies, paradigms and associated theories, researchers and software practitioners are merely conditioned to adopt dominant method of understanding other cultures without necessarily examining the assumptions that ground them, which ultimately widen the gap that exists in our understanding of locality of the global and the globality of the local in design work (Tunstall, 2013). This might, inadvertently, lead to the misinterpretation (and possible mistranslation) of diverse perspectives in design work, possibly lead to low adoption of tools, and might even lead to the misunderstanding of the implications of technology in such communities. Consequently, such a fundamental issue warrants a critical investigation of the underlying social imaginaries underpinning postcolonial orientations and approaches informing the designing and innovating of African realities.

1.2. Research Objective and Significance

The questions that the research considers are:

RQ1: What is the landscape of using educational technologies in Nigerian universities?

RQ2: Through which processes/activities could adaptable and usable educational technologies be re-designed and re-deployed in the context of Nigeria?

RQ3: How could the practices of educational technology research and technology design be enhanced through the adoption of a collective of situated approaches to imagination and knowledge?

The overall objective of this thesis is not to theorise the mundane practices of those that inform the design of educational tools, nor those that produce them and eventually use them, but to provide a holistic account of a range of issues that emphasise how institutional structures in the postcolony shape the practice of postcolonial digital higher education. However, it is essential to specify the focus of the thesis: Who are the primary audience? Where is it located discursively? And how the findings could inform culture(s) of design and pedagogical practice of education in Nigeria? This is a difficult question to answer. As indicated earlier, the thesis is interdisciplinary, it is framed within a western academic environment, whereas the data collected was from a non-western context. This follows a recent call for

developing discourses that examines how a range of theoretical, conceptual, and methodological issues could inform the practice of studying, designing, and evaluating technologies within the temporalities of the present.

As such, it is argued that an 'abundant' and a 'ruined' future can be envisioned and performed when prior defutured conditions in Africa are viewed as do-bale wicked problems that relatively need wicked approaches to solution making and finding (Walls, 2018; Ranabahu, 2020; Niskanen et al., 2021). This thereby enact a temporal vocabulary that considers how turning to the 'here' and 'now' could inform (and not necessarily determine) the compositions of designing for the pluriverse.

1.2.1. Dissertation Outline

The thesis is structured as follows. In Chapter **Two**, I provide a range of themes that have shaped the arguments concerning education and/with technology, and studies that have examined the practices and models of technology diffusion and adoption. Within the framing of mainstream HCI, I examine the arguments concerning technology for/as development (i.e., in HCI4D), with specific emphasis on the epistemological orientations and cultural paradigms that have informed the interpretation of diverse perspectives for the purpose of design work. The chapter ends by outlining specific gaps in the literature that inform the central arguments of the thesis – specifically how power and knowledge direct the future of Africa

In Chapter **Three**, I present a descriptive outline of the methodological approaches adopted, and a reflection on the process of data collection, analysis, and evaluation. Although the thesis emphasises a focus on the mundane practices of a range of stakeholders, I briefly outline conceptual arguments that have shaped the methodological choices, precisely the issues of identity politics, epistemic positionality, and cultural adequacy. This is relational to the requirement for developing a subtle sensitivity towards the context of the research, the different actors involved, and the inevitable crisis of (re)presentation of situated knowledge.

In Chapter **Four**, I provide an initial description of interpretive themes that came out of the analysis of data collected from experienced researchers, educational managers, lecturers, students, and software developer/designers¹¹. A more detailed and subtle discussion of the themes identified is then carried out in chapter four and five. The chapter also accounted for the evaluation approaches adopted in ensuring that the analysis is representative of members perspectives.

In accounting for the landscape of adopting education technologies to support diverse pedagogical practices, chapter **Five** first attempt at determining the extent to which well-known models of technology diffusion and adoption provide insights into the acceptability and rejection of education technologies in Nigerian universities. To show the relevance and limit of these models, I then discuss contextual factors that might have shaped the acceptance/rejection of educational technologies. This raises a range of issues concerning the extent to which conventional models fit into the context of Africa, and especially Nigeria. I then discuss conflicting ideas concerning blended learning, the sort of tools available and

¹¹ A thin description is considered as a first-order account of a cultural perspective that is not obscured by the web of significance (theoretically, conceptual, or pedagogical), and one that does not speculate about the close reading of meanings from members experiences (Brekhus et al., 2005; Porter, 2012).

adopted for blending, the teaching processes and learning activities the tools support, and where improvement is needed to drive acceptance and use. Findings indicate the relevance of understanding the complexities of using technology in postcolonial education, while also making a specific emphasis on the possibilities of developing context-specific pedagogies at the intersection of conflicting philosophies, traditional cultures, and languages.

In Chapter **Six**, I first attempt to unpack the relevance of conventional development methodologies, design concepts and organisational constructs for undertaking software project work in the Nigerian software development industry. Drawing on the perspective of software practitioners, I attempt to show the situated nature of project work that does some form of agility – or as expressed by participants, partial agility. Adding onto existing evidence and argument in chapter five and six, Chapter **Seven** considers what would a projection of a decolonised higher education and software engineering would look like from the empirical evidence presented in subsequent chapters. The discussion in the chapter is heavily empirical as it attempts to highlight what might be considered as an expression of trace of decolonisation in the practices of blended education and technology design. This way, the discussion in the chapter would point to the political intricacies of moving towards localizing subject matters that are imagined and practiced within existing structures of power.

In concluding the thesis, Chapter **Eight** begins by outlining rhetorical arguments about the possibilities of futuring African conditions of designing with/by the autonomous self. Here, the fundamental issue of underdevelopment in Africa is considered as a ‘wicked problem’ of the orientation of the imagination that needs wicked options and trade-off; and particularly options that are known-able and think-able within one’s pluriversal positionality as intelligible subject of interactivity with other worldly things. The consideration of a range of conceptual arguments in design futuring (Cornish, 2004; Escobar, 2018; Fry, 2020) and systematic decolonisation (Taiwo, 2014; Ndlovu-Gatsheni, 2018; Mignolo and Walsh, 2018) led to the ideas about how reformulating the narratives of the ‘unfaithful other’ in computing can allow for the epistemic remembering/ and redeeming of indigenous ways of problematising the self and the community (Amrule and Murillo, 2020). To reflect on pedagogical and political aspects of the thesis, the chapter ends by explicitly outline the contribution to knowledge, identify the limitation of the thesis, and pointing to avenues for future work.

1.2.2. Intended Contribution

The reader might regard the thesis to be profoundly empirical, rhetorical, and provocative. A closer examination of the questions raised, and the arguments presented would clearly show the significance of problematising taken for granted issues associated with merely designing and adopting eLearning systems to facilitate diverse pedagogical processes or activities. The ideas presented have attempted to highlight some of the rationales upon which the problematisation of the practice of blended education and technology design ought to be considered as subjugated discourses of modernity’s exercise of power and knowledge.

What lies herein are a range of narratives that clearly show how the African condition (in its plural form) is a function and a by-product of the power-knowledge line. The sensitivities outlined in this thesis strive to rethink the framing of postcolonial approach to computing in Africa, not necessarily through the

'colour line' as outlined in Negritude and Afrocentric traditions (Benjamin, 2019), but partly and significant through the 'epistemic line' and 'power lines' (Rowe, 2008). This is pertinent to recent efforts in a range of disciplines that have attempted reframing the thinking of technology to and for the improvement of both human and non-human conditions (Pepperell, 1997; Arendt, 2013). The argument presented are meant to guide the future directions of blended approaches to postcolonial higher education in sub-Saharan Africa, reformulate the practices of understanding the diffusion and adoption of educational technologies in non-western context, and revitalise the situated practice of innovating indigenous technologies – all of which point to the minimal exercise of dominant power-knowledge.

Chapter 2: Why this Topic?

2.1. Introduction

This section of the thesis provides some account of the context of the research, why the topic was chosen, and how the questions identified fit into the broader context of the literature. However, the chapter might be considered somewhat different from conventional literature reviews. This is mainly because the thesis draws from a range of issues across disciplines, with each of the fields having its discursive narrative, thus providing a contrastive account of a range of issues. The process of identifying the relevant literature was carried out in two phases. First, I analysed a range of studies that have examined the adoption and use of technology as a new form of digital integration (or divide) and its relevance to the decolonisation of knowledge practices in Africa. Second, I critically examined a range of arguments that have informed the practice of technology design and development in developing countries (i.e., in ICT4/HCI4D). In HCI4D, I was particularly interested in highlighting the complexities of tagging interactive design from non-western context to themes of development; thus, point to discourses that have attempted defamiliarizing the design paradigms, analytical sensitivities, and cultural lenses informing design project in Africa. Adding onto such issues, I then briefly examined arguments concerning the methodologies informing the mundane practice of distributed and collaborative software project work in CSCW. The related works documented provide the base rationale for decoding the imaginaries informing the design and adoption of digital technologies – an issue that has significant implication on the identities of African innovation and culture of design.

2.2. Postcolonial Approaches to Higher Education in Nigeria

The debate about the transformation of Africa's post-colonial educational system is one that has received relatively considerable attention over the years. Different views have been expressed regarding the decade of post-colonial and digital education in Africa. Due to the dominant nature of coloniality/modernity in social and institutional spaces, pre-colonial education in Africa was considered irrelevant to the enlightenment project of Europe (Jagusah, 2001). Besides, during the beginning of the colonial era, education was generally ignored as the main concern for the colony was the exploration of raw materials for the development of its knowledge economies. As the past was generally dismissed, the present and the future was thus jeopardized. These places the educated African under severe moral and cultural disintegration (Amukowa and Ayuya, 2013; Woolman, 2011); and as such one is in a state of continual struggle towards the revitalisation of the pedagogies of both the oppressed and the oppressor. To echo Hopper's view, this suggest that:

“The African voice in education at the end of the twentieth century is the voice of the radical witness of the pain and inhumanity of history, the arrogance of modernization and the conspiracy of silence in academic disciplines towards what is organic and alive in Africa. It is

the voice of 'wounded healers' struggling against many odds to remember the past, engage with the present, and determine a future built on new foundations" (Hoppers, 2000 p. 1).

In building new educational foundations relevant to the plurality of African social relations, the general view is that the current educational system is either misdirected or at a crossroads (Amukowa and Ayuya, 2013). Being at a crossroad, one might argue that any association with Western ontological and epistemological perspectives might symbolise a continuation of colonisation under the banner of globalisation. Instead, scholars have sought to examine and develop new paradigms that would bring about identifying how past and present forms of education in Africa can be re-examined considering current educational conditions and demands. Such effort, sometimes referred to as 'Africanisation', 'indigenisation', 'endogenization', and 'Afrocentric ideation' of education (Asante, 1991; Horsthemke, 2004; Letsekha, 2013; Metz, 2017) calls for a total overhaul of education practices in Africa; from its curriculum and language use to its informing theories and pedagogies (Shizha, 2013). Other efforts have championed for a 'Nigeria centric' (Ovaiwe, 2013) paradigm in higher education, which, when taken seriously, might explicate how the decolonization of conventional pedagogies can bring about a revitalisation of the practices of digital education. However, such efforts have had setbacks. For example, the Afrocentric idea is not entirely African, but one that emphasizes the centrality of the indigenous culture and tradition in academic discourse. This is making an emphasis on how traditional epistemologies, indigenous knowledge, and localised cultural values can act as catalyst for the transformation of digital education in Africa (Shizha, 2014; Shizha and Makuvaza, 2017). The general theme of the discourse highlights the requirement for structuring education in Africa in such a way that it draws from practical pedagogies and experiences.

Consequent to such efforts, some have argued that making education distinctively African (depending on what that might mean) might bring about some form of self-marginalisation and delinking from fundamental pedagogies and practices (Enslin and Horsthemke, 2016). Others have attempted to re-visit such arguments, offering a standpoint that both serves as a means for internationalization and indigenization/endogenization of educational traditions (Letsekha, 2013). Even with such alternatives, it is evident that due to the lasting effect of the colonial matrix of power domination possible (Mingolo and Tlostanova, 2009). However, the endogenization of the discourse of education has shown relevance in different context. For example, South Africa's Africanisation of the educational culture (Metz, 2017), Kenya's indigenization of the curriculum (Owuor, 2007), Nigeria's revitalisation of the curriculum (Oluniyi and Olajumoke, 2013), the decolonisation of indigenous knowledge in Zimbabwe (Shizha, 2010), and Tanzania's educational self-reliance reform (Nasongo and Musungu, 2009). What this shows is that the African renaissance of education is ongoing, but the question that remains is to what extent and at what development stage and outcome? In the following subsections, I discuss a range of arguments concerning the practices of blended teaching and learning in higher education and then considered some ideas about the theories and models of technology acceptance, adoption, and use.

2.2.1. Studies of Blended Teaching and Learning in Higher Education

In the postcolonial discourse of education, the fundamental issues have been about how the decolonisation of existing structures of society can bring about a critical understanding of the future trajectories of higher education (Rizvi et al., 2006; Subedi and Daza, 2008). Some have argued that digital education is configured in such a way that it values 'academic intelligence' while indigenous society values 'practical intelligence' (Bidwell and Winschiers-Theophilus, 2015, p. 140). There is also the issue of how the paradigms informing the practice of digital education are developed under the inspiration of globalisation (Tikly, 2001), but ultimately embodies Western traditions of modernity, liberalism, and individualism (Manzuma-Ndaaba et al., 2016; Shizha and Makuvaza, 2017). What these studies have shown is the political implication of placing greater emphasis on the technological (and the mode of delivery of content) than the context of learning or pedagogies (Kukulska-Hulme and Traxler, 2005).

In addition to the above, the general assumption in technology design spaces is that adopting western-style education at the expense of indigenous pedagogies would bring about the needed globalised 'western expertise' has proved damaging to most educational systems in Africa; leading to what might be characterise as " getting exactly what they sought to avoid" (Bidwell and Winschiers-Theophilus, 2015 p. 139). It is, therefore, essential to identify and develop models that are situational, pluriversal and generative. In the sections that follow, the discussion will provide related background that support the requirement to decolonise the intellectual and institutional landscape directing the adoption of digital technologies as the means and ends to postcolonial higher education.

Studies of Higher Education

In most African universities, education is regarded as a hybrid practice of teaching, learning and research. This places the university as an multi-dimensional institution that can transform/destroy structures society. As an an apparatus of power through its emphasise on knowledge production and dissemination, the discussion in this section will focus on the practices of blended teaching and learning. In the literature, three main approaches to teaching are the learner-centred approach (through deep and surface learning methods), the tutor centred approach (using different behavioural models of observing and measuring learning activities), and the didactic approach (Allan, 2007; Spring and Graham, 2017). In addition, there is also the consideration of the models that have informed the practice of learning with technology: viz skill-driven model, attitude driven models, and competency-driven models. Skill driven models encouraged self-faced and group learning, attitude driven models facilitate synchronous and collaborative interaction between actors, while competence driven models encourage learning through mentorship and transfer of tacit knowledge. What this might suggest is that understanding the implication of technology in the context of postcolonial education is a nuance idea that is informed by the context of inquiry and the actors involved.

Equally relevant to understanding the landscape of blended education in Nigeria is considering how the Nigeria-centric model can bring about a new terrain of using digital technologies to support diverse pedagogical demands and styles. In Nigeria steps were taken by the government and different stakeholders in ensuring the availability of supporting infrastructure for digitization, the accessibility of

digital opportunities, and the affordance of integration of technology in every stage of education (Usoro, 2016; Egbe, 2018). There has also been the continual appropriation of education policies that are philosophically and pedagogically sound (Abiogu, 2014), but also reflexive of the context of use (Rolleston and Adefeso-Olateju, 2014; Iruonagbe et al., 2015). As some part of the thesis is concerned with the practice of education technology research, it becomes fundamental to consider how different experiences foster/or hinder adoption and use.

Blended eLearning Systems in Higher Education

The theme of technology-enhanced learning (TEL) has had a thorny and interactional evolution (O'shea and Self, 1986). The focus has been on how the use of technology can improve the process and practices of teaching, learning, and the management of education (Tamim et al., 2011). The sub-field of education technology research is widely considered as an eclectic theme that is concerned with how the use of technology in educational contexts affects human conditions, and how its use is determined by its design and development approaches (Duval et al., 2017). With the lack of a commonly agreed understanding how globalisation has brought about the development of digital education, there is the likelihood that the terminologies associated with digitisation (such as 'enhancer', 'supporter', 'argumentative', 'mediator', 'enabler', and 'aider') might not account for how technologies can be the problem-solution of post-digital education (Osguthorpe and Graham, 2003; Kirkwood and Price, 2014; Halverson et al., 2013; Bayne, 2015; Vaughan et al., 2017; Grant, 2019). The determining question is whether blended eLearning is a bad idea and whether it can be redeemed? (Oliver and Trigwell, 2005; Moskal et al., 2013). Such questions have suggested that the confusion of its terminologies and development neither satisfies the purpose nor the function of life-long learning.

Regardless of such debates, some have examined the theories, frameworks, and practices informing technology enhanced learning research (Garrison and Kanuka, 2004; Halverson et al., 2013; Spring et al., 2016; Spring and Graham, 2017). What such studies have shown is the evolution and divergence of the field (Halverson et al., 2013), and the uniformity of its discourse across the different region of the world (Spring and Graham, 2017). This also highlight the requirement for examining the multitude of factors that direct the selection of approaches to the design and deployment of blended eLearning systems to support diverse pedagogical specifications and preference.

With a specific emphasis on developing countries, for example, Gulati (2008) provided a review of the debates about the appropriateness of technology to the educational practice of marginalised communities. The analysis outlined the challenges and the prospects of the use of educational technologies to support teaching and learning. This led to the consideration of how a range of socio-cultural, contextual, pedagogical, and institutional factors affect the digitisation of higher education. Such issues relate to limited social infrastructure, lack of adequate funding, in-availability of affordable connectivity, limited expertise and technical know-how, perception, and attitude of practitioners towards digital tools, security and privacy concerns, and other forms of regulatory and political biases (Oye et al., 2011; Shonola et al., 2014; Ajegbomogun et al., 2017).

Another common theme involves examining how the pedagogical practices of higher education might have been enhanced (or hindered) through the intergration of technology (Tamim et al., 2011).

Other have examined the practices informing the selection of instructional approaches relevant to specific techniques or tool of delivery of content (Drysdale et al., 2013). What the landscape of blended approach to education points to is the relevance of understanding the pedagogical requirement of different actors; and of how such account are to be taken into account when designing with/by the variance in user producty specification (Spring et al., 2016; Spring and Graham, 2017). This is specifically calling for the the design of context-specific pedagogical approaches that operate within (and without) the framing of the globalised educational sector.

Even with the above, it appears that fewwe studies have provided an in-depth analysis of how different stakeholders involved in the process of producing and accepting learning tools consider a whole range of factors that would inform the adoption of diffused tools (Moskal et al., 2013; Oyelere et al., 2016). What studies in the literature have failed to examine is how the perspective of a range of stakeholders about technology might have informed the selection of design methods and techniques and collaborative software project work.

To specify, the identifiable gap in the Nigerian literature relates to the sort of tools adopted in different educational scenarios, the different pesagogical activities that the tool support, and the sort of challenges encountered when transitioning to the blended mode and on how such issues can be minimised. Developing on the thematic review carried out by Boelens and colleagues (2017), the thesis contribute to the understanding of how 'blending' might 'incorporate flexibility', 'stimulating interaction', and 'facilitating learning/teaching' as applied to the context of Nigeria.

2.2.3. Theories and Models of Technology Acceptance and Adoption

The diffusion and adoption of the eLearning system, either through a blended approach or through digital learning, has become a common approach to education in developed and developing countries. The assumption is that the adoption of technology might bring about optimal ways to the practice of teaching, learning, and management of educational processes. However, the process of transiting from traditional ways to education to a blended approach has been characterised by many challenges, both institutional, pedagogical, socio-cultural, and technological. There is a common assumption that technology is a transformative catalyst that can bring the old and the new together, and thus relevant to the renaissance of education in most developing countries (Gulati, 2008). Even with the fixation of technology as the one-all solution to modernist challenges of development, research has continuously pointed to how the mere transfer of innovation from developed to developing countries is not entirely a technological phenomenon, but rather an extension of the ideological, political, and socio-economic agendas of Western modernity (Reagan, 2004). A range of frameworks for the adoption and implementation of blended learning has been proposed (Graham et al., 2013; Bervell and Umar, 2017). What might seem applicable to a multitude of developed context might not be relevant to other less developed setting. This thus necessitate a critical analysis of whether and how the determining components of well know models can account for the perspectives of other less theorised settings.

Conventional Models and Frameworks

The notion of technology adoption and acceptance has become a common phenomenon in studies relating to the field of information system, education technology, and human-computer interaction. Different models have considered a range of factors that could predict and facilitate the diffusion, adoption, and acceptance of technology in social and organisational context. The common of which are the technology acceptance models (Davis, 1989; Davis et al., 1989; Vankatesh and Davis, 2000) and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003; Roger, 2010). These models point to the importance of user's attitude and intention towards predicting the acceptance and actual usage of technology. This is developed by outlining how a range of variables can allow for understanding the factors that might supported or hindered the perception of adopters of new technology (Williams et al., 2015). However, most of the initial and even recent studies in the literature report findings from developed countries, suggesting indicators primarily relevant to industrialised social settings, therefore making the analysis situated in a particular context, and thus not generalisable (Marangunić and Granić, 2015). Therefore, the emphasis will be examining how different models have been adopted in understanding the factors that might led to the acceptance and rejection of technological innovation in Nigeria.

Diffusion of Innovation Model (DIM)

As technology has penetrated every parcel of social life, the perception of the adoption or rejection of technological innovation is premiss on technologies perceive importance and relevance in improving conditions of living. To determine the diffusion level of innovation, the DIM provides a range of constructs that can be used to project the level of acceptance of technology in a setting (Moore and Benbasat, 1991). Such construct includes the *relative advantage* of using an innovation against previously used tools, the *visibility* of seeing others adopt the same innovation, the *compatibility* of the tool to one's prior experience and values, the tangible outcome of adoption (*demonstration*), and the perceived acceptability of planned used (*trialability*) (Roger, 2010). The model offers a theoretical basis for identifying the different aspect of innovation and its adopters and provide insights into the decision process for whether to diffuse an innovation or not (Rogers, 2010). It focuses mainly on the organisational and contextual attributes that highlight the characteristic of the innovation to be adopted.

The diffusion of innovation model (DIM) integrates the innovativeness of the technology, the innovation decision process, the differential rate of adoption, and the perceived attitude of the potential adopter in determining the acceptability or rejection of a tool (Rogers, 2010). In determining the subjective level of diffusion of technology in an organisation, the adopter uses a range of construct to facilitate or impede their attitude towards the decision to adopt or not. What the unified theory offers is an understanding of the *decision processes* involved (and the factors that shape one's decision); the *characteristic of the innovation* towards the reduction of uncertainty of acceptance or rejection (in articulating the perception and attitude of potential adopters); and the *rate* at which a particular tool could be accepted or rejected within an organisational context, thereby having a lesser prediction power (Sahin, 2006). What this might suggest is that the unified theory provide a means for identifying what necessitate the decision to adopt the blended approach and the institutional implementation

mechanisms that might have supported the transition from conventional approach to a blended approach.

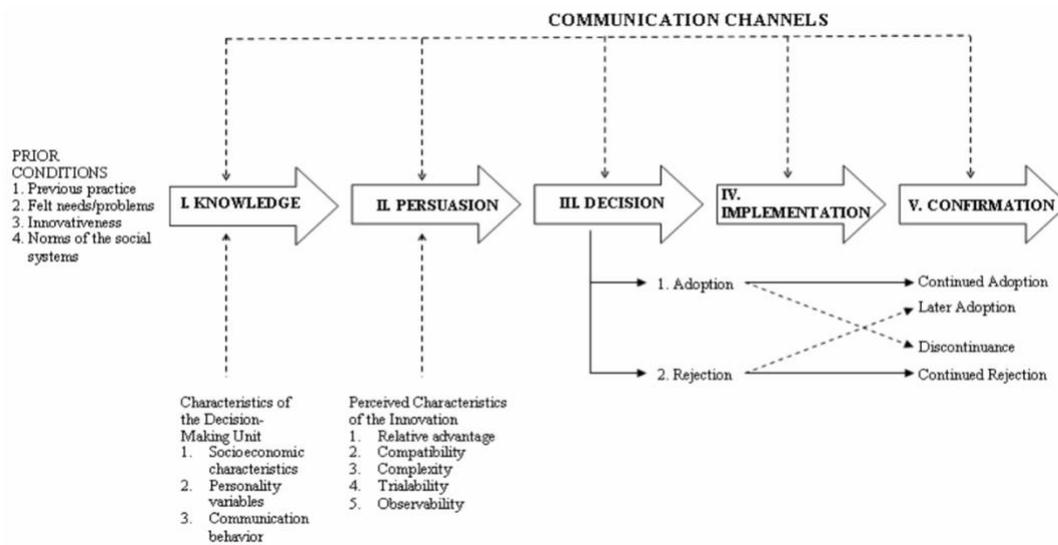


Figure 2: The Diffusion of Innovation Five Stage of Decision Processes, adopted from Sahin (2006)

Technology Acceptance Models (TAM)

The technology acceptance model is considered the most well-known model for determining the acceptability of technological innovation. Its core component includes attributes like the perceived usefulness (PU), perceived ease of use (PEOU), attitude towards use (AT), behavioural intention to use (BI), and actual use (AU) (Davis, 1989). The model has been widely adopted, extended, and used in a different social context, and has proven useful to the prediction of 30-70% usage of deployed technology. The initial model has been extended to consider how factor such as perceived ubiquity, performance and effect expectancy, subjective norms, social influence, and contextual determinant as facilitating conditions for determinant the intention of accepting or rejecting technology (Davis et al., 1989; Venkatesh et al., 2003; Venkatesh and Davis, 2000). This has led to the development of the TAM2 (Venkatesh and Davis, 2000), UTAUT (Venkatesh et al., 2003; Venkatesh et al., 2012), and DeLone and McLean's success model (DeLone and McLean, 2003).

In addition, the UTAUT model builds on the initial framing of both TAM and TAM2 (Davis et al., 1989), exploring how variables like facilitating conditions, social influences (or subjective norms), and performance/effort efficacy can predict behavioral intention to use (Venkatesh et al., 2003; Williams et al., 2015). Social influences examine how the perception of others influence the behavioral intention to accept and use technology. Facilitating conditions are those organizational or environmental conditions that explicate the relevance of innovation to existing practices, which in essence influence the perception of adopters towards deployed tools. Such attributes place the subtle requirement of not only extending well-known models but also considering their relevance within the emerging practice of digital education. This necessitates differential framing of the models of adoption of technology, making explicit how certain constructs function when taken up in the analysis of diverse experience.

Within the Nigerian context, these models have been adopted in analysing a range of factors that might predict the adoption and acceptance of eLearning systems (Olatubosun et al., 2015; Nicholas-Omoregbe et al., 2017; Okocha et al., 2017; Yakubu and Dasuki, 2018; Yakubu and Dasuki, 2019). However, even with its usefulness, the extension of TAM and UTAUT has proven difficult in examining a range of other factors, specifically socio-cultural and contextual factors that might influence the adoption of technology (Legris et al., 2003). It has also not provided sufficient indicators for determining the impact and consequence of adoption to learning processes, engagement, interaction, and possible changes to learning outcome (Edmunds et al., 2012; Persico et al., 2014). As we worked with a range of actors, the factors that might facilitate adoption might vary, and what we sought to point to is how different factors might have driven the acceptance of technology in Nigerian higher education. We focus on identifying factors that might have led to the acceptance and use of eLearning systems like Moodle google classroom, canvass, and blackboard to support diverse practices of teaching/ learning.

Consequently, the problematization of the issue raises the fundamental question of the relevance of well-known models of the adoption of technology (TAM). It also suggests the need for a critical analysis of taken for granted attributes that might have informed adoption, identifying emerging themes that promote and sustain usage (Ansong et al., 2017). This is developed on the premise that the subjective prediction of actual usage is subjected to the perceived behavioural intention and attitude towards use than of the perceived usefulness or ease of use of technology (Legris et al., 2003; Turner et al., 2010; Mtebe and Raisamo, 2014). There is also the consideration of how contextual indicators like social influence (or subjective norms) and facilitating conditions might predict behavioural attention and actual use (Venkatesh et al., 2003; Williams et al., 2015). This leads to the consideration of how the analysis of emerging variables might better inform the decision processes of diffusion of innovation in education and identify factors that might have promoted or could foster acceptance by a range of stakeholders. This is an issue that is scantily explored using qualitative data, and one which some section of the thesis addresses.

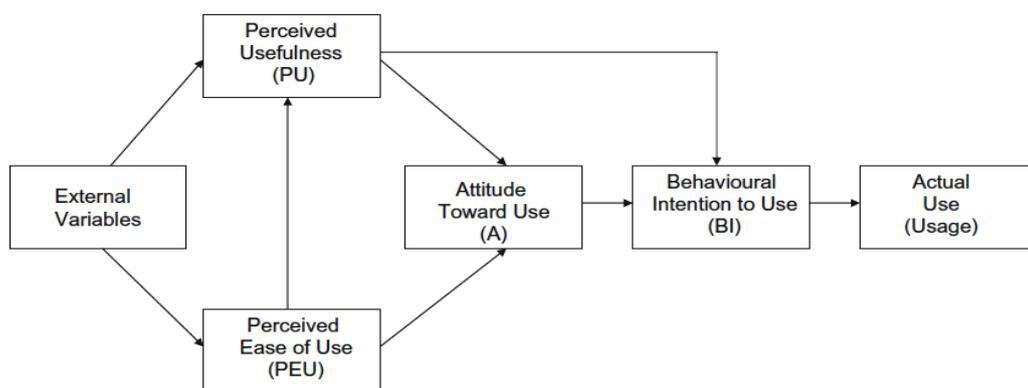


Figure 3: The Original Technology Acceptance Model.

Unification of TAM and DIM

While many studies have attempted to identify and determine a range of factors that support/hinder the adoption of technological innovation in education, there appears to be a varied interpretation and extension of existing models in education technology research. Existing studies have examined how different factors, such as self-efficacy, subjective norms, interactivity, compatibility, and satisfaction might provide determinant insights into user's perception and intention of accepting of eLearning system (Persico et al., 2014; Rahmi et al., 2018). Bervell and Umar (2017) analysis point to the lack of integration of different models in determining the factors that might have supported or hindered the adoption and acceptance of eLearning systems. Most studies adopt and extend the TAM, with only a few utilizing the integration of both TAM and DIM in their analysis. There is also a varied interpretation and extension of the original TAM model in predicting the acceptance of eLearning systems (Musa, 2006; Olatubosun et al., 2015; Okocha et al., 2017; Bervell and Umar, 2017; Rahmi et al., 2018; Yakubu and Dasuki, 2019; Mawere & van Stam, 2019), which has led to the recognition of the significance of integrating DIM and TAM in determining the intention and attitude of end-users towards adoption and acceptance (Tshabalala et al., 2014; Persico et al., 2014; Nicholas-Omoregbe et al., 2017).

Others have pointed to the implication of integrating different models in determining the perceived intention to accept educational technologies (Marangunić and Granić, 2015), and specifically applied to the context of Nigerian higher education (Nicholas-Omoregbe et al., 2017). What these studies have shown is that the integration of DIM and TAM provide a better understanding of various indicators that might have championed for the consideration of the blended approach and the acceptance/rejection of blended eLearning systems in Nigerian universities. The integration of different models, especially the diffusion of innovation and the technology acceptance model has shown significant influence in understanding the attitude and intentions towards actual use (Persico et al., 2014; Tshabalala et al., 2014; Al-Rahmi et al., 2019). For example, Lee and colleagues (2011) attempt to integrate the TAM and DIM to determine the relationship between the motivation and determinants of various factors to the adoption of a blended approach and the acceptance of blended eLearning systems. Al-Rahmi and colleagues (2019) also reported on how the integration of TAM and DIM can assist in developing insights that would inform the decision of planning, implementing, and evaluating eLearning systems. It became evident that TAM and DIM complement each other, and their integration provides insights that would determine the level of acceptance and rejection of an innovation.

Conventional Strategies in Sub-Saharan Africa

With the perceived differences between developed and developing countries, it becomes important to integrate a range of models to determine the institutional, pedagogical, organisational, and technological factors that influence the acceptance of the blended approach to education and blended eLearning systems as alternative to traditional approaches to higher education. This section of the thesis is not entirely focused on critiquing well-established models of predicting the acceptance of technology but focusses on examining how the diffusion and acceptance models determining factors considers (if they do) the peculiarity and specificity of the Nigerian context. The assumption is that there might be a difference in pedagogical needs, contextual factors, institutional structures and policies,

socio-economic relations, technological capabilities in different institutions. And thus, might present the examination of the reasoning behind the acceptance or rejection of innovation not to be a straightforward issue as widely articulated

However, within the context of developing countries, there has been a surge of studies that examine how socioeconomic and cultural factors might influence the acceptance and adoption of technology (Musa, 2006). The general premises for most of the models and theories for the prediction of attitude and behaviours for usage have been about the availability of technology and that the determining factor is the end-user. In situations where the availability of technology is scarce and where other external factors are readily influential, the applicability of TAM and its extended models are put to the test (Boateng et al., 2016). Although the revised models have proven useful to outlining how differences in capacities (accessibility and exposure to technology) and values (socio-economic, contextual, cultural, political factors) might provide insights that would bring about understanding the behavioural intention and attitude toward use (Musa, 2006), a deeper understanding of the determinant influencing the acceptance of eLearning systems are scarce.

What is missing in the literature of education technology research is the examination of context-specific factors that might have warranted the diffusion of technology in education. Most of the attention has been given to the components of the TAM models, specifically the relevance of perceived usefulness and perceived ease of use, rather than on how usage can be maintained and promoted (Turner et al., 2010). Less attention has also been given to the institutional, pedagogical, socio-cultural, and contextual factors that might have facilitated the continual acceptance of a blended approach to teaching/learning. Or the factors that might have warranted the lack of acceptance and use by students and tutors. Most studies focus on modelling the perspective of end-users (tutors and students), neglecting the perspective of educational managers, and the consideration of qualitative data. The analysis of such a fundamental gap in our understanding of education technology research would provide a broader picture of the link between the factors that necessitated diffusion and adoption, factors that influence the acceptance of specific educational tools, and factors that would shape future use.

2.3. Technology for/as Development

Development has become a buzz word, as it implies bringing about change or making a difference to the social and economic condition of the developing world. The common assumption is that 'development' is a post-World-War II Westernization expansion project that identifies globalist attributes towards the sustainability of the human conditions. Even proponents of post-development discourses have acknowledged that 'development' was at first a failed capitalist project that evolved to become the globalist structural adjustment programme imposed on colonised states by Western political institutions (Estera & Babones, 2013). The notion of development has led to a whole range of 'alternative or alternative to' projects, albeit with similar reductionist motives to those that have already failed to bring about significant improvement to the conditions of third world people. Critics of 'alternative development', those tagged under the intellectual position of post-development, have identified theoretical propositions that when combined with social activism can bring about political possibilities that are relevant (and practical) to the immediate conditions of the global south (Escobar, 1992).

Regardless of the promises of the post-development narratives, critiques of 'alternative to' continuously suggest how its methodological praxis romanticises the cultural perspective of marginalised communities, oversimplifying the plurality of social experiences while passively outlining concepts that hardly informs policies and practice of sustainment (McGregor, 2009).

When such complexities are framed in the African context, both development and the post-development positionalities present ideological concerns in relation to the technocratic appeals for the betterment of the conditions of modernity/coloniality (Matthews, 2004). This might thereby present the 'alternative to development' (Escobar, 1992) as a stagnant proposition that relies solely on political debates that don't lead to the identification of concrete sensibilities that are adaptive to existing structures of social life in Africa. Regardless of the promising narrative that has been developed in ICT4D, there seem to be the placement of technological innovation as de factor direction towards sustainable development – in both political and material terms (Caradonna et al., 2015a). Critique of the ecomodernist doctrine has point to how modernist proposition limits common futures by its insistence on technological progression and economic growth as if the social is merely an object of material accumulation and consumption (Caradonna et al., 2015a 2015b; Crist, 2016).

With the significance attached to information communication technology to the globalist progression agenda, there has been the continual quantification of social life in relation to technological advances and adoption. This goes further in the fixation of a technocratic and capitalist ideal as the optimal measure of the human conditions of progression. When the measurement of the human condition becomes an issue on a global scale, it is important to have conceptual frameworks that are relatively sensitive to the multiplicity of the social world (Desai et al., 2002; Dobrota et al., 2015; and Maricic et al., 2015). This has led to the development of a range of ICT development indexes (Dobrota et al., 2012), that have proven useful in understanding how technology futures and defutures. As such, the emphasis of the thesis is not to show how 'alternatives to' development could inform the design and deployment of education technologies but examining how emerging themes in postcolonial African studies could lead to the identification of ways in which postcolonial and decolonial option would direct emerging feature of African HCI. The discussion is meant to be a precursor for developing narratives within the postcolonial limits of computing (Chen, 2015; Nardi et al., 2018) and for the eventuality of a decolonised and de-patriarchal informatics (Tomlinson et al., 2012; Ali, 2016; Chakravartty & Mills, 2018).

2.3.1. Human-Computer Interaction for Development (HCI4D)

The sub-field of HCI4D has been concerned with understanding the implications of technology design and deployment to the improvement of a range of socio-cultural and economic conditions (Brewer et al., 2005; Ramachandran et al., 2007; Chetty & Grinter, 2007; Ho et al., 2009; and Burrell and Toyama, 2009). The scope of the subfield is still being negotiated, as the community is evolving (Anokwa et al., 2009). The focus of the broader HCI community is that HCI4D will offer a balanced view of the world through the reporting of marginalized people's perspectives while maintaining the universality of the dominant perspective (Dell & Kumar, 2016). Even the keyword 'development' is misrepresentative or misleading in HCI partly because most of its proponents are from 'computing', 'design', and 'social

science' background that view ideas about modernity differently. The most common assumption is that of viewing development in HCI as a technological phenomenon that can be approached by the design and evaluation of new artefacts. In development studies, the emphasis has been on how a 'deeper, patient and slow evaluation' of new technologies can bring about a descriptive analysis of how the adoption of innovation bring about changes to conditions of living (Dell & Kumar, 2016). Such conflicting motive supports the need for making a distinction between 'doing research' and 'doing development.

Furthermore, the initial framing of HCI4D was of problematising technology, design, and context as a 'development' research agenda in developing countries (Toyama, 2010; Dell and Kumar, 2016; Estera and Escobar, 2017). The trajectory of the sub-field has shown how doing development is 'slow' and evaluated as a long-time 'outcome' of innovation or result towards development goals. In contrast, doing research attempts at producing something 'new' through the analysis of immediate result and 'output' (Dell and Kumar, 2016). Advocate for after development have emphasised the need for conversations that go beyond one-size-fits developmental ideals and towards pluriverse practices of grassroots development (Estera and Escobar, 2017). Such narratives often focus on recurring themes such as subjectivities and identities, the complexities of context, the plurality of culture, the temporality of perspectives, and the intersection of experiences (Kumar and Dell, 2018; Van Biljon, 2018; Kumar et al., 2019). These shifts have thus brought about a better understanding of the complex relations between the realities and the assumption of what's often characterised as 'out there and 'in here' (Taylor, 2011; Avle and Lindtner, 2016), thus going beyond reductionist models of development (Irani et al., 2010).

With the proliferation of indigenous perspectives in ICT4D and HCI4D research, the perception of technology innovation from developing nations has shifted from a developmental focus to a stationary space where exciting innovations are pioneered and engineered. This shift offers an ideal avenue for the localisation of design patterns, interfaces, and methods to fit into diverse work practices. Such issues have started getting considerable attention in different areas of HCI, among which is the critique and reflection on the implication of adopting dominant paradigms and methodologies in interaction design projects of the global south (Winschiers-Theophilus & Bidwell, 2013; Kapuire et al., 2015). Such efforts have shown how postcolonial (Irani et al., 2010; Merritt, S., & Bardzell, 2011; Philip et al., 2012), decolonial (Ali, 2016; Bidwell et al., 2016; Lazem et al., 2021), and indigenous design paradigm (Winschiers-Theophilus & Bidwell, 2013; Awori et al., 2015; Kapuire, et al., 2015) might direct new ways of asking questions about technology, power, politics, culture, and economy.

For example, the Afro-centric and Ubuntu models consider how the embodiment of HCI's paradigms in ethnocentric epistemologies underpin certain assumptions about people, places, and practices; but also, how its asymmetric relations of power direct specific priorities and judgement of design (Winschiers-Theophilus & Bidwell, 2013; Kapuire, et al., 2015). Others have considered how a collection of situated approaches to imagination and knowledge might allow for defamiliarizing dominant cultures of innovation in transnational design spaces (Adamu, 2020). Such a phenomenological approach to design is not new as it focuses attention on the interactivity between different matters of design, particularly on how situated knowing, reasoning, and actioning can allow for understanding the inter-connectedness between indigenous knowledge and interactive design (Adamu, 2021b).

Regardless of the implication of such orientations in design work, African design shouldn't be loosely considered as the practice of applying a collection of techniques that direct the fabrication of an artefact, but rather as an ontological approach that embodies the wholeness of space and time, and one that considers the conditions in which design are undertaken and brought about.

Following upon the intellectual traditions of decoloniality that points to the ontological dimension of coloniality/modernity (Quijano, 2007; Tuck & Yang, 2012), decolonization of African design is not loosely considered "as a straightforward liberatory process" but deliberation and a "contest over the very meaning of liberation itself" (Irani & Philip, 2019 p.5). Here, decoloniality is considered a political project concern with border thinking, delinking, and detachment. Therefore, the emphasis on innovating Africa will focus on how knowing of the pluriverse can be imprinted in the imagination of African designers and artists as the abstraction of 'colonialism as-in to design' often obscure the unintended consequences of their craft beyond the immanent frame of reference. This is developed on earlier studies that have framed decolonisation as a process of interrogating existing knowledge practices of computing research (with 'computing as a characteristic of a colonial movement') with the sole purpose of embracing subjugated knowledge systems, perspectives, and experiences (Lazem et al., 2021 p.9). Such account presents renewed efforts towards articulating what decolonization might entail – by either reflecting on the outlook of the community about the utilities of the decolonial options as living practices or by engaging practitioners in decolonial thinking as a way of bringing about changes to conventional worldviews of technology-related knowledge.

In a nutshell, this section tries to establish how a collection of sensitivities might have furnished debates about the abundance of localised practices of innovating in Africa. Although these sensitivities have furnished debates about how dynamic relations of power shape interactions and collaborations in community-led design projects, what is missing in the African HCI literature is an understanding of how specific African cultures (de)future the intellectual landscape that African subject matters of design *know* and *think* for the pluriverse¹².

2.3.2. African Human Computer Interaction (African HCI)

In post-development discourse, there's considerable debate among researchers and practitioners about the diversification and re-formation of HCI as applied to other social settings; either as an inter-discipline that examine issues of technology and society within different knowledge systems (Blackwell, 2015a) or as a scientific/engineering program that allows for describing how technologies get designed and adopted (Rauterberg, 2006; Reeves, 2015a). Although there is an acknowledgement of the lack of solid philosophical, epistemological, and methodological core in HCI (Grudin, 2006), some have argued that HCI ought to be considered as an eclectic field of inquiry that leads to implications for practice-oriented research, theory development, or the development of contextual knowledge that inform work practices

¹² Here, design is not loosely considered as a collection of techniques that direct the fabrication of an artefact, but an ontological practice of being, knowing, and thinking about how to make sense of the social world. As such, African design is considered as a cultural means of engaging with the attributes of the world where many worlds fit. It is also emphasizing how African cultures, as in tradition and custom, act as apparatus of power-knowledge that direct the differentiation and identification of intelligible attributes of social life. This might thereby present African 'cultures of design' to be governmentality instruments that can either led to disciplinary segregation or enforcement of cultural hegemonies (Ambole, 2020).

(Kostakos, 2015). This has led to considerable debates about how the inter-disciplinary fragmentation, remarkable expansion, and stagnant unification of HCI might denote an issue of the inconsistencies and incoherence of its development – and how such issues take form in its turns, shifts, and waves.

While some have argued for developing a science like disciplinary order in HCI (Reeves, 2015b), there is still the issue of how the dominant status of Western epistemologies that are embedded in the sciences might limit the engagement with emerging narratives across contestable knowledge and professional boundaries (Blackwell, 2015b). Others have argued for an engineering-oriented approach to HCI where the emphasis is on how design activities are to be thrown into design spaces and interaction situations (Rauterberg, 2006). Such issues have also led to a range of opinions and assertions about the inter-disciplinary attributes of HCI, of HCI becoming a scientific community of researchers and practitioners collaborating (Blackwell, 2015a), or of HCI belonging to a scientific programme that relies on the values of objective truth, concrete knowledge, legitimacy, authority, doing good, making impact, and bringing changes (Reeves, 2015a, 2015b). Regardless of such conflicting narratives, the more prominent opinion has been on how HCI can systematically function in questioning other disciplines and traditions (Blackwell, 2015b) – be it on a micro or macro level.

More recently, strong emphasis has been placed on identifying the particularities of HCI across professions and disciplines. This is not necessarily about locating the cohesion of its core themes, but more about how to contextualise the generality and applicability of its practices as applied to or in relation to the knowledge practice of other disciplines (Kaye et al., 2021). What this might suggest is that the vitalities of HCI can be identified in how it acts as a ‘catalyst’ for innovative ways of understanding technological innovation, and not on how it can be adopted as a service provider or ‘utility’ for bridging boundaries or interfaces of other disciplines (Blackwell, 2015b, Reeves, 2015b).

Regardless of such inspirations, one might argue that HCI as a field of inquiry is a bastard child or as an adolescent maturing. Taking such an assertion further might raise the question of which side does African HCI belong to; if a bastard child of Western invention, then how does it get practiced in institutions that have continuously struggled to de-Westernize? If it is an extension of an adolescent maturing, then how does African HCI reconcile the fragmentations and inconsistencies that are inherent in HCI? Answering this end might shift attention to the fundamental questions of why an African HCI is needed in the first place, what purpose does it serve, and how does it advance the African narrative in technoscience? What might happen to African HCI or could be the response of dominant HCI when one of the intellectual traditions of decoloniality - specifically those associated with ‘delinking, detaching, disobedience’ (Mignolo, 2011) - are introduced to the expansion strategies of HCI? Will the awareness that HCI comes about as a result of de-centring attributes of psychology, engineering and design signal a disruption of its turns and waves as an adolescent maturing? Or will seeing HCI for what it is, an intellectual creation of the West that can propagate the ‘Badlands of modernity’ bring about submission to its episteme of ‘domination’ or a ‘disobedience’ to its principles of differentiation? How this might play out in the diversification of HCI is worth exploring, but not the focus of this section.

Instead, the emphasis is that reinventing the future dimension of African HCI identities ought not to be developed on the backdrop of the early traditions of postcoloniality that have reduced the continual struggle for interrogating modernity/coloniality to tropes of institutional identity and geographical location

(Mbembe, 2021). As argued by Mbembe, when the emphasis of the 'post' – as in poststructuralism, postmodernism, and postcolonialism - conceptual frames are about emancipation-in-the-making, one might lose sight of the power dynamics that renders unthinkable other categories of knowing within hegemonic Western knowledge systems. This is not new as the decolonial approach to design research has pointed to how the coloniality of design thinking emanated from the relationship between the things that populate the social world (Tlostanova, 2017); thereby can impose a particular condition of knowledge and might even dictate the correspondence between the present and the future. What is of relevance here is how the emphasise on individual subjectivities in early postcolonial approach to computing has co-opted efforts to delinking from dominant paradigms a project that is internal to Eurocentric thought (Ali, 2016).

Although there has been considered effort for branching out in relation to the contextualisation of 'interaction' to different cultures, the universal qualities attached to technologies might have created a hierarchical social network whereby the expansion strategy of HCI is premiss on domination and subordination. This is developed on the backdrop that the initial emphasis of HCI4D has been on how the reliance on the traditional assumption of HCI and the promises of ICT4D can allow for dealing with the complexities of 'Other' human factors in the design and deployment of innovation (Cheety & Gritter, 2007; Toyama, 2010; Dell & Kumar, 2016). However, the focus has shifted from the narratives of translation and appropriation to how the utilisation of traditional HCI practices within local logistics can allow for defamiliarizing the models informing innovation design (Bell et al., 2005; Abdelnour-Nocera et al., 2013; van Biljon, 2020). Such efforts are meant to highlight how the 'design-reality-gaps' that underpin ICTD research in Africa might resurface in HCI4D 'interventionist approaches' to social scientific research and practices (Heeks, 2002).

The fundamental issue with the interventionist approach to design is that social issues are reduced to objects of social engineering that create a culture of dependencies and disparities. The underlying assumption directing such approaches in HCI4D is that its projection fixates non-Western contexts as problems and Western cultures as solutions, thereby practising within a determinist stance that displaces/ or suspends local sensibilities. Such a way of thinking in HCI4D has become hegemonic as it is now framed in the name of doing 'socially good' research that stereotypes African conditions as dystopia and Western situations as utopia (Pal, 2017b). Equally relevant to understanding the complexities of HCI4D narratives in Africa is that capitalist structures of organisation viewed the entirety of being as a social engineering problem that can be addressed systematically using established values systems and techniques. This is a myth as one can identify with the learnings from the earlier problem-solving approaches that underpin international development to the technique driven narratives that inform interaction design projects in the global south.

For example, AltSchool Initiative, a pet project of Silicon Valley was developed on the grand idea that autonomous and personalised learning can solve the problem of lifelong learning in the developed world. Unfortunately, the project ended as a rebranded business venture (Altitude Learning) that quantifies the supposed digital natives as capital, thus creating another layer of complexities in the effort to make technology nurture intrinsic aspirations (Arora, 2019). What this suggests is that even with the abundance of supporting infrastructure and technology, social transformation in the educational

landscape of the West is brought about through changes demanded and actioned by people - both students, teachers, administrators, technologists, and policy makers. A practical example of a development project that doesn't adopt a problem-solving approach to sustainable development in the global south is the Digital Green initiative in India, Ethiopia, and Ghana. What makes Digital Green's programme stand out is the emphasis on building human capacities through the amplification of existing aspiration and capabilities as a driver for intrinsic growth. Specific factors that might have supported its 'partnership/mentorship' approach to social issues is the avoidance of 'handholding activities' that could lead to the utilisation of packaged interventions (Toyama, 2015 p. 124). What this might suggest is that people's inspiration bring about structural changes not technology; technology is merely a 'means' and not the 'end'. Even with the proliferation of the religion like culture of technology as the liberator of the human mind or as a panacea of social issues, technical solutions often present alternative techniques to organisation that could relieve man of the task to satisfy natural necessities, and as such doesn't necessarily demand making changes to the underlying principles that direct man's being in the program of existence.

More important, one can recognise how the constitution of colonialism - from the Latin word 'Colere' that means to cultivate or to design - is premised on the need to organise non-Western institutions, territories, and structures under imperialistic epistemological orders. The primacy attached to the ideology of 'newness' in globalisation discourses denote how design thinking emanates from the historical legacies of colonialism, imperialism, and capitalism. Therefore, the politics of thinking in the exteriority of Western logics of progression might be considered as disobeying the foundational epistemologies of design. When such revelations are considered in contextualizing the centrality of HCI4D to 'development, design, and context' (van Biljon, 2020) and not to the 'human, technical artefact and context' focus of HCI (Grudin, 2006), one can begin to wonder whether the futuring practices of Euro-American centric HCI would be underpinning the same objectives as that of Western discourses that defutured non-Western institutions and structures. While there is the acknowledgement of how the core theme of HCI4D has engaged with emerging dimensions technology design, there is the fundamental issue of the implications of adopting dominant epistemologies and methodologies in the understanding of other cultures.

With the awareness of the primacy given to 'newness' as a rhetorical object of modernity (Mignolo, 2011), one can identify how the evolution of HCI, from its faces (human, technical artefacts, and context of use: Grudin, 2006), to its big questions (language of study, term of study, and object of study: Beck & Stolterman, 2017), and grand challenges (Stephanidis et al., 2019) adopt a universalised consensus towards its corpus. What is of relevance here is showing how the big questioning of HCI that focuses attention on the specific genre of man-as-human, technological artefact and embodiment of interactivity can engage with the geopolitics of innovation as applied to the context of Africa (Avle & Lindtner, 2016; Avle, 2020; Jack & Avle, 2021). This might lead to the question of whether African HCI researchers and practitioners ought to have critical reflections on what its big questions are or might be - which could be about the historical forces at work in responding to the implications of branching out from 'Here' to 'There' in HCI, of the global HCI community being about the West and other communities such as HCI4D, HCIXB, AsianHCI, AfriCHI, and ArabHCI for the Rest?

Answering such questions would ultimately lead to further complexities in futuring African HCI identities; first, there is the issue of allocating performative power to responsiveness – just as postcolonial studies have responded to the effect of colonialism in different disciplines and as a result develop new ways of speaking for and writing about the conceptual Other. There is also the issue of the blurred dependencies of counter-narratives – just as earlier postcolonial narratives of the Global south have expanded on Western epistemological frames that might have solidified the utilities of Western vocabularies. The performativity of ‘responsiveness’ and ‘dependence’ is particularly important in understanding how asymmetric relations shape the discourses enacted in the ‘contact zone’ between Euro-American thought systems and African knowledge systems.

Furthermore, with the consideration of Africa as a discursive space consisting of a collection of ‘imagined republics’, the constitution of African HCI as a sub-theme of HCI can be considered as emanating through the synthesis of contested constructs that are open to both analysis and regeneration. Due to the complexities of the histories and realities of domination and resistance in such spaces, futuring African HCI identities ought to begin by questioning the global modernity template that depicts scenarios where often the African is presented leaning towards an enlightened identity. Such a way of representation denotes leaping from one’s state of nativism to an urbanized state of despotism, whereas the use of terms like transitioning and catching up continuously places discourses of African innovation under the Western gaze of economic and political scrutiny. Consequently, such a paternalist approach to futuring discursive inventions does not denote the aftermath of colonialism in HCI (Dourish & Mainwaring, 2012; Dourish et al., 2020) but rather presents a new form of post-colonial colonialism (Alemazung, 2010) or super-colonialism (van Stam, 2016) that sets precedence for the agendas of the global techno-future empire.

As recent efforts have shown, the African HCI community has engaged with critical perspectives in different traditions that show how indigenous and situated perspectives can direct the design and deployment of computing systems (Winschiers-Theophilus & Bidwell, 2013; Bidwell & Winschiers-Theophilus, 2015; Awori et al., 2015; Adamu, 2021a; Kotut & McCrickard, 2021). What this might suggest is that the African HCI wider community has grown exponentially (and still growing) on the awareness of the importance of developing discursive sites where localized perspectives can populate the knowledge of techno-science.

In response to the calls for dialogue in such spaces, the AfriCHI and ArabHCI community developed on the intersectionality of challenges and opportunities within the broader framing of HCI (Alabdulqadeer et al., 2017, 2019). Other local forums such as the CHI-SA initiative have developed innovation clusters as a way of creating community-wide awareness of the implications of information and communication technology projects in South Africa (Wesson & Van Greunen, 2003). Such initiatives have led to the identification of how different dimensions of HCI can be clustered with issues such as power relations, cultural aesthetics, community narrative, and knowledge production (Lazem et al., 2021). This led to the expansion of HCI’s practices across the African continent by the creation of local chapters in Egypt, Namibia, Kenya, and South Africa, to the organization of African HCI summer schools and the AfriCHI conference where ‘bridges were built, barriers broken, and inclusiveness and empowerment’ promoted. More importantly, the emphasis on these communities can be traced to the

ontological necessity for developing African design scholarships using situated epistemologies and methodologies (Ambole, 2020).

Even with such recognitions, one might grapple with why HCI is not a well-established field of study in African universities (Lazem & Dray, 2018), and how the practice of African HCI practitioners might not be significantly informed by the praxis of informatics or HCI than that of computer science or system engineering (Lazem, 2021). One can attribute such lack of establishment on how the paradigms of computer science – encompassing themes of rationalism (e.g., mathematics), science (e.g., engineering and design) and technology (e.g., computing, information system, etc.) – might have emphasized the desire for developing a scientific/engineering programs that enforce the authority of rationality, progression, and modernization. It can also be argued that the paradigm shifts in computer science from a theoretical and conceptual focus to more of a practical scientific design space develops on the values of universality that normalize the Western episteme of knowledge production and consumption (Reeves, 2015a). The general assumption has been that the sciences - the ideal hard sciences, the support sciences, and the soft sciences - demand recognition and authority due to their standards and qualities of accumulation, replicability, and generalization (Reeves, 2015b).

In HCI more generally, the qualities of using the material procedures of the sciences are mostly premiss on how it can provide supporting models for examining and producing a formal account of scientific knowledge. When such issues are taken up in understanding some of the rationales of why HCI is considered an ad-hoc area of inquiry in most African universities, one can recognize how disciplines like computer science and computer engineering would be granted scholarly status than areas such as informatics and information system. This is not new as research has shown how even during African HCI winter schools, students prefer the engineering and technical dimension of interaction design to the aspect that explores culture, meaning and values (See. Lazem, 2016; Giglito et al., 2018; Lazem, 2019). This is not surprising as modern society accord high status to engineers, technicians and artist that are deemed worthy of recognition since they often engage in extensive mental activities that require rational (and in some cases non-rational) navigation of variations and probabilities. Scientists on the hand are mostly considered as ethical social agents that can change the world by their tireless pursuit of concrete knowledge for humanity's sake - and as such conferred certain societal privileges by their capabilities, choices, and preference.

Another possible rationale for the limited engagement with HCI in African Universities might be premised on the underlying structures that underpin the globalized commodity paradigm of universities. With recent efforts toward decolonizing universities globally, it is evident that African universities are Westernized institutions or ethno-provincial sites of knowledge production (Ndlovu-Gatsheni, 2015). Arguably, when African HCI is framed as an eclectic program that is loosely attached to epistemologies and methodologies of the global south (Abdelnour-Nocera et al., 2017; Amrute & Murillo, 2020), there might be the possibilities to widen its adoption (and adaptation) to existing dimensions of computer science, software engineering and information system (Abdelnour-Nocera et al., 2017); Or might even expand existing efforts for the development of 'living curriculums' and 'localized forums' (Peter et al., 2016; Lazem & Dray, 2018) where technical skillset, expertise, and knowledge needed to close the gap between theory and practice are deliberated and produced.

2.3.3. Technology Design and Development in HCI4D

The discourse of human-computer interaction from the context of Africa has begun to show how socio-technical principles and practices of design can bring about a better understanding of the use of technology for the betterment of the African condition. This takes the form of investigating how a collection of epistemologies, methodologies, and knowledge practices account for the political and material stake of technology in such settings. However, research in postcolonial HCI has shown how Western perspectives, cultures, and values are systematically perpetuated in HCI's design paradigms (Winschiers-Theophilus & Bidwell, 2013; Bidwell & Winschiers-Theophilus, 2015). Therefore, one of the provocations of the thesis considers the possibilities that reformulating the African narrative of technological innovation might bring to the future of African HCI as an interdisciplinary space of inquiry about technology, society, and knowledge.

The discourse HCI4D has been concerned with how a range of paradigms and cultural lenses can inform the framing, the analysis, and the design of technologies to be used in a range of communities. e.g., postcolonial computing (Irani et al., 2010; Merritt and Bardzell, 2011; Philip et al., 2012; Dourish & Mainwaring, 2012), decolonial computing (Ali, 2016; Bidwell, 2016; Schultz et al., 2018). This has led to the consideration of how framing technological innovation through indigenous perspectives and experiences (Abdelnour-Nocera et al., 2013; Kapuire et al., 2015; Winschiers-Theophilus et al., 2010) can bring about developing concepts and methods for understanding and designing communities. This thus led to the consideration of how a range of design approaches such as transnational design (Shklovski et al., 2010, 2014; Williams et al., 2014), pluriversal design (Escobar, 2018), de-patriarchal design (Calderon and Huybrechts, 2020), itinerative design (Pearson et al., 2019), transition design (Irwin, 2015; Escobar, 2018), and autonomous design (Escobar, 2018) can direct the staging of community design projects. What is relatively missing in the literature concerns how such approaches could extend the utilities of postcolonial and decolonial praxis of design.

A closer examination into the theories informing the sensitivities directing design project might have limited the interrogation of dominant traditions in the geopolitics of knowledge production. Some have argued that framing of postcolonial theories, which draws extensively on poststructuralist ideas of Michel Foucault and the orientalist narrative of Edward Said lack's universal outlook (San Juan, 1998; Varisco, 2017), silence local voices and delimit constructive dialogue (Spivak and Harasym, 2014), obscures other realities (Haraway, 1988), and become silent on the complex issues of race and gender (Mingolo, 2002). The decolonial theories, although optional, might similarly be considered under-theorised (Tlostanova and Mignolo, 2009), heavily grounded in the geo-body politics of knowledge and the decolonial tradition (Mignolo and Walsh, 2018) and might thus limit intersectional analysis of design work through its praxis and tactics (Tlostanova, 2017). In between the more prominent theories informing the HCI4D discourse in Africa, one can notice the lack of shared concepts of understanding (or even noticing) the densities of African culture of socialities (which are plural and often considered through the triple heritage).

In a way, the African postcolonial narrative is outdated and lacking critical-progressive interpretations. Even the decolonial aspiration can be considered as drifting towards actualisation of the unfaithful stories of the past. Besides, some have emphasised how the appropriation of technology in

indigenous communities (within and beyond Africa) can exert epistemic and methodological catastrophes against indigenous thoughts and knowledge (Kwet, 2019; Young, 2019), or reinvent coloniality through technological domination (Shanahan, 2015). This is not an understatement of the progressive innovations from Africa, but one that questions the global technological imagination that depicts a narrative where often the African is presented as leaning towards a cosmopolitan identity, and the African perspective in relation to and within Western parameters of identification. Such a way of representation denotes leaping from one's state of nativism to an urbanized state of despotism. The use of terms like 'transiting' and 'catching up' continuously negates Africa of any useful knowledge, thus continuously placing African science, innovation, and technologies under the preview of Western gaze.

From a critical view of how African perspective of innovation are presented in techno-scientific, one can deduce that what was termed as postcolonial does not denote an aftermath of colonialism (Dourish & Mainwaring, 2012; Dourish et al., 2020) but rather present a new form of neo-colonial or super-colonialism (van Stam, 2016, 2017). In essence, the thesis attempts to show how postcolonial approaches to HCI4D have contributed to the asymmetric relations of dominant cultures in transnational spaces (Irani et al., 2010). The critique identifies with the critical perspective of computing beyond development (Taylor, 2011; Dell and Kumar, 2016; Kumar and Dell, 2018; van Biljon, 2018) through to recent ontological (Escobar, 2018) and intersectional perspectives of design (Schlesinger et al., 2017; Erete et al., 2018; Kumar and Narusala, 2019; Ranki, 2020). Arguably, the critique of the postcolonial commandment would show subtle shortcomings in the primary argument concerning the needed shift in HCI4D paradigms from developmental studies to a collective of postcolonial and science and technology studies (STS).

Through the utility of Orientalist and Africanist narratives, some sections of the thesis point to important shortcomings in the assumptions of the postcolonial orientation, which might have portrayed its tactics as a mirage of '-splines' that exemplifies how the 'Other' is to be approached and presented in computing – largely under the umbrella of 4D spaces, e.g., ICT4D and HCI4D. These ideas necessitate a critical outlook towards how the tactical postcolonial orientation might be 'underpinning and meeting the same objective' (Alemazung, 2010) that has brought about the radical misunderstanding and misrepresentation of indigenous practices of innovating Africa.

2.4. Closing Remark

In this section, I have examined a range of themes that point to the complexities of decoding how dominant relations direct the practice of educational technology design and development. From each sub-section, the thesis has identified gaps in the literature that when considered as a totality might explicate how power-knowledge operate in the translation of cultural attributes for the design of technologies that embody and extend them. With an emphasis on developing candidate approaches for understanding and designing for emerging educational conditions, the literature review has examined how a range of philosophical, theoretical, and methodological issues could lead to the development of a community of practices appropriate to the Nigerian context (Wenger, 1999). The next chapter examines the methodological approach adopted and how it has assisted in developing a paradoxical account of members perspective on technology design, adoption, and use.

Chapter 3:

A Cross-disciplinary Investigation

3.1. Introduction

The research reported in this thesis aims to decode the practices of a range of stakeholders involved the design, deployment, and usage of educational technologies to support and extend diverse pedagogical practices. In essence, it seeks to question the underlying assumptions shaping the consideration of technology as a socio-developmental apparatus in Africa, and the global proliferation of technology mediated education as the new form of life-long learning. The research adopts an eclectic methodological approach as an orientation for decoding the postcolony of technology design in HCI4D. This is developed on the premiss that all research paradigms are embedded within a particular epistemological frame, and as such might not accommodate the temporalities of the social spaces that have continuously sought to decolonise.

Conventionally, researchers conduct research to provide a multidimensional view of a phenomenon under investigation. Such views are expressed through individual and collective reporting of the views of others or the researchers. Before expressing such views, researchers move towards presenting results that are valid, credible, and objective/subjective. Such results come from the consideration of how theoretical perspectives, methodological approaches, and rich and unbiased data collected and analysed can advance the understanding of a phenomenon. As studies have shown how each design perspective have their advantage and disadvantage (Thurmond, 2001), this thereby necessitate a triangulation of strategies (Denzin, 2012). Taking such issues into account, in the preceding section of this chapter, I provide a relatively thick description of the methods adopted and how the research was staged and carried out (Geertz, 1973). This is achieved by providing a detailed account of the literature behind the approaches employed, outlining the assumptions that have shaped the staging of the research, and reflect on the experiences of the fieldwork that inform the research. I also accounted for approaches adopted for the interpretation and validation of data, and how I attempted to clear some methodological doubts in the initial staging of the issues under investigation.

3.2. An Eclectic Methodological Approach

The initial framing of the field of HCI can be considered eclectic as it draws from a range of established fields in studying, designing, and evaluating interactive systems. Paul Dourish among others have suggested that the field of HCI and interaction design ought to be associated with an eclectic approach to methodology – i.e., mixing, and matching different orienting lenses in framing research questions, identifying participants, collecting empirical data, and the interpretation of results (Dourish, 2007). The eclectic methodological approach adopted in this thesis requires considering how qualitative and quantitative methods can lead to an approximate understanding of practices in digital education, and on how to design eLearning systems that integrate diverse pedagogical requirements. This led to the consideration of whether Western techniques of understanding culture are suitable for investigating

non-Western conditions of experiencing Western modernity, and whether there is the need to consider other candidate approaches that embodies indigenous values?

The empirical data informing the argument presented in this thesis were collected using focus group discussions, an interview, talking circles, and a conversational approach to rapid observation. These methods were selected based on the requirement for using culturally relevant method, and not just for their abstract potential for providing a rich reporting of diverse perspectives. The methods were also selected because they have been deemed appropriate to the anticipated attributes of the sample, and on their flexibility to the context of the research. There was also the consideration of the underlying assumption that might have informed the selection of methods, and in this case, it is the decolonisation of doing research in HCI4D. This is because, as Smith (2013) argues, decolonizing research is not merely about problematising the "technique for selection of methods" for understanding culture, but more about how interrogating the values informing research projects can unsettle knowledge production practices. Below I provided an overview of the different methods adopted.

3.2.1. Research Design

The research reported here considers the triangulation of different methods for analysis and presentation. Triangulation implies using a range of methods to come to a more comprehensive and in-depth understanding of a phenomenon. It allows for the collection of different and rich data types, increases validity and confidence in empirical evidence, and leads to a broader understanding of phenomena (Thurmond, 2001; Speziale et al., 2011). The study was divided into four stages: literature search, planning and undertaking two fieldworks, analysing of empirical data and the writeup and discrimination of findings¹³. This section focuses on the second and third stage.

Sampling and Sample Selection Procedure

The description of participants and the method of selecting a sample is key in minimizing bias and in demonstrating the integrative aspect of the research. There is also the consideration that the appropriateness and adequacy of the sample will determine the validity of a research study, and the claims one can make to the broader population. The sample consisted of experienced stakeholders from an accessible population in three Nigerian universities and three software development firms¹⁴. The research employed a purposive sampling procedure guided by the assumption that the selected participants would assist in answering the research questions. During the follow-up fieldwork, I attempted to engage the same participants involved in the initial study. The table below details the sample selected for the initial data collection and the data log.

¹³ The generic purpose of the fieldworks that inform the argument in this thesis is to collect data or evidence that would bring about developing an adequate understanding of the landscape of designing, deploying, and using educational technologies in the context of Nigeria

¹⁴ Here, experienced stakeholders denote service providers that have engaged in designing and deploying eTechnology service to higher education institutions in the past five years; education practitioners that have deployed digital education as part of their pedagogical practices in the last five years, lecturers that have designed courses using the blended approach for the past academic year; and students that have engaged in any form of blended learning.

Institution	Students (Focus group/ethnographic observation)	Tutors (Interview/ethnographic observation)	Administrators (Interview)	Experienced Researchers (Interview)
University A	- 18 students in three focus group discussion (Computing L2/L3, GST)/ 2 students	- 5 lecturers/ 2 lecturers	1 - Director ICT	Nil
University B	-11 students in two focus group discussion (Computing, Library Science)/ 2 students	- 4 lecturers/ 2 lecturers	2 – Director Distance Learning Institute; Head of Quality Control	5 - Computer Science (2), Science Education (2), Distance Learning (1)
University C	-2 student discarded focus group discussion/ Nil	- 5 lecturers	2- Head Media; Head Counselling and Learner Support	2- Computing (2)
Summary	29 students in 5 group discussion/4 students for observation	14 lecturers/4 lecturers for observation	5 administrators	7 experienced researchers

eTECH	Personnel (interview/Observation)	Position
Company C1	4/ 6	Chief Technical Officer, eLearning Lead, Designer, Engineering Lead/Designers, Developers(2), eLearning Lead, Associate Product Manager, Project Manager
Company C2	2	Engineering Lead and the eLearning and marketing lead
Company C3	1	Business development manager

Tables 1: Sample selection and data collection log

Research Instrument

The instrument for the research was developed by the researcher and passed through the Faculty of Science and Technology Research Ethics Committee at Lancaster University- Ref FST17133. Ethical consent was obtained from the management of the institution and companies identified (a kind of community consent), and from the participants of the studies (individually for interviews and collectively for focus group discussions). The instrument consisted of 10 multiple-choice questions for the questionnaire and some open-ended questions for interviews and focus groups. As a means of critical reflection, I engaged the experience of researchers in computing and education research (Dell and Kumar (2016)) for suggestions and consequently drafted an instrument consisting of nine questions as a guide for discussion. The questions from the interview and group discussion include their views, perspectives, and practices of developing/using education technologies. For students, the information collected provides insights into their engagement and experience of using eLearning systems as compared to traditional methods, whereas for lecturers the emphasis was on their ideas and pinons of the blended approach, and how they go about integrating eLearning within specific pedagogical practices. Educational managers gave their perspective on the motive, assumption, and expectation of adopting a blended approach to digital education. Designers and developers reporting of the practice that inform their work of designing and producing usable and sealable education technologies for the Nigerian context.

3.2.2. Methods

Interviews

An interview is widely considered as a patterned and purposive dialogue that involves a two-way exchange mostly to understand the interviewee's views of a phenomenon. Before conducting an interview, ideas are brainstormed, questions developed and categorized, a guide and schedule outlined, and the instrument of collecting the data specified (Wellington, 2015). Regardless, an interview has its limitations in that some educational researchers believe that the interview does not necessarily "provide the participants perspective and understanding" but of an 'account' of a participant's perspective of a particular concept with relation to a situation (Beach et al. 2018 p. 27). Others have pointed out that an "interview is strange in that it suspends the socially accepted rules of conversation and reciprocity between people" (Walford, 2018 p. 22). Even with such limitation, an interview was considered as it can allow the gathering of information that can be used to develop meaning from participants' prior experiences. The interviews were conducted with lecturers, educational managers, experienced researchers, and software designers/developers.

Focus Group Discussions

A focus group is an approach to collecting data from a group of five to ten people that are perceived to have some relevance to the discussion of a topic (Wellington, 2015). Group discussion does not imply interviewing a group but involves an interactive engagement to provide deeper insight into a phenomenon. The discussion with students was conducted in a convenient setting where the researcher acted as the facilitator. However, a conventional focus group can prove disadvantageous as a few assertive or dominant individuals can dominate the discussion. The consideration of 'talking circles' during the follow-up fieldwork was intended to minimise such occurrences.

Ethnographic Observation

Ethnography is widely considered as a sensitivity that is rooted in Western anthropology, concerning itself with understanding and reporting the psychology of the 'Other', societal structures and cultural practices. Some have argued that ethnography is not a methodology as it doesn't provide a clear means of how to do it (Sharrock and Randall, 2004), but should be considered as a 'sensitivity' a "tool that can be used to unpack members mastery of practical sociology in empirical details" (Crabtree et al., 2012 p. 2). Ethnographic observation involves participating 'overtly or covertly' in a setting; listening, watching, and asking questions through informal naturalistic conversation, and collecting any relevant information that might bring about a better understanding of the participant's activity (Hammersley and Atkinson, 2007). This has led to a range of studies that place diverse experiences under the 'Western gaze' and in relation to Western experiences. As Owusu points out about Western ethnographies in Africa:

"in the course of this recent "rethinking," "reinventing," "new left or radical critique" of anthropology, serious questions have also been raised about the validity and the practical and theoretical relevance or usefulness of microscopic ethnographic studies, i.e., about traditional ethnographic fieldwork. Critics point to the inherent deficiencies of structural-functional empiricism, with its assumptions of cultural homogeneity, the "tribal" isolate, and tendencies toward equilibrium of the social order; a-, anti-, or nonhistorical biases; normative focus; data-theory tautologies; and, above all, Eurocentric or racist perspectives that have failed to provide a genuine and total critique of colonial society" (Owusu, 1988 p. 311).

In the context of educational research, some have suggested that the consideration of ethnography in digital education is partly "driven by the desire to break away from generating data in atypical-researcher-constructed situations" to developing a particular understanding of the context occupied by the subject of education (Walford, 2018 p. 26). Equally important is that in the field of HCI, ethnography is widely considered as a systematic method that can provide and utilise meaningful insights about the social world in system design, evaluation, and deployment practices. However, the

use of ethnography in design and HCI more generally has led to a range of debates about how 'turning to the social' (or considering a social methodology for design) can give rise to a range of socio-cultural and technological implications for design (Crabtree et al., 2009). Such misunderstandings, across different disciplinary traditions, have brought about the need for a 'new approach to ethnography in design, or in doing sociological work for design. This has furnished efforts for deconstructing (and decolonising) ethnography.

Another essential point is that design ethnographies are different to the traditional ethnographic approach in social science. The difference is that traditional ethnography is about "immensely ordinary activities requiring ordinary mundane skills" (Randall and Rouncefield, 2018) while design as a field seeks to intervene to make things better (Brereton et al., 2014). Arguably, ethnographic studies can point to what might work or what might not work in design projects. Consequently, due to the interventionist nature of design, an evolving approach to understanding users practice termed 'rapid ethnography' was developed (Hughes et al., 1994; Millen, 2000). Rapid ethnography, as the name implies, aims to provide a time-constrained understanding of the user's situated processes and activities. The limited time comes at a cost, in that the insight gained might not 'inform sustainable design' (Brereton et al., 2014) or bring about demarcated 'implications for design' (Dourish, 2006). However, some have argued that although it might be quick and dirty, it provides an abstract but informed account of a cultural setting (Hughes et al., 1994). As Dourish (2007) rightly points out, the contribution of ethnography to technology design ought not to be gauged solely on its widely misunderstood notion of 'implications for design' but rather on an 'empirically informed contribution' to design practices.

The quick and dirty approach might not, initially, provide the insight that could eventually inform design practices, rather the motive was the understanding obtained through experiencing life as it is in the environment of the participants, that one could understand their ways of doing. It is through the interpretation of situated activities/processes that one can come to inform/inspire design recommendations and practice.

3.2.3. Ideals for Candidate Indigenous Approaches

In postcolonial literature, there's a recognition that the more politically revolutionary project in/from Africa is about indigenous knowledge and the endogenizing of research practices (Hountondji, 1997; Mwambari, 2019a). Some have posed whether it is moral and ethical to study Africa with colonial instrument and tactics? (Mama, 2007). Or whether there is a link between an Africa-ness identity, indigenous research ethics and the geopolitics of knowledge? (Anyidoho, 2004; Krenceyová, 2014; Melber, 2014). Such questions pose onto-epistemic challenges to the ethical framing of research in Africa, but also provide opportunities where an alternative form of studying and writing cultures can be examined. What this might suggest is that the decolonisation of categories of knowledge is not

straightforward or one-off, but an ongoing power relation that is determined by and through the practice of research.

In striving towards conceptualizing local experiences in research, indigenous perspectives have demonstrated how situated knowledge is articulated and advanced. Scholars like Linda Smith (2013), Shawn Wilson (2008), Margaret Kovach (2010), and Bagele Chilisa (2019) have written extensively for, on, and about indigenous research methodology. Such methodologies are informed by indigenous worldviews and knowledge practices (Wilson, 2008); or consciously driven from customary values, norms, and aesthetics. Example of such methodologies includes the Maori research methodology, the Afrocentric methodologies, and medicine wheel methodology (Asante, 1991; Reviere, 2001; Bagele, 2019). Others have advocated for an indigenous methodology that could develop indigenous theorist and practitioners – what is referred to as ‘indigenist research’ (Rigney, 1999 p. 178). This form of inquiry moves beyond the conventional Eurocentric criterion of objectivity, reliability, and validity and allows societal values and norms to be more visible in knowledge production practices (Pallerin, 2012). Below are candidate methods that can be characterized as forming part of the toolkit necessary for unpacking members’ mastery of practical sociology in empirical detail. These approaches, although considered at the periphery of the social sciences, are considered as they support attending to the complexities of the Nigerian context. There might not be much difference in their framing to other (and corresponding) alternatives, it is their application in the context of the research that positions them as candidates to the practice of postcolonial and indigenous research.

Talking Circles

A talking circle is an indigenous approach to conducting focus group discussions where the dialogue is regarded as a form of giving a voice to all participants. This form of “reciprocal learning and sharing of ideas, views, and experiences” (Chillisa, 2012 p. 106) of participants allows participants to have an equal chance to speak and be heard without being judged or interrupted in the process. It mostly takes the form of having four rounds with as many as twelve people (Wilson, 2008; Chillisa, 2019). Talking circle are evident in African culture and root back to ideas of people forming circles around the fireplace to listen to stories or sing or sharing/having dinners. The approach was adopted for the summative evaluation of interpretative themes developed during the initial fieldwork.

Conversational Approach to Rapid Ethnographies

Within the framing of indigenous research methodologies, Gonzales (2000), for example, has demonstrated how the framing of ethnography through the four cyclical seasons of the year can represent the ontological structures of native Indian cultures in the Americas. Such an approach departs from the framing of Western ethnographies, specifically in how it relies on the seasons of the year in settling into the setting, collecting data, organizing data for analysis and interpretation, and the

write-up and dissemination of findings. Another example is that of using methods that can bring about an adequate representation of members setting, especially the use of conversational interviews and stimulated recall method in the ethnographic study of language policies and practices in the Gambia (McGlynn, 2013). The conversational approach is developed on the premise that storytelling tradition is part and parcel of the process of producing indigenous knowledge (Kovach, 2010b; McGlynn, 2013). Such an approach is quite different from the use of interviews in ethnographic research, considering how 'relational, collaborative, dialogic, and reflexive' it is compared to linear mode of inquiries (Kovach, 2010b).

During the follow-up fieldwork, I carried out a rapid ethnographic study using the conversational approach outlined above. I wanted to 'see' and 'understand' what the participants 'specifically/explicitly' meant when they expressed ideas during the initial study. The rationale for going into the working environment of our participants was that a more insightful understanding of the situated circumstances and occurrences could be examined, the practical work of different actors in producing a deployable EduTech could be analysed, and the activities/processes that the adopted tool could support in three universities. The rapid ethnography was carried out in one of the software developments firms (C1)¹⁵ and in two of the universities (a public and a private). I recognised that such choices might raise issues concerning arguments about the generalisation of perspectives (Crabtree et al., 2013), and also on the implications of using ethnography in design project work (Ronkko, et al., 2002; Passos et al., 2012). It is argued that focusing on specific settings (and not all settings) could support the requirement of providing an adequate understanding of the Nigerian context as it relates to blended education and software project work. The kind of generalizability we seek here might suggest that most of the pedagogical and development practices to be uncovered in the choosing settings will apply to most if not all higher institutions and software firms in Nigeria. I audio recorded our conversations, took field notes and photographs, and kept a field journal.

¹⁵ I choose C1 mainly because of the understanding of their processes, the temporal nature of their agility, the presumed adherence to the best practice in their work, and the level of rapport developed during and after the initial fieldwork. While in the field for a week, I casually engaged in observations of work processes, make conversations here and there, took notes and pictures where necessary, and discuss organisational documents (e.g., the OKR). I attended daily stand-ups (2), a sprint meeting (1) and the weekly mock-up (1), document and took note of how work was organised and negotiated using a range of techniques, strategies, and technologies. I engaged six participants in the company consisting of developers, designers, a product manager, and a project manager. Organisationally, company C1 has been offering products and services to the Nigerian educational sectors for more than 10 years. Their products have been adopted by about 300 schools and 16 tertiary institutes. The company has about 50+ staff in Abuja. The team suggested having 15 members as part of the engineering department (5 out of this number work remotely), 5 for the eLearning team, about 25+ for customer relation and management team, and about 5 management team members. Some of the team members in the engineering department are part of the design or development team, i.e., some notion of a cross-functional team. Within the engineering team, I engaged participants that were working on a particular project – referred to as 'Project C', while also examined some of the processes of the eLearning project team – referred to as 'Project E'. The sample selection was snowballed.

3.2.4. Reflection on Methodological Issues

Given the ontological and epistemological differences between Western and non-Western traditions, research has continuously emphasised the material implications of investigating and understanding other cultures using stereotypical (Western) approaches. At the intersection of the crisis of identity, epistemic positionality, and cultural adequacy, in this sub-section, I reflect on the implications of the practices of fieldwork that informs the arguments presented in this thesis. This is developed on the premise that there has been limited if any, discussion about the praxiological, epistemological, methodological implications/consequences of the approaches adopted in investigating African realities and concerns.

This is not simply a critique of how mainstream approaches of framing research problems and their analysis in real-world settings get carried out, but one that seeks to examine how a range of conflicting and relational themes determine (and might even undermine) indigenous practices of knowledge in Africa. The themes relate to the issues of the crisis of Africa(n) identity, and the possibilities of re-searching/re-assessment its complex performativity in interdisciplinary disciplines like HCI (Hill et al., 2010; Kannabiran et al., 2012; Melber, 2014; Warrick et al., 2016; Eze, 2016; Schlesinger et al., 2017). Other themes include the theoretical and methodological positionalities of co-researchers (Merriam, 2009; Ganga and Scott, 2006; Giwa, 2015; Kapuire et al., 2015; Mwambari, 2019a), and the adequacy and vulgar competence of researcher's socio-ecological strand¹⁶ in the practice of knowledge production (Ganfinkel, 2002; Randall et al., 2007). How these issues are contextualized in the thinking and doing of design fieldwork in African HCI are rarely addressed.

In a nutshell, the issues discussed are considered on the premiss that research in the literature has shown the complexities of national identity and epistemic positionality (Orila and Haggerty, 2012; Giwa, 2015), precariously expressing and producing belongingness and otherness in one own broader community (Ergun and Erdemir, 2010; Yakushko et al., 2011). What is limited in the African HCI literature is an understanding of how issues of unique adequacy (of participants to the larger community and their methods to indigenous one's), vulgar competencies of Westerners or 'home comers' entering the field and 'homeworker' exiting and reporting inform the practices of interdisciplinary fieldwork in Africa. The question is of how identity politics could lay bare the ethical implications of homogenizing and differentiating taxonomic criteria for the study of Africa. This subsection, therefore, attempts to consider how such issues affect the practices of knowledge production and the knowledge produced – as a precursor, perhaps, for the decolonization of mainstream knowledge in Africa (Anyiholo, 2008; Mwambari, 2019a).

¹⁶ These relations determine to some extent the initial adequacy and competence of co-researchers in the field – either as an insider, in-between, or an outsider (Yakushko et al., 2011; Orila and Haggerty, 2012; Giwa, 2015; Kapuire et al., 2015). Note that these positionality attributes are neither adequacy eligibility checklist nor political apparatus for privileging and essentialising certain perspectives over other's but regarded as indicators that bring forth a range of underlying issues in processes and practices of research (emphasis added).

Crisis of African Identity

“The identity politics model of recognition tends also to reify identity. Stressing the need to elaborate and display an authentic, self-affirming and self-generated collective identity, it [identity politics] puts moral pressure on individual members to conform to given group culture. Cultural dissidence and experimentation are accordingly discouraged when they are not simply equated with disloyalty. So, too, is cultural criticism, including efforts to explore intragroup divisions, such as those of gender, sexuality, and class. Thus, far from welcoming scrutiny of, for example, the patriarchal strands within a subordinated culture, the identity model tends to brand such critique as ‘inauthentic’. The overall effect is to impose a single, drastically simplified group identity that denies the complexity of people’s lives, the multiplicity of their identifications and the cross-pulls of their various affiliations. Ironically, then, the identity model serves as a vehicle for misrecognition: in reifying group identity, it ends by obscuring the politics of cultural identification, the struggles within the groups of authority – and the power – to represent it. By shielding such struggles from view, the approach masks the power of dominant fractions and reinforces intragroup domination. The identity model thus lends itself all too easily to repressive forms of communitarianism, promoting conformism, intolerance and patriarchy” (Fraser, 2000 p.112)

I am a Nigerian, a Northern Muslim by geopolitical association. The North is diverse, deeply multicultural, multireligious, and multilingual. Like any multi-ethnic society, and specifically, one that was amalgamated by colonial assumptions and forces, there is an ethical dimension to one’s mode of self-identification and the meanings of self-identity (Wright, 2002). The politics of identity suggests how power constitutes and reproduces the construct, identifiers, and meanings of identity in knowledge production. Being aware of my Northern associations, my PhD advisor wondered about the methodological implications of situating the research within the framing of my supposed adequacy as a Northerner, in terms of the affordance of cultural affiliation to issues of accessibility, rapport and limitation of resources. Focusing on the Northern part of Nigeria might suggest that the ‘Northern’ identifier takes precedence over nation bound identities as a Nigeria, or African more broadly¹⁷. It becomes inevitable that one can either be considered as either an ‘insider/outsider within’, or across/along boundaries of othered relations. This is not asserting belonging nor making a strong sense of otherness but pointing to how being a Western-trained home comer researcher might place one across and along conflicting boundaries in one’s community. The complexities of such an assertion

¹⁷ In Nigeria, persons are first considered as belonging to a geographical region – what is often referred to as national character – than an entity of the republic. If I am to apply for a job, I will be considered in relation to my association with a particular region or state than a candidate of the republic.

have been reported by other homeworkers/home comers in Nigeria (Oriola and Haggerty, 2012; Giwa, 2015).

So where does this leave us with the conception of an African identity and crisis of belonging and otherness? I approach such a question by reflecting on historical structures that inform my knowing of identity politics. The accounts provided to address these questions are not value free, they are ultimately selective and can be considered as bracketed by the imaginaries of recollection and the locale of reporting. The relational aspect between belonging and otherness in identity politics would be either maternal (growing up in an extended family), socio-cultural (in term of the dominance or the subordination of one's culture, gender, language, and so on), and material (in term of one's level of education, family status, political affiliation and so on). My engagement in the North might offer political 'insider within' resources that can either privilege or disadvantage my identities. In the South as well, my 'within-ness' (either as an insider or outsider) could provide some 'upper hand' resources that either elevate or lessen my subjectivities within one nation bound community.

To my suprise, in most of my field study, I had an easier time while in the Southern part of Nigeria (in Lagos). Before approaching the field, I felt I had developed the necessary competence (knowing someone to refer me to a person of authority, knowing how to get an ethical approach on time, and knowing how to leverage on the 'know-hows' to approaching and recruiting participants). The driver that was sent to pick me from the Airport by my accommodation in Lagos happened to be a distance learner in the selected University. In Lagos heavy traffic, Mr Jamiu inquired about my work and what I sort to achieve during my stay in Lagos. Leveraging on his competence of the nitty-gritty of attending to 'know' the where and the how of the University, approval was granted the next day, and participant recruitment and data collection started immediately.

In developing the needed competence of recruiting participants (I became more aware of how my 'insider/outsider within' position might be of disadvantage. It is commonly known that there is a deeply rooted historic and political hostility between Northerners (under the politically homogenised Hausa-Fulani, and Southerners (the Yoruba's and the Igbos in the South). Although we have co-existed and co-habited, I was sceptical of how my outsider-ness (I do not speak the local Yoruba language, I dress differently and other subtle distinctions), and how different levels of competence might play out as I began to engage and interact with co-researchers. The issue generally was in how some of the identifier constructs can trigger the blanketed tribalism that existed in member's setting, be it in the North or the South.

In the North that I identify with, being a PhD student in one of the best Universities in the United Kingdom might signify an advantageous standpoint. The underlying and common assumption would be that I am the son of a member of the elite class, resourceful and privileged, getting the needed education to maintain and continue the family lineage of elitism. Or rather being seen as an exemplar of what the Nigerian political landscape portrays – train them to memorise their pledge to the powerful

or charge them to stand up in the face of intimidation and manipulation for/from the powerful. The negative consequence of such an assumption might be that I could be placed within the exterior of a belonging interior, portraying a sense of otherness within one's associative community. Such a stereotype might be a disadvantage regardless of one's adequacy or competence in the field. However, the understanding is that the position of my identity is shifting, not pre-determined, but a construct that evolves as one dwells across existing boundaries.

This leads back to the question of whether the performativity of African-ness identity could bring about the development of relational frames for the study of African communities. One way to examine the relational aspect between belonging and otherness in identity politics would be historical and socio-cultural. Being placed and displaced within multiple framings of identities, I thought about reflecting on my ancestral identity heritage as a way of explicating the temporalities of identity politics in the experimental and reflexive mode of cultural identification. This is particularly important as would provide some clarity on how a multicultural recognition of the meaning of nation bound identities cross-pulls affiliations that conform to (or divert from) oversimplified politics of group identities.

Through oral histories, I became aware that my ancestors were from the Northeast part of Africa in the ancient Nubian kingdom of Kush – now the Northern part of Sudan. My people were Islamic scholars who travelled across the Western part of Africa in search of Islamic knowledge and commercial opportunities. The Sudanese (implying 'the black one's) are widely considered as the people that brought about a full description of 'blackness' in sub-Saharan Africa through their interactivity with the Arabs and the peoples of the Songhai/Mali empires (spanning from present-day Nigeria to Mali). Mazrui argues that the Arab's 'Sudanization' (make black explicitly) and European's 'alterity' (make inferior implicitly) of most sub-Saharan Africa made the 'black consciousness' integral to the constitution of one's identity (2005). In a way, the 'Sudanized' identity brought about a deeper coherence between Islam and Blackness, which I am a product of. It appears that our people heard of the Jihad of Shaikh Usman ibn Fodio, (the founder of the Sokoto caliphate in the Northern part of Nigeria) and travelled to seek knowledge and offer their support for his Islamic Jihad. After Fodio's victorious wars in reforming northern Nigeria, our people decided to go back home (Sudan) but stopped around the ancient city of Kano to pay homage to their fellow countrymen/women that reside in the district of 'Sudawa' (meaning the community of the Sudanese).

During the colonial regime, railway tracks reached the ancient city of Nguru. Nguru is predominantly dominated by the Kanuri-Manga ethnic tribes. The natives consider the Hausa/Fulani to be expatriates, mostly drawn by commerce, whereas the native Hausa in Kano considered the Fulani's and Sudanese alike as mere herdsmen and passers-by. Therefore, people coming from Kano to Nguru are largely considered 'outsiders' and vice versa. In my maternal grandfather's merchantly and educational expedition in the late 1930s, he travelled back and forth from Nguru-Kano and finally settled at Hausari ward (meaning the community of the Hausa's). He continued his scholarly

expedition, leading to the establishment of the first all-female higher Islamic college in Nguru, while venturing into different business enterprise. I was born there, and it became 'Home'.

The historical narrative is important as it shows the multi-cultural affiliation of my hyphenated identity as an African subject of interactivity. The historical account was not provided as to de-conform to specific group identities but considered as it might show how the performance of different identity constructs provide resources that can either elevate or devalue the relationship that ought to bond co-researchers in the practice of knowledge (Eze, 2014). Failure to adequately articulate how identity is culturally-socially constructed and reproduced as we relate with others might lead to fatal error in the production of relational and situated knowledge. This matter to how we stage and analyse a range of perspectives as it brings attention to the possibilities of developing alternative ways of being with/for others in one's presentation and representation of perspective in community-led research.

Epistemic Positionality and Cultural Adequacy

Interdisciplinarity and positionality are two inseparable issues that can affect the practice of investigating and understanding the multiplicity of the social world. In anthropological traditions, positionality is linked to where actor's stand within the social world they occupy. This can be either a professional or personal role, which emphasises how a set of normative attributes and relations play out in the process/activities of understanding (or misunderstanding) other people (their socialities, traditions, cultures, values, language and so on). However, Winch (1997) points our attention to the (im)possibilities of understanding ourselves and others. This is in relation to the conception (or misconception) of our self-understanding through one's imaginaries, mental model, and language rules of knowing how to know and act in a particular context. Action is shaped by context and makes meaning within the context of its production and reproduction. Winches analysis might seem like an oversimplification of the concept of 'understanding' but an important issue that could show the difficulties in understanding 'other minds and the potential error in professing an understanding of 'other cultures' through one's positions and relations in the social world.

Ultimately, such issues have led to the consideration of how reflexive thinking and documenting about one's epistemic positionality (and possible biases) might provide political resources to adequately account for the relationships that take places as one enters and exit a social setting. This consideration of positionality draws on earlier debates on 'reflexivity in social research (see. May 2000; Slack, 2000) as well as current considerations of 'intersectionality' in HCI (see. Warrick et al., 2016; Schlesinger et al., 2017; Wisniewski et al., 2018). These themes have shown how identity and positionality (either theoretical, professional, or personal) affect the practice of understanding people culture for the purpose of design.

How then does my epistemic positionality, either by the association to disciplinary identifiers or personal construct, shape and impact the multi-cultural and cross-disciplinary fieldwork undertaken?

How does the in-betweenness positionality as a Nigerian impact the fieldwork? Does being reflexive and relational (in thinking and writing) makes the underlying power relation in research more visible? How would my positionality and that of the people that I interacted with be translated and contextualise in reporting? How would one's methodological positionality play out in the analysis of 'unique adequacy requirements and the development of 'vulgar competences? (Garfinkel, 2002). These are important questions that could bring attention to how identity and positionality shape the geopolitics of knowledge in transnational space. It could also highlight attributes that would make clearer the implication of problematising identity, positionality, and adequacy in postcolonial methodologies, primarily because what stands as 'postcolonial' is not post- in any strong sense, but the next neo-colonial practices, which needed to be interrogated and decolonised.

Reflecting on my experience in the field, it appears to me that the hyphenation of an Africa-ness identity might suggest how different nodes connect/interact in the network of situated identity constitution. It appears that non-indigenous peoples are starting to engage with the complexities of their identity in postcolonial engagement (Bidwell, 2016), presuming that it could make clear the changing mobilities of cultural identification. the continual performativity of identity constructs those alternative spaces for re(assessing) one's held identities can be interrogated and regenerated.

Practical Ethics

Ethics in social research is a moral issue that concerns how a comprehensive set of standard values govern the conduct of an individual in relation to others. This has led to the problematisation of how Western thought style, doctrines, values, and specific ethics apply to non-western context - or a question of the implication of 'ethical imperialism' to the practice of research in Africa (Israel, 2017). Under the canon of ethical imperialism, the primacy of the individual takes precedence in its theoretical formation over the inter-relationship between persons. This might thus suggest how (ir)relevant and (in)practical Western ethical practices might be in investigating and reporting other cultures.

In educational research, ethics is widely considered as an imaginative, participatory, and practical process that is guided by the principle of relationality (Dennis, 2018). In HCI, Howard and Irani (2019) have shown a different dimension of the politics of ethics when research subjects care about how their labour is presented and represented in knowledge. This places a dilemma on HCI methods of framing research ethics, either transnationally or trans locally. Often, ethics is viewed as a reflection of the 'before' and 'after of what takes places in a research setting, the principles that shape the interactivity between co-researchers, and not on the practising issues of their interactivity (Race et al., 2020). It appears that the focus on the principles of interactivity does not mostly manifest participants interest and concerns but rather focuses on guiding the actions and decisions of the research. This thus points to how practical ethics ought to be contextualised as one works with and by indigenous communities.

Reflexivity and Relational Accountability

The methodological debate about reflexivity, is complicated and likely to continue as such. Anthropologist termed it 'reflexivity', composition scholars refer to it as 'writing-to-learn (Kleinsasser, 2000 p. 158), while others term it 'self-appraisal of research (Berger, 2015 p. 220). The most common term of reference is that reflexivity is the process of critical self-reflection of one's "values, power, voice, face sheet characteristics (i.e., race, age, gender, ethnicity, and religion), sexual orientation, affiliation, biases, preference, personal experience, linguistic traditional, political and professional beliefs or stance, and theoretical predisposition" (Coffey, 1999 p. 4; Kleinsasser, 2000 p. 159; Berger, 2015 p. 219- 202). It is considered as a structured and analytical process of learning and unlearning about oneself when conducting research, and a practice of acknowledgement that positionality might affect the processes and outcome of the research.

For example, Slack stressed that the researcher's reflexivity is problematic as it "has missed the need to ground their claims in the lifeworld of society members, thus promoting the very ironic stake they seek to address" (Slack, 2000 p.1). May, on the other hand, see's reflexivity as a thorny concept that would continue to divide the spectrum of reflexive practice and argue instead for an examination of researchers' positionalities (and potential biases) to the practices of empirical research (May 2000). This shows how problematic the practice of reflexivity is in empirical analysis, be it radical, referential, endogenous, essential or stipulative. To most sociologists, the focus is on the reflexivity of account than of actors, as opposed to the initial ideas of reflexivity of actors as moved by Garfinkel's (1967) classic description of accountability.

Drawing on intersectional HCI, one can begin to imagine how accounting for the positionalities of the collective can bring about a more relational approach to reflexive culture. The practice is that of articulating and stating the assumption that might affect the research as strongly and as clearly as possible. Some of the assumptions might include the constitution of reality in my research (ontology), the nature of knowledge and how one recognises and identifies with it (epistemology), and how one's own held values influence the interpretation of multiple realities and the choices in my research (axiology). Such accountability emphasizes the 'grounding' of co-researcher's interactivity in the context of the field and not the other way around. This is not a normative problematisation of social relations in the field but acknowledging that one's presence in the field exercises certain powers that necessitates one to be conscious of the possibilities of difference in their values. Through reflexive notetaking of important events in the field and the recollection of how I conducted myself with field member's, I come to apprehend the difference between reflexivity of actors and reflexive account.

The organisation, presentation, and representation of hybrid knowledge

It is evident that the method adopted in research shapes the level of engagement that can take place among co-researchers. As indicated in the previous subsection, practical ethics espouse understanding the relationship, interactivity, and immersion between the research and research participants. With an emphasis on the relationship that is created between co-researchers, how would co-researchers commit to the project and its consequences distributed among co-researchers? As I am neither after theory development nor committed to a prior theoretical formation, I immersed myself in the field with little or no expectation as to what to found, but to observe, listen and provoke responses from actors as to apprehend something interesting and important in the organisation of their work. I had a set of discussion pointers and a few questions that fed back to the research question initially formulated¹⁸. With the inevitable chaotic nature of the field, the engagement with participants was an evolving interaction – mirroring, retracting, distantly gazing, and returning when deemed appropriate. There was also the consideration of how one's positionality (gender, religions, social status, and power) might shape the interactivity with participants in the field. I developed adequate competence in knowing how the issue of gender and social status can determine or undermine the level of engagement. Sensitivities practice includes being courteous, respectful, and modest.

With the awareness of how selective ethnographic account can be, the practice of developing member meanings from the interpretive themes and stories developed was considered as a way of sharing the power and labour in the presentation of knowledge. The summative evaluation of interpretation conducted with students, lecturers and software developers/designers was also considered as a way of showing that one is committed to adequately represent the member's account in their collective voices. This is a typical example of what being reciprocal in engagement and presentation might entail, as might be different in another context.

Equally relevant to the practice of reciprocity in representation is the issue of generalization of empirical findings from specific context to the broader community of analysis. Thinking along with the rhetorical construct of 'how many bloody examples do you want (Crabtree et al., 2013), arguably, the consideration is mainly about the kind of generalisation one makes (in term of purpose, scope, scale,

¹⁸ However, before immersing in the field, there was no underlying assumption as to what to expect or uncover. The field was entered with no single transcript or list of concepts to be uncovered, but of regarding myself as the research instrument. The underlying assumption is to develop a clearer understanding of some of the findings of the initial fieldwork, notably, how student and lecturers interacted and engaged with eLearning systems, and how developer and designers go about designing and evaluating solutions to be deployed to various institutions. The deliberate immersion is to develop an understanding of the participant's experience, and what those experiences mean to them at a specific instance. These instances are specific account or a collection of relational/conflicting accounts, which when systematically analysed would provide the needed sensitivity to the realities of those studied. It is through the observation, audio recording and jotting key moments that one might come to see and understand how "people grapple with uncertainty and confusion, how meaning emerges through talks and collective actions, how understanding and interpretation change over time" (Emerson et al., 1995 p. 4). Equally important is how actively and closely immersed one might be in the field to experience and derive meaning that is nearer to the observed experience. I was actively and reciprocally involved in the setting I attempt to understand and report upon. The involvement was in the form of not only observing but also forming conversation to develop a better understanding of why certain actions are carried out than others.

rationale, and typicality), and the sensitivities adopted by the researcher in attending to the social ordering of member's setting. The emphasis was on how the adequate reporting of members accounts can provide some basis for relationally organising and representing the multiplicity of the social world.

In unpacking how, institutional structure and social contracts determine the practices of knowledge production in this research, I attempt at politicizing the subjectivities of the actors that have assisted in developing competence in the field and its relationship to knowledge (Mwambari, 2019b; Pasquini and Olaniyan, 2004). Pasquini and Olaniyan (2004) have provided an example of how relational accountability can be taken further in the politics of knowledge, making different actors voices visible for interpretation in the geopolitics of situated knowledge. With the fallacies associated with doing social-good research with and for marginalized communities and recent calls for an ethics of care in HCI research (Howard and Irani, 2019), it becomes pertinent to examine how the intersection of identity, positionality and adequacy inform and shape the presentation and representation of different agents in situated and indigenous knowledge. The reflexive account of my experiences as a homework(er) undertaking research in Nigeria is not a critique of how conventional methods in social science and HCI do not attend to the underlying inspiration and subtleties of members, but one that considers the overreaching implication of an eclectic methodological positionality in HCI4D research practices.

While exploring how the ethical practice of undertaking interdisciplinary field study might bring about alternative ways of knowing and doing education and design, it is obvious that 'social-good can also mean 'cultural bad. Accountability without care is more dangerous than intent without commitment. Accounting for the nuances in the field might show how, as co-researcher, we sometimes work together and against each other in our efforts towards negotiating and distributing diverse agencies, identities, and powers. As a matter of urgency, the African HCI community ought to engage the ethics of care in neglected issues like that of identity politics, epistemic positionality, cultural adequacy, and the black marketing of knowledge. Doing so would likely bring our collective attention to how the labour relations are presented and represented in knowledge production and the knowledge produced.

The reflection of my selective experiences in the field is meant to sensitize and shed more light on whether it is ethical to study Africa with colonial-postcolonial tactic; and whether identity and positionality have any (or would have) effect on the ethics of caring for neglected voices and stories. Historically, with 'research' being considered a vulgar activity that was undertaken by self-proclaimed saviors burden with liberating and transforming primitive societies, doing HCI4D research under the premise of doing 'social-good could trigger unfavorable memories, believing instead that accounting for the 'relationships' created and extended as a result of our practice in the field might provide an outlook that shows that HCI researcher's care – that we are not here to do 'missionary work', but here to stay with the troubles of the collectives.

3.3. Data Analysis and Evaluation

For research results to be valued, the process of data collection and analysis must show detailed reporting that would enable drawing meaningful conclusions from results. Although data collection can be daunting, data analysis is widely considered the most complex phases of qualitative research (Thorne, 2000). It is complex in that as part of the analysis, there is the need to state clearly what was done, why it was done that way, and any assumption that might have informed the processes. For the qualitative data collected, I adopted a grounded approach to thematic analysis (Boyatzis, 1998; Nowell et al., 2017; Glaser and Strauss, 2017). Simply put, thematic analysis is a way of “describing and identifying both implicit and explicit ideas” (Guest et al., 2011 p. 10) through “seeing, classifying and encoding” (Boyatzis, 1998 p. 4) qualitative information to find themes and patterns through continuous reading and re-reading of the transcript (Aronson, 1995; Fereday and Muir-Cochrane, 2006).

The consideration of a grounded approach is developed on the premise that it is both a method and a process that is foundational to qualitative research (Nowell et al., 2017). The common argument is that the grounded approach is a data-driven process used as part of most, if not all, qualitative method that assists in finding complementary or contradictory insight from the trial of qualitative information. There is also the understanding that the selection of the method used to develop an understanding of the social life reflects the underlying assumptions of the researcher about the world to be understood, or rather suggest that what to be discovered relatively connects to how it is discovered (Emerson et al., 1995). The thematic approach is considered as it could allow demonstrating how the findings evolve from the data to support the claims made in the thesis.

The data examined consist of interview transcript, focus group transcripts, observational conversation transcripts, field notes, and field photographs¹⁹. The interviews and focus group transcripts were analyzed to form patterns and themes. The recorded ethnographic conversations were transcribed and combined with the selected notes to form a coherent narrative of social events. However, the recording might be regarded as a ‘multichannel event’ while the process of writing the transcript might be viewed as a linear sequence of interpretation (Emerson et al., 2011). The organization of the analysis is solely at my discretion of what is feasible and doable, and not on any theoretical assumption²⁰.

¹⁹ Fieldnotes are a selective written account of the informant’s perception of the actions and events that took place in the field, whereas field photographs are a complimentary account of some of the events undertaken in the field – relatively a snapshot of the reality at a particular instance (in this case the screen of either their project management tool or eLearning system). The jotted notes are a messy and unorganized account of my experience and what has been observed, which after leaving the field helped in drawing out a detailed elaborated account of what happened in the field. The notes were used to provide some descriptive account of what was observed in detail.

²⁰As some have argued that ethnographic accounts are ‘inherently partial’ or ‘incomplete’ (Clifford and Marcus, 1986), this raises the issue of how to distribute the representation powers of ethnographic description. The consideration of summative evaluation of interpretation’ (Chilisa, 2011) and ‘interpretation of interpretations’ (Geertz, 1973) was meant to build a lifelong relationship through the practice of research. After the initial fieldwork, I engaged participants in the process of member checking the transcript from the interviews (to which they consented). After coding and analyzing the checked transcript, I engaged three participants in company C1 in evaluating the interpretation from the interview data, three lecturers from each of the two

The first stage of the thematic analysis of empirical data was achieved through the examination of the transcripts where common themes were identified (stepwise replication) and agreed upon (intercoder agreement). The second stage considers developing a descriptive account of the ethnographic data. The two data sets were analysed at a varied time interval and relative themes (or meta themes) identified. The question to answer is how the initial themes and the patterns from the interpretive stories have been approached to develop meta themes, and how comparable insights from the field studies were established. The themes identified in both studies were synthesis, with the assumption that a meta-theme might emerge from the analysis of the relational data sets²¹.

Furthermore, relying on Garfinkel's ideas that the social science as a practical discipline requires doing practically mundane activities, providing a thick description (Geertz, 2008) – which might not be absolute as such description is provided from a particular point of view that is open to bias, misinterpretation, and mistranslation – might not be ideal. The point worth mentioning is that description might never end, one stops when they adequately place the phenomenon investigated in the right frame of reference. As such, the reporting of the meta-themes will be relatively thin in description (Brekhus et al., 2005)²². The descriptive interpretation of the data is meant to point to trails of insights that are significant to understanding the practice of blended education and technology design in Nigeria.

There is also the consideration that the quality of research findings and the contribution it can make to knowledge is mostly gauged on the credibility and plausibility of the result produced. In doing so, different approaches to the evaluation of empirical findings have been developed and extensively debated as to how they fit a particular context. In this research, I practised a prolonged stakeholder involvement during and after the two field studies that inform the argument of this thesis²³. As part of

universities, and conducted a talking circle session with students in both universities. After the analysis of the ethnographic data collected during the follow-up fieldwork, I engaged two participants from C1 (the project manager and the associate product manager, whom I understood to be two practitioners in the setting that engaged in all stages of project work), not to validate interpretation as earlier carried out, but of dialogically developing member meanings of the account described. The dialogue primarily is to determine whether the interpretive stories represent a 'paradoxical account' of members situated reasoning and actions.

²¹ The relevance of such an approach to analysis and evaluation of diverse experiences is that working back and forth between two data sets might suggest some of the complexities of cultural experiences and expression by participants in a particular setting. It might also demonstrate the relevance of aggregating pre-existing findings and more recent findings, first in highlighting how practices are fast-changing and second in how people tend to misplace meanings over time.

²² As established in the literature, the description of cultures relies on empirical purviews, which might suggest how surface meaning can be 'valid' while deep and convoluted meaning can be 'superfluous' (Porter, 2012; Love, 2013). It is argued that a surface reporting of the themes and patterns identified would make the practices of postcolonial blended education and the work of producing educational technologies both visible and representative.

²³ The assumption is that involving practitioners in the presentation of their experiences could bring about the implementation of the finding of the research to the mundane practices of their work. There is also the awareness of the unintended consequences and challenges of engaging member in evaluation and communication of interpretations (similar to those reported by Mackenzie et al., 2015; Thomas, 2017). Some of the questions that came up during the initial fieldwork and before embarking on the follow-up fieldwork concerned the selection of participants for evaluation/validation of interpretations, how to manage expectation between the researcher and the participants, and the approximate representation of diverse perspectives (those that might be sensitive and conflicting). The few challenges encountered relate to the delays in getting a response (or not getting any response)

the stakeholder involvement processes, member checking²⁴, summative evaluation of initial themes and the development of member meaning from ethnographic tales were adopted. Relatively participatory, such an approach allows for tracing the trail of participants voices, with them commenting on the conclusion drawn from their perspective on specific themes. However, this is not claiming that the participatory approach adopted might have significantly altered the findings, but rather pointing to how the continual engagement could enhance the credibility of the conclusion drawn. Apart from the application of the different evaluative approach to the interpretation of the result, I presented findings to a diverse audience through seminars (to communicate some methodological dilemma anticipated and how one can minimise them), departmental lunch talk (to get comments on the methodological choice before going into the field) and workshop/conference presentations.

3.4. Towards a Situated Methodological Approach in HCI4D

In this chapter, I described the methodological purview that has informed the design and staging of the two field studies that furnish the arguments in this thesis. In identifying some of the implications of integrating conventional (Western) and indigenous approaches to undertaking HCI4D research, the discussion points to the practicality of the approaches adopted for data collection, analysis, and evaluation of diverse perspective. Taking such an approach to sensitizing research problems, collecting data to better understanding those problems, and analysing results is considered as has marginally allowed negotiating and sharing power in the production and presentation knowledge. In postcolonial HCI4D, ethics in research is considered as a “system of agential relationship that cannot be assigned to unitary subject” (Howard and Irani, 2019 p. 11), thus emphasizing the need for responsiveness and accountability in one’s engagement with indigenous communities (Durrat and Kirk, 2018; Howard and Irani, 2019)²⁵. In essence, the central theme of this chapter is that of considering and committing to the ethics of ‘relationality’ in the study, analysis, and reporting of the cultures shaping postcolonial digital education and technology design and deployment. The next chapter reports the analysis of the data collected during the initial and follow up fieldwork.

from participants that consented. However, the transcript from the focus group discussion was not member checked for ethical reasons.

²⁴ Although the literature in social science has continuously question how member-checking enhance research processes, the consideration of checks is developed on the premise that the quality of the transcription process goes a long way in demonstrating the quality of transcript produced (Thomas, 2017; Goldblatt et al., 2011). The check is mainly to review and/or correct transcript and comment on summary of preliminary patterns.

²⁵ Note also that the ethical dimension of such an effort does not consider marginalised communities as spaces for drawing inspiration-motivation or laboratories for the proof-of-concept. These communities have inspirations, agenda and politics that can be leverage, supported, and extended through partnership, deliberation, and dialogues.

Chapter 4:

A Grounded Approach to Thematic Analysis

4.1. Introduction

In this chapter, I present the interpretive analysis of empirical data from two fieldwork that seek to develop candidate approaches for understanding, designing, and deploying educational technologies to support the diverse practice of teaching and learning. This is developed from the consideration of three distinctive (but inter-related) research question that examines how the practice of education technology research and technology design can be enhanced through the adoption of a collection of situated approaches to imagination and knowledge. This led to the consideration of how a range of processes (both methodological, political, cultural, and pedagogical) could allow for the redesign and redeployment of educational tools that can be adopted and used effectively in Nigerian universities. This chapter considers how the perspectives of a range of stakeholders could provide insight into the footprint of 'political imperialism' and 'cultural subordination' in the practice of digital education, while also identifying localised sensitivities that could allow rethinking African cultures of design in HCI4D.

As noted in the methodology chapter, a largely grounded approach was employed for the thematic analysis of empirical data, whereas a relatively context-specific approach was adopted for the evaluation and validation of interpretations. Although I have conducted a grounded approach to coding, this is not a detailed coding that is required in grounded theory as outlined by Galsner and Strauss (2017). The rationale, and as Wittgenstein (2009) argues is that prospective description is what is needed rather than an explanation in providing a critical and representative understanding of the attributes of the social world²⁶. Placed within Winchian traditions of the difficulties of understanding ourselves and other, what is needed is a sufficient description of the phenomenon and not an interpretive explanation of member's perspectives (Winch, 1997).

Adding onto earlier methodological assumptions that have informed the thematic analysis is the consideration of approaches or frameworks that could allow contextualising the thematic process. The literature in HCI has suggested how a range of analytical and theoretical approaches can assist in synthesizing data and in making interpretations that highlight the complexities of the social setting investigated. In this thesis, I employed a People, Activities, Context, and Technology (PACT) framework in staging the perspective participants accounts that inform the possibilities of

²⁶ Wittgenstein argument is not against detailed coding of grounded theory, rather emphasising how one can understand a phenomenon more clearly through the accounting of the organisation of language and its logical structures. This is relational to the ethnomethodological tradition of aligning empirical evidence to already established categorization of description (or language rules) as to identify new insights into the framing of the subjects of knowledge (truth) - we do not need a theory to provide such an understanding of observable subjects. It is through the analysis that I have come to identify themes and patterns that were categorised and verified through the data.

deconstructing the practice of postcolonial education and indigenous technology design (Benyon, 2014)²⁷. I also considered the notion of temporal trajectories as a grounded approach to ordering of description, writing up process and representation of relational (and often conflicting) accounts of the social world (Velt et al., 2017)²⁸. As indicated earlier, the concept of meta-synthesis was also adopted in outlining how comparable and generalizable insight might emerge when interrelated themes are synthesized (Noblit and Hare, 1988)²⁹.

In summary, the reporting of the process of how the findings evolve from the data demonstrate how empirical purview, and specifically the consideration of the surface description, determines the representative description of cultures. The emphasis is on how thin description, as a first-order account of cultures that are not obscured by the web of significance could provide paradoxical accounts that are both situated, evolving and representational. The chapter also accounted for whether the evaluation approaches adopted in ensuring that the analysis is credible supports the need for a deeper level of sensitivity towards investigating African relations. With the awareness of the dangers associated with Datarism (i.e., the process of extracting and exploiting people's data to advance a theoretical proposition or ideological stand), it is important to highlight how one strive to share the labour and credit of the knowledge developed. The adoption of responsive methods of evaluation can be considered as providing a member reading of meanings from the themes developed.

4.2. The Thematic Processes

The analysis of the data collected from the two fieldworks first starts by anonymously coding raw data³⁰, summarising data based on each participant and across each company or institution, and then identifying emerging patterns within subgroups and across units of analysis³¹. The coding involved

²⁷ The PACT framework was implemented at the start of the analysis chapter to set the phase of the thematic analysis that follows. The framework is considered as a way of organising the analysis of empirical data across a different unit of analysis. The framework acted as a mind mapping precursor for phasing the analysis, which demonstrate how the insight that furnishes the claims came to be.

²⁸ I employed the concepts of temporal trajectories in the analysis of how concepts regarding the use of educational technologies are experienced and expressed by different stakeholders at varying time intervals. Velt et al. (2017) presented an analysis of how trajectory can be applicable in analysing user experiences and in generating concepts from empirical data. Temporal trajectory acted as a sensitization toolbox that aid in identifying the disconnect between ideas expressed regarding the same concept by different participants in an organisation.

²⁹ Here, the focus is on the 'level of synthesis' and the 'order of analysis' (Noblit and Hare, 1988; Noye, 2006). During the analysis of data after the follow-up fieldwork, I first extracted and analysed field notes, photograph, and transcript as they relate to a particular concept (first-order analysis). I then subjected the surfaced description to the process of grounded thematic analysis to develop themes (second-order analysis) and concluded by synthesizing the new themes with interrelated themes developed in the initial fieldwork so that a generalizable interpretation can be derived.

³⁰ This issue of pseudonymization has become a critical theme in HCI as has shown how its practices embody social power that construct identities, either positively or negatively. Recent reporting by Nana Kesewaa and Dankwa (2021) points to the implication of participants anonymity and how such allocations can be negotiated between co-researchers. This is an issue that was not thought of extensively in the analysis but accounting for such a position denote a reflexive practice.

³¹ Within each unit of analysis, subgroups such as University A-B-C and Company C1-C2-C3 were identified. During a sketchy analysis of the subgroups, a criterion was adopted where the unit of analysis will be drawn across subgroups. There was also

recognizing key patterns and encoding such themes before interpretation (Boyatzis, 1998). Three stages in using thematic analysis as noted by Boyatzis (1998) were adhered to; "deciding on sampling and design issues, developing themes, and validating themes" (p. 29). In developing themes, a subjective stepwise replication was employed, where myself and one of my supervisors individually and collectively analyse and compare results in each unit of analysis. During the analysis of the focus group data, we noticed that responses were not equally distributed nor independent. We then focus more on the variance in response, how ideas are expressed in relation to the questions asked, and not how frequent such ideas were expressed. From our analysis, we discussed the themes we've identified and agree on a common theme of analysis i.e., intercoder agreement. Later, my supervisors looked at the interpretations of data in ensuring the reliability of the result presented.

After the thematic analysis of the three-unit of analysis for the ethnographic data, I quickly take notes from the bits and pieces of the analysis and reflect on what it might mean to the broader framing of the research, what Crabtree and Miller term "immersion and crystallization" (1999, p. 23). The analysis of ethnographic data (i.e., the third person point of view from the point of view of what the first person observes) seeks to provide a 'narrative tale' of members account in a setting (Van Maanen, 2001). I attempted immersing myself in the narrative and repeatedly reflect on whether meaningful insight that could furnish the arguments of the thesis have emerged. Although the empirical data collected is a selection of the everyday circumstances of practitioners in the setting, the assumption is that a 'near endpoint' description of the relationship that shape event might provide an adequate understanding of the practices that inform the design and usage of educational technologies in Nigeria. This form of analysis clearly shows how patterns are drawn from raw data while ensuring that the interpretive accounts are linked directly to the perspective of participants. What follows in the next subsections are the reporting of the themes for the first two units (experienced researchers and educational managers) and meta-themes for the remaining three units of analysis (lecturers, students, and software designers/developers)³².

4.2.1. Experienced Researchers

This unit of the analysis looked at interviews conducted with seven participants across two subgroups, i.e., University B and C. The researchers work in the field of computer science (4), science education (2), and distance learning (1). From the analysis of the perspective of experienced researchers, two

the assumption that putting together the responses of the participants within a unit, regardless of the subgroup they appear might bring about identifying similarities and differences across subgroups and within particular units of analysis.

³² To avoid repetition of accounts and for the limitation of space, the reporting of the meta themes is provided in section 5.3.2 for lecturers, 5.3.3 for student and 6.2.2 for software designers/developers. However, I provided a preview of the initial themes that came out of the initial analysis of data from the three units. Acronyms like Lecturer 4, Edu Manager 3, FF1N, EVF to anonymize participants response. I used F1-F7 to denote a business manager, a project manager, 4 software developers and a designer during initial fieldwork; FF1-FF6 for different participants in Company C1 during the follow-up fieldwork; and FF1N-FF6N for fieldnotes for the same participants; and EVF for 2 designers that participated in the evaluation of initial themes. Similar acronyms were adopted from students, lecturers, university administrators, and experienced researchers.

distinctive categories of themes were identified across subgroups. The first theme contains ideas that point to the sort of methodological challenges often faced by homecoming researchers, specifically with regards to research ethics, selection of methods, power relations, and representation of plural cultures in indigenous research. The second theme present ideas about how the adoption of digital technology supports the efforts towards decolonisation of the practice of higher education; the implications of pedagogies, cultures, and context to the practice of digital education; and the sort of challenges and opportunities the adoption of the blended approach bring to the decolonisation efforts.

Future of Postcolonial Digital Education

The adoption of technology in postcolonial education has brought about a rethink of what digitisation and globalisation of higher education entails. The common assumption is that the indigenisation of education is a reflexive activity that requires experimentation of instructional approaches to support diverse learning styles. Some participants argue that the practice of teaching/learning is facilitated by the five senses – with a participant suggesting that the “*five senses are the gateway to learning*” (Researcher 3). How these senses are effectively supported by the adoption of a specific pedagogical approach or digital technology is an issue that researchers raised. The main point of reference is how conventional pedagogies, specifically the problem-solving, tutor-centred, child-centred, or society/industry-driven approaches can be made relevant to the peculiarity of the context of use. Such remarks direct attention to how existing structures of society (in term of culture, social norms, economics, infrastructure, language and so on) can direct the processes of integration of technology in postcolonial practices of higher education.

Pedagogies, Culture and Context

From the perspective of two educational researchers (Researcher 3, Researcher 4), the future of blended education in Nigeria may well be some variant of digital education elsewhere. The main idea expressed is that the Westernization of global higher education poses a challenge to indigenous cultures of learning/teaching. In the words of a participant, indigenous education is;

“an endeavour in which the more mature of the human society deliberately tailor the development of the less matured so that you bring greater maturity in his/her for the overall benefit of the individual and society” (Researcher 3).

When the practices of digital education do not consider the peculiarity of the culture and context of use, there is the likelihood that education might not be beneficial to the development of the community members and the community at large. The fundamental issue with such a misguided assumption is that, and as suggested by two participants that;

"we gave superiority of western things over ours. We haven't developed ours and embrace theirs. We have not mastered theirs and we have neglected ours" (Researcher 3)we have not perfected our own, either we move with current trend, or we left behind" (Researcher 4).

What such remarks highlight is the pedagogical relevance of understanding the context of education in identifying emancipatory ways of integrating technology to the indigenous practice of education and not localised pedagogies adapting to global technological trends.

Challenges and Opportunities for Adoption

This theme emphasises how issues like limited infrastructure, connectivity, population size, technical know-how, and attitude of people towards changes hinder the adoption of technology to support teaching and learning. This is supported by a participant who suggested that the:

"number of students have multiplied many folds and the resources, both human and material, are still the same" (Researcher 3).

What such a remark might suggest is that digital technologies offer a multitude of opportunities and challenges to the efforts for decolonising higher education, arguably, it is through the experimentation of what is possible, and preferable of the new forms of education that the future practice of blending can be envisioned and actualised. From the three themes discussed above, the perspective of experienced researchers points to some significant insights into the pedagogical practice shaping the adoption of digital technologies in Nigerian universities. This is important to understanding the landscape of using digital technology in education as it compliments some of the ideas expressed by those that inform the design of blended eLearning systems, those that get to design and evaluate them, and those that get to use them to support diverse pedagogical approaches.

4.2.2 Educational Managers

This unit of the analysis examined data that came out of five semi-structured interviews conducted with educational managers. Seven semi-structured questions were formulated, consisting of the forms of digital technologies deployed, the assumptions that might have informed decision-making processes and the expectations behind the deployment, the mechanisms implemented to facilitate adoption and the challenges anticipated and faced, and their perspective of the future of higher education in Nigeria. Among the five participants, two are responsible for academic support and quality assurance. The participants were identified based on their role in the universities and on how their perspective might provide insight into the practices of digital education in Nigerian universities.

From the perspective of educational managers, I identified four themes that highlight how the blended approach might support the possibilities of developing context-specific pedagogical

approaches appropriate to the Nigerian context. These include themes that relate to the cultural orientation of higher education in Nigeria that necessitated the adoption of a blended approach, the different sub-cultures that shape specific pedagogical approach adopted, the forms of technologies diffused in a different context, and the mechanism adopted in ensuring blended practices adhere to established policies and standards. As will show in section 5.2, the motives that drive and popularise the adoption of the blending in both private and public universities are relatively common³³.

Cultures of Digital Education in Nigeria

On the pedagogical culture in Nigerian higher education that necessitated blending, the analysis suggests no institutional culture as people have a different orientation towards making sense of their immediate environment and that of others. What such an ambiguous account might suggest is that the cultures of learning in Nigeria are a combination of Western and indigenous practices (mostly practices that are shaped by religious and traditional beliefs). For example, a manager suggested that:

“before we took off, I had the chance to travel across the world and have discussions with experts out there and see clearly what the best practices are. We sort out those best practice those that are applicable within the Nigerian context. Those practices that would not conflict with our ideals. We study our subject carefully and move in knowing the best possible ways out. We have received patronage across the country, mostly the south westerners. Also, ABU being a cosmopolitan university, people want to come here. Although geographically people are alleviated from ABU, with the aid of technology, people are open to becoming part of ABU without the necessity to relocate, people just pick it up” (Edu_Manager 2).

What this might mean is that identifying a particular teaching/learning culture is difficult and often misleading. What is more sustainable is the consideration of a pedagogical approach that takes into greater account the plurality of people’s orientation and style of acquiring and sharing knowledge. In all three universities, managers promoted the ideas of how the blended approach might be considered relational to the socio-cultural context of their immediate environment. What this theme highlight is the understanding that the culture of blending fit into different pedagogical demands, thus applicable to the multitude of institutional conditions and requirements.

³³ Example of such motives includes the advance in technology globally, governmental policies, global market demand, organisational necessity, pedagogical relevance and importance, and socio-cultural demand from the context of education. What differentiates the two is the sort of challenges they faced – specifically with issues of infrastructure, the number of students, and the orientation of students and lecturers – and the institutional policy directions and implementation strategies in places to minimise those challenges.

Pedagogies in Cross-cultural Context

Following from the previous theme is the consideration of how the context of education shape (and not necessarily determine) the pedagogies adopted to support teaching and learning. From the analysis, there is a general consideration of education as a nomadic process where different people employ a range of approaches that are relevant to their educational needs. This raises the issues of how the blended approach considers (or could support) the sub-cultures of those seeking education and those doing the educating. The consideration of plural sub-culture here relates to the traditional and theological norms that have shaped the practice of caring for oneself and that of others. From the analysis, the more common pedagogical approach emphasises the need for human engagement and interaction. How then did the blending worked across different sub-cultures?

From the analysis, the emphasis has been on how the blended approach, as a unifiable method for developing a deeper sensitivity across learning cultures, can stimulate interaction, facilitate prolong engagement and relatively improve the experience of teaching and learning. There is also the consideration of the technological resources and service that one can adopt or align their pedagogical practices to in digital education. This is illustrated by a manager who said;

"we assume that students should have basic tool that they can interact with the LMS e.g. their smartphone. Like I use to say, the essence is pedagogy, the content and delivery method. We are only using the tools that are compatible with students' available resources to drive that pedagogy. They have smartphones, and we assume that when we have a mobile app that they can deploy on such devices, then they can have access to course materials and other things" (Edu_Manager 4).

What this might suggest to understanding the practices of digital education in Nigeria is how the blended approach can provide alternative ways of doing postcolonial education, either as a tool for fostering human engagement or as a method that can be incorporated into existing traditional educational practice. Although the analysis of the perspective of educational managers has emphasised the fluidity of cultures of digital education, there was an indication of how the adoption of technology can drive pedagogical experimentation across institutions. From this theme, we have identified by how the adoption of eLearning systems support different instructional processes and learning activities.

Use of Digital Technologies in Blended Education

This theme considers the tools available and those widely used. In all the three universities, learning management systems (e.g., Moodle, blackboard, google classroom, and canvass), open education resources (OER's), integrated library systems (e.g., Koha), plagiarism detection application (e.g., Turnitin), and other Google services are available and widely used. Dedicated labs and computer-

based training centres for computer-based test and other relevant infrastructural necessities are also available. However, due to prevailing issues of connectivity, lack of basic training and know-how, and people's attitude towards change and new technology, the adoption of deployed tools is minimal. Such issue presents the need for examining the process of that goes into the planning, integration, and evaluation of blended approach as to identify how to upscale adoption. This is supported by a manager who says that;

“when people start to use the technology, we undergo a change management phase where we try to engage other institution that hasn't use such tools and advise as to how to use it effectively and efficiently” (Edu_Manager 1).

Such an account emphasis the need for understanding the potential level of adoption and acceptance, which could allow for making an informed decision of future blends and might thus reduce the level of uncertainty in decision making. From the discussion of the perspective of educational managers in this theme, one can appreciate the different ideas that have popularise the adoption of technology and the consideration of the blended approach to the possibilities of developing a Nigerian centric educational system. Although these perspectives are not entirely new, what might be relatively new is in how the blended approach is considered in relation to the process and activities of developing context-specific pedagogical approaches relevant to current educational demands across sub-cultures.

Practices of Standardization and Quality Control

This theme considers the mechanism adopted in ensuring blended practices adhere to established policies and standards. As have provided some indicators of how the blended approach is tailored to the institutional context of use, there is the consideration of how the blend can be guided by the relevant educational policies set out by the relevant regulatory agencies. From the analysis, there is an indication that the blend is driven by governmental and institutional awareness of the demand from the knowledge economy and global manpower. In ensuring that the practices of blending are in line with the established pedagogical standard, the theme also emphasise how relevant quality control and support service directorates were established in the three universities. The directorates identify strategic action plans and implementation strategies that are both responsive to the peculiarity of the Nigerian context. For example, the educational manager from the private university suggested that they have achieved reasonable results through their timely use of insights from analytics in reducing attrition rate, to the incubation of research ideas and projects into the immediate environment, and the continuous engagement with the relevant stakeholder in developing learner's employability and entrepreneurship skills.

As educational managers are those individuals that guide and implements the policies, strategies, and mechanism for the adoption of digital technologies, the reporting of their account suggests how

the blended approach is assumed to promote the indigenisation of pedagogies. This is warranted by the consideration of how blending could facilitate the needed engagement between learners, their peers, and their instructors. Also, educational managers point to how the adoption of the blended approach is relatively warranted by a range of themes that are political, institutional, technological, pedagogical, and social-cultural. As have indicated above, the perspective of education managers is important to understanding the practice of digital education as they have accounted for the rationale, motive and drivers that warranted the consideration of the blended approach as the pedagogical practice relevant to the educational demands of the growing population.

Equally relevant is the consideration of educational managers as de-factor actors informing the practices of technology design and evaluation. These perspectives are discussed in section 5.2.1., and how they inform the processes of designing and deploying educational tools. In the sub-sections that follow, I provided a relatively brief account of the initial themes that came out of the analysis of interviews and focus groups data, and then go ahead to report on the approaches adopted in ensuring that the interpretations drawn are credible and generalizable to the Nigerian context.

4.2.3 Lecturers

This unit of analysis considers the interview conducted with fourteen lecturers across three universities. Two of the universities are public institutions while one is a private university. I recruited and interviewed those that have experienced or are actively using the Learning Management System (LMS) deployed in their institution. Five among the participants reside in a distance learning institute of University C, while those in University B are in the department of library science (2) and computer science (2). Those in University A were from Computer science (2), mathematics (1), and library science (2) department. This shows the variation of participants across different disciplines. Seven semi-structured questions were formulated, consisting of their understanding of blended learning, the pedagogical activities/processes undertaken with the eLearning systems, the instructional approaches employed in the conventional form of teaching and whether the adoption of the LMS compliments (or not) the pedagogical approach, the forms of support provided to learners through the platform, their experience of using the learning management system as compared to conventional approaches, and their take on how to bring about more adoption and use.

From the analysis of the unit, I came to understand that although participants might be using different platforms³⁴, the pedagogical activities they mostly engaged in are similar and their subjective experiences relatively the same. What is presented here is not an actual example of the practice of using eLearning systems to support the processes/activities of instruction, but the understanding of lecturers on the use of eLearning systems through the blended approach. However, from the

³⁴ The universities might have used different platforms in the past, during the two field studies, Uni B and Uni C were using Moodle while Uni A was using google classroom.

ethnographic observation, an actual example of the practice of using eLearning systems to support different pedagogical processes is documented. Therefore, the reporting in the sub-section will attempt to discuss the three themes that emerged from the interviews and the interpretive narrative of the observation will be considered to form four meta themes outlined in subsection 5.3.1. The three themes consisted of those that present ideas about the understanding of what the blended approach entails, the instructional approaches that the blended eLearning systems support and its impact on learner's engagement, and the general ideas about adoption and use (the sort of obstacles to acceptance and how to bring about further usage)³⁵.

Towards a Unified Language for Blending

The first theme contains ideas that seeks to establish the understanding of what blended approaches to teaching and learning entails. Among the fourteen participants, only ten gave a definitive understanding of what blended eLearning might imply³⁶. Amongst the ten that answered the question, three gave both understandings of what eLearning and blended learning might be. There is general agreement with the use of terminologies like “*electronic*”, “*technology*”, “*virtual learning*”, and “*online learning*”, to express the form it takes, while also using terms like “*effective*”, “*quick*”, “*improve*”, “*learn easily*”, and “*convenient*” to demonstrate the relevance of this form of learning. To illustrate with an example, a lecturer suggested that;

“Blended eLearning means use of electronic format which at some point might include the use of resources like internet and other resources to convey educational materials which could be document, audio, or videos to learners regardless of their geographic location” (Lecturer 6).

Another lecturer says that;

“eLearning is a kind of electronic platform that empowers one towards a more effective to teaching and learning” (Lecturer 2).

Despite the range of terminologies used to express the understanding of what blending might be, it is to deduce that the medium of teaching and learning and the benefit that comes with using it to teach or learn signifies how blended learning is understood and expressed. This might also suggest that there is no shared language for understanding what the future of blended approaches to teaching and learning entails or might be like. Participants also expressed relatively similar views concerning

³⁵ The ideas contained in this theme have furnished the discussion of the components of the models of technology adoption and acceptance. In sub-section 5.2.3 and 5.2.4, the perspective of lecturers and student are discussed in relation to ideas about the factors that foster/discourage adoption.

³⁶ The remaining four were not asked about their understanding of the terminologies because it is a semi-structured interview. The situation was that some of this interview started from casual conversation and the moderator used that as a pointer to steers the conversation to the outline of the script.

the activities and processes the eLearning systems could support and what they actually used it for³⁷. These activities range from uploading and disseminating learning content, downloading submitted assignment, grading, and assessment ((tutor marked, computer-based quizzes and reflective project work). uploading relevant learning sources or recommended text, provide learning support, engage in learning discussions, and disseminates information through notice boards. What this might mean is that the blended approach is relatively supports a range of instructional activities. However, there is a difference between what the lecturers can do with the LMS and what they use it for.

Equally relevant to understanding whether the blending actually work is the level of engagement with the tools among lecturers. From the analysis, the level of use is laudable, ranking form five lecturers using it daily during multiple instances, five using it around 3-4 times weekly (mainly due to the structure of their course), while the remaining four using it averagely twice a week. The minimal use was supported by some lecturers in public universities suggesting that due to the number of students that they handle, using the eLearning system adds extra workload, therefore justifying their minimal use. With the level of use commendable, the issue now is on how usage can be maintained for current user, and in how non-users can be encouraged to adopt. This is primarily because the blended approach has shown greater implication in minimising social inequality, can allow timely provision of quality education, and thus might bring about productive ways of developing the capabilities of the growing population.

Participants also talked about their experience of using as compared to using conventional didactic methods. Among the fourteen participants, twelve gave positive remarks on their experience of adopting the blended approach, while the remaining two suggested that it is 'demanding' and 'tasking'. What the participants are suggesting is that in comparison to conventional ways of teaching, the blended approach is tasking. This is supported by a participant who suggested that for conventional methods;

"you have a stipulated number of hours of teaching but with online learning sometimes you are not in control of your time" (Lecturer 11). This also led to the suggestion that the blending would be *'worthy if we can go into open and distance learning fully.....or some form of collaborative learning activity'* (Lecturer 10).

In addition, the theme also examined the challenges participants mostly faced when using or attempting to use the LMS. The challenges they mostly faced relate to issues of connectivity, infrastructural limitation, the incompatibility of hardware with software, and disparity in the ratio of

³⁷ Also, there is an agreement among the participants that they engage with the platform very often. Five amongst them engaged daily, while another five engaged 2-3 times weekly due mainly to the structure of their courses, while four admitted engaging not very often. The limited usage can be attributed to the perceived increase in workload associated with blending, the higher number of students, and the demand that comes with digital technologies.

students to available resource. These challenges are important to understanding how a range of factors, both technological, contextual, and pedagogical, might have hindered the adoption and utilization of deployed eLearning systems.

Impact of Instructional Approach

This theme expressed ideas that point to whether institutional approaches adopted by lectures integrate with the functionalities of the LMS, or whether lecturers have to adapt their teaching styles to the blended eLearning systems deployed. When asked about the pedagogical approaches informing their instructional style, half of the participants answered the didactic approach while the other half suggested employing a student-centred approach. This is supported by remarks like;

The user-centred approach "*gives some form of control to the student as they can engage in other forms of individual and collaborative learning*" (Lecturer 10); that the "*the user-centred approach makes learning better as there is no such thing as all-knowing position that is used to be*" (Lectures 2); and that the didactic approach is adopted mainly due to the "*size of the class and the nonchalant attitude of student*" (Lecturers 4).

Another lecturer suggested that;

"I can say I try to employ the user-centred approach in my teaching. The use of the LMS does assist to some extent in given some form of control to the students as they can engage in other forms of individual and collaborative learning on the platform. It is more like people don't harness the full potential of the LMS, and if they do, the effect on their learning experience will be enormous" (Lecturer 10).

Another lecturer added that;

"the general concept is more of didactic whereby I try to explain the major points and then engage in discussions with the student. Sometimes we also organise tutorials" (Lecturer 8).

This means that the user-centred and the didactic instructional approaches are the two more widely adopted pedagogical approach for teaching among lecturers. On whether the use of eLearning systems assist in actively administering the instructional approach they choose, all participants except one suggested that the use of the eLearning systems does support their instructional approach for teaching. The outlier was supported by the participants level of underutilization (mainly because of his course of study). Also, there is a general agreement among all participants, regardless of them being from a private or public university, that the use of eLearning system does have an impact on the students learning experience and not learning outcome. Three participants could not substantiate

whether the blended approach has had any effect on experience and outcome as that requires an extensive analysis of different scenarios pre-blend, during blend and post-blend.

Although some have pointed to how specific indicators like the course of study and the orientation of student might have had an impact on the level of engagement, other factors like the level of student-lecturer interaction might slightly influence learning outcome. The idea is that the more the students engage with the tools deployed, the more they develop an interest in the subject and the more they develop new skills. The general and plausible perspective is that the blended approach complements conventional methods of teaching and learning, thus considered as the preferable practices to digital education.

Issues of Technology Adoption and Use

This theme highlights some of the ideas expressed regarding factors that might have hindered the wider adoption of diffused tools, while also outlining suggestions on how to upscale adoption at various stages, especially for the circumspect/laggard adopters. The discussion of the indicators shaping acceptance/rejection and the identifies fostering adoption and use for both lecturers and students are discussed in subsection 5.2.3 and 5.2.4. The theme also accounts for suggestions on how to bring about more adoption, which include creating awareness of the technologies deployed (or to be deployed), promotion and incentivisation of adoption through loan schemes, training, and campaigns, and more importantly the implementation and enforcement of well-established policies. It is presumed that such recommendation can be further supported when actionable strategies for the diffusion of technology considers the peculiarity of deployable context and the specificity of adopter's culture towards new technologies.

From the analysis of the perspective of lecturers, one can appreciate how their knowledge and experiences of using digital technologies through the blended approach account for the landscape of digital education in Nigeria. It appears that lectures not only adopt digital technologies to support diverse pedagogical practices but also adapt instructional approaches to the functionalities of deployed tools. This is important as it points to how the blended approach could lead to the development of pedagogies that are temporal and adaptive to the new requirement of pedagogization.

4.2.4 Students

This unit of analysis report of the themes that came out of the focus group discussion conducted with twenty-nine students in five groups from university A and B. The ideas expressed by the student are relatively similar to those reported by lecturers. The difference mainly is about the context of use and their role. From the analysis of focus group data, three themes emerged, which conveyed ideas about the learning activities the tools support and the level of engagement as compared to when using conventional methods, the experiences of using deployed eLearning systems (and the likes and

dislikes), and a reflection on the sort of challenges faced or those that hinder usage and faced and some suggestions for further improvement.

Pedagogical Activities and Experience of Engagement

The ideas expressed in this theme considers the interaction and engagement of students with Moodle and google classroom. Although these platforms are different, the activities that students engaged in are relatively the same. The pedagogical activities that students used the eLearning for ranged from 'downloading and submitting assignments, downloading learning materials, getting other learning resources like links to videos and eBooks, getting notifications about classes' assessments and deadlines, taking assessments, getting notification of results, and engage in discussion via group chat'. There is however the subtle difference in the experience of participants in using deployed eLearning systems – precisely with those in public universities being less appreciative of the platform while those in the private university are found liking as they see it useful in getting resources, engaging in discussion with peers and lectures, and for seeking learning supports.

What stands out is the difference between the experience of using the eLearning systems and the learning experience of being taught through the concept of the blended approach. An example of the experience of usage was reported by two participants that suggest how;

"the technology doesn't really aid or have a significant impact on performance, it's just a way of disseminating information or materials..... the technology is supposed to aid, but the issue is that of usage. I personally use the LMS to ask Malam A questions and he respond to my questions. If the tutor is interested in providing support, it is interesting and might aid but it's just about use. The technology is complementary as people understand the conventional way more" (Fgroup 2).

"it's just a platform where I can access files and submit assignment and not really engage in actual learning" (Fgroup 4).

On the learning experience of the blended approach, all the groups point to how the availability of supporting infrastructure and the willingness of lectures to adapt to new technological advances can shape the level of engagement and the experiences of learning. This led to the conclusion that most students could not substantiate whether the adoption of the blended approach directs their overall learning experience (positively or negatively). This can be attributed to the disparity in the adoption of the blended approach by lecturers, and also on the subjective interest of students towards the use of digital tools.

Adding onto the experience of use is the aspect of the digital technologies deployed that they liked and disliked. Students used terminologies like "interesting, convenient, faster, easy to use, interactive,

available, and saving cost and time" to denote the likeable attributes of the tools. For example, a student suggests how interesting getting notifications from the Google classroom is by remarking that:

"I actually like it because it makes you want to do your assignment and have to meet up with the deadline" (Fgroup 3).

On the other hand, there is an agreement on the disappointment on how learning material cannot be accessed with internet connectivity. Students from University B expressed displeasure with how they do not have a Moodle app and how they cannot have instant notifications about new submission, deadlines, or announcements.

Level of Learner's Support

As the motive for the adoption of some form of digital technologies is to complement the conventional ways of teaching and learning, learner support becomes a vital part of the entire pedagogical processes. This theme emphasises the distinction between what is to be considered as an idle support mechanism (a system that would help in harnessing the potential of continual engagement with peers and lecturers through discussion boards) and what they are getting (occasional utilization of discussion boards). The reality in both universities is that students are aware of the functionality for individual or collective support through chat forums and discussion boards. This is illustrated by remarks like:

"it's more like a chat room, a portion where you can interact with the lecturer on the classroom" (Fgroup4); and that *"there is also this part of the Moodle that is used for group chat, you can interact with my classmates and lecturers (multiple voices) and ask questions and get response"* (Fgroup2).

The assumption is that a blended eLearning system ought to embody features that harness the attributes of continuous collaboration, dialogue, and reflection. However, the reality in the universities is that there is an awareness of the possibilities of such provision but mostly inactive. The inactivity of such features can be attributed to how both those meant to seek support and those saddled with providing the necessary support do not utilise such functionality. Two students in a group suggested that;

"I think there is a place where they will say in case you need help or support, like chat rooms (multiple voices), not been use at the moment. It hardly works, even if you put stuffs there, no one looks at it. No one is ever online to talk to you" (Fgroup1).

"the issue basically is of mind-set, sometimes you attend class just for the sake of attendance, and other time is because you like the tutor approach or the course, so there is so straight forward answer to that, sometimes support is needed from the tutor and sometimes from colleagues, or both" (Fgroup1).

Although some lectures might argue that necessary support can be provided when needed (either through the platform or in-person), the reality of the matter is that neither the students or lectures could attest how such a provision could impact their engagement and experience of using eLearning systems. The more common means of support provided is directly through student service directorates or individual lecturers, which might thereby suggest how support is provided to students through the blended approaches to education.

Challenges to Use and Needed Improvement

This theme adds onto ideas earlier expressed about the contextual factors that hinder the acceptance of the blended approaches and the challenges often faced when adopted. Two challenges were identified, those that are technical and those that are educational. The technical challenges reported relate to issues of infrastructure deficit, limited connectivity, and accessibility. The educational challenges can be categorized as those that relate to the orientation of people towards digital technologies, the disparity between available resources and the number of students, and the lack of awareness of the implications of blending to widening participation.

On suggestion for improvement, participants from University B are more interested in having a mobile app version of Moodle, while those in University A are keener to have a platform that can be accessed without internet connectivity and one that can support real-time assessment and collaborations. In their words for example, those in public university suggested that;

“they should make a mobile app of it, at least an app will give you a notification” (Fgroup2) and that *“if there can be a platform that can work without internet connectivity”* (Fgroup3).

As those in public have a mobile app, there are more concern about other improvement. One of which is that:

” there should an offline mode kind of thing because you can only have access when you connected to the internet. We should also be able to take assessment online via the platform real time” (Fgroup4).

The three themes reported above have pointed to ideas about how the blended approach supports different learning styles and pedagogical requirements. It also points to the subjective experiences of using blended eLearning systems and the learning experience of the blended approach. These perspectives are important to the framing of the landscape of using digital technologies in postcolonial education as it points to the sort of the pedagogical processes the platform could support, but also on how activities that exemplify collaboration and experimentation can be entertained. From the analysis, the data suggested how the future of digital education is not linear and ought not to be fixated on

technological advances. But rather to be viewed as a complex phenomenon that is at the intersection of themes that are epistemic, structural, cultural, economic, and political, and pedagogical.

4.2.5 Software Designers and Developers

This unit of analysis report ideas that came out of interviews conducted with seven software practitioners across three subgroups - Company C1, C2, and C3. Before going into the field, the assumption was of interviewing as many practitioners as possible within the companies that consented to take part in the research study. Upon reaching the field, I was only able to engage with participants that the management of the companies felt that their role and experience will provide the broader picture of their work of designing and deploying educational products and services to the Nigerian market. From the initial analysis of this unit, six interrelated themes were identified across subgroups. The theme related to stakeholder's role in system development and how important those in management positions are in design decision making processes, the methodologies adopted for gathering requirements, analysis and staging of design activities, the understanding of what is widely considered as 'best practice' and what might be referred to as 'do-able practices' (and how the remex of the two inform their design work), the influence of culture and context to the mundane practices of software project work, and finally the sort of challenges and opportunities that institutional and organisation cultures present to project works that are distributed and collaborative. As outlined in section 6.2, the analysis of the themes presented is viewed through the stages of project initiation and assessment (i.e., user and system requirement gathering and analysis), project execution (system development and evaluation), and project management (deployment, documentation, and support).

4.3. Conclusion – Where are We Heading?

In this chapter, I accounted for the insights and themes that came out of the analyses of empirical data collected from experienced researchers, educational managers, lecturers, students, and software designers/developers. As outlined in the introduction chapter, the objective of the thesis is to document and present a holistic account of a range of issues that inform and shape the cultural practices of design futuring Nigerian higher education. The thesis outlined three relative questions that consider developing candidate approaches for re-constituting indigenous cultures of design that can bring about understanding, designing, and deploying educational technologies to support the diverse practice of teaching and learning

The issues raised by the participant, either concerning blended approaches to teaching and learning or the sensitivities informing technology design and evaluation, are considered through a collection of situated approaches to imagination and knowledge. The discussion of the themes developed within the framing of a range of argument in postcolonial education, design, politics, and future studies is meant to lead to the development of candidate approaches for better understanding

indigenous experiences that needed innovating design, and in designing technologies that integrate (and extend and preserve) local ontologies and epistemologies. The critical analysis of different perspectives in the subsequent chapters is meant to provide insights into how conventional assumptions, paradigms, and cultures of education and technology design might have engendered the productive possibilities of deconstructing African ethics and values of autonomy, self-reliance, and sustainment.

Chapter 5:

Approaches to the Diffusion and Adoption of Educational Technologies

5.1. Introduction

In the previous chapter, I conducted a thematic analysis of a range of data sets collected from students, lecturers, educational managers/learning technologist, and software designers and developers. As the thesis is concerned with developing candidate pedagogical approaches relevant to the educational challenges and demands of the Nigerian population, this chapter discusses a range of arguments that account for the landscape of adopting and using educational technologies to support diverse pedagogical practices. This is achieved by examining the extent to which empirical data supports or contradicts the components and indicators of well know models of technology diffusion and adoption (Rogers, 2010; Davis et al., 1989), as well as the pedagogical assumptions informing the practices of postcolonial digital education. This is approached by contextualising the perspective of those that inform the decision process of diffusing technology in higher education (educational managers); those that get to design and develop the tools to be adopted and eventually get adopted (designers and developers); and those that are intended/expected to use them (lecturers and students). The analysis of two well-known models of understanding diffusion and adoption of technology matters in the sense that it could show the extent to which the combination of their determining components (as the widely adopted and extended indicators of the acceptance and rejection of innovation in a particular social context) fit into the empirical context of Nigeria.

As such, the first part of the discussion attempts to show the methodological implications of combining the two models towards understanding the factors that inform decision processes of diffusion, to the variables that drive or hinder adoption and acceptance and the indicators that determine the rate of actual use. I then discuss how the 'experimentation' of design strategies by designers and developers might have led to certain design features, thus exemplifying design attributes that might have influenced/discouraged the attitude and intention of adopters and on how it effect the subjective level of acceptance (either for new users or for continued use by existing users).

In showing the relevance and limit of the components of the unified model of technology acceptance, the discussion of the perspective of end-users first examines the characteristics of the innovation that shape adopters' subjective attitude towards use. To show some of the context specific factors might have shaped the behavioural attention of end-users towards use, I consider the Foucauldian concept of 'cultural panopticon' in outlining how relations of power warrant adoption and use for both lecturers and students. The emphasis here is on how certain institutional and societal

norms might have provided a means of normalising governmentality (for lectures) and disciplinary conducts (for students), which stereotypical models fail to consider. The analysis of empirical using Foucauldian concepts shows the nuance of understanding and representing broad range of perspective through stereotypical models or theories of technology adoption. The subsection ends by outlining a research agenda where alternative avenues for theorizing the adoption and acceptance of educational technologies in non-western context can be approached and formulated.

In the second part of the chapter, I discuss how the adoption of learning technologies might have supported/impeded the possibilities of developing context specific pedagogical approach relevant to emerging educational requirements in Nigeria. I also discuss whether the blended approach actually works in Nigeria, and its implication to the thesis for decolonisation of higher education. The last part of the chapter examines how ideas from the tradition of radical pedagogies might provide a way of rethinking and retheorizing the subjectivities of those seeking and providing education in postcolonial studies. The discussion of a range of theoretical ideas across radical and feminist pedagogies is considered as could provide insight into how the future of digital education can be approached and contextualised.

5.2. The Diffusion, Acceptance, and Adoption of Educational Technologies

The use of technology in learning environments has produced a series of different theories and models about how technology is adopted and accepted. The literature in the field of technology enhanced learning has placed the requirement for examining the factors that might have promoted or hindered the acceptance of educational tools (Boateng et al., 2016; Castro, 2019). As there is significant difference between developed and developing countries, one might argue that the common models and their indicators might be more relevant to industrial social setting (Gulati, 2008; Marangunic & Granic, 2015; Tarhini et al., 2017; Okocha, 2019). Consequently, the two most widely adopted models are the unified diffusion of innovation theory and the models of technology adoption (Rogers, 2010; Davis et al., 1989). The models outline a range of components and indicators in articulating the attitude and intention of adopters, and in predicting the level of acceptance of innovation in a social setting.

The general premise for most of the models has been about the availability of technology and that the determining factors is the end user (Boateng et al., 2016). In situation where the availability of technology is scarce and where other external actors are readily influential, the applicability of models framed and developed under industrial setting are put to test. This therefore places the requirement of not only determining how these models fit into the context of the research, but also on how a critical analysis of the underlying premise shaping certain decisions might provide insights into how both ethnocentric (Western) and localised practice shape adoption and acceptances of technology in educational settings.

As there might be differences in institutional culture and level of implementation in the institutions informing the analysis, the assumption is that the factors that might have driven acceptance/rejection could be relational while also differential. Some of the factors identified might be peculiar to specific institutional context, while others can be generalizable to wider educational context in Nigeria. I attempted making distinction where necessary, regardless of which the discussion would be rather broad and generic.

5.2.1. Assumptions, Rationales and Drivers for Diffusion

There is the common assumption that people appreciate technological innovation when they deem it relevant, valuable, and interesting to their practice of creating, acquiring, and sharing knowledge. The adoption of technological innovation in education not only be about improving the ways in which teaching, and learning are undertaken, but also about the possibilities of improving the processes of managing an educational institution. For educational managers, the emphasis was on how the global advances in technology can bring about a revitalisation of the practices of higher education (either as a part of a democratic government or as a corporate institution). For both public and private universities, the assumptions and rationales warranting the adoption of a blended approach will vary, including which are techno-economical, institutional, pedagogical, or socio-cultural. In this subsection, the discussion examines the assumptions and rationales that might have informed the consideration of the blended approach as the benchmark for higher education in Nigeria.

As have indicated in chapter 2, it is evident that technology has shown greater importance in different sectors of the global economy, primarily with its potential to enhance productivity and performance. When adopted in an educational context, the common assumption is that technology can bring about the transformation of both the subject of education and the social context of teaching/learning. However, there is a risk of considering education as a pre-defined and a predictable mechanism for minimal risk and maximise productivity, where the purpose and function of education is mainly about qualification and socialisation, and thus directed by market oriented and techno-capitalist ideals (Biesta, 2015a, 2015b). To illustrate some of the techno-economic assumptions that might have popularise the use of technology in education, an education manager for example suggests that:

“the philosophy of establishing the university is that we aim to offer British standard education in Nigeria at half the amount to be spend studying in the UK. Having that control, with a click, you wouldn’t have to do much to have access to resources. It is the assumption that the quality of British educational system can be vested on how they leverage on technology – technology has been a key factor to adoption as it has streamlined our operations, reduce cost, improve transparency, and speed up operational processes” (Edu_Manager 1).

Another educational manager also suggested that:

“as a learning institute, the use of technology is paramount. When I say technology, I mean computers, internet access and other factors that will aid in effective learning.... as far as the use of technology in education is concern, the blended approach is the focus. They (suggesting the regulatory agency outlining university policies) felt that the level of development in this country is such that the classic online learning is classically not suitable for us. We are in a system where people are transiting, and people tend to hold certain things that are part of the past” (Edu_Manager 2).

What the two accounts might suggest is the kind of motivational assumption informing the decision processes of diffusing educational technology in the three universities. From the excerpts, there is a clear appreciation of Western systems of education, not only because the entire political establishment in Nigeria was modelled through British standards, but partly and significantly because the global knowledge economy is largely Eurocentric. Within the context of the unified theory of diffusion, what the first account might suggest is the awareness that technology can enable different forms of predictability, calculability, metrification, and testing. It appears that the advances of technology globally have brought about innovative ways whereby educational managers not only manage educational processes and activities but can also run educational institutions as a productive institute for upholding or challenging certain ideologies about the nature of modern society. This might thereby present the university as a governmental institution that can either regulate and enforce acceptable norms in society or operate to empower alternative mode of social ordering/living.

With the consideration of the university as a governmentality institute of power-knowledge, the technicity of technology has thus allowed for the codified measurement and performativity testing of how certain technological fixers work (like the new Jim code that perpetuate inequality, codifies default discrimination, and ultimately reinforce systematic stereotypes (Benjamin, 2018)) can be replicated in everyday practices of society. As the decision to diffuse innovation in education is partly driven by techno-economic assumptions, it raises the issues of how those seeking education and those doing the educating might be presented as commodities (or customers to be sold a product) rather than actual civic resources.

Equally relevant to understanding the assumption shaping diffusion of technology is the consideration of the university as an entity tasked with the role of ethical subjectivity - in terms of training subject of education and producing corpus of knowledge - that can either empower or alienate. Although the adoption of technology can bring about new avenues for providing quality education to the growing population, the subjugation of educational practices through commercial culture of measurement might present the subjects of education as objects of cognitive capitalism and subjective commodification. Consequently, the culture of standardization presents the subjects of education as a

codified object of institutionalisation, or what in Foucauldian terms might be regarded as metrified object under 'administrative gaze'. For example, a manager admitted that;

“the area of most interest to us now is the area of learning analytics. If you look at our portal, we have imbedded some form of learning analytics. We need to do some predictions and see how many students can graduate before they do, and how many can't. How many students are falling behind, and then we can come up with interventions as to how to teach and learn better” (Edu_Manager 1).

The implication of such an admission is that technicity allows for an analysis of the characteristics of prospective adopters as to devise governance mechanism that might appeal to their subjective perception. For example, the governance mechanism widely adopted include the incentivisation of adoption, targeted campaigns, and competitive promotion. This thereby present the rationale for the diffusion of innovation not only to be educational, but also computational and one that could inform making proactive decisions, led to reduction of uncertainty, and thus shape the level acceptance. From the discussion of the techno-economic assumptions that drive the consideration of the blended approach, one can identify how factors like standardization and economisation might have furnished educational manager with a better understanding of some specific advantages and challenges into the acceptance and rejection of identified approaches or tools. This in essence is relevant to the process of articulating the premises for whether to adopt a blended approach or not.

Secondly, the analysis of the perspective of educational managers suggests how a range of institutional factors might have popularized the adoption of eLearning systems as part of the blended approaches to education. Some of the factors include the consideration of how social influences might have necessitated the decision to adopt the blending approach. Example of such social influences include governmental pedagogical policies, global competitiveness of education, and the demands from the knowledge economy with regards to skills and expertise. This is illustrated by three managers who suggested that;

“in a Nigerian setup, because of the number of learners, conventional universities cannot really take in those numbers and blended learning coming in place elevates those issues of numbers” (Edu_Manager 4)

“We are also interested in how students learn. I do some teaching, but I am not interested in how they perform. I am interested in how they engage in actual learning activities. We hope that through these processes, we can come up with pedagogical assumptions and develop a model that can upscale developing skills and employment.....we all know there is a global issue of unemployment, and our students come to us after graduation that they not employed or employable. We are interested in how we can use learning technologies to produce skilled

or job ready graduates. I have been in talk with other key stakeholders, how we can incubate ideas in our teaching that can bring about developing sustainable individuals and entrepreneurs. It is our hope that learning analytics can assist us in moving towards this direction (Edu_Manager 1)".

Equally relevant to understanding the drivers of adoption is the consideration of the institutional structures and implementation policies in places, the change management strategies adopted for transition, and the support systems needed to upscale adoption at various stages (for innovators, early adopters, early and late majority and laggards). For example, some of the strategies adopted to predict rate of adoption include the analysis of the practices of a range of institutions that have implemented the blended approach and a critical assessment of the institutional structures that could widen awareness creation and promote use. This is supported by a remark an educational manager made that;

"as an institution, we adopted the diffusion of innovation strategy in that we made the tool available, train them as to how to use it. We set out two hours in a week, 4-6 pm every Wednesday where no form of teaching takes place in the whole of the university. The time is dedicated for creating awareness, more like a clinic where people can walk in and be offered support. Another strategy we adopted is where we identify a champion in each faculty" (Edu_Manager 1).

What such remarks might suggest is that these conditions are meant to furnish the knowledge of decision makers in ensuring a seamless transition from conventional methods to the blended approach. Regardless of the implication of such knowledge to decision processes, one might expect that the underlying motive for using technology in education would be due to a pedagogical necessity for flexibility and a recognition of the plurality of learning style and teaching preference among stakeholders. This is precisely the case in the two public universities, where an educational manager suggested that;

".....we still want to have some form of human element because it doesn't tie down with our African background and context.....we believe that it is not everybody that has the same orientation towards learning, so we provide them with a platform whereby they can identify what they are more attune to. He further emphasis that "we created flexibility in the whole learning process. In the conventional way, it's a one-track thing where the teacher dictates and that's it. The issue basically is that most students fail, maybe because the system doesn't work for them. (Edu_Manager 2).

Such an assertion suggests how the diffusion of technology might fit into the local need of educators; however, the broader picture is that the underlying pedagogical assumptions driving the

use of technology are mostly Western. Due to the demand from the knowledge economy and the society at large, the general assumption of educational managers appears to be that the blended approach is appropriate to the established guidance laid out by the relevant regulatory agencies. As the proliferation of innovation has continuously shown how educational practices can be supported by the adoption of technology, the overreaching assumption is that the blended approach would eventually become the practice of the day.

Consequently, what the discussion of the assumptions, rationales and drivers for diffusion might suggest is that the blended approach is widely considered to be the future of education in Nigeria. It also shows how a range of constructs have popularised and promoted the adoption of a blended approach towards teaching and learning. The discussion of this factors have thus attempted to evaluate how the perspective of educational managers fit into the components of the theory of diffusion of innovation, precisely through outlining the features of the blended approach that persuaded its popularity; the range of factors that might have shaped the decision processes involved; the indicators that can determine the potential rate of adoption and evidently reduce uncertainty; and the institutional mechanism and strategies adopted to appeal to the perception of adopter towards use.

In a nutshell, the perspective of educational managers has indicated how the diffusion of digital technology is promoted by a range of factors that might have presented 'blending' as the more widely supported pedagogical approach relevant to the educational demand of the growing Nigerian population. Such accounts provide insight into how effective and sustainable decision can be made, while also pointing to implementation strategies that could promote future blending across different universities. As have attempted to show in this sub-section, the unified theory of diffusion of innovation provides important indicators for determining the acceptability or rejection of technologies in higher education. The discussion has also raised a range of issues and present insights that can form part of the indicators shaping instructional design, curriculum development, and policy making.

5.2.2. Influences of (In)effective Design Strategies and Features

From the analysis of the perspective of educational managers, the discussion has shifted from the assumptions and rationales shaping the decision process of diffusion to the factors that might shaped the rate and level of acceptance of eLearning systems (either for new users or for continual use by existing users). Consequently, this sub-section discusses the methodological implication of 'experimenting' design strategies in the development of educational technologies that embodies convivial features. The purpose of the evaluative analysis of the practice of designers and developers was to identify design strategies or design features of the end product that can be considered influential on the level of acceptance and rejection of deployed tools. The high-level methodological indicators identified include the methods used in understanding user requirements, the methodological sensitivity informing design thinking and processes, and the level of user engagement in key design decisions

and evaluations. This is supported by the general believe that the adoption of an agile methodology and an opportunist design strategy (consisting of user-centred design and material design approach) might have provided a way of developing smaller chunk of solutions in iteration. Through iteration, workable solutions are developed that when incorporated would evidently become adopted.

Other low-level design features of the end product consisted of the tool's level of integration with existing user systems; the compatibility of the tool to a range of devices; the usability, user-friendliness and simplicity (or customisation to the university context) of the tool; and the quality, performance and security of the tool would significantly influence the level of user interaction, engagement and relative satisfaction. This is primarily because the adopters might find the tools useful to their current work, and relatively easy to use as it integrates with their existing systems. The effective strategies and features identified as considered as facilitating conditions that could shape behavioural intention of adopters, thus important in understanding how certain design attributes might have influenced the adoption and rejection of deployable tools.

Equally relevant is the consideration of other design related strategies that might have necessitated the low level of adoption or the lack of acceptance of deployed tools. Although participants might not have explicitly suggested that some of their design practices are ineffective, a closer examination of some mundane processes in relation to 'agility' might suggest how specific design strategies could negatively impact the perception of end user toward deployed tools. Such issues are warranted by the contextual nature of software project work in Nigeria, but also on the subjective perception of the public about indigenous technologies. To illustrate such conflicting relations, a system developer suggested that software production is;

“made to look like as if this is not a big deal, sharp sharp, and deliver everything. There was nothing about planning or strategies, just get into implementation because that's what the western is using. Everyone here just wants to jump to writing codes. And due to the nature of the way projects are coming, clients are always in a hurry, so we have to take it as it comes. If not, they will give it to a different company, whom I know will not argue that they cannot deliver. No evaluation, no validation, nothing.... The main priority is trying to meet the deadline as we are always on a rush.” (F6- Software developer).

Such an admission shows how most clients do not fully understand the complex processes of software development, and also on how organisational practices are driven by market demand and forces. Although participants in the three companies have attempted to show how they attempted adhering to best practices (largely a collection of software engineering methodologies and design approaches), irregularities often get absorbed into the mundane practices of producing usable software. From the evaluation of the everyday practices informing their design work, ineffective

strategies such as the neglect for potential user's requirements might have significantly led to low-level of adoption. This is supported by remarks that have suggested how designers and developers:

'put ourselves in the shoes of the user' (F4 - Software developer), 'thinking for them' (F3 – eLearning Lead), 'implement something close to what we think is generic' (F2 - Designer).

Such as assertion assumes that a designedly way of doing is the same as a userly way of knowing. To show how ineffective such an assumption is, for example, another developer suggested that:

"we are designing for the students and a lot of times is what the administrators want that is provided. Ideally it should be the users that tell us what they want, but the case here is administrators do. if the administrators would allow the actual users of the system to be the key subjects, that would be interesting because we believe that engaging with the actual users will determine if we should be doing it in the first place or not" (F6 - Software developer).

What such a remark might suggest is the awareness of the importance of user engagement in reducing uncertainty and in determining the prospective level of acceptance of adopters. However, the misguided consideration of educational managers as de facto stakeholders professing requirement might thus impact on the design features developed, and also on the level of acceptance. One might expect that a set of actual users' (or potential users like students and lectures) would be involved in articulating their needs, and some developed educational frameworks inform the design processes of deployable tools. Surprisingly, it appears that there is limited user engagement or any pedagogical account informing design thinking processes, nor any concrete design approach shaping design making activities. It seems more likely that tools are developed and evaluated with the simple expectation that the users will find them relevant to their processes, which might discourage adoption and thus led to low rate of acceptance. It also shows how irregularities get normalised in the situated practice of project work, ideas that the models of diffusion and acceptance of technology often neglects (or considered under the broad umbrella of the subjective characteristics of innovation).

From the discussion of the perspective of designers and developers within the framing of the unified theories of adoption of technology, it can be inferred that the design-related strategies adopted in producing usable innovation might have significant implications in influencing the perception of adopters towards deployed tools. In essence, one can appreciate what the perspective of designers/developer in accounting for the specific design strategies that might led to certain design feature being developed, which I presume would provide insights into the subjective level of acceptance or rejection.

Relatedly, although the literature might have neglected the perspective of designers/developers, as I have attempted to illustrate and elaborate, they hold significant implications for understanding the acceptability and usability of educational tools in both private and public universities. The analysis of

the perspective of designers/developers adds onto earlier discussion concerning the implications of integrating the unified theory of diffusion and the model of technology adoption and acceptance. More importantly, the discussion has brought about an understanding of the working dynamics of dominant models for understanding the implication of technology in education, and their fateful misappropriation. The design strategies and features identified and presented are to be considered as temporal, which calls for a closer examination of the context of study in identifying residual insights that could approximately account for the underlying factors that shape the behavioural intention and subjective attitude of adopters.

5.2.3. Technological Indicators Shaping Adoption or Rejection

This sub-section illustrates how a range of determining factors, specifically those that outline the characteristic of deployable tools, might have supported the understanding of what fosters or hinder the acceptance of adopted technologies in three Nigerian universities. Although the perspective of lecturers and students are considered relatively similar (their perception towards acceptance and the subjective level of use will ultimately vary), the indicators that might have shaped their behavioural intentions towards use would certainly vary. These warrants identifying context specific factors that can be considered emerging within the context of analysis, while also pointing to how the data supports (or contradicts) the determining components of the models of technology acceptance.

For most lecturers, the most prominent factors that have led to the acceptance of deployed technologies relate to both technological and institutional drivers that shape the perception of how technology can support diverse pedagogical practices. These drivers include individual curiosity, pedagogical necessity, social accessibility, availability of technology, and institutional promotional strategies and policy directions. There is also the assumption that necessary infrastructure and technical training would be readily available, while also having sustainable enforcement mechanisms in place. These factors appear more strongly from the e narratives of the members of the private university. In public universities, however, it is mainly due to personal drive, social influences, and an awareness of the relevance of the adopted technologies to minimising workload. This is supported by remarks from a lecturer that;

“the issue of using electronic mediated means to reach out to students from the part of the lecturers is because some people are conservative and not ready to change. They still feel that the only way students can learn is when they see your standing in front of them. But some of us that have undergone some trainings have come to learn that students learn better when the enabling environment is provided” (Lecturer 11).

Equally relevant to understanding the technological indicators that might have fostered acceptance is the assumption that necessary infrastructure, proactive support mechanism, and

sustainable implementation strategies are readily in place. This is illustrated by a lecturer who said that;

“I think most of my colleagues what they complain is like of infrastructure, now no electricity as you can see. And even the hardware is always not there, no provision for the lecturers alone not to talk of students” (Lecturer 2).

Another lecturer emphasises that:

“policy is the key. There must be a clear policy as to the use of such tools. Without policy and a clear definition of ways and strategies to go about using technology, it won’t work. There is also the need for promoting the use of such platforms, selling the better side of the ideas and then reach out to students” (Lecturer 6).

As have attempted showing, the discussion is not entirely with regards to how the characteristic of the innovation can foster or hinder the use of eLearning systems, but also on the technological conditionings that might have warranted acceptance in the first place, and how they could further inform usage overtime. All these issues might be considered as facilitating conditions that shape acceptance and rejection, but which the models of technology acceptance fail to make explicitly clear.

Equally relevant as the factors that might have warranted the lack of acceptance by other lecturers. These factors include people’s general orientation towards technology, lack of proper promotional strategy and enforcement policies, inadequate training and support mechanism, the lack of awareness of the importance of available tools, and the changing dynamics of people’s attitude towards prompt changes. Other factors like limited basic infrastructure, connectivity issues, and weak implementation strategies might have also hindered the perception of lecturers towards deployed tools, especially senior lecturers. The perspective of lecturers thus outlines important indicators that point to some of the rationale behind the acceptance/rejection of educational technologies in three Nigerian universities.

In addition, with student being considered as de factor users of eLearning systems, their perspective become important in accounting for the specific characteristic that encouraged or discouraged acceptance and use. Specific to private universities, students are more appreciative of the technologies adopted in their educational practice. This is not to suggest that students at most public universities are dissatisfied with the technologies adopted in their institutions, instead highlighting how the difference between the two institutions (in term on technological capacity, contextual demand, number of students, and institutional strategies for adoption and transition) might have influenced the behavioural intention towards adoption. In both universities, students expressed their perception of the deployed tools by suggesting that they are *“easy in all aspects, interesting, user-friendly, straightforward, responsive, interactive, convenient and available”* (original emphasis). These terminologies were used to illustrate the perceived ease of use and usefulness of the tools, thus

providing insights into the characteristics of the tool that warranted such attitude and possible intention towards use.

Equally relevant in understanding the technological indicators of acceptance is the relevance of the tool towards diverse learning activities, to the demonstrability of the tool, and to the perceived ubiquity of the tool with other educational services like the library service, student portal and student emails, and so on.

From the analysis of end users – both students and lecturers – one can infer two key indicators that shape current and future use: the institutional driver's that promote acceptance and the features of the technology that provide predictable insights into the attributes that would shape the continued use by end users. The feature that stand out among end users is the perceived user-friendliness, integrativeness, and ubiquity of the tool with other educational services like the library service, student portal and student emails, and so on. These findings are consistent with prior results from a range of studies that emphasise the implication of factors like; perceived ease of use, user-friendliness and technological integrativeness (Okocha et al., 2017; Rahmi et al., 2018; Yakubu and Dasuki, 2019), and the social availability-accessibility and innovativeness of technology (Olatubosun et al., 2015; Nicholas-Omoregbe et al., 2017) towards predicting actual use. Regardless of such account, the analysis has also identified pointers where acceptance can be improved. For example, some provide suggestions for increasing the level of adoption by saying that:

“there is the need for serious orientation on the part of lecturers and students on why we should use this platform for the teaching and learning” (Lecturer 4)

“as to how to change things, there is the need for enforcement. We can organise seminars and enlighten the university community about those service, then adoption might be a bit higher” (Lecturer 5).

In essence, the perceptives of students amount for the need for effective change management strategies, awareness creation through seminars, workshops, training programmes, competitions campaign), diversifying access to technology, promotion and incentivisation of use, and more importantly the development of sustainable policies, actions plan, and implementation strategies. The general assumption is that doing so could reorienting the perception of the community towards the blended approach.

5.2.4. Other Contextual-Cultural Factors Fostering/Discouraging Usage

In the preceding sections, I have discussed how a range of design related strategies and technologies features influence the acceptance/rejection of deployed tools. In this sub-section, I adopt a collection of Foucauldian concepts (e.g., problematization, govern-mentality, panopticon, and administrative

gaze) in highlighting how a range of contextual factors might have shaped the perception and attitude of lecturers and students towards educational technologies. The emphasis here is on determining how specific cultural attributes or contextual indicators shape the perception and adopters, both lecturers and students. The Foucauldian concept of 'problematization' adopted is considered as an analytical approach for reassessing the discourses that situate the subject of one's analysis as to forge new ways of looking at socio-political problems that are not ideological or polemic (Deacon, 2006). Of particular interest is the consideration of how problematization could provoke critical conversations that might not necessarily conform to widely held assumptions about the relevance of technology in postcolonial education, but one's that examine the underlying principles that situate a range of concepts in the affective aspects of technology enhanced learning research.

In the context of postcolonial education, the Foucauldian concept of 'panopticon' is a metaphor used in the analysis of how the systems of regulation are internalised in the consciousness of subjects by limited exercise of power. The discipline culture of 'panopticon' works not through constant surveillance but by the institution of harmonizing mechanics that unconsciously inflicts the necessity to conform to certain cultural themes of society (Mungwini, 2012; Ball, 2019). Such a mode of governmentality normalizes socially acceptable behaviours, which when considered within the framing of the underlying structures of African communities might point to how culture is used as an instrument for the projection of one's admission to a community, thus operationalising a mode of self-regulation towards the values of communities. As culture operates as the ethical basis for social relation, it often inscribes code of conducts for members of its immediate community. In this sense, culture advances the practice of governmentality by relying on the perception of traditions that outline 'normal' and 'unacceptable' behaviours for members in relation to themselves and others (Lee, 2020). This way, educational subjects are constantly subjugated to the prescription of culture; relinquishing one's subjective power to the cultural mechanism used for and in normalising disciplining and control.

A practical example of Africa's culture of the panopticon is the ceremonial consideration of the perspective of someone older than oneself as factual. Such a cultural practice essentially creates a schema of differentiation that portrays younger generations as passive recipients of ideals needed to fully function in the established structural arrangement of society. This mode of patriarchal classification places a range of stakeholder under the dominant gaze of other and the society at large. For example, educational managers are expected to abide by and advance the political ideals of elected authorities, lecturers are placed under the institutional frames of standardization or administrative gaze, and in some cases act as disciplinary agent of disseminating desirable norms, whereas students are largely considered as hallow cultural objects that need deposits of cultural wisdom. This thus places culture in opposition to the underlying canon of critical pedagogies advocated by Brazilian educator Paulo Freire – the practice of knowing/doing based on one's contextual intuition and knowledge (Freire, 2018) –

which might thus present African cultures as power-metric apparatus used for cataloguing acceptable, contradictory and memorisable narratives about the nature of reality.

In showing the ambiguity of variables like facilitating conditions and social influences in predicting adoption by lecturers and students, I relied on Foucauldian insights of how 'panopticon' regulates adopter's subjective perception towards deployed tools. The emphasis here is on how certain societal norms might have provided a means of institutionalizing modes of social control (for lectures) and disciplinary conducts (for students), which stereotypical models fail to take into account. This led to the consideration of how the analysis of taken for granted variables might reveal insight into the underlying factors that enabled the acceptance of deployed tools in Nigerian universities.

Cultural Identifiers Fostering Usage

Although the three universities might have employed a range strategy to drive the adoption of educational technologies, there is the underlying assumption that the 'employment' of lecturers and the 'admission' of students might have provided the basis for their regulation. As lecturers get employed by the university to develop the knowledge economy that operates within the praxis of qualification and socialisation, they might be considered as having signed a socio-economic contract consenting to abide by the regulations set out by the university and its regulating bodies. Students on the other hand might also be considered as having signed a code of conduct that outline the rules that they have to abide by as prospective members of the university.

In such a contract or codebooks, both lecturers and students are under the control of those that exercise power and those that power is being exercised upon (Deacon, 2006). This thereby places an expectance that both students and lecturers adopt and accept the technologies deployed regardless of their perception or attitude towards what was deployed. From the analysis of contextual factors that might have altered the attitude of adopters towards acceptance, it can be deduced that the unified models of acceptance leave room for ambiguity in understanding the subjective conditions that regulates the behavioural intention of lecturers towards the blended approach and students towards blended eLearning systems.

In addition, there appears to be the understanding that students self-indulge in reacting to conventions; either being captivated by the significance attached to technology or being constrained by the apparatus of culture. To illustrate some of the remarks informing such an assertion, two groups admitted that:

"if the lecturers ask us to us, we will (multiple voices). When they instruct us, we have to do it? When all the lecturers are using it, I guess all students will use it as well and be serious about their studies. Most don't use it, they don't even know about it until when seminars are organised to inform them" (Fgroup A2).

“One thing that would bring about adoption I think is for the lectures to emphasise that each new student has to use the tool, regardless of if they want to or not. I think most people are not motivated to use it and thus limit adoption” (Fgroup B3)

Such remarks point towards how techniques of culture regulate and normalises self-governing and self-compliance without the exercise of power. Here, culture acts as a social influence that has internalised conformity to the perspective of lecturers (mostly people older than the students), while also regulating the subjectivities of students towards passivity. One might deduce that the practice of prescribing the acceptance of any innovation is enabled by the power relations of culture in communities. The common narrative is that students are institutionally and socially ‘expected’ to adhere to the directive of lecturer or anyone in the position of power (even class reps), thereby portraying them as standing reserve for societal and technological instrumentality. As cultural reserves, they are not expected to make informed judgements based on available knowledge to them nor question the command of the authority, but to perceive the prescription as normative to their operation as functioning members of the community. This is further supported by a set of remarks from lecturers in the public universities that;

“as tutors, we have to enforce it on our students, as long as they know that you are given materials through the platforms, they have to use it, they have no choice. It’s not like we are imposing, but we felt that they are in the position to use the tool for educational purposes” (Lecturer C5)“for students, when asked to enrol, they follow. They hardly complain, if they are informed, they will take in” (Lecturer 2)

This might suggest how lecturers’ authoritative powers are exercised on students, either through their social positioning in society or through their intellectual privileges. However, two lecturers from the private university suggested conflicting remarks that:

“they are using it because they are compelled to use it because they get their learning materials there” (Lecturer 9).

“.....students are not compelled to adopt but make in such a way that they see the need to engage. They may be compelled when you conduct an assessment or publish the result, then they will see the need to engage. It is convenient for them I think, not because of the environment or being private, but because it’s learning on the go (Lecturer 6)”.

From the conflicting account outline above, one can identify how the apparatus of cultural and subjective appeals significantly shape the perception of adopters towards deployed eLearning systems. The distinction between the two-unit of analysis is that cultural norms allow for lecturers to

'command' while students merely 'accept' what was prescribed, while institutional norms allow lecturers to 'enforce' while students are 'objective'. This means that the adoption of technology is not merely about the characteristic of the innovation or the institutional motive of diffusion, but largely a matter of the relations of the context of deployment.

Cultural Identifiers Discouraging Usage

Equally relevant to understanding acceptance and rejection is considering the factors that might have discourage adoption on the part of both students and lecturers. For students, the main factor that discourages acceptance includes the limitation of supportive infrastructure, the issues of social access, and the lack of utilization by some lectures. On the part of lectures, and specifically in public universities, the unequal ratio of student to available resources discourages adoption, weak implementation strategizing, instability of policies, ineffective change management plans, and the minimal awareness campaign. There is an agreement across the three university that senior academics are not likely to adopt deployed tools and services. A participant outlines such issues by suggesting that;

"We usually have this problem with our senior colleagues. They will tell you No, me that I have been teaching for 20-30 years, I am not going to use to it" (Edu_Manager 5)

The reasoning behind such a position might be that older professors are panoptical placed at the higher schemas of community frames, offering them a vintage point of gazing on others while reinstating their subjectivities as self-constituting and self-governing subject. Such unequal relations necessitated those that possess knowledge to either reproduce or redistribute power. The analysis of how power and knowledge operate in the practice of technology adoption has provided a broader picture of the link between the factors that might have shaped the subjective attitude and intention of laggard and adopters and variables like facilitating conditions, subjective norms, and social influence.

The discussion of some of the perspective of lecturers and students attempted has shown how Foucauldian concepts of 'cultural panopticon' regulate and normalizes techniques of power, which in essence are 'subjective norms' and 'social influences' that shape the behavioural intention of lecturers and students towards acceptance of eLearning systems. This shows the complexities of understanding and representing diverse perspective in education research, while also pointing to specific attributes that might be considered predictive to the acceptability or rejection of technology. The evaluative analysis of the perspective of lecturers and students towards acceptance and use has pointed to a range of context-specific factors that prove useful in predicting the perceived behavioural intention and attitude towards the use of eLearning systems.

From the interpretation of the perspectives of those that decide on what to blend and how to blend, those that design and develop the tools used to support the blended approach, and those that get to

use the tools in their processes and activities, the discussion has provided a broader picture of the link between the factors that popularise and necessitate adoption, the design strategies that influence the acceptance or rejection of specific educational tools, and the factors that could shape current and future use by end users. The discussion has thus identified, explored, and raised a range of important arguments that are institutional (in term of technicity, calculability-measurement, and governmentality), design related (in terms of the influence of design experimentation), and user related (in term of institutional cultures and societal norms). As posited in the beginning of the chapter, the first section set the objective of illustrating how the data that came out of the analysis of a range of stakeholders applies or contradicts the components and indicators of the unified theory of diffusion of innovation and the models of technology adoption.

5.3. The Use of eLearning Systems for Teaching and Learning

With the surge of information technology globally, recent efforts in sub-Saharan Africa have sought to revitalise the practice of higher education, and especially the development of context specific pedagogies. Such efforts have shown the implications of decolonising dominant thought and practices of industrial education (Reagan, 2004), first in transforming curriculum and second in developing alternative instructional approaches that are situated and emancipatory. The assumption is that is the adoption of technology can bridge the gaps that exist in global education by providing equal opportunities and quality education to all. Regardless of such optimism, research has continuously shown that adopting Western approach to education at the expense of indigenous one's has positioned most African countries under dominant discourse and narratives (El Bouhali and Rwiza, 2017; Shizha and Makuvaza, 2017). Such narratives have thus called for a closer examining of what the use of technology in postcolonial education entails, and on how it can be made relevant to the evolving educational demands and challenges.

This calls for a critical examination of the assumptions popularising the adoption of blended pedagogical approaches, and the practice of using eLearning systems as part of the blend. As previous studies have yet to determine the extent to which the adoption of technology supports, promotes or impedes the development of pedagogies appropriate to the Nigerian higher education (Olatuboson et al., 2015; Aladejana and Olajide, 2019; Okocha et al., 2017; Okocha, 2019; Adeoye, 2020), it places a fundamental question of how the blend can support decolonising themes of higher education (Subedi and Daza, 2008; Shizha, 2013; Enslin and Horsthemke, 2016; Rizvi et al., 2006). The major issue faced has been about how the adoption of Western approaches to education at the expense of indigenous one's might have warranted the continual devaluation of non-western practice of education globally (Shizha and Makuvaza, 2017). What this might suggest is that the decolonisation of universalised practice of education is not as straightforward as it might seem – as it is an ongoing power relation that is determined by and through a constant struggle between cultural ethnocentrism

and epistemological ethnocentrism. This begs the question of whether the blended approach actually works within postcolonial higher education, and whether it promotes the possibilities of developing context-specific instructional approaches. The discussion in this sub-section attempts to answer this question.

5.3.1. Towards a Unified Instructional Approach for Blending

In the previous sub-section, I have discussed some ideas about how the blended approach might support the possibilities of developing alternative pedagogical approaches relevant to decolonisation of higher education. The emphasis here would be on establishing an understanding of the practice of blending among lecturers. This is important as it would add to the understanding of whether the blended approach actually works within the cultural and institutional context of Nigeria. It would also bring about a way of identifying how the blended approach might support the process and activities of generating alternative pedagogies that are emerging and practical. While there might be social and institutional differences between the three universities investigated, the understanding of the blend and the activities/processes to be carried out with the learning management systems are relatively the same. However, the level of engagement and the experience of use are relatively different, partly because of factors like course of study, the institutional level of adoption, one's subjective attitude towards technology.

As discussed earlier, three themes that emerged from the analysis are considered in examining the possibilities of moving towards a unified instructional approach for blending. The themes include those that relate to the understanding of what the blended approach entails, the instructional approach adopted and how the blending supports the approach, and the activities that the blending can further support. From the ethnographic observation of lecturer's instructional design and activities, I attempted to discuss some of the implications of blending to the ethical traditions of radical pedagogies. What is of particular interest here is establishing whether the adoption of the 'ethics of interruption' could further promote the culture of experimentation and collaboration against that of banking and quantification (James, 2014; Biesta, 2015; Freire, 2018).

In politicizing the use of eLearning systems through the blended approach, I adopt Freirean traditions of critical pedagogies in identifying insight into the possibilities of developing minimalist instructional approaches relevant to decolonial education – as a preliminary precursor for radically exploring alternative channels for the dialogical acquisition of knowledge without the exercise of and submission to techno-power. In doing so, I wanted to show how the perspective of lecturers accounts for whether the blended approach works across different sub-cultures. This is not entirely a question of tracing traits of coloniality in the practice of blending, but of identifying possibilities that interruption could provide in rethinking the projected past of higher education in Nigeria.

To emphasise, the ideas of radical pedagogies developed from the seminal arguments of Brazilian educator Paulo Freire about consciousness, emancipation, and industrial education. The political project is principled on the vision of social transformation, community empowerment, self-emancipation, and an ethical regime of truth (Giroux, 1992; Gore, 1993). As an ethics, it rejects modernist forms of binary opposition, linear history of subjectivity, and use of language rules to privilege certain subjectivities over others. As a politics, it signifies the theory of differences, and one that emphasises the struggle for making a difference that makes a difference (Giroux, 1992; Alexander, 2006). In this sense, the tradition of radical pedagogies is framed as;

“a technology of power, language and practice that produces and legitimates forms of moral and political regulation that construct and offer human beings particular view of themselves in the world....it is about the intellectual, emotional, and ethical investment we make as part of our attempt to negotiate, accommodate, and transform the world in which we find ourselves” (Giroux, 1992 p. 74).

Regardless of the implication of his thesis to postcolonial and decolonial efforts, some have argued that the Freirean thesis embodies colonial paradigms as it essentializes marginalising perspective to oppression (e.g., Giroux, 1992; Grande, 2015). Other sees its political propositions ambiguous method for exercising, containing, and resisting power through industrial education (Jackson, 1997). In developing apparatus for unsettling existing assumptions, paradigms and discourse about global education, the Freirean pedagogies operates at the intersection of the vision of critical and feminist pedagogue (Alexander, 2006). To most black feminist theorist, the feminist gynogogy is a transformative project that draws from ‘feminist social vision’ of social equality and justice as to empower the subjectivity and identities of women (Welch, 1994; Shrewsbury, 1993). The Feminism pedagogue combines modernist and postmodernist praxis in outlining the importance of differences and specificity. It emphasises how modernist ethics of social justice and postmodernist politics of identity can provide alternative ways of knowing and doing (Giroux, 1992; Gore, 1993). This thereby places both radical and feminist pedagogies as political options that can allow for continual problematization of educational practices and the subjective-ness of its subjects.

From the analysis of the perspective of lecturers, it appears that the blended approach is considered the present-future practices of higher education in Nigeria. Adopting the culture of problematisation demand an over hall of existing policies, curriculums, pedagogies with the hope that the interruption could widen participation and minimise educational inequalities. However, with the unequal adoption of deployed tools by lecturers, uneven relations of engagement are solidified, where some might use eLearning systems as banking tools, while others might use traditional systems as cataloguing tactics. Regardless, the data continuously suggests how the pedagogical approaches adopted, either didactic or user-centred, enable the ‘slotting’ knowledge into the consciousness of

recipients. The introduction of technology does not distribute the relations of power in both pedagogies but move a step further in regulating the experiences of teaching and learning. In such a scenario, eLearning systems can be considered as an instrument for rote learning as the interactivity between peers is regulated and measured, either for minimising risk or for upscaling profitability.

In addition, the analysis suggests that eLearning systems are merely considered as tools for depositing, sharing, and accessing information and learning resources, while occasionally been used for assessments, grading, and engaging in group discussion. To support such assertions, some lecturers used terminologies like 'pass, disseminate, post, deploy, upload, submit, download, and check' (participant emphasis) to denote the activities the tools might have supported (or could support). What this might suggest is that the adoption of eLearning systems might not have fully supported dialogical pedagogical activities but acted as 'enabler or mediator' of limited relations between lecturers and students. This thus raises the question of the functioning of 'communication' in blending (or the delivery), and more specifically the effect of 'power' in the method of instruction. While some might argue that the communication process between lecturers and students can be considered as multi-directional, the unequal relationship between a depositor and a deposited associated with the banking models goes further in inscribing the powers of the depositor (and their dictatorship) and the effect of the deposit (and its authenticity). This might thereby present educational technologies as *techne*' for continual liberation and emancipation of subjects or as instruments for structural surveillance and standardization of subjectivities. It also emphasizes how the digitization of teaching/learning might perpetuate similar characteristic to the 'banking' model of digital education (Blackburn, 2000; Boyd, 2016).

Equally relevant to accounting for whether the blending actually works is considering the perspective of lecturer with regards to the experience of using eLearning systems as compared to the conventional face-to-face method of instruction. This part of the discussion draws from the interviews conducted with lecturers whereas the paragraph that follows draws from ethnographic data. From the interviews, twelve lecturers see the advantage of using the eLearning system as compared to when they were not using it by making remarks like;

"I find it very important and relevant, not only to students but also to tutors. It easier the way a tutor can organised his lectures and deliver more conveniently" (Lecturer 3).

Another comment is that *"to a large extent, I think it's OK. What happens often time is given the system we have here in Nigeria, you don't get real time response as compared to face-to-face class. You post new materials; they quickly give you feedback and by that you'll know which areas to work more on as to help them. With the LMS, we get feedback, but it's not real time as such for the nature of connectivity here"* (Lecturer 14).

The other two lecturer's felt that it is;

'not that responsive and user-friendly' (Lecturer 10) and that *'it is really tasking, much more than face-to-face teaching because in F2F, you have a stipulated number of hours for teaching. But then it comes to interaction online, sometimes you are not in control of your time when you have a large number of students that you hope to engage with'* (Lecturer 11); thereby providing a varied and important perspective.

On the experience of using eLearning systems as part of the blended approach, the analysis of ethnographic data suggests a range of ideas. The emphasis here is attempting to establish lecturer's level of engagement, what's they like and dislike about deployed tools, and where improvement might be needed. Lecturers in Uni A were more enthusiastic with the whole idea of using eLearning systems to complement their instructional process and activities. While observing the two lecturers, I noticed how they navigate with the platform, through the utilisation of universal design features (icons and buttons), which might suggest how intuitive, integrative, and adaptive the google class platform is and can be. What they like the most about the tool is its *'simplistic outlook'*, how it allows *'scheduling of instructional activities'*, how it provides google *'storage space'*, and the ways it integrates with their email. The level of engagement of lecturers in Uni B was relatively low as compared to their colleagues in Uni A. This might be due to the laid-back attitude of most lecturers in public universities to new technology. When asked what they like about their use of either Moodle or canvass, a lecturer replied by asking: *'Do I even like anything about it? There isn't anything special'*.

In addition, lecturers in Uni A expressed displeasure towards the way changes are made to the platform periodically, suggesting that they prefer the older version as the updated version is not personalised or tailored to the context of the environment, which might thus make it harder to navigate for new users. Those in Uni B also expressed displeasure with the interface, suggesting that it is not mobile-friendly, and the inactivity of the instant messaging functionality. In essence, the analysis suggested that lectures in Uni A have had a relatively satisfactory experience of their use of eLearning systems through a blended mode, whereas those in Uni B might have experienced a range of issues that negatively impacted their experience of use and intention towards continual use.

In a nutshell, the discussion of the perspective of lecturers has point to a range of ideas into whether and how the blended approach actually works in three Nigerian universities. These ideas include the sort of pedagogical activities the eLearning systems could support, the instructional approaches mostly adopted for blending, the power relations involved in the designing and using eLearning systems to carry out instructional activities, and the subjective experience of use against conventional face-to-face instruction. Such accounts have thus emphasis a range of ideas concerning how the blended approach might bring about the possibilities of developing pedagogies practices appropriate to the educational conditions and demands of the different stakeholders. From the analysis

of both themes that came out of the analysis of interview and ethnographic data, one can appreciate what the discussion adds to the understanding of how the future prospect of the blended approach, either by examining how it supports certain instructional approaches or how it might further promote certain pedagogical traditions.

5.3.2. Multitude of Learning Activities, Engagement and Experiences

Adding onto the perspective of lecturers is the consideration of how student's perspectives, specifically from the ethnographic accounts, might provide a better understanding of how the blended approach works across the multiplicity of learning style. Although the three universities might be using different educational technologies, I was after understanding what the reality of the blending is and what also can be considered as an optimal account of blending. The observation of student and subsequent discussion point to how the level of engagement largely depends on the instructional approaches adopted by lecturers. It also points to how the design features facilitate (or not) level of engagement and the experience of use. This thereby suggests how the subjective experience of students is influenced by the accessibility of the tools, the flexibility of the tool, the integrativeness with existing tools, and the range of communication channel incorporated in the tool.

There was also the emphasise on the features of the eLearning system that they find interesting. In University A for example, the y particularly liked the 'to-do list' where all new update and upcoming deadlines are listed out. There was also an emphasis on the importance of receiving email notification of any update to the google classroom, and of how it integrates well with other google services. For those from Uni B, the likable features include its user-friendliness, and how it is easy to navigate and use. However, one of the students points out that newcomers might find it difficult to navigate as some of the quick links are not intuitive enough for one to find them readily available to use. Overall, there was an emphasis on how the design features of the tool could considerably bring about prolong usage and level of engagement, while also improving on the overall learning experience.

In accounting for how the blending works, I was also interested in the challenges they mostly face and where improvement is needed to drive adoption and acceptance. The challenges faced are like those reported by lectures, especially with regards to issues that are either contextual, educational, or technical. The contextual challenge in universities B relate to the uneven ration of students to available resources and the lack of sustainable adoption and implementation strategies for informing decision processes. In university A, the major issue is about the attitude of people towards rapid changes. As adoption is largely facilitated by the availability of and accessibility to technology, the issue of the lack of supporting infrastructure might hinder the level of acceptance. This thus places the requirement of ensuring that sustainable implementation strategies are in place as it could bring about understanding what works or not, and of what might be an ideal situation of a functional digital education.

When considered within the context of the literature, the perspectives of students point to the importance of context in bring about a better understanding of whether and how the blended approach work in non-western setting. The discussion of the themes that emerge from discussion and observation emphasises the importance of developing eLearning systems that stimulate interaction, facilitate engagement, and provide a meaningful learning experience, thereby emphasis issues often neglected in the literature (Olatuboson et al., 2015; Oyelere et al., 2016; Okocha et al., 2017; Yakubu et al., 2019; Okocha, 2019). The relevance of such ideas is that they show how the blend is not entirely about how technology can support certain pedagogical activities and processes, but mainly about how the use of the technological can bring about a rethink of the assumptions shaping the practices of digital education.

5.4. Conclusion

In this chapter, I set out to illustrate and discuss how the practice of adopting and using educational technologies through a blended approach supports and promote the practice of developing indigenous pedagogies. The discussion of the ideas in this chapter draws from the perspective of educational managers, software designers/developers, lecturers, and students in showing how the diffusion, adoption and use of digital technologies has both epistemological and methodological implications to understanding the practices of blended teaching and learning.

In attempted identifying the factors, indicators and identifiers that might have informed the adoption of the blended approach and the acceptance of blended eLearning systems in the three Nigerian Universities. From the analysis of empirical data within the framing of the unified theory of diffusion of innovation and the model of technology acceptance, the discussion identifiers a range of ideas that shows the relevance and limit of stereotypical models of technology adoption as applied to the context of Nigeria. The discussion of the perspective of those that influence adoption decisions and design directions, those that the design and develop educational tools, and those that are expected to accept and use them, raises the fundamental issue of whether there is the need to develop an 'African' approach to the diffusion and acceptance of technology. It is argued that to account for the factors shaping the acceptance/rejection of innovation is to place greater emphasises on how culture and context operate in directing people's perception and attitude towards new technologies.

Equally, the discussion of the perspective of educational managers and lecturers/students with regards to the implications of adopting the blended approach point to ideas of whether the blended approach actually works across sub-cultures. The discussion shows the complexities of understanding the mundane practices of using technology in postcolonial higher education. This is not entirely about how eLearning systems support certain instructional approaches, but also about how the practices of blending can promote the development of context specific pedagogies relevant to the praxis of decolonising education in sub-Saharan Africa. The critical analysis of a range of pedagogical traditions

within the framing of the data does not suggest that current practice of postcolonial education and well-known approaches to understanding the adoption and acceptance are inappropriate to the context of Nigeria, but, rather, point to context-specific insight that necessitated the consideration of indigenous pedagogies and practices.

This, in turn, led to the consideration of whether particular theories and models of diffusion and adoption adequately applies to the Nigerian educational landscape; whether there is the need for a specifically African approach to technology diffusion, adoption and acceptance; whether the blended approach supports, promotes, or impedes the development of context-specific pedagogies and the decolonisation of education in Nigeria; and whether the blended approach can provide alternatives ways of thinking about and theorizing educational practices in Nigeria. The discussion, as informed by empirical data and relevant political discourses, has point to how the blended approach can be re-theorised within conventional paradigms shaping the practice of digital education in sub-Saharan Africa, and Nigeria more specifically.

In the next chapter, I discuss how stereotypical design paradigms and methodologies might have hastily misrepresented the situated practices of designing and deploying educational technologies in multi-cultural context such as Nigeria. The chapter considers how the adoption of a collective of situated imaginaries and approaches to knowledge can provide a shared vocabulary for understanding the plurality of cultures and in designing educational tools that can be adopted and used effectively within the limit of computing in Africa.

Chapter 6:

Approaches to Understanding and Designing Educational Technologies

6.1. Introduction

In the previous chapter, I illustrated and discussed a range of arguments concerning approaches to the diffusion, adoption, acceptance, and use of blended eLearning systems in three Nigerian universities. I also highlighted the possibilities of developing an indigenous pedagogy (both instructional and political) that can empower the subjectivities of both those seeking education and those doing the educating. In this chapter, the focus is rather different to that outlined above, in that it is concerned with the methodological and analytical approaches mostly used in designing/producing digital technologies in sub-Saharan Africa.

As research has continuously shown how the design and development of technological innovation are not merely about the transfer and appropriation of techniques from developed to less-developed nations (Mavhunga, 2017), it raises the question of how software practitioners go about developing adaptable, usable, and saleable software products. The chapter asked the question: Which analytical orientations, development and management methodologies, and design concepts/tools inform the practices of software project work in Nigeria? How (in)effective have conventional design strategies been to the everyday practice of producing innovative products in Nigeria?

In answering these questions, I first examine the appropriateness and applicability of universalised (and Western) approaches to undertaking software project work. This is achieved through an empirical analysis of a range of issues that might have shaped the mundane practice of software practitioners in three local software development firms. By adopting a situated approach to the analysis of the mundane work of practitioners, I attempted pointing to the operations of power relations in monopolising and normalising certain practices as global 'best' practices.

As the thesis seek to develop candidate approach for understanding the plurality of culture and in designing technologies that embody them, the second part attempted showing how a situated approach to understanding and representing knowledge works at the intersection of a range of design issues. These issues primarily concern how the plurality of histories, perspective, and experiences are approached, interpreted, and translated into the design of technological innovation that can be adopted and used effectively. Consequently, the discussion seeks to 'deconstruct' the knowing of design and development work from Africa (in Spivak's term), showing how situated imaginaries and approaches to knowledge can provide a range of possibilities for thinking/doing design 'otherwise'. This is largely

arguing for a way of understanding the trinitities of African cultures without operating and reinstating modernistic traps of how the world is or should be.

Through the temporal analysis of four cases where the coloniality of power and knowledge are exemplified in the thinking of digital innovation, the subsequent sections of the chapter show how stereotypical (often colonial and neo-colonial) design paradigms might have hastily misrepresented the situated practices of designing and deploying educational technologies in Nigeria. The last part of the chapter argues that adopting a situated standpoint orientation can provide a way of approaching and analysing the plurality of culture and context in sub-Saharan Africa – which in essence relies on indigenous people, places, and practices in designing interventions that can be adopted to support teaching and learning (Awori et al., 2016). Thus, the temporal analysis of the four cases points to the material implications of the interactivity between culture and locale in extending practices of design.

6.2. Decoding the Nuance of Software Project Work in Nigeria

In contemporary discourses, there is a general assumption that technology can and will revolutionize the way we live, think and act. However, research in HCI and ubiquitous computing has shown how conventional approaches to understanding cultures are developed in relation to and within modernistic frames that determine what is relevant and what is not (Dourish and Bell, 2011). This raises a range of questions concerning how certain methodological and analytical practices get privileged, monopolized, and normalized, and of what that might suggest concerning ‘community of practices’ or ‘best practices’ – best for who? from where? for what purpose? and at what cost? This, therefore, presents any approach for framing project work to be an asymmetric relation that needs to be continuously appropriated (Shklovski et al., 2014; Bjørn et al., 2019). This is important as it allows an understanding how conventions influence the practice of designing and deploying innovation in Africa.

Even with the continual call for the inversion of design paradigms and lenses in HCI and CSCW, few studies from Nigeria have examined the developmental frameworks informing the work of software practitioners (Ogunyemi et al., 2015; Ogunyemi et al., 2016a; Ogunyemi et al., 2016b; Murus et al., 2018; Ogunyemi et al., 2018). What these studies have shown are the assumptions and principles shaping the practice of the community; specifically, the (mis)understanding of ‘user’s’, ‘cultures’ and ‘politics’ in design and the approaches adopted for designing and evaluating tools. From these studies, it becomes apparent that most of the approaches adopted are Eurocentric and effectively neo-colonial. This might, therefore, present the adoption a range of approaches (as prescriptive maps and scripts (Schmidt, 1997)) in the everyday work of software practitioner to be an expensive gamble due to the differences in the culture of initiation and the context of appropriation. The discussion of the perspective of a range of stakeholders would show how certain organisational practices are monopolized, how software development methodologies are universalized, how design approaches are conventionalized, and how management knowledge is totalized through a globalist matrix of power.

To examine the matrix of power relations in the practice of project work, the section draws on the analytical and cultural approach of ‘translocality’ in sensitizing and evaluating the mundane practice of software project work in – referred to as Edusoft projects (Bjørn et al., 2019). Using qualitative data from software practitioners, the discussion seeks to answer the question: How does the Edusoft project do agility under the influence of civic structures and organizational contingencies in the overall practice of work? The discussion documents the implications of adopting and using well-known approaches for framing, undertaking, and analyzing distributed and collaborative software project work. This challenges the basic assumption that software practitioners in/from Africa are merely recipients of transfer, imitators of Western innovation, or victims of transplantation and appropriation (Williams and Woodson, 2012; Mavhunga, 2017); instead showing how they continuously innovate new practices that get distributed across already established boundaries of the ‘in here’ and ‘out there’ (Taylor, 2011).

6.2.1. The Situated Nature of Edusoft Projects

For a project that is distributed and collaborative, practitioners work together and sometimes against each other as to ensure that project works are kept on track and completed to meet objectives. In this subsection, I examine the orderliness and messiness of Edusoft projects as to show how different methodological approaches inform project work in an organization that does agility. The adoption of the agile methodology, and the phasing of their work is to allow for sensitizing design processes at each stage and for the project as a whole³⁸. The emphasis is on how the lived experiences of working through different phases might provide a better understanding of the politics of adaptivity and change.

The discussion draws on observation notes and pictures as to account for how the adoption of certain procedures, strategies and technologies supports the orderliness of work (considered as maps and scripts for keeping work as a totality) or make work messy. As a range of pre-defined constructs are used to order work, I am equally interested in identifying how the maps and scripts that were meant to make work orderly might have created a mess of doing agility. Specific emphasis is placed on understanding how changes are affected when plans don't work out, how conflict is handled and absorbed in work due to attempts to keep work in totality, and of how localized logicalities (e.g., the use of OKR's³⁹) might have assisted in making those messy circumstances productive. Accounting for such instances would show the contingent effect of transplanted rules and their deposit as applied to different circumstances, outlining the mess rules might create because of the situated nature of work, while also showing how agility might disempower the situated perspectives of practitioners.

³⁸ This is relation to Button and Sharrock's (1996) analytical framework for orienting project work through phases and as a totality. The framework offers a way of analysing how everyday lived processes are activities are coordinated and accomplished (and work become successful) than of how work should be carried out using a pre-defined constructs and procedures.

³⁹ The Objective Key Result (OKR) is a set of pointers that are used to align everyday work to the company goals or individual user's productivity goals.

Company/Department OKR - T1 2019				
Quadrant	OKR	Progress	Score	Overall Score
1	Financial	Objective 1 - Increase revenue from new and existing business by 50% from 2018 T1		
2	1	Generate N30m in revenue from existing clients	100%	74%
3	2	Generate N50m in revenue from existing clients	100%	
4	3	Generate N40m in revenue from Project	100%	
5	4	Generate N10m in revenue from new clients	44%	
6	5	Generate N10m in revenue from new clients	60%	
7	6	Generate N10m from e-learning	40%	
8	customer	Objective 2 - Improve user experience (UI/UX) and Quality of our key products		
9	1	Visit 80 key customers to understand, document their challenges and resolve 80% of blockers and bugs by end of T1	95%	83%
10	2	Launch the registration and result checker for internal an by end of first week of February	100%	
11	3	Implement the application grading module and document at least 60% of all features	60%	
12	4	Launch the Parent module by end of T1	80%	
13	5	Identify 5 key improvement that are pain point to customers and implement 70% on application	80%	
14	6	Identify 2 subjects in JSS 1 and develop a complete quality video content based on the curriculum and feedback received in T3 2018.	90%	
15	Internal process	Objective 3 - Implement and improve key processes		
16	1	Document at least 50% of existing features for and on	20%	49%
17	2	Document at least 80% of completed new features for and on	40%	
18	3	Setup a team, structure and infrastructure to support by end of March	90%	
19	4	Review, update and adopt the processes for travel, invoicing, budgeting and procurement by end of January	45%	
20	5	Create an Intranet portal for flexisat for the purpose of knowledge management and internal communication by end of T1	20%	
21	6	Document at least 90% of completed features of all released apps on	80%	
22	Learning and Growth	Objective 4 - Improve the knowledge of key products and processes		
23	1	Organize 2 company wide knowledge sharing sessions on and	100%	75%
24	2	Take course on product development by all product managers	34%	
25	3	All teams should complete at least one training related to their job function by end of T1	72%	
26	4	Organize at least one knowledge sharing session on a key process by each department	71%	
27	5	Organise one strategy session to drive innovation and business development	100%	

Figure 4: Edusoft Company Objective and Key Result Indicators

Company/Department OKR - T1 2019				
Quadrant	OKR	Progress	Score	Overall Score
1	Quality	Objective 1 - Improve availability and quality of Key Features		
2	1	Investigate what led to downtime and optimise to prevent feature reoccurrence by end of T1	90%	87%
3	2	Fix known bugs on report queue and automate spinning of new servers when more report traffic is detected by end of march	75%	
4	3	Remove 100% of unused code and refactor 80% of redundant code in all mngrs related to student reportsheet and accounts on Main and 100% on Parent by end of March	95%	
5	UI/UX	Objective 2 - Improve user experience (UI/UX) on Key Features		
6	1	Resolve (80% of blockers and bugs) challenges collected and documented from 80 key customer visits by end of T1	90%	72%
7	2	Identify and fix key issues (no credit on main account, select who to send to and sending by section, all or selected) on the sms platform and achieve 90% delivery of sms by end of March.	75%	
8	3	Identify and fix all key issues (sending regardless of provider, select who to send to and sending by section, all or selected, invalid emails) on the email platform and achieve 99% delivery of emails by end of T1.	50%	
9	Parents Satisfaction	Objective 3 - Launch Parents Web Module and Parents Mobile App by end of march		
10	1	Build an activity dashboard to increase parent engagement by end of march	100%	80%
11	2	Make all pages responsive for different screen sizes for mobile and tablet users by end of march	90%	
12	3	Build a parent mobile app with at least 2 features (result, fees and mobile notification) by end of T1	50%	
13	Capacity Building	Objective 4 - Improve the knowledge of key products and processes		
14	1	Organize a company wide knowledge sharing session on by mid-April	100%	98%
15	2	All engineers must take a course on Testing related to their technology by end of T1	96%	
16	Engineers	Course Type	Progress	
17		Testing	100%	
18		Testing	85%	
19		Testing	100%	
20		Testing	100%	

Figure 5: Edusoft Project Development Team OKR Indicators

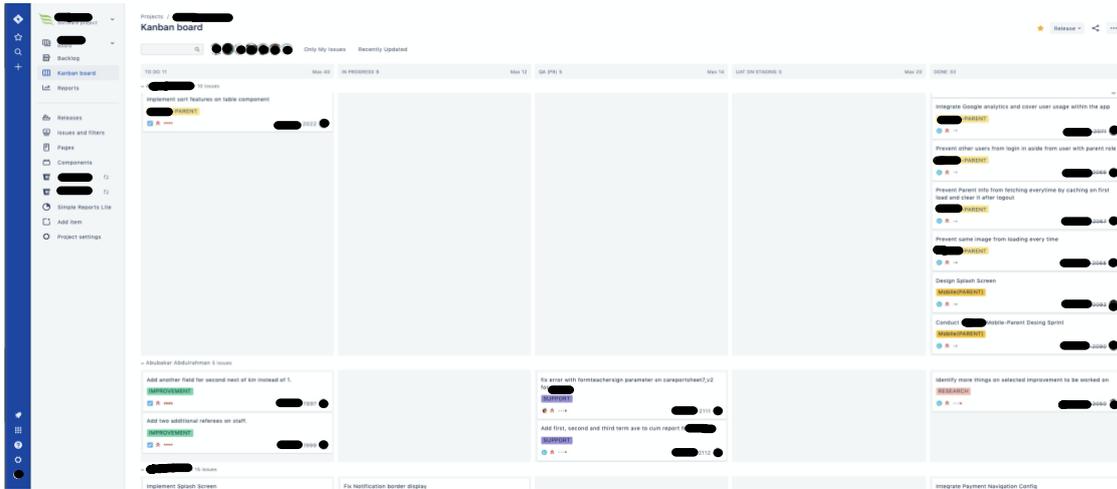


Figure 6: Nemis Scrum board for everyday project work

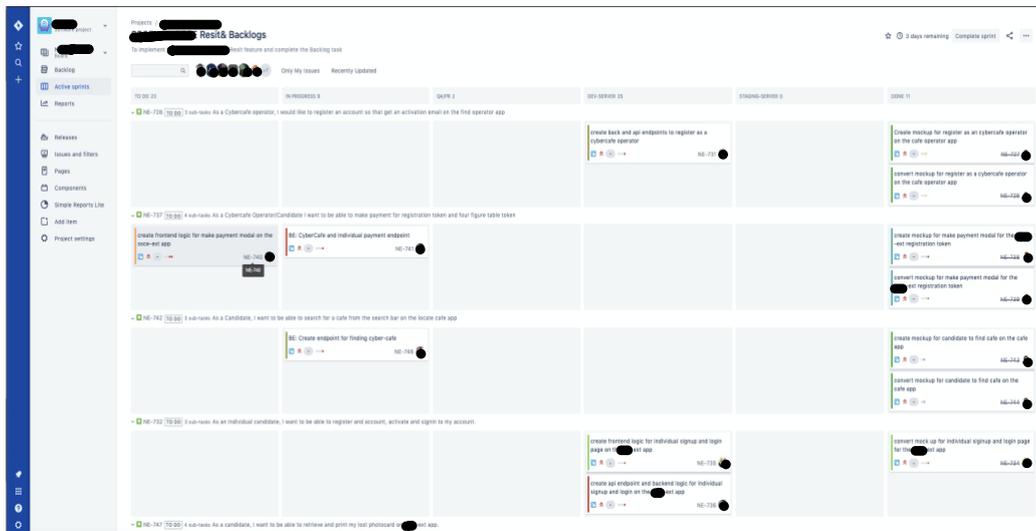


Figure 7: Kanban board for smaller projects

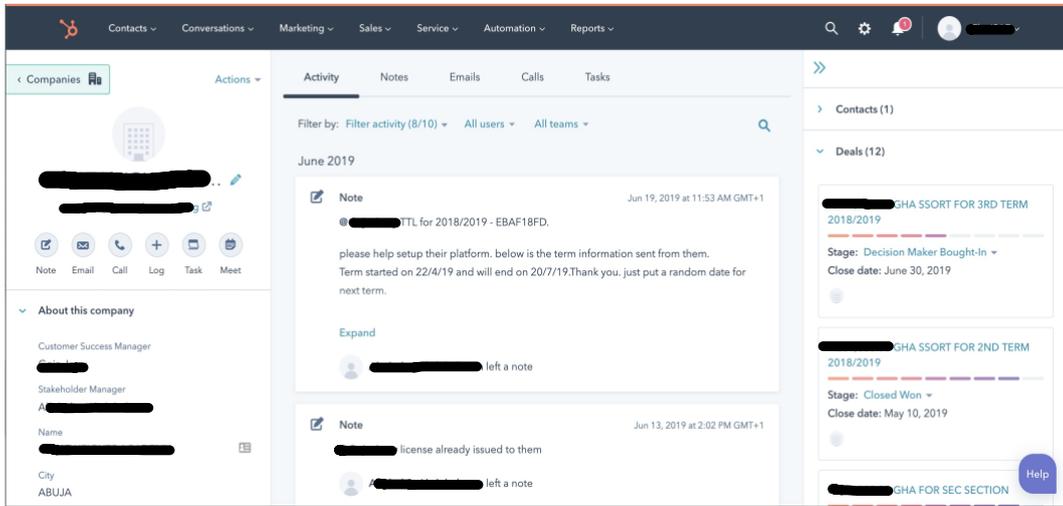


Figure 8: HubSpot board for inbound marketing

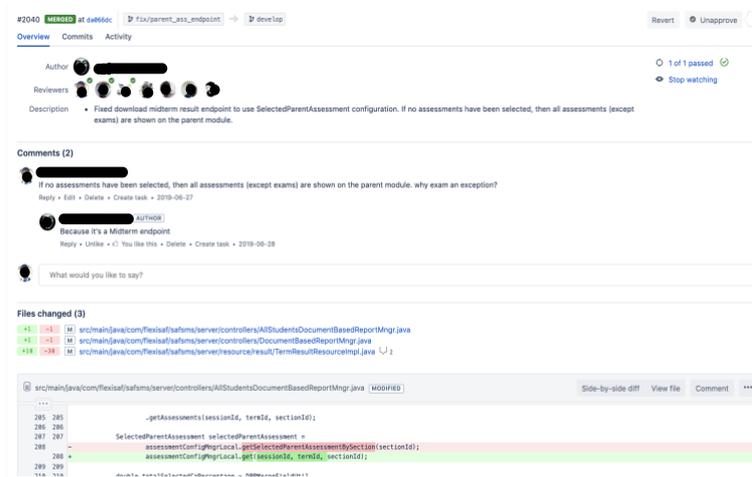


Figure 9: Big bucket for peer review of code, quality assurance, and version control

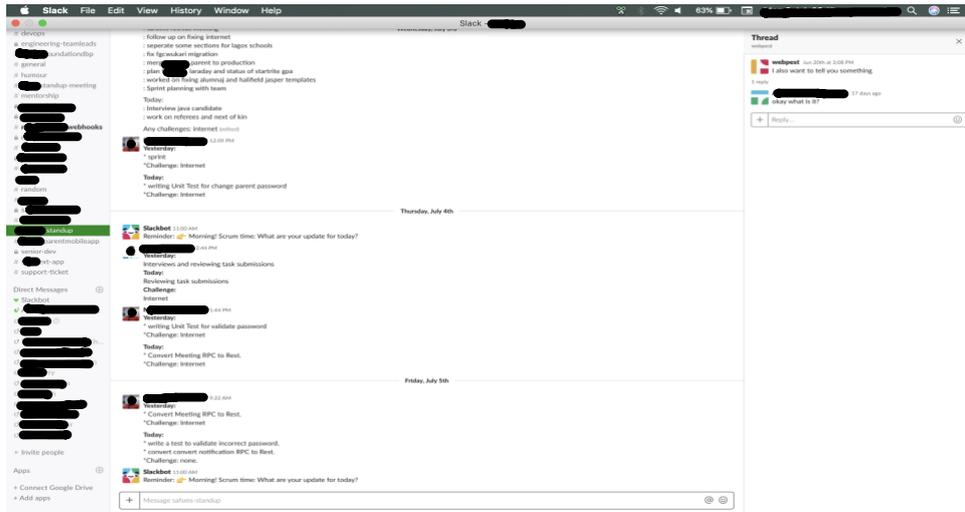


Figure 10: Slack for communication, collaboration, sharing of resources and integration

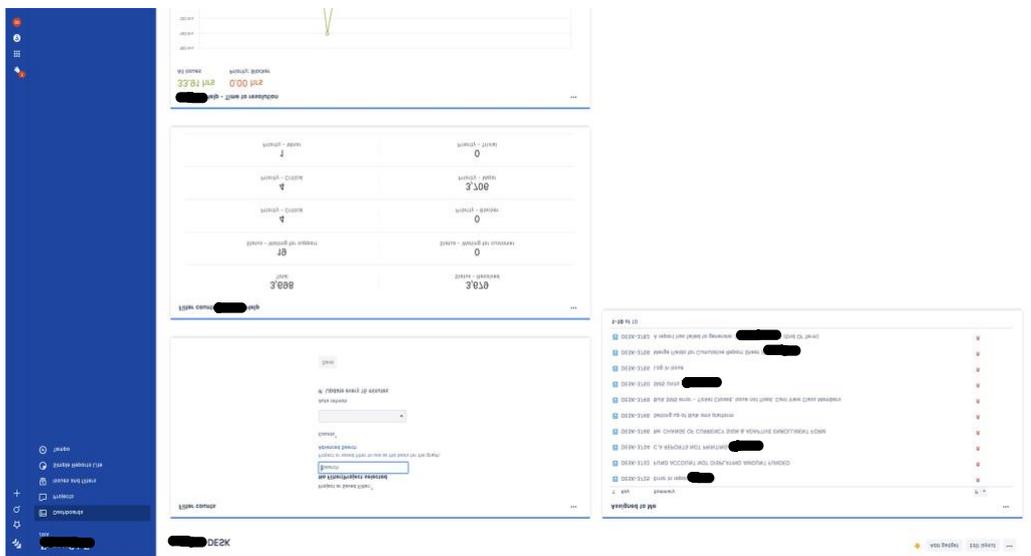


Figure 11: Jira CRM service board for monitoring support desk

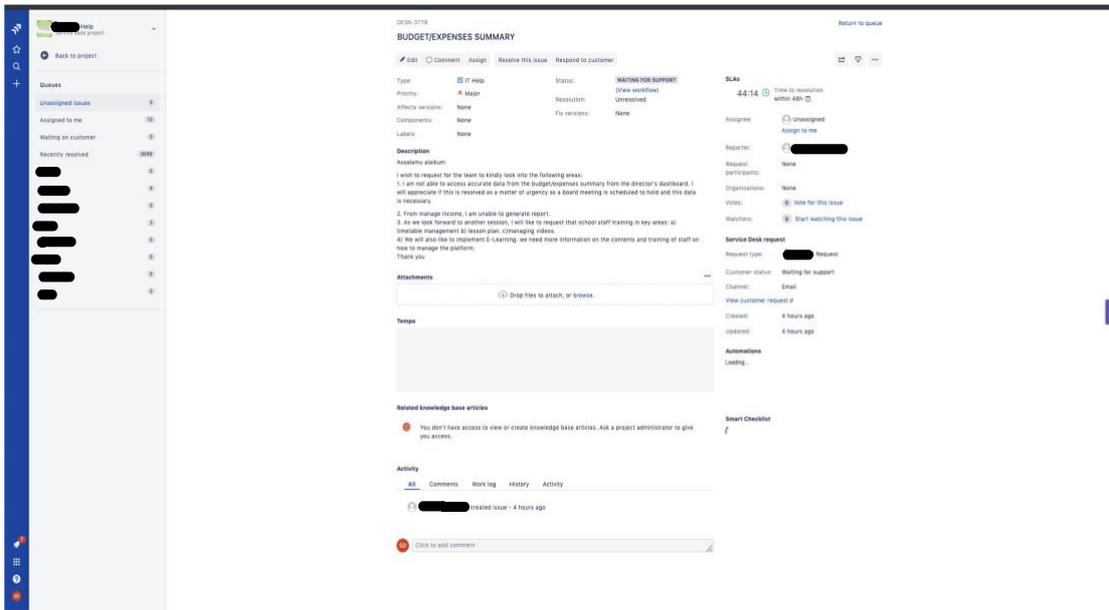


Figure 12: Jira service board for customer support and relations

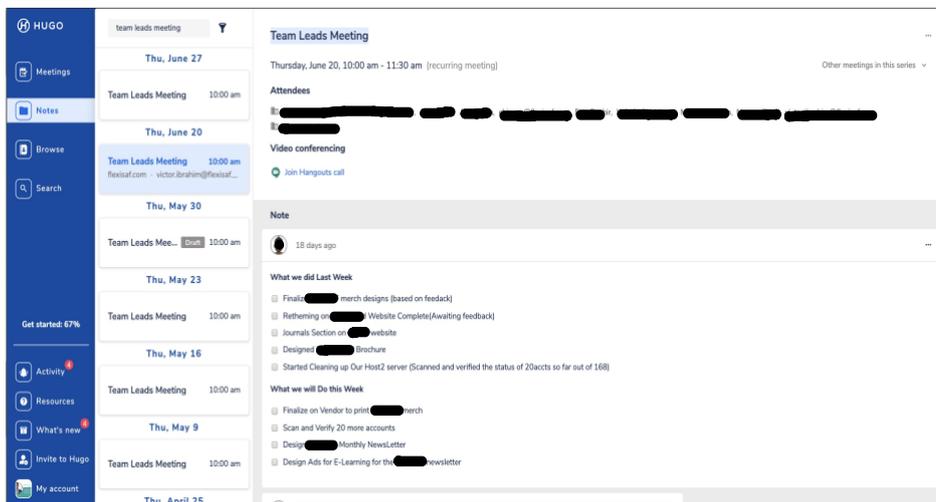


Figure 13: Team leads meeting notes on Hugo

Project Initiation and Assessment

When a new project is initiated, be it based on user requirement or an in-house initiative, specific project deliverables are identified and generated. During project briefs, project goals, conceptual plans and derivatives are drafted. In the initiation and assessment phase, concepts detailing the entire project are examined, which include the desirables and deliverables, the timeline and phases, the budget and resources, and the expected attribute of the product and the outcome of the project. Within the organisational context of C1, the Jira agile board is used for assessing, planning, tracking, and executing the entire processes of Edu projects. Jira is widely considered as a tool for effective utilization of agile methodology, which consists of two boards: A Scrum board and a Kanban board. As indicated in Figure 6 and 7, the team uses scrum board for new projects while Kanban is used for smaller maintenance projects. Other project management tools like Slack (for communication), Jenkins (for integrating codes and running crone job), bitbucket (for code version control), and Hugo.ia (for managing meetings) assist in ordering project work. These tools are adopted to react to the requirement of active user engagement, distributed nature of work, and the need for keeping work orderly and as a totality. In this stage also, an analysis of the organizational processes is carried out to identify the resources and manpower needed for a particular project and outline the different mechanism for ensuring that the project is kept on track.

System Design

In the planning, ideation and design phase, an in-depth analysis of the different processes to be executed, and a clear itemizing of the different steps needed to translate the concepts outlined in the previous phase into a functional product are identified. The gathering and review of requirements and the project processes to be carried out are examined as to determine their feasibility and achievability. As change is imminent and ambiguity is inevitable, Edusoft projects adopt a partial agile methodology. The partiality is partly due to the influence of a range of contextual and organisational contingencies, the limitation of time on both clients and practitioners to fully articulate requirements, and the oversimplification of agility as a quick and dirty approach. The analysis of requirement is mostly carried out in collaboration between the client representative or the project owner, and the project manager. For design, the data suggested an inclusive design approach i.e., adopting an inclusive way of thinking whereby the design processes are transient and evolving. For other small maintenance projects, Microsoft excel is used as a tool for ordering and managing re-design activities. The use of excel was due to the nature of the project and the number of team members (n=4-6). What this might suggest is that the nature of the project, the number of people working on the project, the uptake level and the resources allocated for the project determine the tools to be used for planning and analysing requirements and design.

System Development and Evaluation

In the project execution stage, the design, development, and evaluation of technological artefacts are organized and managed on the Jira board. The boards allow for the allocation of task to different people, which when considered as a whole would produce a functioning product. How then does the use of Jira to undertake and accomplish work makes work orderly or does it make work more difficult and messier? (Tendedez et al., 2018). What happens when plans don't work out? How do changes to plan get affected, get re-planned, negotiated, and carried out in the design and development phase? (Rönkkö et al., 2002). As plans keep changing, re-established plans might change also, which might undermine the possibility of having a concise mechanism for coping with circumstances when plans do not work out or even making actual changes to project plans. Although agile calls for responding to change over following plans, what happens when changes keep coming, and the order of work becomes complicated and messy? Or does doing 'partial agile' provide a way of following plans while also attempting to operate within the guiding principles of agile?

From the analysis, it can be inferred that when changes occur at the organizational level, the departmental OKR's for the quarter are reviewed in line with the company OKR's and established practices in the industry. When changes are client-driven, the project manager reviews client request with regards to how achievable and desirable the changes are – thereby emphasizing collaboration over negotiation. The ideas mostly expressed suggests that most of the changes from client are changes to a particular functionality and not the entire project. These changes are mostly carried out in re-design stage during design sprints or mock-ups. In circumstances where changes from the client are not minimal, the changes requested are evaluated and weighted among other planned activities, therefore minimising the effect of deviation from plans while also adhering to agility principles of responding to change and collaboratively working with customers.

More importantly are the consequences of reacting to ever-changing requirement and how such flexibility might bring about new challenges to the ordering of software project. The challenge mostly experienced in Edu projects are client-driven – of which is the issues of clients pressuring practitioners to produce fully functional product within a shorter time frame. Participants pointed to different scenarios where changes are affected in projects, but the hierarchical relation remains the same – somewhat 'you are buying, we have to attend to your needs, we are selling, we have to leverage on maintaining profitability'. What this might suggest is that agility supports being indifferent to plans and plan-following, but the reality might be that constantly responding to change might disempower practitioner's autonomy to determine the best possible action to take in certain scenarios.

There is also the issue of how conflict or misunderstanding between team members are handled and absorbed in work practice. For example, there appears to be a mismatch between what is 'ideal', 'what is doable', and what is 'good for business'. In different scenarios, team members are in constant deliberation of optimal ways to attend to a certain circumstance, in practical, democratic ways. As some

engineers work virtual, what brings them together, and the mechanism that minimises misunderstanding between them is that a backlog is created for each design chunk and for the project as a whole. The backlog is a list of all the task to be carried out to produce the functional product. What the backlog does is it guides team members towards achieving a working system. Another mechanism adopted is the use of bit bucket for code version control and Jenkins for the integration of different design chunks in the development environment. The progression of project activities and processes are monitored real-time on the board, which shows the transition of the engagement between team members.

System Deployment and Support

In the project management stage, the mechanism for determining whether the desired impact of the project is achieved are employed through training and support provided to clients. It is in this stage that documentation is carried out as a mechanism for keeping a repository of project ideas and not some comprehensive reportage of the procedure followed in developing a functional system. What the analysis shows are the different procedures, mechanism, and technologies adopted in ensuring that Edusoft projects are ordered and kept on track and within budget and time frame. It also points to how localised indigeneity's are translated into project work as to affect changes, minimise deviations, manage peer conflict, and keep projects on track.

In essence, what I have outlined is how Edusoft design projects are organized, structured, and managed using a range of methodological procedures, organisational strategies, and project management technologies. The different approaches adopted and used have indeed assisted in making work orderly and as a totality but have also created a stressful and a difficult working environment, which might ultimately lead to a messier work culture (Tendedez et al., 2018; Bjørn et al, 2019). From the understanding of the work of Edusoft projects, there appears to be no 'this is the way' or 'this is the best way', software practitioners appropriate, adapt, and ignore different options with regards to how they make their work more productive and less difficult.

6.2.2. The Politics of Adaptability and the Materiality of Change

Adding onto how Edusoft adopts the agile methodology in sensitizing project work, I identified six relational themes that emerged from the analysis of the interview transcript and ethnographic data. The themes outlined here are meant to account for the influence and impact of civic structures and organisational contingencies to the overall practice of software projects that does agility. The interpretation of such influences to the practices of Edusoft projects would show how well-known constructs, concepts and practices are interpreted and expressed within the framing of trans local circumstances – highlighting differences and difficulties identified with adopting a largely Western imaginary of what design innovation and software development entails.

Stakeholder Role's – Who Matters the Most?

In design-related field, when we talk of a user, it might suggest the end-use or potential user of the technology developed – who might be responsible for identifying the feature they would expect of the tool. When we talk of 'stakeholders', it might suggest a different set of users that would/could influence/impact what to design, the processes to design, and what the end product would be like. This theme concerns the roles of different stakeholders in determining how software products get produced and used in Nigeria, specifically as they relate to requirement gathering, informing design, and the evaluation and acceptance of end product. From the analysis, the data suggests that 'administrators' – consisting of educational managers/technologies of a particular unit in institutions or organisation – are the people that matter the most in eliciting what and what's not of system requirement and acceptability. However, educational tools are developed and used by different users, e.g., those that teach, learn, or manage the processes of teaching and learning, and those that manage the process of running educational enterprises. These users would have different interests, concerns, roles, positionality, and dynamics. The rationale, as suggested by most participants was that 'stakeholders' are paying for the products and thus the more important actors in project work. In a participant's words;

"I think the most part is that we engage with the stakeholders (management) in gathering those requirements.....If you are developing a product, you can go out and talk to people and gather some information from them or you can put yourself in the shoes of the user as no person is paying for it. But when someone is paying for such a product, they are actually the person that gives you the requirement" (EVF - Designers).

What this might suggest is that as educational tools are deployed for use by a range of users, the significance of the role of stakeholders would depend on the product to be developed. If the product is initiated based on some shared understanding of a particular problem (in-house), who matters the most would be the team member's working on the project (or in some instances the user group articulating the problem to be designed for). If it is a client-oriented project, the consideration of 'those paying' shows the political and economic relation of the role of stakeholder to the practice of software development. The emphasis is that due to the social situations (underdevelopment and economic hardship) and fragile nature of politics in Nigeria (which is about population and different factions), stakeholder's role matters when resources (people) are involved. A developer explained the implications of stakeholder's role in their everyday work by suggesting that;

"With regard to gathering requirement and evaluation if the administrators would allow the actual users of the system to be the key subject, that would be more interesting. This is because we believe that engaging with the actual users will determine if we should be doing it in the first place or not. But the case here is that administrators do the saying and evaluation" (F6).

Such ideas are generalizable to the Nigerian context, knowing the political atmosphere, and how socio-cultural affiliation influences the representation of people or shape the crisis of representing the perspectives of different people in design and development processes. The consideration of 'stakeholders' as the de-factor informant of project requirements might thus pose a range of developmental difficulties during design and development as work is driven by assumptions that are might not reflect end user's concerns and needs, thus presenting the greater chance of deployed tools not getting acceptance and adopted effectively.

Requirement Gathering and Analysis

Research has emphasised the importance of understanding user requirement and its analysis to the possible success of software projects. This theme relates to ideas about how requirements are gathered and analysed for the design and development of educational technologies. Such ideas overlap with issues raised about the role of 'administrators' and 'end-users' in software projects, and what that might suggest to the situated practices of Edusoft projects. Findings suggest the use of classic methods of eliciting requirement (interviews, questionnaires, online feedback forms, customer feedbacks and testimonies, product documentation, user research, system requirement specification documents). When a software product is based on some shared understanding of a particular problem, requirements are shaped by the practitioner's reflective recollection on the vital features and functionalities that a deployable tool ought to have. The project manager is responsible for explicitly identifying and analysing user requirements to the design and development team. Regardless of the technique adopted for getting the requirements, it is presumed that the Project manager has the experience and expertise to act as the system analyst, outlining the specifics of the project, conducting the feasibility analysis, and making decisions either in consultation with other team members or alone.

For the analysis of requirement gathered either from visionary user or through localised experiences, a better understanding of how work practices are to be framed and organised as to achieve set out goals is established. One might expect that a systems analysis or a team of analyst would analyse requirement gathered and communicate them to design and development lead. However, for Edu project in particular, the project manager is responsible for explicitly identifying and analysing user requirements to the design and development team. Regardless of the technique adopted for getting the requirements, the Project manager has the experience and expertise to act as the system analyst, outlining the specifics of the project. What this might mean is that the thematization of localised experience and the primary role it plays in the practice of software practitioners in Nigeria. In most cases, the project manager is the person that conducts the feasibility analysis of project ideas in the initiation stage, implying that most of the decision are made either in consultation with other team members or by the project manager.

The theme also stressed the ideas about the role of 'visionary user' (often referred to as 'stakeholder') and a speculative understanding of user's requirement in the planning and assessment of project processes and practices. This is supported by four respondents admitting that they gather requirements from the 'administrators' and 'managers' of the institutions (F1, F3, F6, F7), while others believe that the ideal way is to speculatively 'think for the users of such tools (F2, F4, F5) – based on their understanding of vital user's needs and expectancies. For example, some participants suggested that;

"Honestly, in most cases, these requirements don't necessarily reflect the perspective of the actual users.... we tend to guide users as to what might work or not. From my experience, some schools teach in their indigenous language as to facilitate better understanding, English is an alien language" (F1 – Business manager)

*"For that project, we spoke with **** (a government agency). There is no form of communication with the people that we are going to deploy for. Most times, when you deal with government, they just tell you this is what we want. They don't allow this seamless process; they just have documented requirements.... We acted as third parties because NITDA awarded the contact to different clients. We just come in and install the solution on the systems in the different centres.....When we got those requirements, we believe the people that came up with the requirement are the educational and development team that have Moodle in mind. If you've used Moodle before, you would know that this team have actually wanted use to use Moodle. There might be other platforms, and we could develop an in-house system. But the easiest and the fastest then was Moodle. We came up with and set up the platform, we find out that some of the requirements are not clearly set out. Making sure the system fits into what they wanted was a long process. Our conclusion was that the team in **** felt they were thinking like actual users, but they are actually not. They just wanted a solution that will fit into the context of what they felt was right- which was not necessarily the right thing. But we never had any contact with the actual users of the solution. "(F3 – eLearning Lead)*

"Our staff go to the field to gather requirement and talk to the university management and get their needs.... Although the students are the actual users of the tools. The problem is that we are designing for the students, but a lot of times is what the administrator wants that is provided. It's always a challenge, to be honest.... Ideally, it should be the users that tell us what they want and assist us in evaluating it. But the case here is that the administrators do the saying and evaluation" (F6 - Software developer).

This might suggest a mismatch between those that determine how the products get designed, developed, and evaluated and those that get to use them. A project manager suggested that due to the socio-cultural conditions and political contingencies of the context practitioners work, stakeholder's role matters in most of the project phases mainly become their role has a political and economic implication. The implications were illustrated by the suggestion that;

“As a company, our primary focus is not on providing services but making some impact to the community. The government might not care much for value for money as there are a lot of political forces behind any government project. Due to the nature of the political atmosphere here, 80% of our projects are private sector-driven, while 20% government. In case there is any kind of instability in government policies, we are at least covered or will reduce the effect on the business” (FF5 – Lead project manager).

As Edusoft is a business enterprise saddled with social and cooperate responsibilities, practitioners must be reactive to local situation and circumstances. The more prominent of which is that 'administrators' (both in government or the private sector) are the one's paying for the services provided, and any deviation or turbulence in the political system in Nigeria might lead to loss of revenue or client. The institutional structures and perception of software development practices in Nigeria rarely support the validation of local practices of work. Quality service is mostly considered when products or practices are imported (implying Western products are of high quality and their practices adaptable). The analysis of the process of project initiation, requirement gathering, and design thinking identifies how relations specific to the context of Nigeria are performed and enacted. From the localised perspective of practitioners, the abstraction that technological practices are cultural or politically neutral is falsified.

The analysis of the process of project initiation, requirement gathering, and the analysis of requirement and design have allowed identifying how relations specific to the context of Nigeria are performed and enacted. The relations bring forwards the scenic features of resources (people) at different stage of work – either through the identification of factors that and shape situated processes of work, the institutional conventions that frame the practices of software companies in Nigeria, or of the institutional cultures that creates the environment in which software practitioners do their work. What this shows is the complexities and the temporality of the Nigerian context, and of how such issues influence the processes of gathering requirements and the role of stakeholders in the process.

The Implication for Localised Practices – Educational and Designedly

Recently, the field of educational research has sought to reframe and reconceptualise the understanding of the role of technology in education – be it to support, mediate, augment, or enhance learning. This theme accounts for the implications of the more common pedagogical culture and

practice in Nigeria that might have influenced the practice of designing and producing educational tools. Within the broader context of the Nigerian higher education sector, the data suggest that much relevance is given to the delivery of content, rather than how the technology can shift and impact the processes, activities, and behaviours of different users. For example, three participants noted that the tools they develop and deploy are mostly concerned with the automation of certain instructional processes and learning activities rather than supporting an entire educational experience (F1, F2, F7). The notion of 'automation' has been problematized by Benjamin (2019) as a design instrument that can lead to deeper discrimination and segregation of social inequality. Here, automation is largely considered as emerging technologies benevolence that can replicate existing structures of successful running institutions of higher education. The emphasis on automation can also be regarded as a fixer of the digital divide that might exist in politically charged communities, primarily because technicity often presents it's as the culture of both production and use.

In addition, the data also stressed the fundamental relevance of identifying implications from indigenous languages (more emphasis), local pedagogical approaches, industry and government policies, and the plurality of people's ways of knowing to the practices of undertaking project work. This would determine how project practices would be made to support and promote the consideration of local perspectives and the extent to which tools developed would reflect local circumstances and needs. Two Participants suggested that;

"there is the need to first understand how we study, how our young generation study and the generations to come, and then look at the technologies that will fit into those ways of learning by those learners" (F6 - Software developer).

"We are informed by the practice of other stakeholders because basically when it comes to learning, learning is a very sensitive aspect to the economy. Before you venture into that, you have to know what the standard is, what's organization are key and what policies are in place. For instance, with NERDC (National education research development council), they have their course curriculum for the student at different levels. I don't know if you have heard of TESSA (teacher education for Sub Saharan Africa), which is an organization that has already set standards as well. So, these are the kind of things or parameters we tend to look at and make sure that Yes, our content and platform are in line with the established standard, both national, regional and international" (F5 - Software developer).

From the above, it seems obvious that practitioners attempted to understand the plurality of learning cultures and preferences and used different pedagogical strategies at their disposal to transform the understanding into actionable insights that could inform design practices. This is relevant as one can begin to identify how a mismatch can be minimised, a continual collaboration between

educational process and design practices supported, and the likelihood of developing pedagogical relevant and adaptable tools that can be scaled across different institutional context attained. A practical example is when the eLearning lead suggested that their eLearning system might have;

“a feel of local pedagogical needs attached to it. The person narrating the learning material has an African accent. So, the way she is interacting is actually the same way teachers teach in our institutions. This can be regarded as a local pedagogical consideration” (FF1 – Business manager).

This adds to the consideration of the implications of localised practices of designing and deploying educational tools, which could upscale the likelihood of user's seeing the need to adopt and use tools in their teaching and learning. It is important to establish the thinking guiding the processes of designing and developing these technologies. What this theme emphasises is that the design of educational technologies without careful consideration of pedagogical culture and epistemological differences in design reasoning might lead to a project not meeting requirements or failing altogether. As the design and development of innovation can be considered an abstraction of different considerations, there is the consideration of how (in)effective certain educational and design assumptions are to the overall process and success of software project work. In the broad context of doing work trans locally, the theme has raised a range of issues that necessitate a closer examination of how a range of practices and knowledge are to be used in appropriating and regenerating the practices of project work in a context such as Nigeria.

The Place of Effective Practices – Myths and Reality

The data identifies a range of ideas about the internal configuration and the external representation of software project work. This concerns how project processes and activities are organised and coordinated using a range of techniques and technologies; how requirements are transformed into design concepts, how to design scenarios are staged, and the strategies adopted in ensuring that a particular design and development methodology is adhered to. These ideas determine whether what is considered effective 'best' practices are developed from the situated work of practitioners or whether it is merely about the adoption and appropriation of conventional practices of software development. From the analysis, all three companies attempt to follow traditional software development and well-known design approaches (meaning prescriptive maps and scripts assists in organising and coordinating project processes/activities) in their work. There is a general agreement with regards to what is considered effective 'best practices' of doing work – often referred to with the concept of what's 'out there' and what 'works. As one participant noted:

“We learn from our own work, based on our experiences and with that of other people. We also attend workshops, summits, and conferences like eLearning Africa. But the main issue is

that when we attend such events, they usually tell you what's out there in the West. So, it is mostly about how we adopt things here” (F6 - Software developer).

What the account might suggest is that the localised practices of Edusoft projects are modelled through and aligned towards what the key players in the software development industry are doing. The ‘out there’ meant the practices that multinational companies develop and adhere to in their everyday work practice, whereas the ‘in here’ mean that situated practices of practitioners in Nigeria. Such issues have been of concern in HCI (Taylor, 2010; Avle and Lindtner, 2016) as they point to the power relations and oppositional binaries created by asymmetric differentiation of work practices. Practitioners assume that the key players have set the precedent for such practices to be considered ‘effective’. The presumption is that when a framework works in various circumstance and organisational context, a community will rally behind it, and which might warrant it being considered as best practice (presuming that the realities and circumstance in developed and developing countries would be relationally similar). Arguably, it is precisely in the process of adopting what’s out there that neo-colonial and dominant relations between organisational constructs and management knowledge are normalised and universalised. A closer examination of the ‘in here’ within the framing of what ‘works’ might suggest the sensitivity and creativity of practitioners as they work with the understanding of the situated circumstance and realities of their work. In a participant’s words for example:

“In ensuring quality of the platform as I said, we make sure we are designing with industry standard. We tend to look at what other stakeholders are doing, what makes the key players stand out, and how that applies to the Nigerian content, and then provide services that suite the Nigerian market, what is missing and how can I improve my product to be better in term of interfaces, user experience, user feel, make sure is mobile compatible, looking at speed optimization, so we put all this into consideration” (F5 - Software developer).

The reality is that they are not merely passive recipients or victim of appropriation but consider themselves as appropriators and co-creators of a new way of undertaking and accomplishing work. As dominant boundaries are transitionally and relationally shattered through the lens of translocality, one might consider how the localised procedure of OKR might have assisted in providing an effective way of empowering and transforming the situated practices of practitioners in Edusoft projects. The OKR is an organizational aid box that assists in ensuring that the reasoning, processes, activities, and actions of each team are aligned to the company mission. Figure 5 and 6 shows C1’s OKR and the engineering department OKR. From the figures, one can appreciate the orderliness and timely progression of Edusoft project works, having achieved 70% and 84% overall scores. What the situated practice of the projects might suggest are ways in which effective practices are created, contested, taken seriously, applied, and ignored. Indeed, there is a myth of ‘best practice’ and there is also the reality of how local

capacities and knowledge effectively inform the practice of doing project work. This might suggest where localised practices are more relevant and sustainable within the cultural context of Nigeria.

The Wickedness of Distributed and Collaborative Project Work

The ideas contained in the themes above connect broadly to generic consideration of how the conflicting issues created in work while attempting to adopt best practices might provide an avenue for recognising and harnessing localised practices. This is considered in relation to the sort of difficulties and issues designers and developers face in their everyday work due to attempting to follow conventions (regarded as dominant and prescriptive rules). We are particularly interested in the ‘mess’ rule-following might create as the consequences of the inevitable nature of collaborative and distributed work. I refer to these as ‘wicked’ problems mainly because we are not after finding a correct path but pointing to some neglected ideas of how to better understand the problem of design and development in a context where cultures are more apparent. To give an example of how designers and developers attempt doing distributed and collaborative is to account for how agility is done. The data suggested that practitioners engage in creating personas and use case diagrams, brainstorming ideas, have design and development sprint, conducting wire framings, develop user flow testing and evaluation, conduct design assumption test scenarios, design high fidelity mock-ups, develop design and development backlogs, develop content prototypes, and develop scrum as they allow quicker development, testing, and quality assurance. But most participants admitted that they do not follow the classic approach to agile scrum methodology (EVF, F1, F6, FF2, FF5), but rather a ‘partial agile scrum methodology’ (FF3, FF6). This is supported by a participant who suggested that;

“In this company, we are not doing the complete process of agile project management.... due to the nature of the way projects are coming, clients are always in a hurry, so we have to take it’s as it comes. If not, they will give it to a different company. We just do things and we just call it agile project management as we use Agile Jira board..... We are using the tools but in a semi-structured way. We are just combining different tools and approaches” (FF6 – Associate product manager).

What their perspective suggests is that although they have attempted to do agility, due to the influence of civic structures and organisational contingencies narrated above, the level of agility is greatly hindered. Doing ‘partial’ agility was warranted by a range of factors, including the nature of projects coming, the way requirements evolve and get contextualised, the limitations of time to follow agile principles, the contextual pressure from clients, and the temporal mismatch between specification and expectances. The situated practice of Edusoft projects is that work is an iterative and continual process of ideation and exploration of concepts – somewhat an opportunistic design process. Although different structural strategies are adopted in the process of opportunistic design, deviation is possible

and often inevitable. During the iterative processes, new requirements are discovered which warrant developing immediate solution before the next iteration. Another aspect of the wickedness of agility to localised practice is about how flexible one can be? To what extent one can negotiate? And to what extent one is willing to trade best practice for a business opportunity. As it appears, practitioners often become bureaucrat, lobbyist, and diplomats to secure project opportunities.

Another wickedness of distributed and collaborative work is the consideration of ethical in the processes and activities of Edu projects. The consideration of ethics is with regards to the implication of the practices informing the analysis, design, development, and evaluation of work in Nigeria. There seem to be an oversimplification of ethics, either the ethics of design approaches, the design of ethical issues into a product (disclosure ethics) or the ways in which certain ethical values appear in the end project developed. There is also the biased consideration of the perspective of people with any form of physical disability – disabilities of cognition, vision, hearing, and mobility. There appears to be agreement among participants that they tend to ignore ethical consideration and issues in their everyday work of designing and deploying educational tools. The implication of such a negligence is contained in a participants account that:

“Unfortunately, that the case in Nigeria that we tend to ignore ethical consideration. I think there is a reason for that. Software's are under-appreciated here. Things in other parts of the world that you would get paid so much the amount, you get paid 1/3 of that here. Because of that, people haven't got the stage where we are so comfortable that we start to worry about those with disabilities or ethical issues” (EVF - Designers).

As have established how the agility of practitioners is influenced and impacted by a range of contextual and organisational factors, there is also the consideration of the implication of taking documentation for granted. Although agility advocates for a working system over documentation, the methodological implication of documentation would be in how it can inform localised practice over times. It appears that documentation is often considered as 'dirty work', but an integral part of any project work. as most participants have noted that through the documentation of the processes and activities of each project, inspirations and insights can be gained when new projects are initiated. The issue of not taking documentation seriously has severe consequences as more resources and time must be allocated to upcoming projects, training and development of new team members will require more resources and effort, and the ultimate issue of the lack of a comprehensive awareness and representation of localised practice of work. The wickedness of taking documentation for granted would be more obvious when a project is to undergoes comprehensive redesign, the lack of documentation of previous design reasoning might lead to unnecessary difficulties and repetition.

The consideration of the difficulties and issues (considered wicked problems) created as practitioners attempt to following rules would in some part allow them to recognise and harness their

localised experience and perspective of the way to undertake and accomplish project work. With the sort of difficulties practitioners face while attempting to transition between different rules, it seems obvious that their situated practices are greatly affected as a result. This calls for a pluriverse approach to design thinking and doing where the rules for interpretation and representation are reoriented towards the social context and culture one designs from, for, and with.

The Influence of Civic Structure and Organisational Contingencies

This theme holds a whole range of ideas relating to how software project processes and practices are influenced, shaped, and impacted by the institutional structures and cultures in the Nigerian software industry. The culture of the industry is one that is driven by the assumptions of practitioners about design innovation and by the perception of the public as to how the industry operates and what it can deliver. The cultures are shaped by the regulatory practices in Nigeria, the convention of the industry, the sort of diffusion and adoption strategies widely used, as well as the behavioural attitude of both producers and consumers of innovation. All participants admitted that as they work in a complex and emerging industry, the structures shaping the industry are mostly driven by Eurocentric ideals (in term of commercialisation, competitiveness, and cooperate strategizing). With the social, political, and infrastructural differences between those Western ideals that they model their practice on and the realities in Nigeria, it can be inferred that the mismatch would greatly influence the possibilities of developing localised capacities and practices. As it stands, the major issue is that, as Mavhunga rightly puts; “the dilemma of knowledge production in Africa centers on how its structures, practices and concepts come to be informalized while inbound European ones were rendered formal” (Mavhunga, 2017 p. 10).

Regardless of the influence and impact of such a misguided and oversimplified assumption, all participant admitted that they had to devise ways of knowing and doing design that appeal to the cultural and institutional structures of the environment that they design for and deploys to – somewhat moving towards the relational and the pluriverse (Escobar, 2018). This is illustrated by a participant who suggested that project practices are aligned to deployable context, in term of cultures, religious affiliation, language (strong emphasis), local politics, and economic realities of users. The experience was with a school that requested that their academic transcript to be designed in the Arabic language mainly because it is an Islamic school. In his words:

“So, we had this client that insisted on having their report sheets in Arabic. We said OK fine we'll do so. But they should inform us on the percentage of parent that understand Arabic since the report sheets are meant for them to know the performance of their children. Then they realize that what they are asking for is feasible to us but not relevant to the immediate environment we find ourselves in” (F1 – Business manager).

“Looking at the culture, we now realize this language barrier in Nigeria and that there is tribalism associated with products.... if you have the platform in such a way that he/she is able to navigate in Hausa now it appeals to the user’s emotion, creating that connection to the platform” (F5 - Software developer).

This is a typical account of what to expect from a client that is quite aware of the influence of the culture of the education and the context in which educational tools are to be deployed. There was also the recurrent emphasis on the issue of client pressure to produce tools within a shorter period, the perceived under-appreciation of software products by the public, and the misguided understanding software development to be more about adopting open sources software (OSS). Although practitioner adopts an agile methodology to make work flexible and manageable, due to the constant pressure from clients and to react to those pressures as to retain clients in the competitive environment, some critical processes of work are neglected as a consequence of being overly flexible and reactive. This is emphasised by the engineering team lead who suggested that;

“The main thing that is affecting our processes is the manner in which projects are coming in and the duration of projects. There is no time to do quality assurance. The main priority is trying to meet the deadline as we are always on a rush. They transfer the pressure from the client to management and onto the team. This I think is the main thing that affects the standardising of processes or implementing the western way of doing software projects in Nigeria” (FF6 – Associate product manager).

As agile might not account for such contingencies, what stands out is the indigeneity of practitioners in understanding such issues and in devising means towards minimising or absorbing their effect in their everyday work. It is the ‘cultural agility’⁴⁰ of practitioners Edusoft project processes and activities that could minimise following neo-colonial rules while emphasizing the creation of new rules of work that are situated, transitional and transnational. Building cultural agility into their practice would therefore provide ways of building lasting collaborations and valuing varied perspective in multicultural context they work. This is important as it would provide a sensitive outlook towards the thinking and practice of technology in education. What this theme points to is that these issues are not a simple intellectual or theoretical conceptualisation of marginal perspectives but focus our attention on a whole range of factors that are broadly about the civic structures particular to the Nigerian context.

In a nutshell, the analysis of the practice of Edusoft projects emphasises findings widely reported in the literature concerning the implication of doing agility in collaborative and distributed work (Tendedez et al., 2018; Vallon et al., 2018), and specific to developing countries (Kunda et al., 2018).

⁴⁰ Cultural agility is regarded as a sensitive practice of developing the capacities of teams to work in cross-cultural situation, to respond to disruptive changes, and to take up the culture of continual engagement with others (Caligiuri, 2012)

It also identifies similar trends to findings that the Nigerian software industry work practice is more concerned with automating manual work than of creating a whole chain of system (Ogunyemi et al., 2016a, 2016b; Mursu et al., 2018). Findings also point to lack of awareness of end user's positionality in ensuring acceptability and the success of a project (Dingsøy et al., 2012; Kunda et al., 2018), the rampant adoption of development methodologies mainly because that's what the key players in the industry are adopting (Ogunyemi et al., 2016b), and the likelihood of abandoning situated practice for Western conventions (Ogunyemi et al., 2016a). There was an emphasis on the informality of project processes and practices, the over-politicisation of design decisions, and the trade-off of profitability over nurturing local capacities and capabilities, explicating earlier findings by (Vallon et al., 2018). These factors can be relatively attributed to the political instabilities and economic difficulties practitioners must face in their work, which characterises the volatility of the Nigerian software industry.

Apart from the implications of the themes developed, findings point towards the idea that designing and producing software using agile is an expensive gamble at the crossroad of one's organisational practice of doing agility and of one's personal productivity and development (Tendedez et al., 2018; Bjørn, 2019). As it stands, practitioners are innovating for survival and form below the radar, which might suggest the 'darker side' of project work, and in particular agility (Bjørn et al., 2019; Bjørn, 2019). It also shows the imbalance between standardization practices (through following of rules) and the needed flexibility that agile espouses – restating some of the classic problems of CSCW as emphasised by (Tendedez et al., 2018). This might suggest that project work is not entirely an engineering phenomenon (the focus has shifted to software projects), but also a thread of socio-cultural, economic, political, and material relations that are ultimately determined by power relations.

6.3. Deconstructing Technology Design and Development in HCI4D

While research in HCI has emphasized the importance of understanding the nuances of lived experiences in design thinking processes, current frames of staging and analyzing the design and deployment of learning technologies might not accommodate the spirit of indigenizing and decolonizing education in Africa. Recent efforts in HCI4D have demonstrated the importance of socio-cultural, political, material, and ontological alternatives to framing of technology design paradigm and practices (Irani et al., 2010; Philip et al., 2012; Winschiers-Theophilus & Bidwell, 2013; Kapuire et al., 2015). However, it appears that there are unanswered questions of whether postcolonial (or neo-colonial and patriarchal) paradigms are essential in adequately interpreting and representing African experiences in design thinking? (Ambole, 2020). Or whether radical tactics are needed in pushing the boundaries enacted by colonial conditions of design knowing?

The implication of such questions is that of whether the adoption of discursive structures that have presented the African imaginaries as 'primitive' are necessary (and applicable) for the emancipation of African identities? Or whether there is the need to re-draw the thread linking Western solutions and

prescriptions to African problems and conditions? Such issues have begun to resurface in African HCI discourses as they are receiving considerable attention because conventional design practice embodies imperialistic logic that considers certain perspective more important than others (Winschiers-Theophilus & Bidwell, 2013; Kapuire et al., 2015). The emphasis here concerns how localized imaginaries, situated cultures, and emerging practices of design demand a paradigm shift in African HCI (Bidwell et al., 2011; Winschiers-Theophilus et al., 2011; Awori et al., 2015; Sikhuphela et al., 2018; Peters et al., 2019).

Regardless of such efforts, research has shown how the paradigms informing design and development projects in the global south are rooted in Western epistemologies that are at best sexist, and at worst racist (Dourish & Mainwaring, 2012; Bidwell, 2016). In developmental discourse, the prevailing narratives has been about quantifying basic needs, proliferating sufficiencies, obscuring limits, creating scarcity, and normalizing dependencies (Esteva & Babones, 2013). Even in post-development discourses that have championed for self-reliance of communities, critiques have pointed to how its common approaches – from the economic and infrastructural projections of Goldman Sachs to the progressive and philanthropist approaches of Jeffery Sach, and the activist/intellectual position of Wolfgang Sach – oversimplifies the possibilities for addressing societal challenges brought about by the appeal for directed forms of globalisation (Esteva & Babones, 2013; Esteva & Escobar, 2017).

Such misguided narratives have also led to paradigm shifts in international development and science and technology research, from a largely economic perspective of innovation in Africa to a collection of emerging discourses that were driven by situated epistemologies, evolving methodologies, and everyday lived experiences (e.g., Winschiers-Theophilus & Bidwell, 2013; Mavhunga, 2017). For example, Mavhunga collection of essays shows how African scientists and artists produce knowledge outside formal laboratory or institutional settings (Mavhunga, 2017), thus offering a different reading of creativity, expertise, and innovation from Africa that emphasize “knowledge that will subject economic growth to human needs rather than subject human needs to economic growth and development” (Mignolo, 2015 p. 118). Or more so, advocating for knowledge systems that are directed by community-wide aspiration and not individual needs. This is primary focusing attention on how internal strength and capabilities can be amplified as a means towards economic development, and not the emphasis on the provision of external interventions to create social changes.

In ICTD, the emphasis has been how on the ‘need-based, market-drive, and problem-solving’ paradigm pushed by the ‘Washington consensus’ might be less appropriate for bringing about social changes to existing structural disparities in the global south (Toyama, 2017). An alternative, as suggested by Kentaro Toyama, is that aspiration-based approaches to social development are longed-term, can nurture human abilities and be operationalised and are motivational forces to inspire changes in both personal behaviours and structures of society (Toyama, 2105 2018). Taking such narrative into focus in HCI4D might point to how the colonial matrix of power has constructed the political and material

state of the computing system in ways that depict the future formation of 'citizens-subjects' into 'entrepreneurs-consumers' as celebrating differences while suppressing diversities (Dourish & Mainwaring, 2012; Irani & Philip, 2018 p.7). The fundamental issue that remains is that of the material consequences of continuously experiencing modernity in its fullest forms without deconstructing its vocabularies, its templates, and its models. Arguably, the failure to interrogate the particularities of Western modernity in the postcolony (as in the here and the now) might signal the performance of a colonizing reality that promise growth and progress but instead threatens the prospects of being and living in a satisfactory society.

Adding onto how the colonial matrix of power might direct the relations of technological creativity, political economy, and geopolitics of knowledge, the remainder of this section situates the issue of futuring African HCI in different accounts of identity formation and cultures of innovation. The emphasise is not mapping out the discourses that inform the trajectory of African HCI, and certainly doesn't suggest how the politics of innovation can make clear ways in which design futures and defutures (Fry, 2019). It is instead presenting a particular reading of how the politics of design - here design as a system of pre-configuration or correspondence that emerges from the interactivity between things that populate the social world e.g., design objects, design processes, and design agency - could inform African identities of innovation in HCI. Such framing presents design's main project as reimagining the world in ways that makes it possible for the social world to act back on us and redesign us. This is ontological in the sense that in remaking the objects that populate the social world⁴¹, the politics of design provide the basis for approaching the future of African HCI as a historically dependent *wicked problem* that demands context-specific *wicked options* that are both generative and contestable (Niskanen et al., 2021)⁴².

Although conceiving the future of African HCI identities as an ontological design problem of the coloniality of spaces and time might be new (Dorst, 2006), the major issues identified concerning wicked problems in the literature related to its conceptual ambiguity and abstraction, its normative approach to solution findings and its lack of analytical utility in providing practical solutions (Niskanen et al., 2021). Regardless of the effect of framing specific structural issues within Western epistemes that are hegemonic, recent efforts have begun to examine how wicked problems are framed and applied to the African context. For example, Niskanen and colleagues conducted a systematic literature

⁴¹ Here, ontological design is considered a way of knowing, forming, and practising the world in its particularities. To Arturo Escobar, design is underpinned by different ways of thinking about the world and how to practice it; be it the rationalist tradition of the sciences, the ontological dualism of Eurocentric modernity, or the relational ontologies of indigenous communities (Escobar, 2018).

⁴² Wicked problems and by extension emerging features of African HCI identities are considered indeterminate and residual concepts that are difficult to formulate and adequately frame (Ranabahu, 2020; Light et al., 2020). With no specific formulation, such issues demand diverse interpretations of the functions of problem-making as what might appear to be a plausible solution might not a solution after all but a glimpse of a high-level problem-finding activity with a contentious subject matter of its own (Douglas, 2021).

review of how wicked problems have been adopted as a descriptive and theoretical frame for diagnosing everyday challenges and opportunities in Africa.

This led to the suggestion that such residual concepts become manifested in contemporary discourse because of historical dependencies and contextual inter-relations that are both problematic and productive (Niskanen et al., 2021). On the one hand, such relations are problematic as Western discourses have continuously portrayed inventions related to the descriptors of Africa as problems that needed modernistic approaches to staging and analysis. On the other hand, the dependencies can be considered as productive as could provide avenues for tracing the epistemological orders that have constructed the imagination and subsequent expression of Africa as an ahistorical entity to be named, studied, and explained. And it is through approaching specific epistemic inventions as units of historical analysis that unpacking the coloniality of the social imaginaries that African matters of design *know of* and *think for* can be entertained and established. Therefore, the discussions in different parts of this section will attempt to show how approaching the African social imaginaries as an ontological design problem draws into focus the complexities of futuring inventions imagined and practised within the Western canon of expression.

Such efforts have begun to show significant implications in our understanding of how design thinking shape the identities of people, their practices, and their geopolitics. As such, the efforts to deconstruct the practices of technology design and development identifies with discursive trends that situate design problems in the locale of communities (Bidwell et al., 2011; Lazem, 2019), working with/by the complexities of diverse experiences while ensuring that the ‘knowing’s’ influencing design are not pre-determined but evolving within the context of making. Such an approach to design thinking has led to the consideration of how the design of localized educational technologies might support diverse educational requirements (Ssekakubo et al., 2013; Eagleton, 2017; Uchidiuno et al., 2018; Uchidiuno et al., 2019) while also fostering adoption and acceptance (Ssekakubo et al., 2011; Adamu and Benachour, 2020).

As most of the paradigms, methodologies and design lenses informing the processes and activities of design and deployment are Eurocentric, it introduces the subtle requirement of identifying how the collectives of situated imaginaries and epistemologies can reorient African culture of design and African designs in culture across transnational locales. The situated orientations the section draws from are not considered as a new postcolonial or decolonial paradigm in computing, nor a ‘standardized cultural package’ for African design (Dourish, 2020). Instead, the situated positionality is to be considered as ‘outlook’ that is critical of the current assumptions shaping design knowing and thinking in HCI4D. This is developed on the premises that what is widely regarded as the ‘postcolonial’ (Irani et al., 2010) does not denote an ‘aftermath’ of the marginalization of indigenous perspectives in the manifestation of design work, but a ‘next’ cultural practice of disempowering indigenous relations through charismatic conditioning of the politics of design (Ames, 2019; Dourish et al., 2020).

As such, the next sub-section attempted showing how postcolonial approaches to HCI4D have contributed to the asymmetric relations of design cultures in transnational spaces. Firstly, it examines the argument of postcolonial approaches to computing through the lens of Orientalist discourse in an African context and attempts to illustrate how it might have endangered the ideas of an African approach to HCI. This points to subtle shortcomings in its initial philosophical orientation, which might portray its tactics as a mirage of 'paternistic' and 'eurosplain' ideology that exemplifies how the 'Other' is to be approached and represented in the cultural practices of computing. This thus requires a critical outlook towards understanding how the tactical postcolonial orientations and its associated methods of cultural engagement might 'underpin and meet the same objective' (Alemazung, 2010) that has brought about the misappropriation of indigenous practices of knowledge in Africa. Secondly, it reflects on the continual efforts towards defamiliarizing the practices of design in transnational spaces, as a precursor for decolonial and pluriversal framing of design in HCI. Arguably, the critique and reflection can be considered as taking the postcolonial-decolonial narrative a step further, not just as an intellectual exercise, but one that places the inspirations and conditions of diverse African communities at the forefront of technological practices of design.

6.3.1. An Orientalist Critique and Reflection on the Post-coloniality of HCI4D

Historically, postcolonial discourses focus on power and knowledge creation: how language, culture and values are imposed upon dominated groups by dominant societies. Edward Said's Orientalism discourse emerged as a scholarly undertaking based upon an ontological and epistemological distinction between the Orient and the Occident, or the traditions of the global South and the global North (Said, 1979). The orientalist thesis strongly argues that Orientalism at its simplest manifestation is a Western form of dominating the thought processes and narrative of the Other, which has significantly assisted in shaping the grand cultures of the West (Said, 1985). His seminal work deals with the cultural, political, and material effects of coloniality - with coloniality being the by-product of colonization and colonialism⁴³. Early writings in postcolonial theory challenged the universalized narratives of Western knowledge by responding to/reacting to the implications of the epistemic dependencies of colonized people to Western histories, cultures, vocabularies, and concepts. Such a way of presentation might be considered as portraying the vitalities of Western epistemes, which in effect has made it plausible for some contemporary intellectuals to embrace the idea that objective knowledge is situated in Western spaces of imagination and discovery. While some could argue that the arguments presented in earlier sections of this paper are underpinned largely by Western

⁴³ For example, the common understanding is that colonialism is not just an episode in contemporary history but a timeline of coloniality-as-modernity in action. Colonization, however, is widely considered a historical process of distorting subjectivities, imposing authority, and controlling the material economies of indigenous communities. This might thereby present coloniality as a by-product of colonization that uses techniques of power in defining systems of organizing resources, expertise, labour, capital, and technology.

vocabularies of reflection, one can identify how the detachment and linkage with existing literature could denote the use of its discursive practices as a weapon against hegemony.

Regardless of the vitalities of postcolonial narratives in decentring the symbolic system of modernity, research has continuously shown how postcolonial thinking is embedded in post-structuralist and post-modernist thoughts of the West (Mbembe, 2001; Mingolo, 2015). In response to the narrative of the colonialist, earlier framing of postcoloniality might have exhibited forms of epistemic exploitation through its practice of speaking for and writing about the conceptual Other, which inevitably silences local voices and stories (Irwin, 2006). Although it has proven to be useful as an anti-imperialist sensitivity for thinking about the effect of coloniality/modernity, critics are sceptical about its essentialist focus on identity and geographical narratives, and its one-sided outlook toward other modes of historicization (Harding, 2013, 2014). Others have suspected Orientalism's rhetoric of blame game that demonstrated that the discourse of the postcolonial was more about the scholars doing the writing than the people from different geographical locations that the orientalist thesis presents and vaguely represents (Varisco, 2017). However, a closer analysis of some of the deconstruction traditions adopted by Gayatri Spivak in subaltern studies and the psychoanalysis approaches of Fanon Frantz in African studies would show that one cannot detach the scholar from the text, but instead, critical reflection ought to focus on how the intellectual creates the imaginary Other and thus unconsciously imagines itself in the process. This points to the subtle conclusion that not all postcolonial writings are viewed from the lens of oppression and domination.

Considering the above, the foundational ideas of postcolonial computing originated from the work of Lily Irani and colleagues where they explore the thorny issues of technological innovation, political economy, power relations, and cultural practices in transnational spaces of technology production and consumption (Irani & Dourish, 2009). Although a nascent idea in HCI, the legacy of postcolonial computing lies in how it brings to focus the ways on which the legacies of colonialism are embedded in transnational encounters and exchange of innovation. Drawing on the analytical sensitivities of postcolonial theories, science, and technology studies (STS) and computer supported cooperative work, the orientation focuses attention on the complexities of techno-political relations that are affected by the logic of coloniality (Irani & Dourish, 2009). In computing research, it is widely considered a flexible and robust approach for thinking about the socio-cultural, political, and materiality implications of the encounters between developed and developing spaces. Although critiques have pointed to significant shortcomings in its engagement with the locality of the global and the globality of the local (e.g. Taylor, 2011; Ali, 2016; Lazem et al., 2021), postcolonial computing as an analytical lens has been adopted in the studies of technology design and consumption (Wyche et al., 2015; lin Kaying et al., 2019; Chandra et al., 2017), residential mobilities (Ahmed et al., 2013), and, surprisingly, religiosity (Mim, 2021) and witchcraft (Sultana & Ahmed, 2019).

More importantly, what these studies have shown in HCI4D discourse is that the postcolonial orientation raises a new set of questions that engages with the dynamic relations of power in unequal design spaces. This shift has furnished the understanding of how dominant HCI methods of innovation disregard local practice of healthcare in rural Bangladesh (Sultana & Ahmed, 2019), or of how local practices impact the adoption and consumption of digital technologies in Indian and Bangladeshi bazaar spaces (Chandra et al., 2017). As an alternative orientation in HCI4D, it has proven useful in contextualizing how the construct of power-knowledge operates in shaping the subjectivities of indigenous communities – be it from the political and material implications of importing technological innovation, or on the potential impact of appropriating transferred technologies within existing institutions and structures. However, how the nascent ideas of postcoloniality are continuously performed in developmental or computing research from Africa is an issue that is scantily addressed.

As such, the reflection on specific dimensions of the post-developmental and post-colonial commandment points to how its tactics might lead to another regime of compulsive indoctrination under the cacophonous proliferation of ‘alternative/alternative to’ modernity (see. Subramaniam, 2017 for similar arguments). Arguably, the critical reflection on the utilities of postcoloniality and interculturality would show subtle shortcomings in the primary argument concerning the needed shift in HCI4D paradigms from developmental studies to a collective of postcolonial science and technology studies. It is important to highlight that the reflection is not attempting to show how the legacies of domination might have suspended equitable interactions in design work but instead point to the material implication of generating counter-narratives that might not necessarily deconstruct the taxonomic models of development (Irani & Dourish, 2009). This is developed on the understanding that although the value of interculturality has brought into focus the hybrid and generative aspects of culture in transnational design (Heimgärtner, 2013), what is relatively missing in the postcolony of African HCI is the understanding of how postcolonial encounters could reconcile (or even reproduce) the conflicting parameters directing the approximate adaptation and translation of cultural attributes in such spaces. As research is yet to establish how integrative cultural forms could emerge from the contact, conflict, confusion, and coalescence of culture in community collaborations, there is the need to re-examine the consequences, in material and political terms, of hybridizing conflicting cultural elements in transnational space of innovation – and this is what this sub-section seeks to address.

Theoretical Hybridization

In the preceding section, the reflection points to how a particular analytical orientation has raised new questions that engage with the colonial histories and realities of computing systems. Although a nascent idea in HCI, it has drawn upon postcolonial theories of science and technology studies that explicate how the relationship between technology, politics, power, and knowledge shape technological innovation. Few conceptual issues can be identified by the dependence on the

paradigms of postcolonial theories and STS studies against that of critical and cultural studies. First, there is the prevailing issue that relates to the implication of theoretical hybridization, particularly the effect of concatenating distant ideas to do the heavy-duty analytical work of unsettling coloniality. For example, in postcolonial theory, the focus has been on how to interrogate coloniality through the critical analysis of its performance in different aspects of institutional and social life. In science and technology studies, the emphasis has been on how the analysis of the dynamic of cultures, politics, and economies can inform the framing of innovation in diverse social settings. Relying on these two distinctive discourses lead to the second issue of how a postcolonial orientation can be developed in computing research without the critical questioning of the historical narratives underpinning the discipline within which these theories were founded upon. Or rather on how an alternative and a hybrid formation of design can be entertained when the link between the colonial and the postcolonial, the developed and the developing are entangled by conditions that are equally problematic.

Adding onto the complexities of relying on the utilities of postcolonial theories and science and technology studies is the argument concerning the assumption that Western sciences are universal – one that portrays a 'culture of no culture, or at the borderline an 'a-cultural' or worse 'neutral/value-free' and not 'multi-transcultural' (Harding, 1994). With the awareness that there is no wholesome position of neutrality in the politics of design, attempting to uphold neutrality is a position in its own right – and certainly, one that could reinforce orders that might not be equal (in African HCI, see. Smith et al., 2020). Consequently, it appears that postcolonial STS is veiled under the hegemonic view of Western modernity that assumes a statutory position of being apolitical and beneficial to the progress of all. This abstract positioning presents postcolonial computing, at least to other societies, as a cultural invasive phenomenon that exhibit traits of missionary rescue orientation in design work. Although it does not advocate for a sympathetic narrative of the aftermath of colonialism, the interpretive frames directing its interpretation of transnational design work mirrored the classification of experiences across the dichotomy of 'Us winners' and 'Them losers' (Taylor, 2011). This takes shape in how its calls for a hybrid formulation of design work might not have expanded HCI's outlook towards the particularities of what's going on 'in here' by paying attention to the historical force shaping what's happening (and not happening) 'out there'.

A closer examination of its tropes of articulation and translation in social design spaces might have risked promoting hybridization as an apolitical network that views the activities and processes of designing as politically given (Irani et al., 20210) – which in essence reproduces the tactics of interpreting from 'in here' for 'out there' that make strange the Other (Taylor, 2011). This way of thinking about the politics of design links to the benevolently paternalist practice of design as we know it, which in principle is about addressing the conditions of the other. The concern here is that the hybridization of different ways of knowing might not be premised on the multi-directional articulation of meaning between cultures, which Alex Taylor has identified as providing "a seductive theoretical perspective

that neatly joins things up when looking from “here” “out there” and, coincidentally, offers a convenient parallel to the technological metaphor of networks” (Taylor, 2010 p. 688). In its simplistic manifestation, this way of thinking about the effect of coloniality in the translation of domain-specific aspect of design denotes a common scholarly practice where a persistent political agenda of normal (mostly Western) and exotic (mostly non-Western) mode of knowledge production are advanced in HCI.

As Feminist research has continuously shown, conventional science and technology perspectives lack a global preview as they are predominantly Western (Harding, 1994), even with their intersectional outlooks (Bidwell et al., 2011; Lyons et al., 2017). Does it suggest that modern ‘science’ is discursively and culturally Western? ‘How’ Western and which Western among the many diverse traditions of the West. When such issues are brought to bear in computing research, does it imply that one can’t be modern without being Western? Although commentators pushing for Western scientific agenda have suggested that there might be multiple dimensions of modernity beyond Westernization, what the postcolonial approach often fails to account for is how through design, other features of modernization are excluded in the dominant narratives of technoscience.

Arguably, the postcolonial commandments in HCI4D can be considered as domesticating its arguments in science and technology programmes as a manifestation of an advocacy for developing concrete and applicable knowledge that develop son existing scientific knowledge. However, it is argued that the advocacy for applying scientific knowledge in computing systems design goes further in enforcing the authority of rationality against relationality and economic progression against ecological prosperity. This might thereby present the analytical orientation of postcolonial commandment as practising ‘Winching’ and ‘Sharrock’ moments as applied to the context of postcolonial settings (Dennis & Rooke, 2019). For Dennis and Rooke, “a Winch moment is the point in an account where something not required in the analysis is smuggled in to facilitate the making of unnecessary and unwarranted claims. A Sharrock moment is an incoherent or nonsensical premise or assumption made to get an account off the ground in the first place, without which little of the account remains” (Dennis and Rooke, 2019 p.202). The inferred moments of the postcolonial orientation can be linked to the second wave of HCI that champion for widening collaboration across discursive traditions, and its expansion programmes that lead to mobile computing and ubiquitous computing as sub-themes of computing research.

With the awareness of the analytical status attached to 'postcolonial' traditions in the global South, arguably, the postcolonial computing argument can be considered as practising 'sleight of hand' in directing a paradigm shift in HCI4D research. This is developed on the understanding that earlier traditions underpinning postcoloniality in different parts of the world have reduced the issues of interrogating modernity/coloniality to tropes of institutional identities and subjectivities (Mbembe, 2021). As argued by Mbembe, when the emphasis of 'post-' narratives is on emancipation-in-the-making, one might lose sight of the power dynamics of the postcolony, i.e the "in-just-that-moment assemblage of

people and things that enact just-that-way-of-seeing/understanding the world” (Taylor, 2010 p. 691-692). The accusation of the sleight of hand of the postcolonial commandment is not unfounded as the failure to engage with existing criticism and discussion in postcolonial theories or postcolonial science and technology studies signal an unfortunate kind of anti-colonial hoax without which the ideals linking postcolonial computing to colonized experiences will be a collection of distant and strange ideals.

Additionally, the reliance on the materiality of the ‘postcolonial descriptor’ or ‘trendy words’ (Lazem et al., 2021) has provided a steppingstone for Euro-centric scholars to take upon themselves that the experiences of practising modernity can be (and should) reduced to the creation of counter-narratives to mainstream discourse of global encounters and exchanges. Taking such issues into critical focus, one can identify how the easy labelling of the nascent ideas developed by Irani and colleagues as the postcolonial manifest an abstraction of reducing the global south to tropes of identities and locale (Ali, 2016); an overly essentialist and seductive theoretical schema that denotes dependency on colonialist epistemes and vocabularies (Taylor, 2011). In other words, the tactical orientation is a “deeply specific yet unremittingly abstract model” that portrays how the Other should be approached and presented in design work narratives (Philip et al., 2012, p.9). The fundamental issue with the intercultural counter-narratives of postcoloniality is that it exemplifies the rhetoric of comparison against the co-existence appeals of multi-culturalism and the inter-dependence of trans-culturalism (Winschiers-Theophilus et al., 2017).

New ‘Othering’ in Transnational Design

Critics of postcolonial approaches to HCI have pointed to its silencing of the complexities of race, gender, class, and labour before technological utopianisms. From an overly critical perspective, its deliberate placement within the critical lenses outlined in early postcolonial theory was meant to provide a steppingstone for signalling an extension of patriarchy, privilege, and power through an ‘epistemologies of ignorance’; bracketing the asymmetric relations of power and materiality in technological discourse, thus encouraging radical mistranslation and misrepresentation concerning matters of indigenous knowledge and globalist technology (Ali., 2016). One can also recognize how the political neutrality stance of the postcolonial in HCI might “neutralise rather than problematising questions of power dynamics, leaving them uncovered at worst and un-reflected upon at best, or even carry the risks of unknowingly perpetuating a colonised worldview where local epistemologies are disadvantaged” (Lazem et al., 2021 p.26). This is exemplified in its language towards repatriation/redemption (in design futuring gone wrong), and more importantly in how its design metaphors of articulation and translation difference might make strange the ongoing relations between peoples, places, and practices.

In unpacking the complexities of a global network of knowledge, the orientation draws upon a selection of design-related fieldworks, larger research projects and technological travel, and the

histories of cultural encounter to push for a particular way of thinking and making in HCI (Irani et al., 2010; Philip et al., 2012). This might merely be passed as an 'exotic strange tales' that conceals the underlying resolution of the epistemology of ignorance as suggested by (Ali, 2016). This sort of ignorance might have presented its tactics as a scenic concept that could not engage extensively with the underlying structuring principles in communities. The unintended consequence of such intellectual positionality practice is that it represents "the locals as the researched-at-the-margins to which Western methods are applied and where power might be unbalanced in favour of the researchers" (Lazem et al., 2021 p.11). This is not a function of methodological indifference often associated with the postmodernist dialectic of questioning and answering problematically, but rather a patriarchal approach that depicts an overt fetishism towards local capacities and forces.

Considering the initial ideas that Orientalism espouses, the methodological fetishism of the orientation in question can be identified in how its counter-narratives might be doing exactly what Said sought to question and challenge, i.e., predominantly Western scholars constructing the scholarship that forms foundational to investigating other dimensions of political economy, design cultures, technological innovation in technoscience. This is not calling for an us-study-us type of scenario, but focusing attention on an approach to HCI, an epistemic worldview that depicts *them* that need and *us* that have. This form of fetishism, placing centrality on method over intricacies of the locale does not allow for an intimate engagement with the momentary operations of power but instead seeks to provide counter-intuitive narratives that exemplify the materiality's of the Eurocentric mode of organising the world (Taylor, 2011).

Furthermore, a recent debate that might suggest the othering of the postcolonial sensitivity is that of 'eurosplaining/whitesplaining' in HCI. Under the ideal of political correctness, techno-evangelist similar to those identified in post-development discourses attempt to determine (or undermine) the utilities of non-Western cultures in computing by providing the needed discursive explanation of what their problems are and outlining how they can go about understanding them and thus begin to imagine solving them. The orientation came together in HCI, just as the developmental debates in HCI4D that they argued against, dominated by Euro-American centric scholars – developmental activists, solutionist, utopian theorists and technological philanthropies – that sought that it is their moral responsibility as citizens of the world to turn others into their subjects of experimentation, violently othering particular matters as if they needed rescuing from themselves, and in ways that suggest the sooner the better.

To emphasise, the sympathetic mentality of whitesplaining depicts a humanitarian narrative of the vitalities of packaged intervention; of coming to dystopian situations or arriving with quick fixers, and one that is often camouflaged as a token of capacity building on values of trust and care. In ICTD for example, it is evident that "packaged interventions work in proportion of the capacity brought to bear", and that 'those delivered from the outside erode communities' own capabilities" (Toyama, 2015

p.81-95). The act of whitesplaining takes the form of those in a privileged position seeking to announce and enforce specific interventions, albeit on self-licencing appeals of elevating (or worsening) people underlying preferences and personalities (Flaherty, 2016). In educational projects across rural India for example, there is the awareness of how educational researchers or tech leaders influence the design of institutional structures and policies, teachers acting as implementers and managers of packaged interventions, and students as the beneficiaries of well-intended social systems (Toyama, 2015). Such a mindset presents the supposed saviour as a heroic reformist or an external provider of social change e.g., the founders of the One laptop per child initiative.

Even in popular culture narrative, one can identify how accounts of saviourism operate within a system of thought that is 'raced, gendered, aged, and classed' (Flaherty, 2016 p. 26). Although it is commonplace to accord high status to technology cult heroes, there is the need to politicise their work as a reflection of positionalities and personalities, and as such would demand holding social agents responsible for their reasoning and actioning. When technocrats and researchers are accorded the status of 'scientist-for-science-sake', society enabled the negation of responsibility by self-licensing the culture of saviourism that define people's subjectivities from within an externally enclosed epistemic frame. In its simplistic form, such a way of thinking about social issues internalises a cult-like view of designer and artist, and as a result create artificial dependencies that are not align to community wide preference and might even widen existing disparities and inequalities. On the surface, eurosplaining takes the form of criticism and optimism from within the Eurocentric systems of thought but then goes further in fortifying the 'man knows better than the native' aspect of the emancipation project.

Such a benevolent way of engaging with the global south ultimately breeds enmity as eurosplainers often assume that in the good gesture of the 'citizen', one commit to the enlightenment of the collective as an ethical reaction upon nature. Under the intellectual framing of 'alternatives to' narratives, technology evangelist champion for building 'a social enterprises' that can act as interface for providing the needed explanations to social problems, thereby self-assigning oneself as a provider of solutions for their altered and marked marginalisation. Presumably, the proposed solutions can be considered as magnifying the underlying desires of specific actors as the knowers in ways that solidify a hierarchy of aspiration that might not accommodate the assumption that human needs themselves are evolving with life cycles. The implication of such a method of engagement in post-development design project is that dominant cultures direct actionability by their request and commands.

From the different accounts of how Western paradigms of innovation enforce a particular constitution of non-Western realities, it is evident that the postcolonial framing of computing reproduces binaries that widens the digital divide. This can be attributed to how colonial impulse and relations create contemptuous narrative across both sides of the divide, and specifically, one that depicts how Africans are to think within Western ethical frames but also make with Western constructs, methods, and techniques (Avle et al., 2017). Presumably, adopting the postcolonial tactics can be easily encores

the suggestion that “as far as computing is characteristic of a modern world, it is also characteristic of a colonial movement” (Lazem et al., 2021 p. 9). This is not suggesting that postcolonial approaches to computing are colonizing in themselves but pointing to how a critical engagement with its underlying assumptions might signal new forms of neo-coloniality.

Next ‘Ordering’ in Transnational Design

The critique of colonial and postcolonial relations of power through the decolonial option is about how the unstated assumptions underpinning the monoculture of the West obscure an adequate representation of diverse experiences in the geo-body politics of knowledge (Tlostanova & Mignolo, 2009). The decolonial praxis came about in computing as a limited, contested, and emerging option for analysing power at the intersection of racial, gendered, and geopolitical relations of innovative design (Ali, 2016; Bidwell, 2016b). Recent studies have attempted to show how decolonial approaches to HCI, just as Feminist HCI, can cultivate the culture of pluralism (Tlostanova, 2017; Alvarado et al., 2021; Lazeem et al., 2021). Specific to African HCI, the emphasis has been on how the community has approached and applied the decolonisation lens in practice (e.g., Bidwell, 2016; Giglito et al., 2018; Lazem et al., 2021). It is presumed that examining how decolonisation has been contextualised in the literature could reorient the geopolitics of knowledge in ways that recalibrate existing power relations, advocate for indigenous worldviews and integrate local systems in HCI practices of diversification.

Besides, through the decolonial option, design thinking sort to achieve two things; first to ‘dismember’ racialized ways of knowing, and second to ‘remember’ the unacknowledged implications of the systems that symbolizes the Orient/Occident as opposing tropes of being. Such options emphasize the situatedness and embodiment of the other in the self and how taking a decolonial turn in HCI can respond to emerging impulses of race and gender more profoundly (Ali, 2016). The decolonial option is considered emerging ethics of “attempting to think through what it might mean to design and build computing systems with and for those situated at the peripheries of the world system, informed by the epistemologies located at such sites, to undermine the asymmetry of local-global power relationships and effect the ‘decentring’ of Eurocentric/West-centric universals” (Ali, 2016 p.7). The emphasis here is not to consider such a proposition at the margin of computing and ultimately not HCI, but to be regarded as a praxis for reimagining African HCI identities.

This is not an isolated case as it recognizes recent efforts that grapple with the ethical paradox of practical decolonisation. As identified by Lazem and colleagues, decolonisation is not to be loosely considered as some ‘trending word’ that has a consolidated meaning or is applied to mean the same thing across the African HCI community. It is to be considered as a political stance that emphasises the power dynamics of encounters and exchange of technological innovation, but also their geopolitical implication in adapting to/and integrating with existing knowledge systems. Such issues have

resurfaced in HCI narratives - either as a tactical outlook towards interrogating neo-coloniality of power or as a way of extending postcoloniality of knowledge (Dourish et al., 2020; Lazem et al., 2021). Such an intersectional approach has been taken up seriously in decolonial STS studies and in African HCI as it offers utilities for reconciling the thinking of pluriversal worlds (Bidwell, 2011; Lyons, et al., 2017). Therefore, decolonialisation of HCI practices of knowledge production is a continuous process that ought not to be reduce to trope of the colonised and the coloniser – it is a liberative political project that is life-bound, and thus undefeated.

So far, the section of this paper has critically reflected on a different dimension of postcoloniality and decoloniality in HCI, offering a different reading of their heavyweight analytical work as applied to the context of Africa. This led to the consideration of the solutionism of specific *Eurocentric models of futuring* that inform design projects meant for non-Western settings. The discussion also considers how the traces of saviourism mentality can be attributed to specific *pan-Africanist sensitivities of futurity* African conditions of economic development and political prosperity. This led to critical reflection on how the underlying epistemologies of postcolonial theories and science and technology studies might have reduced indigenous knowledge from Africa – which consisted of the plurality of people, places, and practices - to a set of unified problems or technological challenges that needed the adoption of the 'ruler' specialized sensitivities in the social description of culture. The critiques identify with recent accounts in HCI that have shown how the failure to interrogate the particularities of Western modernity/coloniality in the postcolony (as in the here and the now) might signal the performance of a colonizing reality that promises progress but instead threatens the prospects of being and living in a satisfactory society (Lazem et al., 2021).

Taking such issues into critical focus, one can identify how the easy labelling of the effect of modernity/coloniality as the 'postcolonial' neutralizes the power dynamic underpinning the production and consumption of technological innovation. This is an issue that needed continual problematization, either through the decolonisation of the intellectual landscape that makes decolonizing research possible or through the deconstruction of the ontologies, epistemologies and methodologies informing its discourses. As such, it is argued that decolonisation is a continual grassroots process and activity that cannot be defeated; its politics is about reimagining and remaking the world, thus too complex to be reduced to tropes of institutional identity and geographical location.

6.3.2. Situated Standpoints in African HCI

In this sub-section, I considered how the adoption of the collectives of situated imaginaries and knowledge practices in African can provide a shared vocabulary for understanding the plurality of the cultures of education and for designing technologies that respond to the conditionality of the context of deployment. The section argues that adopting an 'African standpoint' based on a combination of various standpoint positionalities and the Wittgensteinian approach of Winch can offer conceptual and

analytical sensitivities for articulating social relations, transnational engagements, and the conceptualisation of technological innovation. This provides an approach for seeing and accounting for things as they are – right here, right there and right now – and not some idealised conception of an African condition and reality. This is pertinent with recent efforts that have situated design practices in the locale of communities (Escobar, 2017; Erete et al., 2018), thus engaging with the plurality of ‘cultures of design’ and ‘designs of culture’ in HCI4D narratives (Ambole, 2020; Dourish, 2021).

(Im)possibilities of Understanding ‘Other’ Societies and Cultures

One central idea from Wittgensteinian approach of Peter Winch concern the characterisation of human understanding of social life as embedded through models of rule and the use of language (Stern, 2004; Winch, 2015). The emphasis is on how historical models of rules shape the reason for ordering social life, while language models provide the motive for examining how interrelations of social practice provide a pedagogy for the reasoning and meanings of social interaction. To examine the basis for devising ways for developing critical and unbiased ideas about understanding a social phenomenon, the orientation argues for an understanding of the rules and models of language in describing the multiple forms of social life in Africa. It is evident that the politics of language in Africa take dual forms – as a way of communication and as the root and carrier of culture. Wa Thiong ‘o’ (1992) argues that culture, through language models reflects the articulation of our being and that of others, and acts as a means for understanding the imaginaries and principles of social life.

While the Winchean approach is not a recapitulation of existing cultural tropes, of restating the difference between Western sensitivities with perhaps less developed ones, it is calling into question various ideas about cultural relativism, arguing instead for linguistic and logical relativism as a misnomer for instances of cultural heterogeneity. This, therefore, brings about developing emerging concepts of understanding transnational collaboration and multicultural ideation, of analysing the underlying principles guiding multiple forms of social life, and of how their reformation might provide a form of characterising cultural generality. These ideas necessitate rethinking stereotypical concepts of understanding the implication of innovation ‘out there’ and ‘in here’ (Taylor, 2011) and moving towards imagining the possibilities and impossibilities of empirical and rule-based abstractions.

Whilst I am appreciative of the arguments made by Taylor (2001) against the dichotomy of the ‘here’ and ‘there’, I am not necessarily convinced by Verran’s ‘Science and African Logic’, the plausibility of its argument, evidence, or perspective on cultural relativism. Similar issues have been examined by Oyěwùmí (1997), where she points to epistemic and material implications of using Western categorization schema’s in understanding African communities. One of the bases for her argument was that in Oyo-Yoruba communities, it is not ‘worldview’ that practice at the activity of understanding social relations, but rather ‘world sense’ as it logically and linguistically operates within

the African way of being-knowing⁴⁴. However, critiques of her thesis point to how its logic obscures the de facto notion of understanding reality using language, some arguing instead that the application of language games does not foreclose or preclude other alternatives interpretation of lived experiences (Bakare-Yusuf, 2003). The emphasis was on how assemblage of the logic that form part of the dynamic structures of social life provide some clarity on how meaning operates across resemble terms or its interrelated usage. This is not seeking to find absolute truth using language, as words cannot fully capture the entirety of social reality or social endeavours. Instead, it is what was done (action), how it is done (labour), and why it is done (imagination) that reveal something about the African condition and the African mode of innovation.

The implication of Winchean approach is that is sensitise the conception (or misconception) of our understanding of other cultures through one's imaginaries, mental model, and language rules of knowing how to think and act in a particular context. In 'Understanding a Primitive Society', Winch was pointing to some of the conceptual difficulties in simplistically applying predominantly Western notions to the analysis of other cultures and thereby producing interpretations and understandings that are simplistic (and wrong) at best and borderline racist at worst (Winch, 1964). This is not an argument against cultural relativism, Winch is pointing to a conceptual mistake in the structuring principles of understanding other societies and culture using dominant schema's, ignoring that they might have their own ontological (i.e., assumption about nature of existence or reality) and epistemological (i.e., nature of knowledge) framing of reality. Arguably, we view and understand the world differently – not enormously differently (this is not a case of 'Wittgenstein's lions' - "if a lion could speak, we could not understand him" (Wittgenstein, 2010 p. 223) but different enough and subtle enough that we should be aware of it as we embark on research, design, deployment, and evaluation.

As such, the Winchean approach outline the requirement of developing a set of sensitives for analysing multiple experiences and perspective of the nature of the social world. The emphasis is that to adequately understanding other cultures, logical and linguistic relativism offers a mode of recognising the gaps in imaginations and knowledge, which when considered as one encounter other cultures might provide situated ways of knowing compositional attributes African design.

Situated Approaches to Imaginaries

The foundation of 'the African standpoint' is about politics, pedagogy, power, and knowledge. In political terms, it is the possible outcome of a moral and intellectual struggle towards a subjective and objective understanding of the African traditions (Gutmann, 1935). As a pedagogical praxis, it is considered as an epistemological orientation and a methodological sensitivity for moving from investigating and understanding the plurality of African traditions of sociality and culture of innovation

⁴⁴ The distinction between worldview and worldsense is that of values– i.e., the structuring principles of knowledge schemas. In Africa, sense, as in sensibility, shapes the paradigm and model of understanding the composition of the African personality.

to the design of technologies that embodies them. The ideas of situated approaches to imaginaries extend feminist approach to situated knowledge where the faculty of the imagination is considered as providing opportunities for engaging with multiple affordances of representational cognition and action (Stoetzler and Yuval-Davis, 2002; Van Dijk & Rietveld, 2020). When imagination is considered as being shaped by social positionality or knowledge schemas, possibilities for understanding human actions are afforded through the intimate attention to what goes on in the social world.

Such an approach, although temporal and emerging, not only empowers individual experiences and collective perspectives but also provide the basis for developing plural design vocabularies that are embedded in African ways of knowing. This begs the question: How could situated imaginaries allow framing certain issues as 'know-able', 'think-able', or 'do-able' problems in African design? (Dourish, 2021) How could situated approaches to knowing allow for demarcating what transnational 'best practice' demands and what translocal 'do-able' practice entails? This question necessitates a rethink of the social imaginaries framing African design, paying close attention to 'where the facts and stories cohabit', identifying analytical tropes that commit to 'telling it like it is', while being against an idealised projection of African stories towards meetable ends. Besides, the social game that the situated imaginaries mandates is not of 'fetching' the facts or 'chasing' the stories of the moment, but to engage in epistemic exercises that 'invest' in remodelling the thinking of the worlds and in the making of who/what they can be/or are in it (Haraway, 2016 p. 193).

In some sense, the African stories manifested from two relational folk-philosophical doctrines, the Akan language philosophy, and the Yoruba epistemological philosophy – which links to Wittgensteinian ideas about the implications of logic and language in understanding and describing the social world. Arguably, it is through the operative function of logic and language in African philosophical traditions that the subsequent 'releasing-revealing-reliving' of the communique between African people, people, and practices can be made more explicit in technoscience. While the ideas of how imagination is shaped (and not determined) by positionality might not be new, the African standpoint logic is missing in HCI4D literature.

Situated Approaches to Knowledge

The situated orientation builds on other, notably feminist, standpoint approaches. In feminist studies, both situatedness and positionality have been used as analytical and conceptual tool for exploring epistemic, social, political, and economic issues (Collins, 2002; Smith, 2013). The Feminist standpoint theory developed partly to challenge and rectify common (and sexist) assumptions about the nature of the social world. Feminist discourse has brought about a paradigm shift in scientific and social science discourse, which include the insistence on a critical and reflexive analysis of the implication of positionality and power in knowledge production and consumption. The feminist approach grounds knowledge claims in the identity, mode of conceptualising reality, and the objective location of the

knower (Harding et al., 1993). The approach shows how conventional forms of rationality and objectivity privileged certain positionalities, thoughts, and experience over other's (Collins, 2002) – which needed to be reconsidered.

Regardless of its critique of dominant assumption about knowledge, standpoint theory has had its share of controversies that has been examined and addressed by Feminist scholars (Collins, 2002; Wylie, 2003; Harding, 2008; Naidu, 2010). Such controversies have extended to the African context, in that the debates about the political implication of the traditions of 'African Feminism' (Lewis, 2001)/ 'Feminism in Africa' (Salo, 2011) might have limited the possibilities of developing plural approaches for resisting oppression and in responding to the struggle for emancipation. While the process of deconstructing existing framing of design in HCI4D are not entirely grounded in the traditions of Feminist HCI as moved by Bardzell (2010), it recognises its critical framing of the geopolitics of knowledge (Bardzell and Bardzell, 2011) and that of pluralism in design practices (Chivukula, 2020). The thesis also commits to its practice of insistence on the multiplicity of social relations in community-based and participatory-based interactive design.

Within the context of African design, 'standpoint' theorization does not always offer political and material resources for epistemic privileging and elevation. It, however, emphasises the importance of having a situated positionality, either in 'shared communitarianism' or in having a 'conglomerate of singularity' views for defamiliarizing knowledge practices (Stoetzler and Yuval-Davis, 2002; Wylie, 2003). The question, then, would be how would an indigenous standpoint positionality bring about collective responsiveness to emerging design challenges and learnings of the pluriverse? How can individuals and communities in Africa recognise and adopt the standpoint of designing by, for, and with themselves? (Escobar, 2018). How can the cultural practices of indigenous design be translocally constituted and translated across existing boundaries and taxonomies? The discussion of a range of argument within the intellectual tradition of decolonial border knowing-thinking will attempt showing how situated imaginaries and knowledge can extend and preserve the practice of ontolo-political designing sub-Saharan Africa.

Consequently, the framing of African design through range of situated positionalities and approaches to knowledge recognises the methodological implication of postcolonial framings in showing how culture of design futuring are not only about the historical conditions of marginalised communities but more about the political premiss that brings about their prior and current historical conditions into communication. The contribution that the discussion makes to the discourse of African HCI is that it outlines a vocabulary that is situated in the epistemologies of the South, and one which can be adopted in understanding the residual problems that might have significantly undermine the productive possibilities of developing African communities through ethical practices of design.

6.3.3. Alternative Cultural Approaches to Community Technology Design

Although the positioning of technology as a developmental apparatus has brought about a shift in perspective in HCI, it has also repositioned some of the underlying ideologies of the field, specifically the homogenisation of various traditions in relation to Western epistemologies and the dualization of subjectivities as *them* and *us*. A range of cultural lenses have shown how the differentiation and homogenization of culture through multiculturalism, cross-culturalism, inter-culturalism can be problematic (Irani et al., 2010; Heimgärtner, 2013; Sun, 2019) can bring about a reflective and critical analysis of cultures in transnational spaces. However, there appears to be a continual subjugation of ‘Other’ modes of knowing and theorizing in contemporary discourse, which unfortunately finds solace in postcolonial approaches to HCI, and computing more generally.

This is written not in ignorance of other alternatives like the Hofstede ‘cultural dimension’, Hall’s model of ‘beyond culture’, and other models of appropriating technology. Instead, it suggests that they oversimplify the central ideas of cultural differences and the complexities of traditions. The slippery debate about the differences and the universality of culture in design spaces considers the complexities of social identifiers, agencies, subjectivities, locales, and culture (Bhabha, 2012). Both models of ‘cultural hybridity’ (Bhabha, 2012) and ‘interculturality’ (Mignolo and Walsh, 2018) are means through which radical change in the conception of culture can be articulated.

In addition, research in HCI4D has shown how a range of cultural stance frame design collaborations and narratives in software project work. This has led to the consideration of how a range of cultural approaches can bring about a radical shift in the framing of HCI design paradigms and discourses. For example, the cross-cultural approach emphasises the difference between cultures as a way of modelling user’s and their cultural attributes. The intercultural approach came about as a counter narrative to mainstream framing of community collaborations, thus depicting a hybridity of cultures in differential context (Irani et al., 2010). Both multi-cultural and transcultural approaches point to the ‘co-existence’ and ‘independence’ of cultural dimension (Sabiescu et al., 2014; Winschiers-Theophilus et al., 2019). These approaches present a narrative that is both reciprocal and reflexive, and one that seeks to transcend existing boundaries as to create mutually beneficial partnerships.

Although one can recognise the implications of the different approaches to cultural engagement within the ontological framing of African design, there remains the issue of how the unequal relations of power in the blending of cultures as tripartite can support and allow for deconstructing community narratives of autonomous design or designing for the pluriverse (Escobar, 2018; Reiter, 2019). It is argued that framing cultural engagement in most African community communities (largely viewed through the triple heritage? (Mazrui, 1984)⁴⁵ and in indigenous design work (largely as a manifestation

⁴⁵ Although the term ‘heritage’ has been characterized as problematic in African political discourses, there is ample evidence that the Islamic and Western values are relatively imposed onto indigenous peoples. Also, there is the awareness that the tripartite heritage goes through four stages: contact, conflict (friction and fusion), confusion (surrender, alienation, and survival), and coalescence (indigenisation and domestication).

of the cultural bazaar) through the values of the symbolic adaptation and translation can open possibilities for continual creation, dialogues, and restoration. The proposition is that approaching transnational collaborations through the political praxis of a 'transatlantic' outlook, which denote collaborations across borders and within temporal spaces, could focus attention on the integrative and residual components of the trinities of African cultures as to bring about an approximate adaptation (to new design context) and translation (to new design conditions) of diverse perspective in African cultures of design.

The transatlantic approach to cultural engagement extends on situated efforts in African HCI that seek reframe the assumptions that direct the processes and activities of designing and deploying technology in African communities (e.g., Winschiers-Theophilus and Bidwell, 2013; Awori et al., 2016; Adamu, 2020; Ambole, 2020). In particular, it attempts to lay bare the material implications of focusing attention on neglected inter-relations of power that direct the relationships between cultural dimensions across the Atlantic – what is commonly referred to as technology design practices in here and out there (Taylor, 2011). This is brought about by the intimate reading of Cress collection of essays titled “The ISIS Paper: The Keys to the Colours” (Welsing, 1991), which suggest how the crisis of the transatlantic symbolises a cultural function (and a by-product) of an ontological design outlook.

The transatlantic option considers what it might entail to approach the practices of technology design from the 'borders' and the 'cracks' of the in here and the out there. By this, I mean, analysing what placing the trinities of African cultures of design in the framing of an asylum (which is considered as heterotopic space for continual creation, dialogue, and restoration) might suggest to the identification (and not defining) and representation (and not demarcating) of indigenous designs of culture. It is presumed that the metaphor of an asylum, which denote uncertainty and temporality, could allow for finding plural points of understanding the transition between the composites of the tripartite so that emerging cultures of design are both Cosmo-cultural and Cosmo-politan. This is an intervention-in-progress that sought to engages with the political praxis of Feminist standpoints and systematic decoloniality in transcending patriarchal mode of cultural collaboration and engagement. The rationale for drawing on the intersection of two critical theoretical outlook in framing the futuring practices of African design is that their praxis, specifically the situatedness and pluralism of knowledge practices, could allow for re-drawing the epistemic boundaries imposed by Western discursive canons of identification and representation.

In HCI, systematic decoloniality has presented the need for deconstructing the 'knowing' shaping socio-cultural assemblage of worldly things, while also identifying alternative mechanism for reconstituting itineraries for 'thinking' with/by the pluriverse (see. Pearson et al (2019) for similar example). Feminist HCI has also emphasise the need for recognising and extending situated epistemologies as to widen the participation and bring about an equitable representation of perspectives (Bardzell, 2010). This has led to the development of the transatlantic travelling gestures

that can allow for examining the underlying premiss that constitute the dualities of the cultures of 'differences' and 'sameness' outside patriarchal discursive dependencies (Jardine, 1981; Davis and Evans, 20119). Such an exercise, the continua reconciliation of disputed cultural parameters begins by creating a transitional imaginary time-lag of moving towards the 'projective past' of cultural identification so that eventful practices of design are neither universal nor dominant

The reliance on Cress's approach of analysing the composition of culture beyond surface symbolism has led to the preliminary framing of the conceptual ideas about the transatlantic approach to cultural engagement in technology design projects. The brief reporting of how the value of adaptation and translation can allow deconstructing cultures in indigenous design work was informed by the temporal analysis of the practice of designing and deploying educational technologies in the context of Nigeria. The project that informs the interpretation of design narratives using the metaphor of an 'asylum' and against the fruit salad and smoothies framing of multi-trans-cultural approach suggests how situated knowledge direct design agenda's than pedagogies for teaching and learning.

6.3.4. Rethinking EduTech Design and Deployment – Lesson from an African Standpoint

As outlined and extensively discussed in the preceding sections, the vintage African standpoint is to be considered when thinking about the conditioning and possibilities of doing design otherwise, and differently. It is not an ad-hoc way of knowing what thinking and doing otherwise might be or could be, but a generative sensitivity that is integral to the practice of reimagining and reorienting design innovation in/from Africa (Peter et al., 2019).

In this sub-section, I examined four cases that came out of the analysis of the data using the ideas of an indigenous African standpoint, as an orientation for transiting from understanding the plurality of educational goals into the design of tools that absorb and embed those complexities. The orientation argues for a closer examination of the practice of design innovation through the nuance structures of social and institutional life in African communities might provide a better understanding of how African design is largely ontolo-political. The cases are considered temporal mainly due to the understanding that the practices of education and design get expressed and understood differently over time. The understanding of the collective needed to be emerging and contested as the articulation and translation of the plural takes time and considerable labour.

Reframing Cultural and Contextual Differences

“Take M-pesa for example, because it works in Kenya, everybody assumes that it will work here. There was a culture in Kenya which makes it work, there was a gap. Here too, bank attempt to fit into those gaps. Some argued that dues to some environmental limitation, we can build SMS based systems. When you think of it, what of user experience” (Lead Project Manager).

The excerpt above reflects the empathy and frustration of a project manager concerning the harmful assumptions (and expectancies placed on them) that they mostly face in their everyday work of designing and developing tools and services that respond to the demand of the Nigerian educational and software industry. The emphasises made regarding the popular mobile-based banking service M-pesa is that of the issues of culture and context. The project manager’s account might suggest how culture is interchanged with context and vice versa. This is mainly because practitioners have identified how culture and context shape the culture of design and their practices, but also how they can act as an analytical instrument for staging design processes and activities. Culture is largely seen as a mechanism for staging design features in relation to pedagogical approaches or social structures of the context of deployment. Whereas context can either the site of production, interactivity, or deployment. It seems likely that the organisation of work in both sites of production and deployment might determine the implication of multiple cultures in the reasoning of practitioners. This suggests that the project manager was referring to how a set of financial conditions embedded in the Kenyan culture play out in the success of M-pesa, which when imported to the Nigerian context might not reflect the underlying financial structure in the wider community.

While some might argue that there might not be significant differences between the mobile banking culture in different Africa countries, the manager was making a clear distinction between a cultural attribute or contextual conditions that might have warranted the success of M-pesa, which when blindly transported and appropriated in Nigeria might not bring about the same success. This shows the taxonomies of culture and context, how they are easily interchanged, and how they get enacted and perfumed for or against the other in design spaces.

Consequently, the literature in HCI has provided a varied interpretation of culture and context in design space – either as a practice, a perspective, a social system, or a politics (Dourish, 2004; Chalmers, 2004; Ogunyemi et al., 2016b). From a generative view of culture, Dourish suggests that the notion of context is a ‘slippery’ and meaningful practice of action that takes the form of representing everyday mundane work and not some idealized work (Dourish, 2004). The focus is on how past events inform present ones and not how the present ones might inform future actions. The ideas behind context were mainly of how design can be sensitive to a particular social setting, while culture is cultivated and understood within a context. Context provides an overview of how the setting’s culture

is developed and can be used in design work. This might suggest that the design and deployment of technology within an organization might take the form of seeing activities/processes to be undertaken to be partly due to a specific cultural outlook whereas the organization is the context within which these activities/processes are undertaken. Put differently, it is about identifying the influence and impact of context to one's cultural practice of design, and how such practices are embedded in a particular organizational culture. What this might suggest is that culture cannot be understood outside the context within which it is enacted and understood, and context exists and operate in a particular organization or community.

However, the major issue faced by most practitioner is with regards to how to multiple cultures are to be articulated in the practice of designing technologies for the plural educational context. Research from Nigeria has established how the social structures of the context practitioners work might determine (or undermine) their innovative practices (Adamu, 2020; Ogunyemi et al., 2016b). However, there appear to be no clear indexes as to how the mundane practices of practitioners are influenced (or lack thereof) by HCI design practices and vice versa. What stands out from the everyday work of Edusoft is that software engineering methodologies and procedures, by definition, are of greater importance to the organisational context of their work than HCI methods or practices. This can be partly attributed to the lack of awareness as to how HCI design practices are operational translocally.

With the differences in the contextual cultures of different communities in Nigeria, reframing the difference between culture and context might reveal how they get translated within a particular social structure of use. The unification of culture to be community bound or nation distributed has proven to be more problematic than anticipated as one could not fully articulate where one culture ends, and another starts. Even attempting to write off porous cultural boundaries enacted by transnational conditions of engagement might denote a power relation that can either privilege or subordinate certain conditions over others. Instead, the situated approaches espouse examining how cultures flow across contested boundaries. Equally, it examines how the integrative and residual components of culture interact and get re-distributed within a particular context, which could in turn outline how it is presented and represented through its travel across multiple contexts.

Appropriating Uneven Concerns and Realities

The case above warrants analysing how context and culture is interchanged and renegotiated in translocal spaces where there are unequal relations of power. As it appears, the complexities and slipperiness of articulating a community of practice in the translocal spaces of design might be partly due to the differences in the inspirations of actor that inform the thinking of design and practices of design making. The excerpt below denotes a common challenge faced by practitioners when the actors that influence their reasoning and decision-making process have significantly different concerns (cultural perspectives) and realities (cultural experiences). In their collective words:

“We aim to offer British standard education in Nigeria at half the amount to be spent studying in the UK. Having that control, with a click, you wouldn't have to do much to have access to resources. It is the assumption that the quality of British educational system can be vested on how they leverage on technology, the technology here been a key factor for adoption to streamline our operations, reduce cost, to improve transparency, and to speed up operational processes” (Edu_Manager).

“The kind of students sent to our universities aren't that prepared for the ideal level they are supposed to start here. It's a kind of like we are building a castle in the air. We don't use the learning management system fully, it's a form of a blended approach. The blend is basically to reduce the burden on us” (Lecturer)

As it stands, actors have different assumptions of what technological innovation can further support their work culture. The educational manager might be more concern with computation and productivity that adopting eLearning systems can bring to their current processes. The lecturer on the other end is more concern with the broader preparedness of learners to the proposed use of technology via the blended approach. This has implications to the situated practices of practitioners in that it shapes the judgements they can make of the approaches to attend to the designs for plural concerns and realities. The difficulty here is of how to make meaning of their varied perspectives/experiences as one begins to engage in the processes of deciding the sensitivities (as in design methods and management methodology) to adopt as new conditions emerge. The lack of a unified language of bringing together multiple relations might be partly due to the unwarranted assumption on the part of the general community that software development is like plug and play. The unspoken assumption on the part of software practitioners is that users will ultimately adopt and adapt technologies that might not have been designed with/for them. Both educational managers and lecturers might not have admitted that there is a clear distinction between the use of technology for computational purpose and when used for reflexive rote learning. The situated alternative calls into question those unacknowledged and unspoken assumptions.

In essence, what it might offer to practitioners is a set of effective-ineffective possibilities for intelligible making sense and meaning of the relationship between different actors (their collective imaginaries of the implication of technology to their work), moving with such knowledge as to make an informed judgement about the design method to adopt for designing the pluriverse. The major issue here is that actors have different ways of presenting and representing their understanding of technologies either in education or in the management of an educational establishment. How then can practitioners approach the similitude and difference in perspective and translate them into the pool of

design reasoning or thinking? (Avle et al., 2017). Arguably, focusing on the compositional aspect of Nigeria social and political system of organization – as a contested, emerging, and relational network of particularly important ‘things’– can offer ways of attending to/responding to the diverse conditions of work. Here, the translation can take places when practitioners pay attention to the social context of deployment, the cultural basis of their design thinking, and how to contextualise values in the practice of design making. What this might suggest to the complexities of knowing with/for/by the collective is that design would be a collection of reasonings that are not contextually predetermined but culturally and contextually emerging.

Interpreting and Translating Local Meanings to Design

“We put ourselves in the shoes of the users and think for them. The thinking is basically about what should be there. We don’t really go out and talk to users of the application per se. What we usually do is gather requirements, do wireframing, conduct user flow evaluation and testing, design high fidelity mock-ups – visual designing of wireframes and how users flow from one screen to the other, develop content prototypes which feel like actual application, and collect feedback from selected user group..... We are building for the users, and we believe that without the users, there is no product” (System Designer)

“Or maybe it’s a two-way thing to make it clear. If you are developing a product, you can go out and talk to people and gather some information from them or you can put yourself in the shoes of the user as no person is paying for it. But when someone is paying for such a product, they are actually the person that gives you the requirement” (Software Developer)

“So, if we are going to use such learning technologies and get the best out of them, my emphasis would be on orientation.... It is only when they have the know-how that they will start to gain the advantages and thus stimulate their learning. If you don’t have any idea what the eLearning system can do and the benefit, you can’t patronize it. The awareness issue should be taken into consideration seriously” (Student)

The first two excerpts above demonstrate how system requirements and specifications are translated into design actions. At best, this is 'designerly way of knowing' and at worst an exhibition of 'speculative realism' – considering users perspectives as residual objects that can be easily conveyed through the artistic imaginaries of the designer. The way of knowing or the frame of design thinking is that practitioners mostly adopt common and unproblematic forms of design reasoning and actions. It becomes justifiable for many to assume that designerly ways of knowing are no different from userly ways of thinking and that such ideas of designer reasoning are typical forms of user thinking, regardless

of individual positionality and identity. Such an account corresponds with Ames (2019) reflection on the nostalgic ideologies that shape the One Child per Laptop Project, where ‘precocious’ developers assume that the users designed for (and not with or by) have similar university experiences as them. Or largely have common pedagogical needs and concerns that can be juxtaposed under a unitary approach to design thinking. This represents the unintended biases associated with dominant cultures of design thinking, where design imaginaries recognise or alienate the inspirations of peoples, and where an equitable design approach ought to form basis for designing the pluriverse – similar to those reported by (Ssekakubo et al., 2013; Uchidiuno et al., 2019). The excerpt from the student reflects an entirely different perspective that one could imagine of someone that went to a Nigerian university, either public or private. With the culture of thinking for and not thinking with/by the collective, a relational way of knowing and thinking for plural conditions ought to take precedence over nostalgic one’s.

In addition, from the analysis of the perspective of software practitioners, there seems to be the lack of a shared language for interpreting and translating the situated meanings of ‘things’ in design processes. This warrants an examination of how practitioners can get design techniques into their situated problem or how design methods are made (or can be made) to react to the specificity of conditions as they emerge. This is an issue that has been extensively examined, showing how design methods shape the identities of practitioners (Avle et al., 2017; Tran O’Leary et al., 2019), which in turn inform their understanding of work and life in generally – which is emerging, contested and circular. Within the framing of the situated approach to African design, these do-able problems are approached and resolved when framing the problem of design and not as an added ad-hoc problem, which adds some localized attribute to them. This way, the presentations (and subsequent representations) of diverse experiences are negotiated and distributed in design thinking or the end-product of design. The complex power relations between the ‘user’ and ‘designers/developer’ here might suggest why contextual conditions must be placed in dialogue as to better understand how the interactivity between different cultural attributes can be (or get) translated into design.

A noticeable example is that in the field is that of the few (if any) women as designers/developers/university administrators. Most of the women were in the marketing, quality control, and support department. Software development work appeared to be from a masculine perspective. However, the understanding and translation of systems requirements into actionable design insight, which is a critical stage of any software project, is mostly informed by those women in the marketing and quality control departments. What this might suggest is the material implication of the interactivity between people and culture, which thus extends the practicing of situated and indigenous knowledge in design work.

Equally relevant is the locale of users in design thinking and decision-making processes. Reflecting on existing work in the literature concerning the particularity of the ‘human’ in design

methods point to the complexities of design framing when and where 'users' are absent, multiple or hybrid (Baumer and Brubaker, 2017). The common assumption is that those invisible users or idealised ones are scenic components of design spaces, which has led to the consideration of how post-userism might reorient the constitute other 'things' other than and more than 'human' in design processes and activities. Focusing on other 'things' other than the primacy of the user could therefore open up new possibilities about design that the proxy of well-known design approaches bracketed (Baumer, 2015; Baumer and Brubaker, 2017) – meaning the focus on various 'centred- sensitive- oriented- specific' and so on design approaches. The sensitivity has allowed identifying and extending the functioning and manifestation of things 'other than' and 'more than' the human to the acceptability and adaptability of deployed tools.

More importantly, through the situated orientation, I came to apprehend how practitioners work beyond the user and focus more on issues like politics, context, culture, economics, religion, infrastructure, literacy and so on. To some extent, it seems that users are partly visible in the framing of Edusoft's everyday work of design. Within the framing of University manager's, potential users are more likely to be tagged invisible, with the underlying assumption that they would adopt or could adapt to tools that might not have been designed by/with them. This might suggest that the engagement in the representation of multiple requirements would have minimal impact on design reasonings and decisions of designers (knowing well that they are designing for pre-user, usees, non-users, or post-users), thereby providing a counter-narrative to common framing of design approaches in HCI. It is presumed that attending to the situated practices of practitioners might outline new tactics for the renegotiation and redistribution of the power manifested and reproduced in emerging educational and designerly ways of knowing. The knowledge attributes that standpoint identifiers are those that exemplify the gaps in situated knowledge, either indigenous or transnational. The emphasis is that one ought to focus attention on how the interactivity between people and places might bring about the creation of indigenous knowledge and practices that not only get shared but also get extended.

Juxtaposition of Indigenous Knowledge and Indigenous Technology Design

"I don't think there is one solution fit for design and development. We need to look at the organization or the context, or the niche for which we are trying to provide your solution. What will work in Africa and be sustainable, and in Nigeria in particular, might be different from what might be feasible with what works in Europe or America. So, the ability to look at things like learning context, their habit, the technologies in place, dependability's in place, and dependencies for both parties will determine what's the best fit or local practices" (Associate Project Manager)

Relatedly, what the project manager is emphasizing is the adaptability and shifting structure of knowledge and design practices. Relying on the understanding that knowledge (either tacit or explicit) is constituted and preserved from the recollection and reflection of people's practices, how then would an indigenous approach to geopolitics led to the design and deployment of indigenous technologies? Such issues have been examined by Awori and colleagues, emphasizing how indigenous technologies can sustain the practices of peoples in transnational context, while also providing avenues for storing and preserving knowledge within the locale of use (Awori et al., 2018). This might suggest how the appropriation (or lack thereof) of technologies relies on the interactivity that takes places between the people designing them and the people being designed for/by.

The excerpt above is bringing attention to the distinction between Western practices of education and indigenous ones that focus on indigenous philosophical traditions, localized pedagogical, and practices of language. This is of particular importance as research has established the need for reframing the neutrality assumption of language in technology design (Benjamin and Houssouba, 2015; Aludhilu and Bidwell, 2018). This places the necessity for reworking how African design can embody indigenous languages, either in its culture of design or in its design of linguistic cultures.

Consequently, the shipment of Western design cultures and educational practices has ultimately hindered the possibilities of developing sociolinguistic frameworks than can bring about the design and deployment of technologies that reflect the linguistic structure of deployable context. As such, standpoints make clear the need for decolonising the social imaginaries that shape the thinking of designing indigenous technologies, which in essence could lead to epistemic emancipation and political competitiveness in technological discourses. The situated orientation also brings attention to the charismas of Western cultural practices, highlighting how they affect people's constitution and preservation of their knowledge, and thus needed to be supported (or neglected all together) in African design practices.

In essence, the discussion of the temporal cases seeks to identify how the adoption of a standpoint positionality can provide political resources for recognising the power relations of postcolonial practices of design in HCI. This is achieved through the grounded of the perspective of a range of stakeholders within a collection of positionalities, which when taken up in innovating Africa provide useful resources for the material characterization of diverse inspirations in design work. What the temporal analysis has attempted showing are the fractional implications of focusing attention on the situated interactivity between culture and locale in African modes of knowing. With the consideration of standpoint as not stand still but situated, how then would the orientation react and respond to the powers of sociotechnical assemblage in HCI?

Within the framing of the four cases analysed, standpoint acted as a socio-political vehicle for the generation of new insights into how diverse perspective evolve and interact as one dwells in institutional and cultural borders enacted by colonial and postcolonial conditions. The option also acted

as a spatial mapping tool between social and technological issues in Nigeria, thus opening up new possibilities for thinking about technology design and deployment. From the analysis of the four cases, the political resources accorded by multiple possibilities did not provide a clear and concrete pathway for determining how design thinking by practicing indigenous knowledge might have altered the situated practices of practitioners that inform the study, it instead sought to reorient assemblage of power to take for granted 'things' of the present i.e., the ontological focus of design.

The outline and critique of the various postcolonial discourses presented in some part of the chapter is not merely a summary of existing ideas and arguments. I believe the emphasis on a Winchean approaches (Winch, 1964) explicate how "in any attempt to understand the life of another society, therefore, an investigation of the forms taken by such concepts – their role in the life of the society – must always take central place and provide a basis on which understanding may be built" (Winch, 1964 p.324). The question then is whether the reorientation of African design in HCI through after developmental and situated lenses could bring about reflexive deliberation of design choices within communities? Or would it be logical to rethink established sensitivities, to redevelop new and differential one's grounded in indigenous knowledge? (Klein and Morreo, 2019).

6.4. Conclusion

In conclusion, Halverson's argues that the relevance of theory in HCI and CSCW is of how it points to relevant ideas about the social world when objects/subjects are studies and not outlining a definite and objective account of reality. The emphasis is that theory can help in 'making sense of and describing the world' (descriptive power); can helps in identify key conceptual attributes of talking about the world (rhetorical power); can helps in coming up with design insight by making inferences of 'where and how to look' and the consequences of the insight (inferential power); and how it can be applicable in understanding a social setting (application power) (Halverson, 2002 p.245). Arguably, adopting a situated positionality offer a sensitive way of attending to and extending 'things' of the present, not necessarily from prior imaginaries but from those practised in the liveliness of the interactivity between subjects and objects.

In answering two of the research questions posed in the beginning of the thesis, documenting the implications of adopting well-known' practices for framing, undertaking, and analysis distributed and collaborative projects in the first section raises questions regarding the appropriateness and applicability of what might be considered as 'best practice' or 'doable practice' in software project work. Such issues have magnified the fundamental need for examining exactly how conventional (and generally Western) constructs, approaches and methods widely adopted in the process of producing and deploying technologies actually work. Findings show that analysing what is often considered as 'best practice', supposedly prescriptive maps and scripts for accomplishing work, necessitates considering how they get adopted, interpreted, and extended as 'orderly' and occasionally 'messy'

alternatives, offering some sensitivities for understanding the translocal features and meanings of project works that does agility.

The second section examines how the practices of education and design are to be approached through the collection of situated approaches to imaginaries and knowledge. The consideration of an African standpoint epistemological positionalities offers sensitivities for articulating and contextualising transnational engagement of technological innovation in Africa. The epistemic orientation considers the centrality of logic and language in understanding social relations, and also on how the intelligible understanding of culture is embedded in the relationship between indigenous people, their traditional practices and historical places. It is claimed that the African standpoint epistemological strand takes the postcolonial narrative a step further, not just as an intellectual exercise, but one that places the inspirations and aspirations of Africans at the forefront of technological practices. The optional strand represents, to a large extent, a liberation process where a marginalised group becomes active creators, inquirers, experimenters and organisers of their social world and reality. In the next chapter, I consider what would a projection of a decolonised higher education and software engineering would look like from the empirical evidence presented in subsequent chapters. This is particularly attempting to identify traces of localization/decolonisation as expressed or demonstrated by the practices of practitioners.

Chapter 7:

Towards Localization of Blended Education and Edu-Tech Design

7.1. Introduction

In this chapter, I attempt to unpack the relevance of conventional development methodologies, design concepts and organisational constructs for undertaking software project work in the Nigerian software development industry. Drawing on the perspective of software practitioners, I show the situated nature of project work that does some form of agility – or as expressed by participants, partial agility. Adding onto existing evidence and argument in chapters five and six, this chapter considers what would a projection of a localised higher education and software engineering look like from the empirical evidence. The discussion is heavily empirical as it attempts to highlight what might be considered as an expression or traces of decolonising practices of blended education and technology design.

In the first part of the chapter, the issue of software projects is brought to focus through a close analysis of tropes that highlight how practitioners are becoming less Western-as-colonial in their work, viz: Software engineering contracting, designing for the locale, and the framing of user's and uses of technology in education. In demonstrating the complexities of framing software projects as political, the chapter considers how the concepts of contracting, designing and accepting are constituted as a contextual feature of an organisational setting. The closer analysis of the expressions of the design and use of technology is meant to show how such entities feature in design thinking and action. Or rather consider how the user, as a central figure of design and HCI research (Satchell and Dourish, 2009; Gonzatto & van Amstel, 2022;), is typified as either an abstraction of the structural position of representation (Cooper & Bowers, 1995), as differentiated entities (a social actor, a user, a stakeholder, or a consumer/client) (Bardzell & Bardzell, 2015) or as a contextual feature that is imagined and invented within the internal configuration of the design process (Sharrock & Anderson, 1994; Martin et al., 2007). Put differently, this is considering how the expression of the user in practitioners' narratives might render their figure as either relational entities (Hyysalo & Johnson, 2014) or scenic features of design work (Sharrock & Anderson, 1994). Whatever the case might be, the rhetoric about designing the user gestures toward highlighting circumstances that warrant speaking for/about the Nigerian users in certain ways, and the uses a particular view of the user are put to in project work that does agility.

As current structures of digital education in Africa are considered as mirroring Western conventions, the second part of the chapter considers what the decolonisation of blended higher education might look like from the empirical data. This seeks to identify ways in which practitioners' practices of integrating (or disintegrating) digital technologies points to either localisation or

decolonisation of higher education. The brief discussion speaks to longstanding debates about the requirement for decolonizing African universities; thus, presenting the need for identifying the organisational specificities that warrant institutions wanting to be postcolonial-as-modern or decolonial-as-indigenous. Therefore, the discussion in the second part of the chapter will touch upon the efforts being made by the three universities toward furthering the call for decolonising African Universities (and if that's the case).

In highlighting the political intricacies of critically examining digital education and technology design, the last part of the chapter discussion centres around whether the narratives presented represent a praxeological expression of localization of work from member activities; or whether the accounts might be considered as forming part of a particular (and a decolonised) interpretation of members' practices of work.

7.2. Decolonizing the Postcolony

Lucy Suchman pointed out that "If You Want to Understand the Big Issues, You Need to Understand the Everyday Practices That Constitute Them" (Suchman et al., 2019). As research has already established how coloniality/modernity shape the identities of innovation (Avle and Lindtner, 2016; Bidwell, 2021), how then can one account for the situated practices of blended education and software projects that seek to be postcolonial? In answer to that, the author considers how the concept of 'postcolony' (Mbembe, 2001) can allow for outlining traces of /or projections of decolonizing in higher education and software project work.

For Achille Mbembe, the 'postcolony' is not the same as the postcolonial or postcoloniality, they converge and diverge (Mbembe, 2001). The postcolony and the postcolonial converge in their effort to grapple with the experiences of modernity/coloniality. The divergence is on how the postcolonial-as-in-postcoloniality is an intellectual movement that concerns itself with the cultural analysis of the relationship between the colonizer and the colonized, which in effect shows the violence of colonial discourse in both political, economic, and material terms. The postcolony on the other hand is about how Western modernity is being continuously experienced as a reality for the global population. The consideration of the postcolony as an emerging dimension of earlier postcolonial tradition is demonstrated by how it has been conceived as a process for diagnosing the experiences of post-modernity/post-coloniality (Mbembe, 2006).

With the awareness of how the colonial matrix of power manifests itself in the identities of innovation, it appears what was deemed as interrogating the coloniality of space and time might not be emancipatory after all. Such a revelation could present the initial framing of postcolonial computing research in Africa as a wishful narrative of emancipation-in-the-making that does not affect practical changes to how interactive systems are to be sustain-ably produced and consumed (Ali, 2016; Bidwell et al., 2016). The critique towards the postcoloniality of computing also identifies with recent accounts

in HCI that show how the failure to interrogate the particularities of Western modernity/coloniality in the postcolony (as in the here and the now) might signal the performance of a colonizing space that promises progress but instead threatens the prospects of being in a satisfactory society (Dourish et al., 2020; Lazem et al., 2021).

Therefore, the emphasis of this section of the chapter is to empirically identify how practitioners further the concepts of decolonization from their work (if that is the case) without referring to the conceptual ideals of decolonisation. In a way, this is attempting to establish how the 'playfulness' of practitioners in relation to software development methodologies and the practices of 'remixing' Western structures of digital education and local sensibilities could signal a transition from a postcolonial to a decolonial way of knowing.

7.2.1. Software Project Work

Adding to the introductory section of this chapter, the focus of this section of the chapter is to provide an empirical description of practices that express localization or decolonization of software development and not the theorization them. The discussion identifies three inter-related attributes of EduSoft project⁴⁶ that might be considered as instances of being less Western-as-in-modern in their work, viz: Software engineering contracting, designing for the locale, and the framing of users and uses. These attributes are informed from the analysis of interviews and ethnographic data collected during two fieldwork sessions in Nigeria.

Although the thematic analysis of empirical data in chapter four was dialogical, this is not suggesting that the activities of practitioners are the same or even similar amongst the three companies informing this thesis; but proceeding on the premise that the relevant part can give rise to a picture of

⁴⁶ Edu-soft has about 50+ staff in Abuja - fifteen of which are part of the development team that is distributed in-house and remotely. I worked with the participants that were working on a particular project in the engineering department, and I understood the team structure to be similar to the 'scrum of scrums' (SoS) team (Mundra et al., 2013). The usual scrum team consist of five to nine members, whereas for this particular EduSoft project, fifteen members form part of the engineering department, five parts of the eLearning team, twenty-five part of the customer relation management (CRM) team, and about five members that represent the management team. It also appears that some members in the engineering department are either part of the design or development team, i.e., some notion of a cross-functional team. The sprint/stand-up meetings were attended by about seven team members, consisting of a scrum master, four developers, a designer, and a senior developer that acts as the evaluator. The scrum of scrum team consisted of:

- The project manager acts as the product owner. He is the person that mostly engages with the different stakeholders involved in the project and in most cases engage in translating user requirement to the development team. He is regarded as the person that sits at the intersection of the user and the development team, ensuring that the product developed makes business sense but also meets the requirement of the end user. He is the most important person in the company.
- The assistant product manager can be regarded as the partial scrum master. His role is to coordinate all the activities of the project and come up with the department OKR. He handles the coordination of the team activities, assigns a task to the different team members, and moderates sprint and stand-up meetings.
- The engineering team consist of designers, developers, senior developers (virtual), testers and evaluators. In most cases, the senior developer, and the assistant product manager act as the testers/evaluator of Edu projects.
- The eLearning project team consist of an instructional designer (team lead), a content creator, a scriptwriter, a story board artist, a graphic designer, and an animator.

the whole when intimately analysed. Archaeologists employ such a technique, inferring the whole from the parts discovered. In addition, the classical metaphor of synecdoche was adopted to generalize the findings from Edu-soft to the broader context of the other two software firms that inform the arguments of this thesis. To be practical, providing a thick/massive description (Becker, 1998; Geertz, 2008) - which might not be absolute and pure, as such description is provided from a particular point of view that might even bring about an incomplete account- might not be ideal, as the description might never end. One stops when they adequately place the phenomenon in its right place. Therefore, the author relies on Garfinkel's ethnomethodological commentary that observational studies are meant to be practical activities of finding meaning from members' processes and practices (Garfinkel, 2002) – and as such, the narratives presented across the chapter can either be a praxeological expression of localization of work; or forming part of a particular (and a decolonised) interpretation of specific work patterns.

Furthermore, the empirical evidence considered in this section consisted of transcribed interviews with a business manager, a project manager, an eLearning lead, three software developers, and a designer (F1-F7); a rapid ethnographic story line from the observation of four team members in Edu-soft (a designer (FF4), a software developer (FF2), a senior developer/evaluator (FF3), and an eLearning Project manager (FF1)) and the transcript of a follow-up video conference call with an associate product manager (FF6). Field notes from a weekly mock-up, two daily stand-ups, and a sprint meeting detailing how Edu-tech projects are designed and executed, and the techniques and tools adopted to support collaboration were also considered in the discussion. After a sprint meeting, I interacted with the lead project manager (FF5) and validated earlier themes with two developers (EVF); the transcript and notes from the discussion are also considered as they provide insight into the politics of running a software development firm in Nigeria.

To reiterate, the focus of the discussion is to empirically describe practices that might be considered as projecting what localization or decolonization of software development might entail. This is achieved by briefly highlighting ways in which the expression of concepts such as software engineering contracting, designing for the locale, and users and use point to instances of practitioners becoming less postcolonial and more decolonial.

Software Engineering Contracting

Like the other two software firms that inform the arguments in this thesis, Edu-Soft is a private sector-driven technology company that provides educational solutions and services for high schools, tertiary institutions, and the government. Edu-soft provides end-to-end eLearning solution, tailored support services, and training and capacity development to different sectors of the economy. The company also offer stakeholders in the Nigerian education sector connectivity solutions, web portal development, and other professional and supporting infrastructure services. Most of their educational products are

in-house legacy applications and platforms that were developed based on a shared understanding of the technological and educational landscape. On the issue of software contracting, this section is concerned with how Edu projects engage in the process of initiating the development of new legacy products and the ways in which software projects are been contracted.

The initiation of legacy applications manifested from the company's core mission of wanting to transform education in Nigeria using digital technology. Edu projects engage in developing solutions that first meet global technological advances, and second, those that are relevant to the peculiarity of the Nigerian market. The initiation process of legacy products is exploratory and iterative, particularly one that recognises that change is imminent as user aspirations evolve. This might suggest a community-wide agenda that equally recognises the trajectory of market demand and the perspective of potential users. As highlighted by two participants:

"What we've done with a lot of these tertiary institutions is basically automation of their processes. The most common challenge in this country as to the processes of the tertiary institution is getting academic transcripts managed effectively and efficiently. Our solutions move to address this particular problem" (F1- Business manager)

"For us, due to the context of the environment, we only develop based on some contract or something, and we feel that if we go onto develop this product, there is a huge market for the product. Later we try to ask people for feedback and then attempt to see how the system might be suitable for others. Other universities came with their requirement and we hath to balance the different requirements and come up with a general idea of what might suit a wide range of requirements "(FF3 – Senior developer)

What this shows is the shared business understanding of the gaps in the market, and the mechanisms Edu-soft projects have adopted in providing services that meet current and emerging market demand. This might also be considered as demonstrating the relevance of understanding the politics of what might work for a particular institution, but also what might sell to other similar settings. For example, three participants noted that the initial in-house products they develop and deploy are mostly concerned with the automation of certain instructional processes and learning activities rather than supporting the entire educational experience of different stakeholders (F1, F2, F7). Here, automation is largely considered as an emerging technological benevolence that can replicate existing structures of running institutions of higher education, and as noted by two participants:

"As a software development company, we automate processes for our clients. We develop in-house systems; we don't use off-the-shelf system. We have the 'college portal', which is an

educational product that has different models. We also have the learning management system, application system, registration and result publishing system, fee payment system, and other products specifically for schools (F7 – project manager)

“We build school administration software solutions. When we started, we launched learning management systems for tertiary institutions in 2011. The system is being used by over 20 tertiary institutions at the moment. We also launched a system for primary and secondary schools, which is been used by 500 schools now. What this system does is the automation of the entire process of running an institution of learning - from enrolment to accounts to assessment and more. The system produces the report sheet based on the format adopted by the schools. In essence, it freezes up the time at the hands of tutors and administrators. Tutors don't have to deal with the manual computation of results and have more time to engage in other learning activities and research. For the administrators, it gives them indicators, in a form of dashboards where they can see what's happening in their institution or school. These indicators would help in making better decisions. This is what we've been doing all this while. We are also looking at the learning itself, and how can we impact actual learning. But what we are doing now is mostly administrative work, and not on how students can come to learn better and feel they've learned something new, we are not targeting the student more.... Because of this, we came up with other initiatives like distinction.ng. Distinction.ng is about a learning platform, similar to Khan Academy. Our entry point is a CBT platform where you can practice past questions in JAMB and WAEC (something similar to the GCSE in the UK). It's a proprietary product of Edu-soft. The platform as of now is free for usage. Schools can set up accounts, and students from the school can practice under that account. (F1– business manager)

Considering the above, the understanding is that most of the legacy projects in Edu-soft were concerned with the automation of some processes of the educational establishment and government agencies. With a deeper understanding and appreciation of technology by the public, the service demanded and provided has shifted from mere automation to the development of an entire chain of business structures or work patterns. Examples of such requirements include providing solutions that can cater for the work practices of university administrators and management, but also the teaching and learning processes of lecturers and students. This makes the processes of contracting (as in development) to be either internal to an organisation or the provision of customized or purchased products as an external vendor. From the account of how in-house development is initiated, one can infer that the arrangement of software development depends on values-based aspiration and market demands, thus provide an indication of factors that could direct the scoping and processes of a project.

Equally relevant to understanding the initiation of Edu-soft project is the concept of software engineering outsourcing (Whang, 1992). For Edu-soft projects, contracting takes two forms: either through marketing outreach or referral within the customer relation team (CRM) or through government procurement bids. In the first case, the business manager engages the project owner/client in detailing the sort of product and services the company offer and entering into some form of client-vendor agreement. The implication of the marketing outreach and referral is demonstrated by comments that;

"We advertise our services based on the features we have on the system. We mostly deploy our solution to the schools and give them a free trial usage for a term. If they are happy with what the system does, then they can pay for the subsequent service. That's the strategy we used to penetrate the market. From my experience, most of these schools tend to not understand how software work. They just want an automated version of their manual processes. We hath to do educate them more" (F2- Designer)

The same participant pointed out that:

In the beginning, we don't have a lot of clients on the platform. When we are building the application, we took most of the important features like registration and result generation into account. The result generation part is more of providing a reporting of assessment. We took a general view of how a school setting works, then we implement something that is close to what we think is generic to everyone..... We deploy the application to five schools, acting as our user cases, building, and testing in those schools. As we get more clients, each customer has a different requirement. Because of the numbers, we hath to expand to meet the needs of the client by having a support team. We come up with a configuration feature where each school can have a customized outlook of the same platform (F2 - Designer)

Adding onto how in-house projects get advertised and supplied, the understanding is that interested parties sign MOU that details the specifics of clients' demands and the deliverable expected of the vendor. This is highlighted by a participant hat suggested:

"First you must have an MOU with the institution. After that, our staff go out and try to find out about their processes. In Nigeria, I find out that no two universities have the same processes. So, you have to go and gather information through the ICT department and different departments in the school. We do this because we aim to provide tailored service to our clients, and not just dump a system to the universities (F7 - Project manager).

"When we are talking about clients, we are referring to the administrators in the schools. Although the students/lecturers are the actual users of the tools. The problem is that we are

designing for specific people, but a lot of times what the administrator wants is provided (F6 – Software developer)

In the case of government-funded projects, the Project manager and some members of the CRM team engage in extensive marketing of the company's products and services to secure a contract. Although not specified by participants, there is the understanding that some contracted projects are awarded not entirely on the track record of the companies (i.e., on their capabilities to deliver), but partly and significantly due to the familiarity or understanding established between the project owner (client) and the business manager (vendor). It can also be inferred that some software contracts are sub-contracted from a more well-connected company (in a Nigerian term meaning companies that have some sort of direct relationship with a member of the management team in an organisation) to companies that have the capabilities to deliver customised services. For example, in traditional software development, contract arrangements are widely considered linear processes of outlining a complete specification of a system to be delivered (Zijdemans & Stettina, 2014). In such cases, the project has fixed scope and cost and estimated deadlines that might not support adapting to new work practices except for agility. It is also expected that for a company that adopts the agile methodology, there should be a continuous involvement of clients/or users in post-award and pre-delivery activities.

However, the case demonstrated by Edu-soft project is that of a fixed value-driven approach to scoping and delivery. By this, I am suggesting that the company's adoption of an agile approach demands loose fixation of cost and schedule to inform the scoping of the project roadmap to achieve them. This loose fixation on project roadmap is demonstrated by the ways in which an institutional unit or an actor outlines pre-award requirements detailing high-level specifications of deliverables and not a template of how the contracted product can be incorporated into existing structures of work. With specific reference to a collaborative project with a government agency, a participant demonstrated the complexities of value-based agile contracting by suggesting that:

"There will always be room for negotiation. As a company, we have to draw a line as to what we can do and what we cannot do. We also have to look at the opportunities presented to us. As a company, our primary focus is not on providing services but on making some impact on the community. The government might not care much for value for money as there are a lot of political forces behind any government project. A lot of companies provide services for the government, which might not necessarily uphold such values. We make it a point of reference that others can learn that it's not just about being in business but to point that this is how things should be done and that one should not settle for less. Due to the nature of the political atmosphere here, 80% of our projects are private sector driven, while 20% are government oriented. In case there is any kind of instability of government policies, we are at least covered or will reduce the effect on the business (FF5 – Lead Project manager)

Although the accounts presented to support the idea about 'value-based agile contracting' above are provisional, there was the suggestion of a case that demonstrates 'fixed-price agile contracting'. This is highlighted when the project manager said that;

*"Because we generate our revenue based on partnership with ***** (a government agency that handles university entrance exams), we track what was paid and what is on credit. That way if we come to know if we provided our own end of the partnership and ***** can pay us for the services provided, and not to say that they have to wait for all credit to be paid. So, these are some political factors that you have to look at. Just note that we are not providing end-to-end service for such projects, we handle the registration, payment and checking of results. NECO handle the examination part" (FF5- Lead Project manager)*

This form of software contracting is collaborative but not an exemplar of agile collaborative joint-venture as it often entails upfront specification of timeline and price, might lead to compromising tension between contracting parties, and in most cases held vendors to pre-award performance measures that were not responsive to emerging conditions of work (Lichtenstein, 2004). The implication of such an issue in a project that does agility is that its core principles of collaboration over contract negotiation are neglected, the need for responding to change is replaced with following a fixed scope and timeline, and the emphasis on working software and not performance documentation is unattended. It also demonstrates how checkpoints are established to ensure compliance with a detailed plan of action from contracting parties – a practice where functionalities are not collaboratively developed and evaluated in design sprints but in contracted timelines. This is demonstrated by a participant that suggested;

*"Most times, when you deal with the government, they just tell you this is what we want. They don't allow this seamless process of gathering requirements, they just have documented requirements. We acted as third parties because ***** (a government agency) awarded the contract to a different client. We just come in and install the solution on the systems in the different centres across the country. The only form of evaluation is that ***** (the main contractor) make sure that we deployed the approved version of the platform (F3 – eLearning Lead)*

What the different accounts above might suggest is the 'political' dimension of software contracting as applied to the context of a localised software development firm in Nigeria. It also highlights how prosaic matters such as in-house development and contractual customized development are not typified as 'political' even when explicitly indicated in the empirical data presented. From the empirical evidence above, one can appreciate the detailed account of the ways in which in-house projects are initiated, and how customized software developments are contracted (or sub-

contracted) to software firms in Nigeria. One would also notice the emphasis on the automation of the process, but also on the role different organizational units or actors play in the initiation of projects, in articulating requirements, and in the evaluation of deployable products. Adding to the organizational framing of software outsourcing as indicated above, there is the need to understand the activities undertaken to design and deploy products for clients within the Nigerian educational sections. This entails accounting for what happens when a mutual understanding of what an in-house or contractual project is established, the ways in which system requirements are gathered and translated into design processes, and the sort of activities that led to the development and evaluation of software products for local conditioning.

Doing Partial Agility

Adding to our understanding of how different dimensions of software contracting might demonstrate localization of software projects in Nigeria, this section will attempt to show how software practitioners design for/with locale while doing partial agility. Put differently, the discussion seeks to establish how the 'playfulness' of practitioners in relation to agile software development could signal a transition from a postcolonial to a decolonial way of knowing. Or, rather, seeks to demonstrate what might further the localization of agile software development from the perspective of three software firms in Nigeria. This is in relation to the conceptual argument in HCI about the cultural practices of software appropriation as a pathway for the adaptation of social practices (Eglash, 2004, Tchounikine, 2017). As the end products of Edusoft projects are adopted by a range of actors, there is also the question of how the appropriation of conventional design practices takes place, and the forces directing their translation in other design settings.

As I will attempt to show, the practice of adopting agile principles as normative scripts that are adaptive to changes and enables collaboration, is not only about how conventions get interpreted and made useful, but have more to do with the organisational sensibilities that direct how they are adopted and used. Therefore, the consideration of the playfulness of practitioners in relation to the agile principles might be considered as emphasizing a reflexive culture where localised practices of agility are not a derivative of convention but an extension of them. As pointed out by three different participants:

So, in design and development, we try to adhere to software engineering best practices. We used the waterfall methodology. We did like three months of documentation and use cases (personae). And of course, waterfall became not a preferable methodology in software development because things change. When we go out to schools, we develop system requirement specifications (SRS) with other relevant stakeholders. The SRS keeps changing, and thus brings about coming back to the books and making changes. Currently, we are using the chrome agile methodology because it allows delivery of solutions quickly and in iteration, making testing and quality assurance possible. We build a small functionality, push it out and

get feedback from clients. It has been effective because we feel it's a natural way of how things work. As things change, with agile, we are able to handle that effectively. We try to adhere to the standard and best practices out there. The good thing is that almost all the leading providers in this field showcase what they are doing, e.g., Google, Facebook, Microsoft etc. in reality, they build functional procedures which have a huge community behind them, and conventionally becomes a standard because it works. (F1 – Business manager)

"In this company, we are not doing the complete process of agile project management.... due to the nature of the way projects are coming, clients are always in a hurry, so we have to take it as it comes. If not, they will give it to a different company. We just do things this way and we just call it agile project management as we use Agile Jira board..... We are using the tools but in a semi-structured way. We are just combining different tools and approaches" (FF6 - Associate product manager)

From such accounts, one can deduce the assumption underpinning the initiation of normative scripts and how they get adopted and extended in specific design work. It also demonstrates the sort of circumstances underpinning the appropriation of conventions, the conditions informing their selection, and the forces directing their translation into new settings. The narrative above can also be considered as highlighting how a playful adaptation of the agile principle in a semi-structured way might signal an awareness of the need to design for/with local conditions. Another example of such awareness is demonstrated in a dialogue between two designers, referred to as EVF:

Designer 1: This is what they usually do, the project lead comes and discusses the project and you sign an MOU. You develop the product with no room for changes, that waterfall.

Designer 2: Do you think this project we are on can be done using waterfall methodology?

Designer 1: No.

*Designer 2: I don't think the waterfall methodology is working in Nigeria. Isn't waterfall the notion that before you start a project, you let....(interruption by the other person) know it's too rigid (emphasis, swearing, **this Nigeria**)today you are doing this and next Monday this person will come and give us a new set of requirements. The waterfall cannot work..... For me, I am arguing that we have no choice but to do agile methodology*

Designer 1: Maybe because you have a lot of developers around you).

Designer 2: Imagine we adopted a waterfall for this project. After having signed an MoU for a long time, they came and bring a different set of requirements. If it is a waterfall, we tell them NO, but doing so will make users lose their job.

What the dialogue might suggest is the complexities of adopting conventional design methodologies across contestable settings; but also, the need to adapt conventions to new conditions of work. Such recognition would lead to a better understanding of the ways in which how localised structures of work facilitate interaction between team members, and how the semi-structured and playful adoption of the agile principles could provide resourceful way of adopting multiple perspectives without re-inscribing the dichotomy of the provider and the consumer (Anderson, 1994). This is relational to the concept of 'play of possibilities' that demonstrate how ethnography, through the play of rationalities in the local structures of social life, can provide resources that would inform eventful design reasoning and activities (Anderson, 1994). To demonstrate the implication of playing with possibilities as an exemplar of local sensibilities leading to the 'do-able practices' of work is to consider an earlier comment by the associate product manager that 'we are just combining different tools and approaches'⁴⁷. The reference to the keyword 'combining' here serves as an indicator that normative scripts might not be the best practices for a particular circumstance of work and that it is the active engagement of practitioners with emerging conditions of work that design practices that are both do-able and transferable can be identified and applied. This is further demonstrated by a developer and designer that pointed out that:

"For me, I don't feel there is a one solution fits all for design and development. You need to look at the organization, the context, or the niche to which you are trying to provide your solution. What will work in Africa and be sustainable, and in Nigeria in particular, might be different from what might be feasible with what works in Europe or America. So the ability to actually look at things like the learning context, learning culture, their habits, the technology in place, dependability in place, and dependencies for both parties will determine what actually determines the best fits or local practices..... What best practices will be for me will be an eLearning solution that has data integrity, protects the data of the individual, as well as delivers value where users will actually still acquire knowledge within the restricted environment of learning. (F5- Software Developer)

"The peculiarity of the environment made things the way they are, and I think sometimes you have to push back this thing. The funny thing is that contextual factors affect software development practice. Imagine someone coming to you that they want this product and maybe they don't necessarily understand what they want. But because it is a business, you just have to just take it in and make people do ridiculous hours to achieve that and not pay fast-track money. The pressure

⁴⁷ During the initial fieldwork, for example, a participant narrated his experience with a school where they requested for their transcript to be designed in the Arabic language mainly because they are an Islamic school. In his words: "So we had this client that insisted on having their report sheets in Arabic. We said OK fine we'll do so. But they should inform us about the percentage of parents that understand Arabic since the report sheets are meant for them to know the performance of their children. Then they realize that what they are asking for is feasible to us but not relevant to the immediate environment we find ourselves in. In different cases, we tend to guide users as to what might work or not" (F1- Business manager). Although, some participants in the initial fieldwork suggest having their products multilingual. What this show is that language might have some influence or even impact on software development processes. It also shows the role of language in design processes and decisions.

I think comes from the fact that the marketing team tends to sell products or services that we don't have or maybe take in more than we can chew. They tend to make too many assumptions and the pressure comes down to the development team which will ultimately hinder following best practices" (EVF – Designer)

From the accounts above, the data is suggesting that practitioner's play-off between attempting to adhere to standard practices while also being flexible to everyday working conditions and circumstances – similar findings to Tendedez and colleagues' (2018) concerning the need for balancing development procedures in CSCW and HCI. There is also the consideration of how the adoption of specific procedures over others might facilitate interaction in ways that would ultimately lead to unnecessary difficulties in project work and might even negatively shape the level of adoption and acceptance of deployed tools (Tendedez et al., 2018; Bjørn, 2019). Although practitioners in the three companies have acknowledged the differences in the conditions that they work and those that they are blindly following, they fail to appreciate how the processes of devising local logicalities of combining approaches might inform future work more than any adopted practices 'out there'. This is not suggesting that the adoption of stereotypical western approaches is detrimental to the localised practices but points to where conventions are applicable and where localised alternatives are more sustainable. In the proceeding paragraphs, an overview of the different approaches and tools adopted to demonstrate the partial agility methodological frame is considered – with specific emphasis on how the semi-structured adoption of the tenant of the agile principle might have made Edusoft work orderly or messy.

The case described below provides an overview of how Edu-soft projects are framed and executed as an exemplar of partial agility. The description is from the notes and pictures taken during the daily stand-ups, mock-ups, and sprint meetings. The first part of the discussion will focus on the interaction that takes place between team members in designing a functional product – and how specific tools and mechanisms for planning, organising and communicating different activities convey Edu-soft projects as a totality. The second part focuses on how small-scale demonstrative and maintenance projects are organised to ensure changes are implemented and working software deployed.

When a new project is initiated, be it based on customer requirements or an in-house initiative, specific project outlines are generated. During project briefs, project goals are set out (the focus of the problem and identifying and specifying the scope of the project), and an outline is drafted. The outline of the project is aligned with the development team/company OKR, which is also lined with the company's mission. The strategic approach for any Edu-soft project is that it should have a project assessment and roadmap planning phase, product sprint and release phase, and project review phase. In a participant's words:

"Let me explain the different stages. From the OKR, the company present its own OKR for a particular tier. Each department is expected to produce there and submit it for review. You look at the company's OKR and the part that relates to your department and then develop your OKR. The management team review the department's OKR and work starts. In the engineering department, we plan our activities for each month. The lead refers to the department OKR he sends to me and suggests that each objective is timed so that they can monitor progress. On each quadrant, for example, item 10, cuts across different departments. Sometimes the engineers have to participate in those visits as they might come to fully understand user requirements. If we update our OKR, it automatically reflects on the company OKR. The google standard is 70%, so you can see the company has achieved that. OKR is mainly to align the company goals to what the departments are doing. We use it to measure the achievements of the company so that we work in one unified direction. Everyone can see clearly how those goals are achieved, and track what each department is doing and if they are contributing to the goals of the company. (FF6 - Associate product manager).

First, in the **assessment and roadmap planning phase**, concepts detailing the entire project are incrementally agreed upon between contracting parties. This includes the desirables, timeline, budget, and expected outcome of each sprint and release. It is in this phase that a project roadmap is draw-out, one that highlights the specification of the system and the functionalities of the deliverable. For Edu-soft projects, the Jira agile board is used for assessing, planning, tracking, and executing the processes of any contractual project. Jira consists of two boards; a scum board and a Kanban board, where the team uses a scrum board for new projects, while Kanban is used for smaller projects (e.g., demonstrative or maintenance projects). This is demonstrated by a participant that suggested how:

"When you are trying to build a new project, scrum board is better, it makes it that you have to complete each and every task after one another, while the Kanban structure is random and priorities. The team can identify the maximum number of tasks they can do for a certain day and the certain number of tasks that can be given to a particular individual. Kanban, I think originated from a Japanese automobile company where the engineers are given a maximum set of tasks for a day. For example, each engineer is flagging a red flag when he has a maximum number of tasks to do, something like five and which suggest he won't do more than five tasks. As soon as he is done with his task, the flag changes to suggest that he can accept more tasks. But it's not liked a planned or complete story, because nothing is really planned like a complete feature. So, you just take randomly any part of the project. We use Kanban when the project is been maintained or its almost done, maybe if we are iterating or doing some maintenance or so" (FF6 - Associate product manager)

What this might suggest is that user stories created on Kanban might not be a complete episode of functionality but rather an emerging task that can be undertaken by any member of the team within a particular sprint cycle. On the Kanban board, it appears that practitioners can take up the specific task to be executed and released within a sprint session. For example, figures 6 and 7 outline the scrum and Kanban board where tasks (stories) are allocated on the Jira agile board. Scrum has six channels of 'To-do, In progress, QA/PR, Development server, Staging server and Done'⁴⁸. Kanban has five stages of 'To-do, In progress, QA/PR, On the staging and Done. What the figure shows are the different stages a user story can be, and the iterative ordering of the activities of different team members to achieve a totality. The board also allows for team members to coordinate their sprint activities across the project roadmap, first to ensure that each user story is completed following to release plan, and second to allow for a retrospective review of the project as a whole.

Apart from the use of the scrum board and Kanban board as part of the Jira agile board, a CRM service board is also used in roadmap planning (see Figures 11 and 12). The CRM board assist the support team to understand and identify customer needs, as explicitly suggested by a client or through user research. Figure 11 is the Jira CRM board for monitoring the activities of the support desk, in which we can notice the total number of customer support requested (#3698), provided (#3679), waiting for a response (#19), and the priority of the support request (#1- 4) for a particular product. On the board also, we can notice the support task assigned to the assistant product manager to handle and the minimal time taken to resolve a customer request. Figure 12 also shows a similar customer support mechanism where a customer can write to the service desk reporting and requesting information regarding other services. The support was registered by a member of the CRM team and forwarded to the assistant project manager for further action. The dashboard also suggests the task assigned to a team member and a count of all requests resolved or pending. What this suggests is different agile teams interact in providing timely and tailored support to each of their clients. This is further supported by the comment that:

"We also engage some few schools, in case there are some grey areas, and they give us feedback, so it's a combination of different things and not a standard approach as you may expect. We also learn a lot from the support desk, about issues users are putting forward. We document such issues and iterate and learn new insights. We don't expect that our practice should be 100% agile, or build a full system at a go, but iterate in the process. (FF5 – Lead Project manager)

⁴⁸ On the dashboard, each module has five/six channels. For each project, a module is created for a particular mock-up using Xd. The 'to-do' list outlines the task to be carried out for a particular story (functionality). When a task is been handled, the mock-up moves to the 'in-progress' stage. The 'QA/PR' stage indicates a task that is on priority, in most cases a backlog task from the previous week. A reviewer reviews the functionality against the mock-up outline and pushes the story to the 'development' or 'staging' stage. Before moving a story to the development or staging stage, depending on if it's scrum or Kanban board, the different stories are merged to form a coherent product timeline. The integration is achieved with the help of the bitbucket tool. Bitbucket allows team members to integrate, manage, and collaborate on software codes. It also allows for testing and evaluating project codes within an integrated CICD infrastructure. Bitbucket also serves as a repository for codes and for version control of codes.

Apart from using the Jira service board, the CRM team also uses HubSpot (Figure 8) for the inbound marketing of products and services. Although this is not the classic idea of user research as expected of software engineering, the idea was that of adopting tools that could allow for understanding user behaviours through different mechanisms. A close examination of figure 8 highlight how the customer success manager of a particular school communicates client request to the assistant product manager through HubSpot. This also highlights how via HubSpot, the CRM team works hand in hand with the project owner and the project manager in outlining the project roadmaps, the high-level requirement of the system, and the functionalities of the deliverable. What this might suggest is, in a participant's words:

"If you are building something to build for a particular user, you ought to do some user research. If an organization or company contracted to you, I believe they have their own requirement, it is a two-way thing. Based on what we currently working on right now, if I get you correctly, you are suggesting that the person that pays or those in managerial positions are the people we are about regardless of the end user. Maybe with some of our product like SAFSMS, but with the product we currently working on, I know for a fact that some of the features we have built recently are features that the end-user has explicitly asked for as opposed to the people paying us. It is inevitably still that those that are paying us are concerned about whose end users are, and if the end-user complains we have to fix those issues..... That might be because of the particular product that this is. I don't know if that's the case across the board. But we have direct access to the end users after you build the product" (EVF - Designers)

At this stage, an in-depth analysis of the different release objects to be delivered and a clear itemizing of the different steps needed to translate the concepts outlined in the assessment phase into a functional product are established among the agile team members. However, due to the shared understanding that change is imminent, responding to change is key to agility and client collaboration is more important to the negotiation of the outcome, Edu project adopt a 'partial' agile methodology. This is inferred by the comment that:

"We follow the standard of agile scrum not strictly but by looking at the environment we work in..... We have to apply it the way we apply it if you want things done. In Nigeria, few companies like Andela, eHealth Africa and Pay stack adopt modern practices, some don't have advanced standards.... this gives the wrong impression that an application can be fully rolled out in a month." (FF5 – Lead Project manager).

The consideration of the agile methodology as a frame is meant to ensure that interaction between interested parties is prioritised over the adoption of strict organizational processes (tools, strategies,

mechanisms, and more) to achieve evolving project desirables. The suggestion of doing 'partial agile' was a useful phrase to explain the way in which they did not follow the entirety of the agile principle in their work. This is attested by the comment that:

"We try to evaluate those requests based on business sense and the resources and time needed. We try to see if the request can be scaled up to other clients to use or if it's just for that particular client. So, we communicate the decision to the client. If we are building the functionality, we monetise the new request against what they have been paying, if it is covered then we don't charge anything, we can up sale the new feature to other clients" (FF6 - Associate product manager).

Second, in the **product sprint and release stage**, different fidelities of deployable products are designed and evaluated on the Jira agile board. Usually, the stags involve project kick-ups, weekly sprints, daily stand-ups, and sprint review meetings at the end of each circle. Project kick-ups usually take the form of an iterative and incremental dialogue between the project owner, the project manager, the CRM team, and the associated product manager. In this meeting, the project manager attempts to develop release schedules across system requirements – with items such as storyline, estimated resources and time, sprint iterative plan, and product backlog outlined. This gives rise to a range of activities that lead to:

"Creating persona's, user case diagrams, brainstorming ideas, sprint meeting as decisions can be made while identifying new priorities, wireframing, developing flow testing and evaluation, designing low/high fidelity mock-ups, developing content prototypes, and testing and evaluating functionalities (EVF – Designers)

During sprints, a set of activities to be carried out in a continuous development cycle are identified and assigned to practitioners. Each department coordinates its sprint meetings in line with the outcome of the kick-up and sprint planning meeting – which can be weekly, bi-weekly or monthly. The assistant scrum master develops the sprint backlog, which is reflected in the to-do list on the Jira board. When Kanban is used, the backlog will take the form of smaller tasks that can be handled by different team members and flagged off when completed and new tasks undertaken. In some cases, the sprint meeting can be collaborative with other departments, specifically the CRM team and the engineering team. One might expect that when a sprint is set out, changes cannot be accommodated. What I noticed is that where there is any request for changes to the plan, be it from a client or in-house, the product backlog is not altered until the next sprint meeting. As each project has daily stand-ups that attend to new circumstances, changes to sprint/release plans are reviewed in the next cycle (sprint runs on Tuesday for S1, Thursday for S2, and Friday for S3 project). The purpose of the stand-up is to track the progress of the team and discuss what is expected of each team member and not to identify

who is not doing their work as expected. The discussion is open and dialogical, and mock-ups identified and modified on the dashboard by the scrum master.

Equally important in the product sprint and release stage is that when a prototype is fully developed, for example, the design stage of the product is completed, and a sprint review meeting is convened. The design prototype developed is showcased to the project manager, who reviews the functionality against the user requirement and agrees upon whether a prototype should move to the production stage or not. Testing and evaluation are carried out in the development and staging environment. This is illustrated in figure 9, where a description of the pull request, a comment made by a reviewer and an outline of the affected files in the repository are highlighted. Apart from the test runners and other mechanisms adopted for testing code, the reviewer also engages in testing stories to ensure that they are running as expected. This is where bitbucket and Jenkins are used for the integration of different stories in the development environment, specifically the front end and the back end. The test runner in the infrastructure reviews each code before granting the pull request of the reviewer. A senior reviewer reviews the code of the story against the mock-up outline and pushes it to the staging environment. In a participant's words:

"We have an internal evaluation which depends on if we are launching a new feature or trying to meet the needs of a client. Whichever one it is, we have a quality assurance phase where peer review is conducted at each and every stage of development. Each developer that builds a functionality has to be reviewed before it's accepted into the whole solution. From that stage, we conduct a user acceptance test (UAT) where a test of the functionality developed will be a gauge as to doing what it's supposed to do. This way, we have validated that this function has met the client's requirements. If the requirement is not client based, we do have members that conduct UAT. We do collect feedback from users through online forms or through incorporated feedback ads." (F1 – Business manager)

For each issue identified, a ticket will be raised by the reviewer and examined by the scrim master of the development team. The process is iterative and incremental until a fully functional product is ready to be pushed to the 'done' stage. If any change occurs from the previous sprint meeting, a backlog of the processes is reviewed to ensure that functionality is only pushed to the done stage when it has satisfied the systems requirements identified during project road mapping.

For small demonstrator or maintenance projects, Microsoft excel is used as a tool for ordering project activities. In peculiar instances, such as limitation of resources and pressure from the client, Edu project processes are managed and organized manually using sticky notes and boards. Such instances mostly occur when team members are under pressure to deliver a product against a fixed contract timeline. What this might suggest is that the nature of the project, the number of people

working on the project, the uptake level and resources allocated for the project determine the tools and techniques adopted in ordering project processes.

Finally, in the project review **stage**, training and support are provided by the CRM team in determining whether the desired impact of the project is achieved. This is achieved through the analysis of customers' reactions to products offered, through customary marketing reach out, through customer satisfaction or cancellation forms, or through a reflection of the entire project documentation. The Jira service board in figure 11 for example is used to gauge the success or failure of a design project. This might lead to the conclusion that the partiality of practitioners does not equate to the messy ordering of work, the account above suggests quite the opposite, and it is the adaption of conventions to emerging conditions of work that render Edu-soft project orderly.

In a nutshell, what the case described above provides is a bird's eye view of the processes and tools adopted for the design of educational systems in the multi-cultural context of Nigeria - and not some 'idealised' and 'sociologically interesting' or 'theoretically relevant' work (Randall and Rouncefield, 2018). The different examples provided demonstrate the situated nature of software projects that does agility. Using the case of Edu-soft as a perspicuous example, the themes identified suggest how the adoption of conventions (or lack thereof) and the standardization of work might have led to a range of developmental difficulties, poorly reflecting the understanding of the context of initiation and adoption, might lead to the likelihood of project failing, or might even warrant less acceptance and use of deployed tools (Tendedez et al., 2018; Bjørn et al., 2019). The analysis also indicates the methodological implication of "playfulness" in regenerating work practices and might also be considered as restating Schuman's seminal arguments about the contingency of rules and rule-following as applied to non-Western software projects (Suchman,1987) which thereby highlight the 'mess' rules might create because of the inevitable situated nature of work, which, in turn, perhaps necessitates new views of the notion of scale across contested boundaries.

'User' and 'Use'

Adding onto ways in which practitioners adapt the agile principle in designing for the locale, this section will focus on how users and uses are discussed as differentiated empirical entities within the context of Edusoft design work. Having established how 'doing agility' might lead to the messiness or orderliness of work, the close analysis of the empirical expression of the user (be it the intended user of tools or the contracting client) in practitioners' narrative is meant to highlight the materialities of the Nigerian user in design work. As research in HCI has continuously shown, the figure of the user plays a significant role in how design problems are framed (Bradley et al., 2011; Satchell and Dourish, 2009); particularly how interactive systems are to be designed, and how the interaction between the rational actor and interactive systems are to be represented. This thereby presents the need for understanding how the social construction and expression of the Nigerian user in practitioners' narratives might render

their figure as scenic/contextual features of design work (Sharrock & Anderson, 1994; Martin et al., 2007). Presumably, doing so could explicate the political implications of framing African users in certain ways, and the uses it is put to in project work that does agility.

Before going into the details of how the user figures in practitioners' narratives, there is the need to recognise how the process of framing-as-in-invention emerges from a particular way of thinking about reality – and in particular a style of thinking about other cultures and beings other than the self. One might argue that the invention of Africa as a wholesome geographical entity was developed on an imperial construct that sought to dissolve empires and territories with the purpose of economic exploitation and political domination. Therefore, social groupings that were framed on colour (black and white) and epistemic lines (traditional vs scientific) would ultimately be stereotyped and disciplined. Even the pan-Africanist and nationalist construction of a wholesome Africa that consisted of independent republics was engineered on a grand design style that seeks to unite fragmented entities but instead goes further in staging local communities into nation-states that triumph in 'cultural synthesis and dismemberment' (Mazuri, 2005). This led to the question of whether the Nigerian user ought to be thought of as secular and objective beings; or rather posing, how do practitioners frame users in Edu-soft project? If users are socially constructed, what types emerge in practitioners' narratives of designing for the locale?

Before providing evidence to show how such issues appear in the data, there is also the need to explicate how specific histories in Africa might have directed the default fixation of the African users as an Other within existing matrix of power (Cabrero et al., 2016). This is not speaking to longstanding trope concerning how Africans – as per technology design – are typified as social design problems of technoscience, but rather pointing to subtle issues such as: the unvalidated stereotypes about a particular user group and how that is reflected in design products, and the political implication of involving and representing the user in design processes - either as an abstraction, a motivation, a distant entity, or a standing reverse to be ordered and used.

Consequently, these issues emphasize the complexities of socially defined identities, particularly those that are approached through a hegemonic mode of construction. This is further complicated by the premiss that identity formation is a historical process (and not a stationary event) that emanates from a geopolitical orientation. And as such, the utilities of such a positionality would give rise to the meaning attached to its product. In identity politics, the more common argument is that being African as a representation/expression of subjectivity came about through the unequal relations of spaces and times in contemporary discourses; relations that point to how:

“the idea of 'Africa' is a complex one with multiple genealogies and meanings, so that extrapolations of 'African' culture, identity or nationality, in the singular or plural, any explorations of what makes 'Africa' 'African,' are often quite slippery as the notions tend to swing unsteadily between the poles of essentialism and contingency. Describing and defining 'Africa' and all tropes

prefixed by its problematic commandments entails engaging discourses about 'Africa', the paradigms and politics through which the idea of 'Africa' has been constructed and consumed, and sometimes celebrated and condemned.....Africa is always imagined, represented and performed as a reality or a fiction in relation to master references—Europe, Whiteness, Christianity, Literacy, Development, Technology (the comparative and colonizing tropes mutate continuously)—mirrors that reflect, indeed refract Africa in peculiar ways, reducing the continent to particular images, to a state of lack” (Zezeza, 2006 p.14-16).

Equally relevant to understanding the effect of such an invention is illustrating how socially constructed identities are approached within differentiated design spaces. First, one has to recognise that the taxonomies of confiding post-colonial African identities to the arbitrary social construct of African proper, Africaness, and Blackness dismiss its combative dimensions in relation to themes such as ecology, geography, ethnicity, religion, culture, and language (Zelesa, 2006; Ndlovu-Gatsheni, 2010). This raises the fundamental question in African HCI of whether being African, be it the Occident, the Aboriginal, the Native, or the Subaltern Other form part of the Hegelian framing of man-as-human or the other-than-human and more-than-human dimensions of Euro-centric HCI?⁴⁹ Although the framing of more-than-human/other-than-human in design spaces has been largely in relation to non-human beings like insects, plants, rocks, and lakes, in ontological design, the emphasis has been on challenging the centrality of design agency as design matters are relationally bounded by different forms of being.

Consequently, a closer examination of the principles governing the categories of the figures of man-as-human might show the blurred relations between the vitalities of being referred to as an Other (i.e., the denial of existence as Human or the allocation of the status of non-being Human) and the patriarchal framing of the Human(s) in contemporary discourses (Cabrero et al., 2016). As noted by Mbembe, “in African tradition, human beings were never satisfied simply being human beings, they are constantly in search of a supplement to other human hoods. Often, they added to the human hood various attributes of the properties taken from the world of animals, plants, and various objects” (Mbembe, 2021 p. 218). Therefore, the negation of the status of being-Human towards Africans might denote the possession of a specific genre of properties that signal a fact of a prior and a conscious existence (Mignolo, 2015) – or as the Existentialist might argue, existence precedes essence.

Second, one has to recognise the complexities of approaching the African User, as a component of a communal spiritual being, within a Eurocentric tradition that value secularism, individualism, and

⁴⁹ A critical review of such a proposition might lead to the uncomfortable truth that the idea of 'man-as-human' is a recent Hegelian invention – with all its contradictions and lack of mutual recognition - that emerges through the distortion of other regimes of knowledge. This might also lead to questions of whether there are, or there is the need for, discursive differences in the framing of the biophysical aspect of the Human in HCI, and certainly how that might shape the materiality's attached to the interaction between the 'more-than-human' users and the 'other-than-human' interfaces (Gonzatto & van Amstel, 2022).

universalism. And how in turn, African HCI researchers and practitioners might inevitably domesticate the connotation attached to non-Western beings in their practices of interaction design? Therefore, such a question demands a critical analysis of how discourses about the biophysical differences of people that negated being African of the status of humanness could shape current and future identities of the 'Human' in HCI. As indicated earlier, the complexities of articulating what it means to be African or of African descent miss the point that arbitrary constructs and categories do not accurately represent subjective things in the social world. This led to the consideration of how concepts such as 'Man' and 'Human' are underpinned by an episteme that produces genre-specific dimensions of the figures of world history (Mignolo, 2015). Although the status of the 'Human' in HCI has started to change with the framing of matters of design as more-than-human/other-than-human, this shift can be considered as a recognition of the genre-specific dimensions of being-human.

Such ideas reiterate the question of who/what 'gets to be human in HCI' largely because the dualism of subject and object in design spaces often misses the point that human-as-subject are objects within a socially engineered category that classifies things populating the world⁵⁰. Drawing upon such a mode of recognition, the point here is that partly due to the colonisation of spaces and times in the postcolony, unpacking being African as a secular or objectified user would first demand unsettling the negative connotation attached to Other beings as a verb and as a reality, and then begin to show how the framing of the African as an Other in Western narratives denote a prior knowledge of the instrumentalities of the African person as a mystery that cannot be reduced to mere descriptors and identifiers. In answer to this end, the discussion below would attempt to show how the Nigerian user is approached in Edu-soft project work, and how uses of deployed products are thought of by contracting parties.

To answer the question of how Nigerian users are approached in an educational setting and in design work is to consider the social structures that underpin the constitution of a customer, a client, or a potential user. In the context of Nigerian universities, an experienced researcher made an inference to the characteristic of a potential 'customer' to be admitted into an institution of higher learning by suggesting that:

"The education philosophy is that we must have an individual that is all-round developed, an individual which can think intelligently and intellectually, and be effective. You know there are three domains that make up an individual: affective, psychomotor, and cognitive domains. Any education, whether African or non-African, as long as it can cater for these three domains, we

⁵⁰ The question of who/what gets to be human in HCI is developed on the backdrop that the entire episteme that underpins the discipline of modern design develops on historical circumstances that privileged certain experiences over others. When the assumptions underpinning the practices of modern design are considered colonial, one can identify how their colonising patterns of making continuously influence the politics of designing our being: with being referring to both human and non-human things. And it is through the critical analysis of the social episteme that determines the being of things that one can articulate the political implication of design in making the world.

can have a good philosophical base. Remember, develop an individual who is mentally alert, physically fit, and effectively relate with other people" (Researcher_3).

What the researcher is pointing at is the philosophical assumption that a social actor to be admitted into an educational establishment ought to possess specific qualities – qualities that a potential customer must satisfy to be considered a prospective student. The use of the term customer above serves as a reminder that modern universities operate within the structures of the quantification sector; a sector that gives more relevance to objectification, measurement, and socialization of education. It also highlights the ways in which user feature in conversation about personhood in educational spaces, but more so how they are typified in the abstract as individual customers to be sold a product. This might lead to the consideration of how the typification of the prospective student in the abstract might usher the customer a contextual feature of any modern society. It also points to how the prospective African student is viewed as neither fictitious nor objectified – but rather as a relational entity that can be inferred as socially construct or a natural fact. If prospective students or potential users are socially constructed or contextual features of the academy, what types emerge in practitioners' narratives of designing for the locale? Let's consider a participant that suggested that; :

"Although, we employ an approach whereby we basically informed based on what the user wants - a user-centred approach, we are building for the users, and we believe that without the users, there is no product.....We put ourselves in the shoes of the users and think for them. The thinking is basically about what should be there. We don't really go out and talk to users of the application per se. What we usually do is gather documented requirements; do wireframing; conduct user flow evaluation and testing; design high fidelity mock-ups – visual designing of wireframes and how users flow from one screen to the other; develop content prototypes which feels like actual application, and collect feedback from a selected user group. When we develop the prototype, we send it out to some certain user group, they won't know that it's a prototype because it feels like the main application. We usually conduct user testing and collect their feedback. Even before jumping into development, we can tell what is going to work and what's not working. (F4- Software developer)

The case reported here raises the question of whether the user-centred approach to design does enable design for/ or designed with the specific circumstance of use and non-use. The central tenet of UCD is that the intended user's aspirations are placed central in design processes, however, recent efforts have shown how approaches adopted to guide UCD designs are political activities that produce outcomes (be it practices, products or procedures) that might not necessarily reflect the entirety of the aspiration of a user group. One might also argue that even when UDC is adopted as an ontological framework in design, there is the possibility that designers by default *design for* fictitious users that

have similar experiences as their own, or for a more profitable or responsive group of users. Even when *designing with* the potential user in mind, practitioners rely on the historical understanding of prospective users' work structure; characterising and abstracting tasks to decide which aspects of social events are to be unmarked and prioritised.

On a closer examination of the excerpt above, the reference to keywords such as 'building for them' and 'think for them' denote the typification of the different roles that users take as a contextual feature of a practitioner's work. Here, the term 'for' might imply designing from a position of authority, as in university administrators as responsible clients and contractors as social actors that can solve the problems of others. The role taken up by contracting parties is that of viewing other groups of actors as social problems that needed objective expert intervention. This is highlighted by a project lead that suggested;

*"We find out that some of the requirements are not clearly set out. Making sure the system fits into what they wanted was a long process. Our conclusion was that the team in ***** (a government agency) felt they were thinking like actual users, but they are actually not. They just wanted a solution that will fit into the context of what they felt was right- which was not necessarily the right thing. But we never had any contact with the actual users of the solution". (F3- eLearning project Lead)*

The use of the term 'them' and 'they' in the excerpts above seems generic as it doesn't make a distinction between the intended users of the end product (think of them as potential users) and from contracting parties (what they wanted, they just wanted, what they felt was - as in the government agency) – thus complicating the suggesting that a UCD approach was adopted, and the central tent of the user as a subject matter of design (Bradley et al., 2011). The excerpts below also highlight the social construction of specific design entities and their representation as contracting parties, either as a stakeholder, clients, or administrators. In a participant's words:

"When we are talking about clients, we are referring to the administrators in the schools. Although the students are the actual users of the tools. The problem is that we are designing for the students, but a lot of times is what the administrator wants that is provided. It's always a challenge, to be honest. If the administrators would allow the actual users of the system to be the key subject that would be more interestingIn this part of the world, we don't do any best practices per se. Ideally, it should be the users that tell us what they want and assist us in evaluating it. But the case here is that the administrators do the saying and evaluation. Sometimes, it gets so bad that we don't get to design for our environment. For example, a university asked for a full-blown real-time eLearning system. But then we don't have the bandwidth that can support such a system - more of an African factor. People want what's out there without considering our own peculiar environment" (F6 – Software developer)

This is further supported by comments that:

"Honestly, in most cases, these requirements don't necessarily reflect the perspective of the actual users of the system. We had instances where a client had a mix of Islamic teaching and western. Because the client has a specific need, we had to have a functionality that would produce report sheets in Arabic. This is a kind of support we provide- so each client that wants a linguistically and religiously relevant system, we ready to meet those needs" (F1 – Business manager)

"I think the most part is that we engage with the stakeholders (management) in gathering those requirements. Or maybe it's a two-way thing to make it clear. If you are developing a product, you can go out and talk to people and gather some information from them or you can put yourself in the shoes of the user as no person is paying for it. But when someone is paying for such a product, they are actually the person that gives you the requirement.....I think it is a valid point that the person is paying for it is the alpha omega. Now I think if I am building a personal app for people to use, I go out and interview people and get their feedback. I think it is a valid statement that the person paying is the most important person when it comes to gathering requirements" (EVF - Designers)

From the narratives above, it is evident that the inference to a specific genre of the expression of the user, e.g., stakeholders, clients, people, and person, might be considered as rendering particular social entities relational to other features that emerge in the context of work. This is not suggesting that the typification of the user as a social entity inherent in any organisation is considered a topic of discursive representation (Bradley et al., 2011) but rather viewed as a scenic feature of any design project (Sharrock & Anderson, 1994). This is premised on the comment that;

"In project management, we have development scrum where we have weekly sprint. We split the functionality into user stories (building solutions for users and not just having the mindset of a developer). This allows focus on the user, and not only on the developmental challenges. In other words, it's like creating a persona. Companies like google have a design sprint where the focus is on the users (one of google and our focus). The sprint consist of designers and user experience experts where different persona of different stakeholders would be designed. In source code management, you pick from those stories and develop to meet those needs. (F1- Business manager)

Additionally, the inference of different user groups and contexts using phrases such as 'we don't talk to users per se', 'talk to people, ' you can put yourself in the shoes of the user', 'we send it out to some certain user group' and 'what should be there' further complicate the typification of the Nigerian

user in the abstract and not some contextual feature inherent of any social setting (Martin et al., 2007). From the close analysis of the empirical expression of the user (be it the intended user of tools or the contracting client) in practitioners' narrative, one can identify how social entities are constructed and represented as both relational and distant features of any design project. The analysis also points to ways in which practitioners make inferences to a specific user group or categories e.g., the 'stakeholder and user' in informing requirement, 'them and they' and 'person and people in referring to the collection of people relevant to the project, and the 'client and user' in contracting terms. The implication of such insight is that social actors take up the different roles in the context of work, but more importantly the materialities of User-centrism in agile project work.

In a nutshell, this section sought to approach the user as a differentiated empirical entity, showing the political implications of framing African users in certain ways, and the uses it is put to in project work that does agility. In concluding this section, I will now consider how the use of technology is viewed among different entities in a university – i.e., from the perspective of project owners/educational managers and potential end users. The emphasis is to show the subtle difference in the aspiration of social actors that outsourced software projects and those that are meant to adopt and use them. In a way, this is attempting to show how usage of technology is perceived by university administrators and how it is taken up by certain user groups – in this case, students and lecturers. Let's consider the perspective of two educational managers about the adoption of technology in higher education:

"The expectation is that this is the future of education – meaning the blended approach. Our belief is that in the next 5-10 years, the blended approach would be ABU's preference, the conventional way will be like an appendage. We created a system that is able to satisfy the yearning of people. People wanted to come to certain universities in Nigeria, and ABU happens to be one of them.... What we are doing with technology is saying we have created an option/platform that makes it possible to obtain an ABU degree" (Edu_manager 2)

In this part of the world, there are a lot of central issues to technology deployment but getting people to access the technology is an issue. So, when we started this university, we said every staff must have a device and access to the internet. So, these are some of the things we move on to as we've witnessed how technology fails in this part of the world because the intended users don't use the technology for what reason so ever. So, we have these assumptions in mind, and as part of our risk strategy. When people start to use the technology, they undergo a change management phase where we try to engage other institutions that haven't used such tools and advise them as to how to use it effectively and efficiently. And honestly, there is resistance in the first instance, and once they go through the transition process, we try to change their culture. We can say that we've achieved a lot, but we still didn't get what we want" (Edu_manager 1).

The participant further elaborated on the issue of adoption by suggesting that:

"We are very much concerned about the quality of our student's work. We all know in this part of the world, there is a lot of plagiarism. Right from when this university was established, we invested heavily in Turnitin, and all students must adopt the tool to affirm that their work is truly there's. But as usual, we have had issues with the adoption of turnitin, for over seven years the adoption is very slow while the impact is visible and amazing. But I can tell you, all students must use the tool before they graduate. Even if they don't use it for submission of assessment, but it is a must that they submit their final year project to confirm that their work is original and there's. I think only about three faculties are using the tool at all level..... However, the google classroom seem to be promising because it is integrated with our email. Users don't have to do multiple logging. We had few challenges in using the learning management software for reason of access, but with google services, it was much easier. Using the classroom, we have high adoption rate"

(Edu_manager 1)

The first account represents the perspective of an administrator from a public university on the vitalities of digital technology, and specifically the blended approach, in catering to the educational requirement of a wide range of people. The second excerpt was from a manager who points to the generic issue faced in relation to the integration of technology in education practices, but also the efforts in place to ensure compliance and upscale of adoption. The last excerpt highlights how the adoption of a particular educational tool ensures the quality of service provision but also the quality of the student graduating. The difference between the two can be identified in how technology is framed in the abstract and in its particularity. The first is making the case that the usage of technology is the future of education in Nigeria, while the second is highlighting the mechanism adopted to ensure acceptance and the sort of deployment to ensure quality education is provided. This led to the consideration of whether lecturers, as forming part of the user groups referred to above, share similar views as the educational managers. In both universities, lecturers suggested that:

"Few lectures were using it first, then they had to inform their colleagues as to how important it is and how it can free up time. People don't have time to even check it up themselves. Few of us started using, and then others joined. They mostly don't use the platform basically, but when they do it is mostly for CA and exams. For students, once they are asked to enrol, they follow. They hardly complain. If they are informed, they will take in. I usually tell them that it's very straightforward, but they don't want to use it. There is provision for discussion forums, but I don't use it and my student didn't attempt to use it as well" (Lecturet_1)

"From my experience, some of the students may not join the classroom till the end of the semester because they feel whatever is given, they can get it from their friends via drives. So, they are not

compelled. They may be compelled when you conduct an assessment or publish the result, then they will see the need to engage. It is convenient to them I think, not because of the environment or being a private university, but because it's learning on the go - wherever you are" (Lecturer_6)

From the perspectives above, one can deduce how the reference to usage differs between intended users. Lecturers in both universities were making the case for the factors underpinning the limited acceptance of deployed tools among colleagues but also emphasizing how students are persuaded to use specific tools to aid their learning. What emerges from the brief analysis is that the use of technology is perceived and performed differently by those that outsourced software projects and those that are meant to adopt and use them.

In this subsection, I set out to empirically describe practices that might be considered as projecting what localization or decolonization of software development might entail in the context of the Nigerian software industry. This is achieved by discussing three inter-related attributes of Edu-soft project that depict instances of practitioners becoming less Western-as-in-modern and more decolonial-as-in-locale in their work: viz Software engineering contracting, designing for the locale, and the framing of user's and uses. The discussion has established the political dimension of software development – be it the initiation of new legacy products or the outsourcing/contracting of software projects. It also highlights how prosaic matters such as in-house development and contractual customized development are not typified as political even when explicitly indicated in the empirical data presented. This led to the consideration of what agility entails in designing for/with locale.

As I have attempted to show, the playfulness of practitioners with the agile principles signals a situated way of knowing that is not predated on historical conditions and structures of design. Considering the fictitious framing of the African as an Other in techno-scientific traditions, the concluding part of this section account for how the Nigerian users, as either relational entities or scenic feature of the design, are imagined and practised in a project that adopts UCD and agile as methodological frames.

In demonstrating the complexities of framing software projects as political, the chapter considers how the concepts of contracting, designing and accepting educational technologies are constituted and inferred as a contextual feature of the postcolony – i.e., the practising of agility in an organisational setting that inspires to be modern. Although participants might not have mentioned the decolonisation of a software project in their narrative, the emphasis on the locale – as in design thinking and actioning on things as they are right here right now – can be considered as a shift from a postcolonial (as associated with the tropes of appropriation and leapfrogging) to a decolonial framing of African design (which is situated, pluriversal, and transitional). The closer analysis of the expressions of the contracting, designing, and using of educational technologies is meant to show how such entities

feature in design thinking and actioning. In the section that follows, I empirically consider instances that might warrant an expression of decolonised higher education in Nigeria.

7.2.2 Blended Higher Education

In education research, the call for decolonisation of digital education has been about how non-western pedagogical traditions can provide alternative means of developing global knowledge economies that embody social justice, equity, and diversity. Although neoliberal education ideologies and policies have advocated for the juxtaposition of both colonial and postcolonial practices, studies from Africa have shown how stereotypical models and frameworks of digital education are not relevant to the educational challenges faced in sub-Saharan Africa (Gulati, 2008; El Bouhali and Rwiza, 2017; Shizha and Makuvaza, 2017). This is developed on the premise that what might be considered as the postcolonial practice of education in Africa is not entirely Africa, but rather a reflection of Eurocentric ideals about the global economy, liberal education, the academy, and digital technology. This thereby raises the question of whether the remixing of Western structures of liberal education and localised sensibilities signals an expression of decolonised blended education. In a way, the discussion would identify the organisational specificities that warrant institutions wanting to be postcolonial-as-modern or decolonial-as-indigenous (if that's the case). And, how does the practice of integrating (or lack thereof) digital technologies through the blended approach further the call for either indigenizing or decolonizing African universities?

In answering whether the remixing of Western structures of liberal education and indigenous sensibilities signals an expression of decolonization, there is the need to elaborate on how the culture of 'remixing' has been adopted and extended in the literature as a pathway for learning and regeneration (Lessig, 2008). As the name implies, remixing is widely considered a process of combining existing ideas, concepts, and technologies to derive new ones. In design spaces, it is often referred to as a productive 're-interpretive' process, a continual activity of 'mashup' and 'co-creation', and as a 'democratise' path of 'peer production' (Dasgupta et al., 2016; Hill and Monroy-Hernández, 2013). When considered within an educational context, remixing can be premised on shared cultural values, the multidirectional collaboration between initiators and remixers, and its emphasis on relationship creation than the reproduction of practices. Although remixing can either be extended, selective or reflexive, the major issue to be raised concerning its generativity in global education is how it might reproduce (or collapse) the matrix of power between colonised and colonizing states.

Considering the above, the discussion thus considers the organisational specificities that warrant institutions gesturing towards becoming postcolonial-as-modern or decolonial-as-indigenous. For example, in the private university, there was an emphasis on providing British-like educational services to the growing population in Nigeria. This is often framed in economic terms as prospective students were not admitted merely on fulfilling set out educational requirements but also on whether they can

afford the cost of tuition. In a way, this can be considered as embracing liberal educational models that view actors in the academy, especially students, as customer-client to be marketed and sold a specialised package. When higher education is driven by the tenant of the quantification sector - objectify, calculate, predict, measure, and socialize – the African university might be considered as losing the political moral authority as an entity tasked with the ethical role of training social actors to acquire equitable characters and also the production of a body of knowledge. This is highlighted in an education account that;

“The philosophy of establishing Baze University was that we aim to offer British standard education in Nigeria at half the amount to be spent studying in the UK. Having that control, with a click, you wouldn't have to do much to have access to resources. It is the assumption that the quality of the British educational system can be vested in how they leverage technology – the technology here has been a key factor for adoption so as to streamline our operations, reduce cost, to improve transparency, and to speed up operation processes.... That's our motive and way forward for us. Beyond Baze, we are trying to see how we can push this agenda on a national scale” (Edu_Manager 1)

The education manager is emphasizing how the British model of higher education leverages digital technologies in ensuring standardization, metrification, prediction, and profitability. Although the provision of a British-like educational package might satisfy the appeals of the bourgeoisie class – or bring about the creation of African elites that are to think like the English one – this does not equate to relevance in a context where subjective commodification and knowledge economisation are frowned on. In a way, the emphasis placed on the need to adopt colonizing educational model via localised institutional mechanism mirrors an extension of the indirect rule that enable the alienation of indigenous values, cultures, and structures in Africa. This is further complicated by the suggestions that:

“We are not the west, and we would probably never be like the west” (Edu_Manager 2)....and that “we gave superiority of their things over ours - we didn't develop ours and we embrace theirs- we haven't mastered theirs and we have neglected ours” (Researcher_3).

"The issue of an African notion of digital education you see is a difficult one - in higher education, there are two options I feel, either you go along with the current trend, or you left behind, such that you didn't perfect your own and create more gap between yourself and others. Left to me, there is nothing wrong if immediately someone can focus on his environment and culture and come up with something, but Western education is certainly not African, however, there are a lot of things which are in our traditional education that we are able to see in western educations too, so it's about finding a balance.....the only way forward is to create social relevance to your own

environment because you can't be an island.....unless we harness our environmental advantages, then we can't become more advance" (Researecher_3).

The first excerpt is making a case that uncritically adopting Western-led educational systems at the expense of indigenous ones might not satisfy the need for developing a supportive and sustainable knowledge economy. It can also be interpreted as pointing to how the entire modern educational establishments in Africa were to instil essential attributes of Western values to the population. Put differently, earlier and current universities in Africa were specifically modelled to produce actors that can absorb Western thought patterns and not question and seek to change them. Even with the continuous call for decolonizing the university, one can grapple with the complexities embedded in the curriculum and pedagogies, mode of instruction and knowledge production, and the function it serves in the qualification, socialisation, and subjectification of actors as contributing members of society.

However, as the second excerpt suggests, the purpose of digital education is one that can enable new arrangements of educational processes. It also highlights how the activity of 'blending' different knowledge systems and the process of 'remixing' established tropes within local conditions of learning through the practice of subjectivity could signal a transition from a postcolonial to a decolonial way of knowing. The participant's expression of 'finding a balance' and creating 'social relevance' can also be considered as an expression of localisation through the awareness of the kind of subjectivities that could render imaginable new educational arrangement – particularly one that recognises the specificities of the lived environment and enable taking a specific course of action against others. The effort towards finding a balance between contestable – or rather the assumption that Western and indigenous practices of education are contrasting – traditions of subjectivity is one that can be considered as enabling social actors to become less postcolonial-as-modern and more decolonial-as-indigenous. How then does the practice of integrating (or lack thereof) digital technologies through the blended approach further the call for either indigenizing or decolonizing African universities?

From the perspective of the educational manager in the private university (excerpt 1), it can be deduced that the centrality placed on technology in such settings might have been premiss on the assumption that educational packages ought to show value for capital spend to acquire English-like characters. Such ideas can also be identified in public universities where the adoption of technology in education is not entirely premiss on its economic relevance to the organisational context but rather on a larger global technological trend. As pointed out by a participant;

"We are just following the trend globally. Everybody is embracing it, and yesterday I heard over the radio that a government body has mandated even polytechnics to embark on distance learning. This is so because these things are even deployed in high schools in developed nations. I don't know of any indigenous effort rather than just following the global trend. Globally, I believe the one problem that eLearning seeks to address is that of access and flexibility because the population

is growing and universities don't have the facilities to accommodate those who seek access to basic, both basic and higher education.....Well, to follow the global trend as we realise there is the need to expand access to education. People didn't see the need then, but I am glad it is now part of the local community effort now" (Researecher_2)

From the above, the reference to 'following the trend globally' is aimed toward digital education and not necessary the quantification value systems directing neoliberal universities in the global north. In the context of the public university, the researcher was pointing to how the blended approach satisfies an organisation required for a model that can adapt to the specificities of the context of use. Therefore, the adoption of technology within public universities is not premiss on how it can enable acquiring Western-like ideals, but rather on how it can accommodate the need for flexibility and accessibility. This is supported by an educational manager that pointed out that:

"Our system is so flexible that you pay per course and can enrol at any given semester. We created flexibility in the whole learning process. In a conventional way, it's a one-track thing where the teacher dictates and that's it. The issue basically is that most students fail, maybe because the system doesn't work for them. We believe that it's not everybody that has the same orientation towards learning, so we provide them with all these platforms so that they can identify what they are more attuned to. As for examinations, we have different centres in Zaria, Lagos, Abuja, Port Harcourt and Gombe on the way. There is extra flexibility where examinations are taken at the convenience of the learners. Education is something that should be exciting and shouldn't be as stressed as we've made it. When I was a student, I hated the 8 am classes, I wasn't given any option but now we have given our students options" (Edu_Manager 2)

The same participant emphasizes that:

"We have a mixed range of students, where some are in their 60s, and also important to look at things from their perspective. Tied up to our cultural and social ways of doing things, we still want to have some form of the human element because it doesn't tie down with our African background and context. What we did is that we look at the system and create much human interface in the system such that it ties down what we want to do as Africans. In each geo-political zone, we have an academic adviser and a liaison office. Like in Lagos, we create an avenue where our students (920) would have a feel of the university close to them. We also have an academic advisor, who must be a retired Professor. In each semester, we organise two discussions with my student through Facebook live whereas as administrators we can discuss a lot of issues relating to their learning. We also look at the classic online learning, and in areas that are rigid, we try to make things more flexible. It's too flexible that sometimes the regulatory agencies are raising concerns.

As a teacher, I believe that education shouldn't be made as rigid and as uninteresting as it is. Our slogan here is that "With us, Learning is a pleasure not an ordeal" (Edu_Manager 2).

The point that has been made here is that of the need to develop or adopt an educational model that speaks to/for emerging conditions of sociality. The emphasis placed on the blended approach as a model that caters for diverse preferences is also supported by the reference to having a 'human element' that supports the virtue of communal learning and development associated with African philosophical traditions. However, it is not only through the integration of flexible or accessible technology that demonstrates the efforts toward public universities in Nigeria becoming more decolonial-as-indigenous, but also through the outlook toward research development. Another participant also commented on how African universities ought to harness localised aspirations that could bring about the needed development of their communities and people. In his words:

"When I was the Dean of postgraduate, we proposed that 70% of our research should be problem-solving, society or industry driven. The position then was in respect of your discipline, every student should go back to his community and find a problem that is relevant to that community. Then we proposed that PhD students should work with that community in coming up with a solution to the problem. For the master, we said students should be able to come up with theoretical solutions. In solving that problem, then we can award a degree. As a vet, I realised that most of our research doesn't have an impact because they don't solve our immediate problem and doesn't move in solving the problems of others. In science, it should be industry driven, in humanity it should be society driven. In the end there is value in what we do to our communities. However, what we are doing now mostly is molecular research and doesn't solve most of the societal problems. For me, research should be contextual to the local needs of the environment" (Researcher_5).

This is particularly showing how educational establishments are meant to ingrain and enforce certain values in society through knowledge production and application. With the university as an institute of learning and governmentality, the emphasis placed on digital technology might have normalised codified measurement and performativity testing of how certain constructs work and how they can be advanced or replaced in society. Such ideas raise a range of questions concerning the purpose and function of educational systems that are driven by technological (and often commercialised) ideologies that are not educational. As have attempted to establish, both universities are motivated to adopt together towards managing educational processes and activities. However, there is a sharp contrast between the purpose of embracing or remixing conventional models of higher education in these universities, and one which points to the organisational specificities that warrant institutions wanting to be postcolonial-as-modern or decolonial-as-indigenous.

7.3. Is Decolonisation the Answer – A Conclusion

In introducing this chapter, I set out to consider what would a projection of a localised higher education and software engineering look like from the empirical evidence presented. Relying on existing empirical evidence, I attempted to show whether a close analysis of the mundane practices of software practitioners and a range of actors in Nigerian universities could point to traces of decolonising practices of blended education and technology design. This is achieved through a critical analysis of the activities, processes and practices of software project work and the integration of digital technologies through the blended approach.

First, the chapter attempt to establish whether software practitioners are becoming less Western-as-colonial in their work by discussing how the concepts of contracting, designing and accepting are constituted and inferred as a contextual feature of an organisational setting. This led to the consideration of how the Nigerian user as an empirical entity is approached and represented in design projects that does agility - thus highlighting circumstance that warrants speaking for/about the Nigerian users in certain ways (as an abstraction (Cooper & Bowers,1995), a relational entity (Hysalo & Johnson, 2014), and as a scenic feature of design (Sharrock & Anderson, 1994; Martin et al., 2007)), and the uses a particular view of the user is put in to project work's that does agility.

Second, the chapter considers the longstanding debate about whether decolonization is to answer to fundamental challenges faces by African universities. As decolonization is a continual process in transitions, the chapter has attempted to establish how the practices of integrating (or disintegrating) digital technologies either denote localisation or decolonisation of higher education. This led to the remark whether the narratives presented represent a praxeological expression of localization of work from member activities; or whether the accounts might be considered as forming part of a particular (and a decolonised) interpretation of members' practices of education and technology design. Although the analysis in the subsequent chapters might be considered as demonstrating relational accountability in the description of social events, the author recognises that one must be reflexive in describing the process that led to the abstraction of circumstance as indicating traces of decolonization (if that's the case). Considering the 'playfulness' of development methodologies and the 'remixing' of educational practices the chapter ends by considering the political implications of the Nigerian perspective within current debates about whether localisation or decolonisation can expand the genealogies of technoscience. Whatever the case above might suggest, decolonisation is not a one-off activity, it is a continual struggle for the liberation of the collective, and thus cannot be defeated.

Chapter 8:

Towards a Situated Design Orientation in African HCI

In the waiting room, everybody is crowded around the keyhole, trying to look into the future on the other side while remaining stuck in the present. The opportunity to look through into the future is a seductive one, but one that also traps us into a very partial and manufactured view of the possible: In *Techno Futures in Stasis*, Sun-Ha Hong (2021)

8.1. Introduction

The initial ideas that motivated this thesis were first conceived after the defence of a Master's thesis where a user-centric approach was adopted to the evaluation of the re-design of a mobile learning app (the iLancaster app) to include new features (specifically attendance monitoring and personalisation). The analysis identified contrasting interests between stakeholders; specifically, academic staff, administrators, teaching assistants and students, and highlighted significant differences between when the app was being used as a reflective learning support and when used for monitoring and supervisory purposes. This led to the conclusion that the future of digital education in Africa may well be some variant of current practices of designing and deploying technologies in HCI, which when examined within the 'postcolonial' framing of HCI4D might bring about the need for alternative approaches to design that are largely politico ontological. This cultivated my interest in advancing an epistemological and methodological agenda that acknowledges and recognises indigenous practices and knowledges, while also assessing their impact on how we conduct research and design, evaluate, and deploy technologies of all kinds, specifically educational technologies.

At the beginning of the PhD, the direction for the research was to develop a set of questions that considered, in a Nigerian context, what exactly might constitute indigenous technology design practices that bring about understanding, designing, and deploying education technologies that can be adopted to support diverse pedagogical practices. It begs the question of whether the technological solutions deployed and adopted in Nigerian universities take into account the plurality of pedagogies and the demands of the knowledge economy; whether technologies are designed for contextual limitation, unprecedented demands, and scarcity of supporting infrastructures; and whether what is unilaterally considered as candidate 'best practices' for community technology design are regarded as situated practices or are they some new neo-colonial phenomenon? Although the initial framing of the research questions might have been slightly different, the focus has been on developing a relatively decolonised understanding of how approaching the design and deployment of educational

technologies from a situated standpoint can bring the revitalisation (and reinvention) of African subjectivities and identities about technological innovation.

This thesis is heavily empirical, relatively speculative, and ultimately provocative. It is interdisciplinary in nature as it draws from a range of philosophical, theoretical, conceptual, and methodological themes in moving towards (and in arguing for) an African approach to the design and use of educational technologies⁵¹. The thesis outlines three questions that seek to deconstruct the practice of designing, adopting, and using education technologies to support diverse pedagogical requirements. Drawing on the politics of standpoint epistemologies, the thesis offers conceptual sensitivities for articulating and representing socio-technical relations of digital education, the transnational attributes and features of African design and the conceptualisation of technological innovation from Africa – right here and right now. The thesis has outlined a range of issues and offered some provocative ideas that might be considered as moving towards redeeming the indigenous compositions of digital education and design innovation in Africa. In introducing the research project reported in this thesis, I outlined the following questions:

- *What is the landscape of using educational technologies in Nigerian Universities for teaching, learning and management of educational processes?*
- *How could the practice of educational technology research and technology design be enhanced through the adoption of a collection of situated approaches to knowledge?*
- *What methodological, analytical, and pedagogical process could allow for the re-design and re-deployment of adaptable and usable educational technologies in the context of Nigeria?*

The analysis of empirical evidence collected through two field studies in Nigeria is an attempt towards problematising well-known and established approaches for framing and analysing design innovation from Africa. Through an eclectic methodological approach, the thesis examine how collection of situated imaginaries, positionalities, and approaches to knowledge can provide a way of focusing attention on the blind spots of understanding African cultures of design. I adopted a collection of qualitative methods for data collection (interviews, focus groups, ethnographic observation, conversational interview, talking circle, conversational approach to rapid ethnography, contextual inquiry and indigenous narratives), utilised a grounded approach to thematic analysis (Boyatzis, 1988; Nowell et al., 2017; Galsser and Strauss, 2017), and adopted sensitivities like the PACT framework

⁵¹ Certainly, working across different strands might places one in the dilemma of discursive privilege and submission or in the epistemological struggle for finding intermediary truth. Such a requirement, as emphasised by Foucault is that “the essential political problem for the intellectual is not to criticise the ideological contents supposedly linked to science or ensure that his own scientific practice is accompanied by a correct ideology, but that of ascertaining the possibility of constituting a new politics of truth. The problem is not changing people’s consciousness – or what is in their head – but the political, economic, institutional regime of the production of knowledge” (Foucault, 1980 p.133). The discursive practice adopted is one that can be considered as holistic as it moves towards findings an approximate truth about the dimension of the African perspective in techscience.

(Benyon, 2014), temporal trajectories (Velt et al., 2017), and meta-analysis synthesis (Nobit & Hare, 1988) in organising and presenting empirical data. From the analysis of the empirical data collected, one can appreciate how the insight from the data contribute to arguments about postcolonial education, technology adoption and acceptance, and the practices of designing and evaluating educational technologies.

In this chapter, I outline a progressive futuring agenda at the intersection of design studies and African studies that first seeks to understand the complexities of techno-future thinking about/from Africa, and then begins to articulate its consequences within the theoretical framing of a post-development/decolonial narratives of social futuring (Szántó,2018, Oomen et al., 2021)⁵². In speculative African literature, social futuring is considered as a necessity for rethinking and a commitment to reworking the knowledge practices of Africa – i.e., reconstituting social life by thinking about integrative way of being, knowing, and living (Ndlovu-Gatsheni, 2015). The emphasis is on cultivating an integrative cultural outlook for autonomous design that takes seriously neglected power relations so that political technologies of the self and that of the community are developed and get used effectively across polarised geographies. The contribution that the chapter attempts to make is calling for a closer attention to the ontolo-political aspect of design, while also offering conceptual propositions for transitioning towards the politics of grafting in designing by/with the pluriverse (Escobar, 2018). The arguments presented are speculative and rhetorical as the futuring of Africa is a life-oriented project in continua, one which seeks to reap the benefits of the after-modern era while minimizing its risk.

In articulating how, emerging attributes of African subjectivities and identities can be appropriated through situated epistemologies, the chapter adopts the politics of manifesto and the rhetoric of design futuring. It outlines how a specifically African approach to knowing-doing development could make the characterisation and differentiation of a range of perspectives open for both analysis and regeneration. As will be argued in other parts of the chapter, the future of Africa is a design problem that is written, lived, sustained by the function of power and knowledge. The prevailing argument in future studies is that of adopting either the method of ‘pragmatic projection’ that develops future pathways on historical knowledge or that of ‘grand vision’ that mobilises the present as to act upon and exploit them can direct the future. As such, the emerging model of social futuring Africa ought to recognise the complexities of the African conditions (which are epistemic, systematic, cultural, political, and economic), while also requiring a continual problematisation (Dorst, 2009), dialectical experimentation (Light et al., 2020), and itinerary adjustments of the ‘conditions’ of wicked problems and the ‘temporality’ of wicked solutions (Light et al.,2020; Ranabahu, 2020). And it is through the sensitization of the common

⁵² Critiques of the development enterprise have pointed to how its common approaches – from the economic and infrastructural projections of Goldman Sachs to the progressive and philanthropist approaches of Jeffery Sach, and the activist/intellectual position of Wolfgang Sach – oversimplifies the possible future of the world(s) (Esteva et al., 2013) The question that remains to date is about ‘whose development, under whose labour, towards whose expense, and towards whose ends’?

imaginaries shaping the analysis of possible and preferable futures that the affordance of decolonising models for understanding African conditions of social living can be actualised – either fictionally or speculatively (see. Tanenbaum et al., 2016; Hong, 2021 for similar propositions).

In the preceding sections, I outline a critical vocabulary that equivalently rejects both the post-development and the post-colonial framing of African socio-cultural and techno-economic conditions in computing. I argue that the futuring of African HCI narrative is not about alternative approaches to design thinking-making, but more concerned with how discursive construct of power-knowledge might direct other dimensions of identities and subjectivities in Africa. This has significant implications, in creating a reflexive narrative about the place of technology in restructuring social life in Africa; and in understanding how to design, evaluate, and deploy technological interventions that are diagnostic, participatory, and emancipatory – albeit similar to the feminist strategies of critical design futuring work (Bardzell & Bardzell, 2013; Bardzell, 2018; Roedl et al., 2015). Such an epistemological outlook approaches design futuring not as a development, growth, or progression agenda but as a genealogy that traces the historicity of the present as to identifying practices that led to the discourse of the unfortunate past. When the unfortunate past and the uncertain present are viewed as a unit of historical analysis, the envisioned or projected future would be temporal, contested, and speculative.

8.2 No More Solutionism or Saviourism – A Manifesto for Futuring African HCI

With the emergence of the ideas of a specifically African approach to HCI - the sort of fuss about its potential prospect and possible challenges - it has been categorically clear that indigenous communities in Africa do not need Eurocentric palliatives, nor welcome African-diasporic rescues in reinventing its future identities. This assertion might trigger unwarranted emotions in certain persons, primarily those that continuously present and imagery of Africa (an othered, dystopian, third-world nation), and those outlets that convey a particular narrative from the African continent (an emerging market for the global techno empires, a workspace for social-good research, and a laboratory for experimenting ideas). The call out of such narratives in futuring African HCI is that some anti-colonial ideologies embody the dualities of Ethnocentrism-as-futuring and Africanism-as-defuturing e.g., scientism, userism, and materialism. While some might argue that there exist systematic inequalities in the organizing principles underpinning social relations in Africa, the fundamental issue is how practitioners might be entrapped in local dependencies and accountabilities as well as those influenced by external dynamics and forces. Even when there are fewer HCI researchers or practitioners from the African continent, that doesn't necessitate developing narratives that 'speaks for' the conceptual Other as doing so would inevitably silence situated accounts of creativity and innovation (see. Cabrero et al., 2016 on how HCI approaches might have the tendency to Other Non-Western perspectives).

Developing on earlier accounts of some of the rationale underpinning the limited engagement with HCI scholarships and practices in the African context is the understanding that scarce investment in facilities for interactive design doesn't equate to the lacking in expertise as portrayed in techno-scientific narratives of the West. Even with the increase in the number of tech hubs and start-ups in major African cities, one should not lose sight of how the unequal movement of resources, labour, and capital between developed and developing nations inform the identities of innovation. Consequently, research in African HCI has begun to show how dominant paradigms of innovation breed a particular way of viewing the African situations as space for problem finding and solution making (Csikszentmihalyi et al., 2018; Bidwell, 2021). With the continuous call for decolonising the intellectual landscape that researchers and practitioners' collaboration, recent efforts have shown how alternative sites of technology production and consumption can be enacted in Africa— e.g., in community design space (Bidwell, 2016a; Avle & Lindtner, 2016; Winschiers-Theophilus et al., 2019; Kotut & McCrickard, 2021), and in community networks (Avle, 2020; Bidwell, 2021),

Drawing on the ideas that colonial paradigms impose a particular identity of African innovation, critiquing their application in African HCI is not a one-sided historical analysis as it considers how specific ideals of progression defuture the productive outlook of the African towards designing for emerging conditions and challenges of mobility. To demonstrate the solutionism of *Eurocentric models of futuring* is to consider how techniques digital humanitarianism (Burns, 2019), and humanitarian design (Nussbaum et al., 2010; Ansari, 2019) have directed design projects meant for non-Western settings; whereas the saviorism of *pan-Africanist sensitivities of futurity* can be inferred towards the praxis of the 'talented tenth' (Du Bois, 1903) and the 'Afropolitan' culture of circular identities (Mbembe, 2006; Ede, 2016). As will show below, aspects of post-development and post-colonial approaches to computing research adopt a universalised outlook of (re)presenting the African experience under the veil of a Western preview of how the world is or should be - albeit in ways that obscure the imagination and performance of alternative dimension of modernity-as-in-futurity.

Solutionism of Post-developmental 'Alternatives'

To show the performativity of *Ethnocentric solutionism* is to examine how digital humanitarianism and humanitarian design are practised in the design and deployment of socio-technical systems meant for non-Western context. The idea of digital humanitarianism develops on the assumption that the cultures of modernity are universal, and thus, can be adopted in analysing the prevailing issues facing non-Western societies (e.g., cultural indoctrination, linguistic alimentation, and economic exploitation). Partly due to the colonial matrix of power in the institutional and social life of the global south, there is the general view that modernistic problems have (or need) modernistic solutions since they were imagined and practised within a particular epistemological frame. When such views are embedded in the framing of developmental design work, practical social problems and solutions are reduced to

systematic appraisal and numerical valuation that imposes a specific way of analysing matters of interest in differentiated frames of space and time (Toyama, 2015).

Taking such issues into focus has led to considerable protests in the international development community on how digital colonialism creates a culture of speculation and a set of practices that entertain stereotyping of humanitarian conditions (Viera Magalhães & Couldry, 2020). The solutionist dimension of digital humanitarianism can be identified in how its double-edged-sword analytical model adopts colonialist like strategies in quantifying and securitizing social relations (Dearden & Tucker, 2015), albeit in ways that “refashion the tool of social intervention so that a particular kind of digital solutionism necessarily seems the only toolkit available” (Viera Magalhães & Couldry, 2020 p. 354). A practical example of such a patronizing and often oversimplified narrative is the billion users’ connectivity initiatives across the global south (Arora, 2019; Oyedemi, 2020). In Africa for example, the billion-user narrative first portrays digital connectivity/accessibility as a human right (Oyedemi, 2019), and then goes further in normalizing digitization as a development optic for the global south (Pearson & Avle, 2016).

As Payal Arora has shown in her critical analysis of aspect of digital life in the global south, technology is being Weaponized as a tool against underdevelopment (Arora, 2019). Although technology in the development sense is meant to nurture aspirations, drive capacity development and bring about intrinsic growth, the major issue being raised is that ‘handholding’ programmes (Toyama, 2015) like the ‘Facebook Zero’ and ‘Free Basic Initiative of Facebook’ promise to close some form of the digital divide that exists (Wyche & Baumer, 2017), on the side-line, they might have amplify pre-existing stereotypes of Africans leapfrogging out of poverty as a result of the mere adoption of digital technologies (Rankin & Henderson, 2021). Therefore, the userism framing of the billion-user initiative denotes how human beings are reduced to objects of quantification and commercialization (Gonzatto & van Amstel, 2022). The implication of such a way of thinking about African conditions of sociability is that the introduction of digital technologies can intensify existing inequalities and disparities by their intrinsic motive for quantifying and ordering the aspiration and necessities of people.

Arguably, such a techno-utopian initiative has postulated that under-development requires strict scientific measures that imply that technological solutions translate to upward economic, political, and social mobility. What such power dynamic does is that it regulates modes of participation in digital life: first by directing what content is been produced, who produces it, and how it is to be consumed; and second by promoting immaterial labouring (Wyche & Baumer, 2017) through the design of functionalities that urge compulsive consumption while suppressing productive and leisable use (Lee et al., 2020). The consequence of such mode of organisation, as in humanitarianism, is that it normalises a particular view of technological progression - those that have and those that don’t. Example of such a divide is the ‘criminalization’ of digital gold farming and the ‘upscaling’ of digital buying of status in the game industry (see. Arora, 2019). Often, those involved in labouring for work’s

sake and those playing for leisure's sake are considered an instrument that can scale up new markets for technologies or act as tools for stratifying the experiences of digital life. The most troubling dimension of such disparities is that all of this operates on a supposedly inclusive market ideal that inequitably commemorates the values of exclusion, thus feeding directly into the spatial expansion of digital coloniality.

Equally relevant to understanding the material implication of digital humanitarianism is expanding the relationship between the histories of 'social-good' and 'bungee' research (Dearden & Tucker, 2015; De et al., 2018), the promise of 'making a difference' (Taylor & Broeders, 2015), and the realities of 'social-for-capital' and 'good-for-capital' (Viera Magalhães & Couldry, 2020; Cinnamon, 2020). In ICTD research, for example, Dearden and Tucker (2015) have shown how 'bungee' and 'parachute' research agendas are at best unworthy and at worst unethical. In HCI, Pal (2017a) has shown how the assumptions underpinning and informing social-good related research conceived non-Western *context* as an Othered-laboratory or workspaces, viewed marginalised *peoples* as passive subjects of design, and approached indigenous *cultures* as commodities to be appropriated. However, a critical analysis of social-good research programme in HCI has shown the limitations of design-for-good and the fallacies of technologies-making-a-difference as applied to non-Western settings (Bates, et al., 2017). What these accounts point to are the political repercussions of the assumption that the transplantation of Western templates of modernity to other social settings should bring about similar implications as that of the originating site (Pal, 2017b) – which in essence conceals the unintended consequences of misplacing/displacing local practices of driven intrinsic growth.

Adding to such revelations is the consideration of the *techno-solutionism* of specific approaches to post-development in Africa – in this case, the practice of humanitarian design. As the name implies, this approach to developmental design considers how the adoption of specialised design toolkits or rule-based packages can assist in framing social issues as tame problems. The analytical emphasis of such an approach is that everyday challenges of modernity can be addressed through the identification of standardized techniques that could support the systematic process of making and actioning solutions. Examples of such specialised packages include the models adopted by global design firms such as IDEO, NESTA or Dalberg. Although these design conglomerates have positioned themselves as key players in doing social-good projects, critics have point to how their epistemic frame of reference developed on the assumption that technocratic and scientific instruments can address the social challenges facing humanity; be it social, institutional, political, or environmental (Irani, 2018).

The rhetoric strategy adopted by these global design firms and their supportive institutional forums like Stanford TED and Harvard Business Reviews is that of universalism and tautology (Ansari, 2019; Irani, 2018). The prevailing argument is that design thinking as a form of expertise is HARD (Irani, 2018) and that the realities of underdevelopment are HARD issues that require creative intelligence and innovative expertise. Relying upon such a way of thinking about the dynamic of social

issues suggests that supposedly HARD solutions are readily available to specialised institutions and holders of the totality of scientific knowledge. This might thereby present humanitarian design, at least to other ways of knowing, as imperialistic and authoritative.

As decoloniality of design has begun to show how humanitarian design views under-development as an inspiration, a motivation, and a design opportunity (Tunstall, 2013), others have emphasized how the humanitarian sector operates as a neo-imperialist space for the internalization of modernity/coloniality ideals in Africa (Tunstall, 2013; Ambole, 2020). Such issues raise the questions of why humanitarian designs are largely directed towards non-Western context (and not the other way around)? There is also the question of whether the creative class clerisy, be it in universities or design firms across the globe, might have inhabited spaces within the global scientific caste system whereby labour, capital and power are unevenly distributed. This is not anew as commentaries of the imperialistic dimension of humanitarian design have shown how its underlying assumption towards positive impact, making a difference, and empowerment of stakeholders present Western researchers and designers alike as the new anthropologist or missionaries that define and discipline (Nussbaum, et al., 2010).

In effect, this way of thinking can be traced to the One Laptop per Child (OLPC) project in the global south (Toyama, 2015; Ames, 2019), the Global Learning XPRIZE project in Nigeria and Paraguay (Arora, 2019), and the Hippo Roller Re-design Project in South Africa (Nussbaum, et al., 2010). Both developmental projects were meant to disrupt the practice of education and sustainable living in postcolonial times but do the opposite, i.e., propagate the analytical status of Western technophilanthropism to non-Western social issues (see. Nussbaum, et al., 2010; Philip et al., 2012; Ames, 2019; van Stam, 2019; Arora, 2019). For example, the OLPC project conceives the idea that improving schooling is a difficult issue that requires computational thinking of progressive ideals for industrial education. The XPRIZE started as an autonomous learning project that was meant to disrupt the landscape of liberal education through the design of child-friendly and adaptive learning apps that can improve learning outcomes and attainment. With Africa as a testing ground for such ideas, these projects might be considered as the by-product of the 'intellectual sabbatical' of ecomodernist and philanthropists alike that desperately want to tell the 'good stories' of the responsive technologies destined for the global south - which inevitably conceal the failures of earlier educational palliatives meant for such settings (Arora, 2019 p. 138). The expected failure of these two projects denotes the unsuitability and unsustainability of Eurocentric ideals of attaining upward mobility – and specifically, one's that places technology before people, and external provision before capacity development.

Consequently, such issues require the continual problematization of how coloniality/modernity might have created temporal design vocabularies where technological innovations, in the material and aesthetic sense, are adopted as analytical vehicle for the internalization of social practices such as thinking, making, and using. When design thinking is considered as a service for experiencing

modernity, one ought to begin by interrogating the colonial histories and legacies of technology fabrication in political terms, and then approach African design as a by-product of decolonizing design scholarships and the regime of indigenous knowledge.

Saviourism of 'Alternative to' Postcoloniality

To show how some pan-Africanist sensitivities of futurity might exhibit the values of *epistemic-saviourism* is to examine how the doctrine of the talented tenth and the cultural praxis of Afropolitan is practised in re-inventing African narratives of progression. To place within the context of the literature, the pedagogical ideologies of the talented tenth came out of the sympathetic gestures of White philanthropists that felt the 'need' to educate exceptional African Americans as a way of uplifting them from the epistemic sense of ruination often associated with their African roots. On the surface, the initial emphasis might be about satisfying the 'security' need of African Americans as marginalised groups, but a close analysis of its hierarchical approach to addressing social issues might suggest a deeply rooted urgency to satisfy one's 'self-esteem and self-actualising' needs. Pan Africanist activist W.E. Du Bois adopted such an idea as a preparatory framework for developing conversations that can elevate the black population of the 'Negro problems' through the creation of 'educational palliatives' (or pedagogical quick fixers) that would unveil the capabilities of those 'worth saving' in the community (Du Bois, 1903). It is important to highlight that the talented tenths are not among the black bourgeoisie group in northern America, but a whole set of persons that have 'supposedly' proven abilities to pursue scholarship and attain material status while also willing to guide the misfortune others among its ethnic groupings.

This is relational to earlier account of how packaged interventions might not bring about structural changes pre-existing disparities in society, and certainly emphasising how rule-based palliatives might not nurture the inspirations needed to bring about intrinsic growth. However, the 'problem solving' empowerment-like praxis of the talented tenth is not the same as the 'mentorship' approach discussed earlier concerning the Digital Green Initiative with farmers across the global south. The difference is that digital green partners, in principle, do not represent an organisation that is having more intrinsic 'aspirations' for sustainable farming than the communities they innovate with (Toyama, 2015); whereas under the self-actualisation 'needs' of the anointed one's, communities' members are viewed as social problems that can be organised and upgraded. One depicts partnership and 'capacity building', the other paternalism and 'handholding'. In its simplistic manifestation, the talented tenth doctrine exhibit an anti-colonial saviour mentality whereby one is conditioned to embrace the Ethnocentric canon of thought that privileges the will to power and knowledge against that of the responsive personhood and the community (more emphasis).

Such issues have become ordinary in African communities as one can make inference to how the tourism initiative of 'Year of Return, Ghana 2019' might have normalise the thinking that those

'been to' (either by force or by choice) have proven abilities to guide the misfortune others among its groupings. This is not a harsh reading of such initiatives as that would equate to the dismissal of African diaspora experiences over the years. It is, however, a closer reading of a way of thinking amongst Africans at home and in diaspora that should the actively ethnic Africa adapt to the rationalities and scientificity of the West as the enlightened Other did, might re-awaken the subaltern consciousness of the native towards the dystopia of present situations. Such an account depicts a default Eurocentric future of Africa, a future that is directed by Western assumptions and projections, and one that is to be performed and experienced under the Western gaze.

Taking up in the context of African design, one can identify how the common trope of leapfrogging and appropriation institutionalizes a particular way of framing innovation as largely technological and material. The fundamental issue with such a doctrine is that African narratives of design are organized across the line of citizens that known and customers that are known in the global commodity society (de Oliveira Martins, 2020). Although the talented tenth doctrine has championed for unveiling the capabilities of the collective, the emphasis on assumed 'needs' denote 'help for' or 'helping' those in problematic situations.

The reservation with such mode of engagement is that 'help' from the high castle might be relevant to the supposed carer, to those supposedly being helped, it might signify an exercise of invisible power of being cared for (as in meeting one's needs and want) and not cared about (as in showing emotions and empathy towards one's kin). Such a way of thinking exhibits double marginalisation as it limits participation in knowledge production while also enforcing dominant group perspectives and preference. It also denotes how power hierarchize needs - be it for survival, security, belonging, self-esteem, or self-actualisation - in ways that depict a stagnation of specific individual traits as autonomous beings that are meant to exhibit subjectiveness.

Another example of the saviourism of pan-Africanist sensitivities of futuring is the emerging theoretical stance of Afropolitanism. In African literature, the Afropolitans are largely considered as a collection of passers-by writers that celebrate the hybridity of geo-cultural identities. Often identified with their 'rhizomatic existence' as rhizo-subjects that are distinctively hybrid yet retained the routes they emanated from, the Afropolitans are rooted in diverse cultures and traditions, affiliated to multiple locales, and often perform in transnational identity spaces that are equally stereotyped (Ede, 2016; Anasiudu, 2021). However, critique of the Afropolitan identities has point to how its projections of the past aspect of the present emphasise the *arrival* of new identity categories that denounces the ethical descriptors assigned on arrival; or rather goes further in internalising the connotations attached to the genre-specific dimensions of the assignment (Ede, 2020; Anasiudu, 2021).

The prevailing argument in the literature is that Afropeans project a vision of African futures from within Eurocentric political and social thought in ways that might be considered as extending second contact narratives of the neo-colonizers alike landing on the shores of Africa (Ede, 2020). The arrival

of the Westernized Other, with their vision for a utopian Africa that resembles the good side of the West often presents a dilemma of not fully understanding the implications of imagining (and professing) within an epistemological frame what objectifies, materialize, and subjugate. This continual process of seeking to *belong* to (longing to be with something) or *become* (coming to a differentiated site of belonging to something) shows how its politics oversimplify being-of-African-route across relations of institutional identity, ethnic grouping, and geographic locale.

Furthermore, the consideration of the emergence of Afropolitan itineraries or shortcuts from the circular movement of culture might be considered as oversimplifying how “the coming together of people with disparate backgrounds, histories, and epistemologies” transport different modes of sovereignty and domination that could shape interactions (Irani & Dourish, 2009 p. 252). However, the fundamental issue here is how the Afropolitans, with their ethnocentric veiled minds, are meant to portray Westernization as futurity and Africanization as defuturing. This led to the consideration of how transcultural interaction between indigenous peoples and a collection of passers-by might direct the equitable transformation of creativity, capital, economy, politics, and innovation. This is not new as research in postcolonial studies has sought to develop diasporic intellectual networks for sharing of expertise and experiences, albeit in ways that can dissolve the unequal relations between actors in developing and developed nations (Mbembe, 2021). Regardless of the utilities of such network, the associative traces of epistemic-saviourism can be identified in the material forces at play in the dialectics between indigenous and settler researchers and practitioners.

Therefore, the reflection on how such mentality might manifest in HCI4D discourse would be when social design projects are premiss on the assumption that should the actively ethnic African embrace the palliative guidance from those exceptional persons being saved by Western thought systems and industrial education, can and will attain noblesse. Arguably, this sort of thinking about upward mobility continuously denies local actors any form of knowing how to innovate. It also reduces social life to utilitarian ideals of acquisition of wealth, compulsive consumption, commodification of social relations, and technology determinism. While some might argue that coloured Euro-US based researchers engaging with the ideas of postcoloniality might not be doing saviourism work, the focus here is the underlying epistemic worldview directing their engagement with other cultures, locales, and communities. One can postulate that the talented tenth and Afropolitans alike often assume a statutory position of knowing what the future of Africans could be/ or should be, while in essence might be in an oppositional struggle for/against authority and freedom. Or infer how they utilize the instruments of power-knowledge in claiming as epistemic position as agents of re-presenting Other worldly events, thus exemplifying the epistemologies of ignorance associated with the socially good projects in computing. This thereby links both the talented tenth doctrine and the Afropolitan identities to saviourmentality that embodies values of intercommunal uplifting and empowerment against that of collective advocacy and allyship (more emphasis).

In Africa for example, Giglitto and colleagues reported the saviourism attitude of some engineering students toward the conditions of sociability in Egyptian communities (Giglitto et al., 2018). The specific mindset of the student is that of having the expertise and knowledge to fix the social world, thus conceived design thinking as an instrument that exists within an Enlightened and agential subject. The major issue with such a way of thinking in HCI4D is that it has become hegemonic as it is now framed in the name of doing socially good research that stereotype African condition as dystopia and Western situations as utopia. Other examples of saviourism mentality of postcolonial design thinking can be identified in the design and deployment of technological interventions meant for specific African settings (e.g., Poon et al., 2019; Madaio et al., 2019; 2020; Wojciechowska et al., 2020). This often takes the form of engaging in 'bungee' research activities that export solutions to supposedly marginalized communities – and unfortunately by the same institutional structures that marginalize them in the first place (Dearden & Tucker, 2015).

The point being raised here is that due to the colonial matrix of power between dominant Western institutions and subjugated ones, there is the possibility that the informing principle directing transnational engagement will privilege certain experiences over others. As have attempted to show, forms of 'sabotage and subversion' can be attributed to some solutionist and saviourist approaches to futures as applied to the context of Africa. When such issues are taken up seriously in socially imagining and performing future dimensions of African HCI, there is the possibility of uncovering how what was deemed as interrogating the coloniality of the imagination might not be postcolonial after all, but rather a tendency of something rather complex – i.e., the neo-coloniality of the intellectual landscape that actors know and think of the self.

In a nutshell, what this section set out to show is how the philosophical assumptions underpinning various dimensions of 'post-development' and 'post-colonial' approaches to computing camouflaged the values of solutionism and saviourism. This is particularly important to the prospect of analysing future discourses of African HCI – first in how it interrogates '*alternative*' and '*alternative to*' approaches to understanding the dynamic relations underpinning transnational encounters and exchanges, and second, in how it can open up relational ways of engaging with the particularities of communities (Bidwell et al., 2011). Considering the central ideas that orientalism and the postcolony offer to unsettling the universality claims of techno-science, what I present in the next subsection takes the form of examining how the underlying epistemologies of postcolonial science and technology studies might have reduced indigenous knowledge from Africa – which consisted of the plurality of people, places and practices (Aworì et al., 2015) - to a set of unified social problems or technological challenges that needed the adoption of the 'ruler' specialized sensitivities in the social description of culture. What this section is trying to establish is how a particular way of thinking about African conditions of sociability reinforce a reductionist framing of social experiences that demand mechanical explanation and prediction of reality.

8.2.1 Towards African Approaches to Design(s)

Research in future studies has established how the future is imagined and designed; how the future comes to be by a function of design thinking, and how future technologies are adopted and experienced through the operationalisation of design (Fry, 2019). What this might suggest is that the future is not an empty vacuum nor a reachable destination from the present – the future is here, and unfortunately unevenly distributed. Even the present is not a wholesome stationary space but a social construct that interlock the conditions of the past and the prospect of the future. Both the past and the present can be considered as discursive constructs of power-knowledge relations; relations that through design can give form to different possibilities for futures. It also emphasis how technology as a complex phenomenon can be agential, and thus can ordain a particular view of the social world that form the basis for the preservation of past dystopia or the prevention of future ones (Du Toit, 2003).

Even with the awareness that technology, in the broadest sense as techne, can enable and limit futures, practitioners have continuously ignored the material implications of its structural abstraction as the one-of-all solution to current societal challenges (Eriksson & Pargman, 2018; Schultz, 2018). This is particularly true as techno-utopia projections have advanced a discursive agenda that Africa as a mysterious design problem ought to be situated in modernistic design principles and templates that demand objects being studied and explained as social engineering entities.

In African studies, social futuring is considered a necessity for and a commitment toward rethinking the knowledge practices of Africa – i.e., thinking of integrative ways of being, knowing, and doing (Ndlovu-Gatsheni, 2020; Mbembe, 2021). As the apocryphal narrative of the past has begun to be re-told, abandoned stories of the present have begun to be re-lived. Even when social futuring is regarded as an instrument for imagining and performing the future (Szántó, 2018), there is the fundamental question of how the supposed African social imaginaries could function in politicizing the organisation of labour, resources, and capital in ways that exhibit decoloniality and pluriversality? This also led to the question of how techniques of futuring can allow for unpacking the assumptions underpinning the presentation of technological innovation as a default solution to modernistic problems? Or rather considering how framing technological innovation as the solution to social challenges might have distracted the public from the real issues facing African communities e.g., digital coloniality, surveillance capitalism, and commodification of social life. Or rather posing how technological quick fixers might have substitute the need for addressing recurring issues facing humanity.

When such issues are taken up in directing future dimension of an epistemic invention, social futuring from Africa will be a network of relations that direct our orientation toward the future or our investment in the past and the present. This is relational to recent efforts in HCI that approach ‘cultures of design’ and ‘design in culture’ as known-able and do-able problems (Dourish, 2020). To paraphrase Paul Dourish, what futuring problems does design render think-able and make do-able? What sort of

problems can be addressed when the focus is placed on the structural arrangement of social life in African communities? What sort of interventions can be developed when one focuses on the conditionings of the present and historical learnings of the past?⁵³ (Dourish, 2021 p. 68). These questions situate social futuring from Africa as an emerging unit of analysis where the problem making and finding are either on an institutional or individual level. When a better understanding of the effect of 'coloniality of imagination' is established as a think-able intervention, one can then begin to articulate multiple features of autonomy around interpretations that makes 'decolonization of the African social imaginaries' do-able.

Therefore, design futuring the African personalities requires continual problematization of African narratives of innovation within (and without) the Western canons of historization. Such intellectual position draw upon earlier decolonial traditions of African studies; where those of the Africana doctrine like Charles Mills and Frantz Fanon seek to construct African discourse from within modernist traditions as a way of reinvention from within, whereas those of the African stand like Kwasi Wiredu and Ngugi Wa Thiong'o' have advocated for developing decolonial narratives outside Western epistemological orders (Mitova, 2020). Drawing on both traditions, the discussion in the preceding section explores how interrogating the colonizing matrix of power in specific African cultures of sociability can provide directions for autonomous knowing how technologies (de)future by design instrumentation. For decolonial theorist Arturo Escobar, autonomous knowing is a praxis of continual self-transcendence with communities in ways that contribute to the politics of decentralised organisation, distributed economies, and shared prosperity (Escobar, 2018). Such an approach to futuring denote how design expresses a particular way of being that is implicated by historical formations of designing other self and other beings. Thus, how design is implicated by the political agency of autonomy is hardly examined in HCI4D literature. Therefore, the discussion will attempt to show how modern objects, aesthetics, and agencies of design are colonial in their outlook on the entirety of non-Western human experiences (Tlostanova, 2017) e.g., humanitarian design and minimalistic design.

African Cultures of Futuring/or Defuturing

The modern world is inevitably messy both in terms of construction and function. Any attempt to tidy it up requires power and knowledge about the (un)desirable and the (un)necessary. While it might seem contradictory to the potentiality of Africa as a geographical entity that innovates, the unfortunate truth is that African institutions embrace modernistic 'consumption-inventive patterns' than its 'production-innovative techniques' (Mazrui, 2005). Although critics of the Western constitution of science and

⁵³ It is important to note that the reference to intervention here does not equate to package intervention critiqued in the ICTD literature (Toyama, 2015). The emphasis is that technological solutions destined for the global south might not necessary be solutions to social issues brought about by practising within the structures of modernity, but rather a set of abstract ideas and policies that often distract from the fundamental issues facing communities, or even substitute the requirement for addressing them.

technology have continuously shown how Africans create and preserve knowledge systems outside formal laboratory or institutional settings (Mavhunga, 2017), one can also identify how African institutions might have undermined indigenous and situated knowledge. The basis for such a proposition is that the sensitizing rationalities of Europhilia and Eurospain, which are unfortunately embedded in the political ideals directing postcolonial Africa (e.g., in the praxis of leapfrogging and transitioning), have significantly placed Africa in the place it finds itself, and Africans as co-conspirators in their subjugation.

To make that clear, the alteration of the image of Africa is not a wholesome product of coloniality, but partly and significantly a by-product of the interactivity between pre-colonial and colonial ideologies. Before coloniality, the subjectivities of the actively ethnic African were subjected to the societal gaze of customary values that renders the African person an object of communal control and manipulation. This is not depicting that the communitarian principles of organization (which is politically Feudal and ethnically partisan) defutures by its emphasis on the community over the self; instead, making the case for its failures to cultivate the capabilities of the persons that form the nodes for the communal network (Metz, 2015).

Critiques of the communitarian principle have argued that the recent formulation of African knowledge economies has not embodied the philosophy of 'possibilities' but rather embraces that of 'appropriation' (Táíwò, 2014). For Táíwò, the major issue with such an outlook is that it doesn't demand a critical interpretation and an adequate understanding of what was eagerly emulated and consumed. A classic example of such ideas is the debate about the place of the English language in African literature that goes as follows: something is given to me, I either use it as I see fit or out of unwarranted ignorance and fear misunderstand it and never attempt to put it to good use. As noted by Nigerian novelist Chinua Achebe:

"those of us who have inherited the English language may not be in a position to appreciate the value of the inheritance. Or we may go on resenting it because it came as part of a package deal which included many other items of doubtful value and the positive atrocity of racial arrogance and prejudice, which may yet set the world on fire. But let us not in rejecting the evil throw out the good with it".....or rather recognize that "perhaps the language was not my own because I had never attempted to use it, had only learned to imitate it. If this were so, then it might be made to bear the burden of my experience if I could find the stamina to challenge it, and me, to such a test" (Achebe 1965 p. 27-30).

Two issues stand out here: the Africanist school of thought argue that the English language is part of the coloniality project that carries imperialistic logic and cultures of civilization (Wa Thiong'o, 1992), whereas the pragmatic political school suggest that although the language was part of the oppressor's liberatory package, it can be put to good use when it is Africanized, e.g., Pidgin English in

Nigeria (Táíwò, 2014). When such narratives are linked to modernistic cultures of futuring, the prevailing argument in African studies is that the adoption of Eurocentric logics of modernization reinforce the views experienced and expressed by its cultures (Wa Thiong'o, 1992). This begs the question of whether the visible coloniality of being in pre-Western colonialism equates to the invisible coloniality of power in post-modern colonialism?

To articulate the implication of such a mode of organization is to consider the geopolitics of conflicting modernity and traditions. For example, the invisible coloniality of being from within current structures of organization in Africa is that of how political institutions propagate social orders that commodify social relations against lines of the ruler and the ruled. This led to the consideration of whether in the name of African nationalism, modernization might have created an artificial caste system of power where the anti-colonial projections of the national bourgeoisie re-colonize instrument of organising political and social life. The most troubling aspect of being subjugated by one's kins is that it is presented under the flagship of Europhilic structural adjustment/or indirect rules that were meant to re-configure existing knowledge structures but instead go further in atomizing systems of hegemony, patriarchy, and supremacy.

The issue is that such facilities first came about as part of the globalization appeals of the World Bank (WB) and the International Monetary Fund (IMF). Under the inspiration of incorporating Africa into Eurocentric economic models and technological projections, the WB and IMF pushed initiatives that strip Africa of its knowledge and resources and Africans of their personhood and livelihood. The appropriation of such ideals in the fabric of community life has thus internalized the thinking and the reality that Westernization equates to modernization. The issue with adjusting one's view of the world to Eurocentric ways of knowing is that it departs from one's way of being and might even go further in creating a shadowed version of oneself that is detached from the composite of the situated self.

The different scenarios of structural adjustment denote an investment and a commitment to Ethnocentric structures of thought, which when uncritically embraced in futuring narratives of HCI might postpone the futures of African HCI and could even lead to what has been referred to as 'epitemicide, linguicide, and culturicide' (Ndlovu-Gatsheni, 2015)⁵⁴. The point raised here is that specific African cultures of sociability, for example, the practice of 'invention and consumption', defuture the outlook of the actively ethnic African outlook towards the past, the present, and the future. This is developed on the assumption that an examination of the development practitioner's interest (i.e., imitation of Western values) and preferences (i.e., appropriation of Western innovation) tell a good deal about the underlying social imaginaries directing the reasoning and actioning of actors towards emerging challenges and opportunities. One can identify how the rejection of the political and economic prescription of the IMF

⁵⁴ Epitemicide is simply the dispossession of indigenous histories and knowledge systems; linguicide implies the destruction of people's logic and language of expression, whereas culturicide suggests the displacement of the organizing principles, structure, and mode of representation of a grouping of people.

by the Chinese communist party denotes epistemic disobedience to dominant systems of organization (Mignolo, 2011). Arguably, should political entities in Africa embrace the epistemic of disobedience as the Chinese did, the argument against the philosophy of 'appropriation' would have focus on how counterpoint 'possibilities' can be embedded in the praxis of building community economies.

Futuring in African Cultures of Design

Adding onto how specific cultures might have defuture the African personalities knowing of the present is showing how specific African designs have intervened in changing the organisation of people, places, and practices. Although there is an acknowledgement of how creativity has been championed in informal spaces, researchers in HCI have studied and documented the work practices of tech hubs, start-ups, and tech companies (e.g., Avle & Lindtner, 2016; Avle, 2020; Adamu, 2020b). Others have focused on how challenges of modernity and development can be reconstituted as sites for ideating and creating sustainable innovation (Peter & Chepken, 2016) – be it through critical thinking or in critical engagement with communities (Sipos et al., 2019). What such initiatives have shown is that even within the colonial matrix of power that subordinate creative endeavours, actors across the spectrum of industries are continuously innovating new ways of making meaning of the technology-connect social world. Even in states of cultural decomposition, community members have continuously sought to disintegrate from Eurocentric moral orders and economic models. And it is through the decolonial fracturing of the episteme formation that underpins modernity-as-development that an alternative mode of innovating Africa can be established.

To demonstrate such struggles, one can recognise recent design futuring exercises that rely extensively on situated aesthetics and resources; examples of which has been showcased by the AfriDesignX platform⁵⁵. The relevance of such exercises to the prospect of futuring African HCI identities is that it makes aware the kind of disruptive design work being carried out across Africa, and especially the material implication of utilising locally sourced materials, techniques, and concepts that are sustain-able. Examples of such projects include Kenyan artist Cyrus Kabiru's *C-stunners* collection of spectacles, Nigerian architect Kunté Adeyemi's prototype of the *Makoko floating school* in Lagos, Kenyan brothers Joseph and Charles Muchene's *Cladlight* smart jacket for motorcycle riders and Ugandan engineer Brian Turyabagye's *Mamope biomedical smart jacket* for diagnosing pneumonia in children. What these design projects have consistently shown are the vitalities of indigenous perspectives in engineering, architecture, construction, medicine, agriculture, and so on.

Such projects have also gone further in negating the ecomodernist framing of non-Western settings, particularly ideas that point to how supposedly urbanized subjectivities have normalized the abysmal thinking that the social world presents itself as a set of unified technical space that when a

⁵⁵ <http://afridesignx.com/>

problem surfaces, apply computation thinking to it, and if it doesn't work, then there might be no optimal solution after-all. This sort of cult-like culture presents tropes of science and technology in the broadest sense as instruments (means) for satisfying utilitarian necessities (ends). Therefore, the awareness of how the colonial matrix of power manifests itself in the postcolony of innovation could point to how what was deemed as interrogating the coloniality of the imagination might not be emancipatory after all. Such a revelation could present the initial framing of postcolonial computing research in Africa as a wishful narrative of emancipation-in-the-making that does not affect practical changes to how interactive systems are to be sustain-ably produced and consumed.

This poses the question of how can practitioners re-design historically dependent *wicked problem*? What sort of sensibilities are to be adopted to make *wicked trade-offs and options*? In this proceeding sub-section, the proposition is that the decolonial option of 'remembering' (Wa Thiong'o, 2009) can provide ways of engaging the 'subaltern' Other in the dialectical process of 'dismembering' colonial thoughts and imaginaries in futuring (Spivak, 2003). As already established, when the coloniality of the imagination is conceived as a thinkable intervention, one can begin to articulate how decolonisation of the social imaginaries can render imaginable the invisible performativity of modernity. This is precisely attempting to regain the African personalities ontological densities of sense-hood and personhood, either through the remembering of the self – as in knowing the characters and personalities of the conceptual Other clearly, or through dismembering the organizing structures that direct the experiencing modern societies. Here, both dismembering and remembering are considered ontological instruments that can draw into focus the complexities of futuring inventions imagined and practised within Western canon of expression. As such, the brief discussion considers three tactical pathways for building on pluriversal and situated imaginaries; imaginaries that could direct the foresight, reasoning, and actioning of actors towards emerging challenges and opportunities of innovating Africa.

Theological Re-awakening

The Arabic expression 'Insha'Allah' implies the firm belief that if GOD wills, events will happen; be it colonialism, poverty, and alienation. In HCI, the expression was adopted as a way of drawing attention to the need for embracing uncertainty and ambiguity as a critical design strategy in futuring (Howell et al., 2021). However, it is conceived here as an instrument for showing the interdependence between imagination and reality – that if a person has a forthright intention for morally doing good deeds for themselves and others, الله (Subhana Wa Ta'ala - SWT) will intervene by opening/ and offering new prospect into the future. However, the awakening call upon here is that futuring is not only about having the intention for good causes but of the 'remembering' that الله (SWT) ordain the then, the now and the future. For example, in the Holy Qur'an, الله (SWT) vows that "And those who strive for Us -We will surely guide them to Our ways. And indeed, Allah is with the doers of good" (Qur'an, Chapter. 29 Verse 69).

From the verse, one can deduce the certainty of a sustainable future should one 'know' الله (SWT) proclamation – here the emphasis is knowing and not believing.

The relevance of considering mythology in reawakening the African social imaginaries is that the Western Enlightenment project of Commercialization, Christianization, and Civilization has dismembered African modes of spirituality. The prevailing argument in black speculative literature is that spirituality is the recognition that there is a larger force in the universe, and in such a sense, the incorporation of the African person into Western moral orders organized mythological concepts in ways that contain the mind into the prescription of Western rationality against indigenous ideals associated with relationality. This lack of intimate engagement with the scriptures of monotheistic religions might have created a doubtful feeling towards the vitalities of divine interventions. A possible pathway for futuring African HCI identities will be the conviction that wishful thinking will not change the invention of the future; what will actively direct the performance of the future are the minimal actions one is genuinely willing to take or has taken to change the trajectory of one's knowing. Remembering the other self in the communal self is an option, whereas moving towards self-designing the other-than-human objects that populate the world.

Epistemic Re-cognition

The idea of epistemic re-cognition draws on the politics of consciousness switching that is often associated with the anti-colonial project of W.E.B DuBois. One of the central themes of Du Bois thesis is that of the concepts of the epistemic veil and double consciousness. Of relevance to design futuring African conditions of sociality is that of how intersectional identities of the self can either future or defuture. The initial framing of double consciousness is that being black and American provides a particular outlook on human affairs; a kind of ontological second insight and a feeling of two-ness that can allow for remembering the composition of the single-minded self within the veil of Westernization (Black, 2007). With the colonization of space and time, design futuring call for an investment in a 'subaltern consciousness' that could accommodate decolonial epistemologies (Wa Thiong'o', 2009). As recently identified in community narratives of designing Africa, sublating one's held identities presents productive avenues for identifying possibilities within the gaps and silence of contemporary modernity (Bidwell, 2021). This temporal space of representation, the gaps of innovation, could provide an opening where the subaltern self can recognize the bazaar nature of orientalist culture of engagement as to maximize one prospect of interacting and experiencing the future.

Therefore, it is presumed that this recognition of a second sight could indicate how design as a politics can redefine the conception of human identities as how things are imagined, fabricated, and consumed become the constituting fragment of remaking of worlds towards other futures. This thereby presents the attempt toward designing the 'human' in African HCI an object-oriented inquiry that has

politically oriented consequence, and one that recognizes the interplay between human universality and cultural plurality in community design practices.

Political Re-organization

In the Igbo language of South-eastern Nigeria, the proverb "Onye fe eze, eze elu ya", means when one serves or honour a king, kingship will reach him. This style of organization is embedded in the Igbo apprenticeship programme; a world-class business incubation system that seeks to develop self-reliant members of the community. Often associated with the ubuntu philosophy, it is a scalable system of entrepreneurship that build-up the commonwealth of the community. The apprenticeship framework developed after the Biafran civil war as a pluralistic instrument for building up the defutered economic and political system of the Eastern Nigerian state. Although the programme might have drawn inspiration from the conditions of the past, its culture of reorganizing the present does not exemplify a rescue mission but of building up a complex web of industrial and economic apparatus. In ensuring shared prosperity, the scheme remixes a range of techniques in identifying the talents of the individual, leveraging those talents in providing further training in a sort of guerrilla warfare manners, and then graduating the individual into the network of community wealth. Although the tactics of the system often resemble that of stakeholder capitalism, it emphasizes accountability, relationality, and scalability. Such an entrepreneurship complex considers futuring possibilities that do not rely on the defutered situation of the past (civil war) but instead focus on how fragmented technologies can be harnessed to change the conditions of the present. The entire process of the scheme is that of finding the right lens for nurturing the assets of community members, thus resembling the circular itirenative associated with techniques of future-making in HCI (Pearson et al., 2019). From the three tactical pathways for futuring African HCI identities, one can recognize how pre-colonial and anti-colonial tactics of social futuring enact possibilities of futures that are both abundant and limited.

8.2.2. Contribution to Knowledge

With regards to contribution to knowledge, certainly the thesis builds on and advance previous works in educational research, HCI4D, CSCW, and postcolonial studies. The value that the thesis add to the corpus of knowledge is the emphasis on the complexities of adopting a Eurocentric imaginary in understanding the plurality of African cultures, and in designing and deploying tools that are meant to be used in developing the subjective-ness and identities of the growing Nigerian population. The thesis significantly contributes to the possibilities of developing a specifically African orientation to the framing of technology, design, cultures, politics and people in techno-science and techno-futures.

From the different empirical cases documented in the thesis, it has contributed by providing an outlook that might be considered specifically Nigerian on a range of issues concerning blended approach to higher education, technology adoption and use, design innovation, and software project

work. By determining the extent to which some of the empirical data supports or contradicts the determining components of well know models of technology diffusion and acceptance, the analysis has contributed to the understanding of the factors that shape the acceptance or rejection of educational technologies in Nigerian universities. This is important as it shows the relevance and limit of the determining components of conventional models, arguing instead for the combination of different models as to identify and better understand a range of technological, pedagogical, institutional, socio-cultural and design related factors might have facilitated, and discouraged the acceptance and rejection of technological innovation.

In accounting for the practice of using educational technology to support teaching and learning, the thesis also contributed by outlining the possibilities of developing a context specific pedagogical approach appropriate to the peculiarity of the Nigerian context. This matter greatly as it points to whether the blend actually works, and whether it supports the efforts for decolonising the practice of postcolonial higher education. The thesis also contributes to corpus of studies in CSCW and HCI by providing a detailed account of the frameworks and methods informing the design and evaluation of eLearning systems in Africa, with Nigeria as a perspicuous setting. The empirical evidence provided contributed to the longstanding debates about design innovation from Africa, specially how what is often considered as 'best practices, supposedly prescriptive maps and scripts for accomplishing work, necessitates considering how they get adopted, interpreted, and extended as 'orderly' and occasionally 'messy' alternatives. Such accounts challenged widely held assumption about design innovation from Africa, instead showing how practitioners constitutively innovate new practices that get distributed across polarised boundaries.

From the analysis of the mundane practices of software designers/developers, the thesis has contributed by indicating some methodological implications of 'remixing' and 'playfulness' in appropriating software work practices, offering practitioners and researchers' sensitivities for understanding the trans local features and meaning of agile project work. The thesis has also contributed to the methodological debates about the relevance and implacability of indigenous sensitivities in studying Africa, which when considered in the framing of HCI4D field studies would make clear the motivate and commitment of HCI researchers to diverse communities.

Theoretically, the thesis also contributed to recent arguments about how indigenous knowledge (which consist of people, practices, and place) can informing the understanding of culture and in designing technologies that embodies and preserve them. This has led to the consideration of a collection of situated approach to ontological design, precisely the Wittgensteinian approach of Winch and a range of Feminist positionalities, can bring about a better understanding of African cultures of design(s) and designs in African(s) culture. It outlines the foundations of the African standpoint epistemological and methodological orientation, the ideas of a transatlantic approach to cultural

engagement in African design, and the ideas about design futuring African HCI narratives through the cultures of autonomous design and designing for the pluriverse.

Regardless of the added value that the thesis brings to the corpus of knowledge, it has its limitation. First, the perspective reported are limited to the context of three Universities and three software development firms in Nigeria, however, can be generalizable to other settings in Nigeria. The data that informed the arguments of the thesis were collected in 2018-2019, there is the likelihood that new insights might emerged that could either support/contradict the accounted reported in this thesis. For future work, there is the need to consider how some of the conceptual arguments presented can inform the design and evaluation of educational technologies, either for prototypes or a functional eLearning system, and on how adoption and use can be upscaled. Others can consider how approaching and understanding the political stake of computing system through the African standpoint can bring about the re-vision of the discourse of development, modernity, progression in Africa.

8.3. An Invitation, not a Conclusion

While the thesis has a beginning and a middle, the end is uncertain and undecided, lacking a set of recommendations expected of a provocation on how to approach the conceptual Other or what can be done about the situation of either abundance or ruination. This is largely because, as Michel Foucault has cautioned in his genealogy that professing or proposing ways out (in the Nietzschean sense) outlines a vocabulary that can only effect domination. I wouldn't want to end by prescribing future directions or design implication for the community to reflect or act on/upon. Instead, I invite the community and beyond to reflect on how the political technologies of the community has routinized the mentality of Europhilia and Europlaining, whereas moving towards identifying how technologies of the autonomous self can cultivate a culture of advocacy and ally ship in rectifying the default technological discrimination in the historization of the present.

In introducing the possibilities of developing a manifestor for re-inventing African HCI identities, the invitation chapter set out to reflect upon what future dimensions of African HCI would be/should be imagined and performed to allow for autonomous and subjective things *to know* and *think of* the pluriverse? (Escobar, 2018). Similar to Taylor's (2010) conviction that drawing upon a collection of arguments to make a case for investigating 'Out there' in its particularities might be considered armchair theorizing, this paper begins and ends with ideas depicting the metaphor of fruit mixer (Winschiers-Theophilus, et al., 2019). The implication of the arguments presented will become performative depending on the purview directing one's reading as attempting to speak to the HCI establishment might be debased by sleight of hands underpinning the adoption of conventional concepts and techniques in one's reflection. This idea, of intellectual and conceptual meandering, is not a new issue, but one that has fascinated and embarrassed HCI for several years.

As studies have begun to show, there is an awareness of the how WEIRD HCI's knowledge production practices and discursive sites such as CHI are (Sturm, et al., 2015; Linxen et al., 2021). Even with such recognitions, however, the suggested 'propositions' for diversification emanate from within existing Eurocentric epistemes of ordering the many more 'Out there' from 'In here' – which are often shallow and mainly administrative and bureaucratic involving changes related to the procedure of locking 'them' up in a particular frame of reference, thus offering little in the way of a fundamental reorientation in ontology or epistemology. As this intellectual exercise is simply meant to question and answer the emerging dimension of the human, the technological artefact, and the cultural context of use problematically, the sincere hope is that the African HCI community and regional initiatives such as ArabHCI and AfriCHI won't become another WEIRD and bastard child of Westernised-HCI.

Although the ideas underpinning the manifesto might be embedded in African traditions of postcoloniality and decoloniality, this is not suggesting that its application or evolution can only be directed by African HCI researchers and practitioners. As a manifesto, it commands relational conversation across disputed episteme in widening participation in futuring exercise that engages with the particularities of the social world. The call-out of solutionism and saviourism of HCI4D in Africa is not a static conversation but an extended invitation to the HCI community of the aspiration to continuously problematise the politics of technology design and adoption. This is because discourses of technologies are directed by variation of preferences that could shape societies in different ways; one of which is how the framing of computing research in the global south as doing 'socially good' work has normalise the values of Europhilia and Eurospain in the social imaginaries directing the African personalities quest for and will towards responsive personhood. How such practices can be dismembered in the organising principles of communities is an avenue that can be considered for future work.

The move towards reinventing African identities of innovation in HCI might be sluggish and agonising, the invitation is that the wider African HCI community ought to remember its routes in African philosophies, epistemologies, methodologies, traditions, languages, and technologies. But as decolonial theorist Frantz Fanon rightly pointed out about the prospect of a collective humanity, futuring is a struggle with and against the part we are part of. As African HCI researchers and practitioners;

“we today can do everything so long we do not imitate Europe, so long we are not obsessed by the desire to catch up with Europe..... If we want to turn Africa into a new Europe, and America into a new Europe, then let's leave the destiny of our countries to Europeans. They will know how to do it better than the most gifted among us. But if we want to advance a step farther, if we want to bring it up to a different level than that which Europe has shown it, then we must invest, and we must make discoveries. For Europe, for ourselves and for humanity, comrades, we must turn over a new leaf, we must work out new concepts, and try to set afoot a new man” (Fanon, 1963 p. 251-255).

To end on a personal note, Foucault doctrine of ethical subjectivity has shown how techniques of power-knowledge constitute the self as a subject of investigation. For me, investigating the ideas about futuring African conditions of pedagogization and design innovation have partly revealed attributes of the individual self (through intimate reading and writing of diverse experience that are considered peripheral in contemporary discourses) that might have been enframed should I have accepted the Eurocentric narrative about technological innovation from Africa. As Judith Butler noted in *Gender troubles*, “the anticipation of an authoritative disclosure of meaning is the means by which that authority is attributed and installed: the anticipation conjures its object.... the prevailing law threatened one with trouble, even put one in trouble, all to keep one out of trouble (Butler, 1990 p. xv). Arguably, it is through the will to know, using the political technologies of the self and the underlying value orientations in African communities, for example, ubuntu, oration, relation, animato, and domino, that an adequate deconstruction of what seem ‘strange’ and ‘unfamiliar’ can be entertained and advanced.

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Appendix A: Consent Forms, Information Sheet, and Research Instruments

Participant Information Sheet

I am a PhD student in the School of Computing and Communication at Lancaster University, and I would like to invite you to take part in a research study about Investigating Approaches to the Design of Technologies in a Blended Learning Environment

Please take time to read the following information carefully before you decide whether or not you wish to take part. If you have any question regarding how to respond to particular question, do not hesitate to ask for assistance.

What is the study about?

The research broadly aims to provide a critical understanding of ways of using and developing appropriate techniques, methods and tool for the design, development, evaluation, and use of technology for education within an African context. This understanding will bring to light exactly how and where educational technologies fit into development paradigms, processes, and structures of an African educational system. Our aim is to use research in moving towards an Africanised integration of technology in education and answers the call for a specifically African way of teaching and learning i.e., an African philosophy and approach to education.

Why have I been invited?

We have approached you because of your role in using, administering, or developing educational technologies in Nigeria – as a student, teacher, administrator, or software developer. I am interested in understanding how different stakeholders engage in one form of using technology for teaching and learning.

We would be very grateful if you were to agree to take part in this study.

What will I be asked to do if I take part?

If you decide to take part, you will be invited to do one or more of the following:

1. A survey where you along with others will give your reflections on the current landscape of blended learning in those institutions as it relates to learners' engagement and experience, and if they see it as real learning or something else (behavioural and attitudinal views towards the use of technology in their learning process), and how it might be improved, or comment on any developments.
2. A focus group with learners where we will discuss how they interact with the system (i.e., their learning activities), how engaging it is, and how practical it is as compared to conventional approaches to learning. We will also discuss possible ways of improving your entire learning experience.
3. An interview, either face to face or via telephone or video conferencing will be administered where respondent will provide a deeper and more insightful reflection into their practice of developing and deploying such systems, and in how tutors use different teaching approaches/styles within the same learning environment.

What are the possible benefits from taking part?

The study may not directly benefit participants but taking part in this study will allow participants to share their personal experiences of the use of technology for teaching and learning. It might be beneficial in that it moves towards an African notion of technology design and use, and thus might be considered beneficial as it echoes the notion of a 'Pragmatic Africanised Approach'- with an African identify, philosophy, voice, and focus. Participant feedback is important as it may influence future approaches, methods and frameworks for the design deployment and adoption of technology from an African Perspective, and notably to the use of technology in education. The outcome of the study is expected to provide insights into stakeholder's best practice that will lead to an improved interaction, engagement, and experience of learners, and thus might contribute to the development of Nigerian educational system.

Do I have to take part?

No. It's completely up to you to decide whether or not you take part. Your participation is voluntary, and you are free to withdraw at any time, without giving any reason. For students, if you decide to not to take part in this study, this will not affect your studies and the way you are assessed in your course. For tutors/development team members, if you decide to not to take part in this study, this will not affect your position in the university/company and your relationship with your employer.

What if I change my mind?

You are free to withdraw at any time and if you want to withdraw, please feel free to contact me, or any of the researchers, and we will extract any data you contributed to the study and destroy it. Data means the information, views, ideas, etc. that you will have shared through the interview or focus group discussion. However, it is difficult and often tricky to take out data from one specific participant when this has already been anonymised or pooled together with other people's data. If the case arises, we will contact you and devise a means of identifying your response even when anonymised. Therefore, to assist us please withdraw within 3 weeks of taking part in the study. This will allow easy extraction of any contribution you made. If you decide to withdraw after the stated two weeks, we will make sure your decision is honoured in good fate.

What are the possible disadvantages and risks of taking part?

There are no risks anticipated for taking part in this study. Taking part means you'll be investing 30-40 minutes of your time.

Will my data be identifiable?

No - only the researchers conducting this study will have access to the data you share.

After the interviews and focus group discussion, only I, the researcher conducting the study will have access to the data you shared with me. The only other person who will have access to the transcribed data will be my supervisor. We will keep all personal information about you (e.g., your name and other information about you that can identify you) confidential, that is, we will not share it with others. We will anonymise all the information we get from you. This means that we will remove any information that may identify you. We will anonymise any audio recordings and hard copies of any data.

Participants in the focus group are asked not to disclose any information outside of the focus group and with anyone involved in the focus group without the relevant persons express permission.

How will my data be stored?

Your data will be stored in encrypted files (that is no-one other than us, the researchers will be able to access them) and on password-protected computers. Audio recordings will be destroyed and/or deleted once the project has been submitted for publication/examined. Hard copies of questionnaires will be kept in a locked cabinet. The files on the computer will be encrypted (that is no-one other than the researcher will be able to access them) and the computer itself password protected. At the end of the study, hard copies of questionnaires will be kept securely in a locked cabinet for five years. At the end of this period, they will be destroyed.

The typed version of your interview will be made anonymous by removing any identifying information including your name. Anonymised direct quotations from your interview may be used in the reports or publications from the study, so your name will not be attached to them.

How will we use the information you have shared with us and what will happen to the results of the research study?

We will use the information you shared for academic purposes. This will include trying to improve the technologies we develop and deploy. It will also be used for academic purpose, for example journal articles, academic conferences, and a PhD thesis. When writing up the findings from this study, we will only use anonymised quotes (e.g., from the feedback you provided), so that although we may use your exact words, you cannot be identified in any of our publications.

Who has reviewed the project?

This study has been reviewed and approved by the Faculty of Science and Technology Research Ethics Committee, Lancaster University United Kingdom.

What if I have a question or concern?

If you have any queries or if you are unhappy with anything that happens concerning your participation in the study, please contact myself or the Principal Investigators.

Muhammad Sadi Adamu
InfoLab21
Lancaster University, Bailrigg
Lancaster, LA1 4YW
E: m.adamu@lancaster.ac.uk
Cell: +2348038873570/+447741856421
Tel: +44 (0)1524510371

Dr Mark Rouncefield/ Dr Philip Benachour
InfoLab21
Lancaster University, Bailrigg
Lancaster, LA1 4YW
E: m.rouncefield@lancaster.ac.uk
E: p.benachour@lancaster.ac.uk
Tel: +44 (0)1524 510305
Tel: +44 (0)1524 510387

If you have any concerns or complaints that you wish to discuss with a person who is not directly involved in the research, you can also contact:

Prof. Adrian Friday
Head of School of Computing and Communications,
InfoLab21, Lancaster University, Bailrigg
Lancaster, LA1 4YW
a.friday@lancaster.ac.uk
Tel: +44 (0)1524 510326

For further information about how Lancaster University processes personal data for research purpose and your rights, please visit our webpage: www.lancaster.ac.uk/research/data-protection

Thank you for considering your participation in this project

Consent Form

Study Title: Investigating Approaches to the Design and Deployment of Technologies in a Blended Learning Environment

We are asking if you would like to take part in a research project that aims to explore the approaches to the design of technologies to be used in a blended learning environment across Nigerian Universities. The purpose of this consent form is to check that you are aware of your rights, understand what will be required of you and agree to take part in the study. Before you consent to participating in the study, we ask that you read the following participant information. If you have any questions or queries before signing the consent form, please speak to the researcher

Please
initial each
statement

1. I consent to take part in the above study.
2. I confirm that I have read the information sheet and fully understand what is expected of me within this study.
3. I confirm that I have had the opportunity to ask any questions about the research and have them answered satisfactorily.
4. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason.
5. I understand that my interview/focus group discussion will be audio recorded and then made into an anonymised written transcript. I also understand that audio recordings will be kept until the research project has been examined.
6. I understand that the information collected during the study will be pooled with that of other participants, anonymised and aggregated before being published.
7. I understand that once my data have been anonymised and incorporated into themes it might be tricky for it to be withdrawn, though every attempt will be made to extract my data, up to the point of publication.
8. I am satisfied that the information I provide will be treated as confidential and will be anonymised by the researchers, unless it is thought that there is a risk of harm to myself or others, in which case the researcher may need to share this information with his research supervisor.
9. I agree that quotations from the interviews and discussions can be used in the project reports and in other publications (if applicable). I understand that my quotations will be used anonymously.

<input type="checkbox"/>

Name of Participant: _____ Signature _____ Date: _____

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher: _____ Date: _____

Preliminary Survey

We would be grateful if you can help us complete the survey below. The survey aims to gain some insights into your reflection of engaging and experiencing of learning process in a blended learning environment, how it might be improved and developed better. Thank you for your time.

1. Gender
 Male Female
2. How often do you access the internet?
 Daily Weekly Rarely Never
3. Through which medium do you mostly access the internet?
 Mobile Phone Work Computer Personal Computer Others
4. What do you mostly use the internet for?
 Social networking Educational purpose Others
5. How often do you access your LMS in a day?
6. Through which medium do you mostly access your LMS?
7. Which activity do you mostly engage in?
 Check notification Download materials Engage in a learning activity
 Make submission
8. Do you consider this form of engagement actual learning? Yes No
9. If Yes, why? If No, why?

Should you be interested in participating in a focus group discussion with us to go into more detail about your answers? If yes, please leave your email below:

Students Focus Group Discussion script:

The question below acted as discussion pointers that guide the focus group with students:

- What medium do you use for accessing learning content?
- How do you interact with the LMS? How often? How different for users?
- Can you account for your experience of engagement of the deployed tools? Are they Easy to use? Easy to understand? Intuitive? Responsive? Accessible? Detailed? Engaging?
- What is your learning experience? Can you say using the tool assist you in understanding the topic better and help in your performance? How it that?
- What form of support is provided via the LMS to students?
- Ask if you have any other comments or suggestions for the study, and if there's anything they want to talk about. Thank them for their time.

Tutors Interview script:

- What is your understanding of blended learning or eLearning?
- How do you go about engaging with the LMS deployed in your institution?
- How do you disseminate learning content to students? How often? In what context or form?
- What instructional approach do you employ? Didactic, user centred, tutor centred? Does the use of the system assist or not to your teaching approaches/style? Does the teaching approach/style have any impact to how students learn?
- Do social constructs like culture, religion, social norms, gender, or context affect student's adoption and use of the LMS, their level of participation in the learning processes, and their subjective experience of the blended approach? How so?
- Describe your experience of using eLearning systems as compared to conventional ways.
- Is there any form of support that is provided to students via the LMS? Elaborate more.
- In your opinion, how can we better utilise the use of LMS in your department?
- Ask if there's anything they want to talk about. Thank them for their time.

Educational Managers Interview script:

- Ask what form of digital technologies are deployed in their institution
- Ask why blend in the first place? The motive, rationale, expectation and any other assumption that might have informed their decision processes.
- Ask about their adoption mechanism, how quality is assured, how they conceptualise return on investment, and on how they conceptualization adoption objectives (how to know that it is working towards the aim outlined).
- Ask if they have any other comments or suggestions for the study.
- Ask if there's anything they want to talk about. Thank them for their time.

Service Providers Interview script:

- Ask about the sort of work they do, the products and service they can offer (and have offered) to the Nigerian market?
- How do you gather requirement; which design and development methodologies do you employ to guide their work; how do they go about evaluate tools (with or without users, or using heuristics); how do they go about deployment and subsequent maintenance- through trials, pilots or full roll out; how do they go about articulating if user requirement are met; and do the processes mentioned above get documented as to inform subsequent practice or how do they get re-use, if that the case?
- What do you consider as design and development 'best practice' that inform their wok of producing and deploying educational technologies and services?
- Determine whether these practices are informed by the practice of other stakeholders or through in-house research and trials?
- Is there any consideration for design ethics regarding human subject, and specifically people with disability or those in disadvantage positions?
- Ask if there's anything they want to talk about. Thank them for their time.

Experienced Researchers Interview pointers:

- Discuss most of the challenges and opportunities for digital higher education in Nigeria?
- Discuss the current landscape of using technology to support diverse praxis of education
- Ask them about their understanding of the more relevant pedagogical approach to adopt with the proliferation of ubiquitous computing.
- Then discuss the methods you have selected for data collection and analysis, and whether they can be considered as culturally and socially relevant to the context of Nigeria?
- Ask them about any evaluation/validation methods they might suggest going forwards in your research. the area
- Seek any suggestion on how to decolonize the future narrative of digital education in Nigeria
- Ask if there's anything they want to talk about. Thank them for their time.

Appendix B: Approval Letters for Fieldwork

<p>Prof. O. O. Amund <i>B.Sc. (Lagos), Ph.D. (Cranfield)</i> E-mail: oamund@unilag.edu.ng kayodeamund@gmail.com dldirector@unilag.edu.ng www.unilag.edu.ng Tel.: 08023032906</p>		<p>DISTANCE LEARNING INSTITUTE UNIVERSITY OF LAGOS LAGOS, NIGERIA</p>
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27th July, 2018

Adamu, Muhammad-Sadi,
School of Computing and Communications,
Lancaster University,
United Kingdom.

Dear Sir,

**RE: REQUEST FOR APPROVAL TO CONDUCT A TECHNOLOGY
ENHANCED LEARNING USER STUDY**

The above subject matter refers. I write to convey the approval of the Vice-Chancellor, Professor Oluwatoyin Ogundipe, University of Lagos, Akoka-Yaba, Lagos, Nigeria to your request.

We wish you the best in your research endeavour as we look forward to the outcome of your research.

Thank you.


DIRECTOR
DISTANCE LEARNING INSTITUTE
UNIVERSITY OF LAGOS
Professor Olukayode O. Amund, FAAS
Distinguished Professor of Microbiology
Director, Distance Learning Institute.



DIRECTORATE OF UNIVERSITY ADVANCEMENT

Office of the Vice-Chancellor

AHMADU BELLO UNIVERSITY

Opposite Senate Building, Main Campus, Samaru, Zaria, Nigeria

Vice Chancellor: Professor Ibrahim Garba, B.Sc. (Hons) Geology, M.Sc. (Mineral Exploration) ABU, Ph.D Geology (London), D.I.C., FNMGS

Director: Professor Adamu Ahmed, B.Sc. (Hons) Geog, M.Sc. (Urban & Reg. Planning), Ph.D URP (ABU), FNIP, RIP

20th July, 2018.

To Director/Dean/HOD,
Ahmadu Bello University,
Zaria.

Dear Sir,

INTRODUCTION LETTER: ADAMU, MUHAMMAD SADI

I write to introduce Mr. Adamu, Muhammad Sadi who is currently a PhD scholar at the School of Computing and Communications, Lancaster University, United Kingdom. He is investigating the design and use of technologies to be used in a Blended Learning Environment in Higher Institutions of Learning in Africa, particularly Nigeria.

We have confirmed that Mr. Sadi is a Lecturer from Federal University, Gashua. He is on Petroleum Technology Development Fund (PTDF) scholarship.

Please grant him all the necessary support to enable him interact with staff/students and or faculty member (s) of your department.

Thank you.

Sincerely,

Ahmed Zakaria
For: Director

Office of the Director
V.C.'s Office
A. B. U., Zaria



406/407, 3rd floor, The Kings, Ahmadu Bello Way, Opposite NAF Conference Center, Kado, Abuja, Nigeria
W: www.mylearningacademy.com E: info@mylearningacademy.com

10th July, 2018

Muhammad Sadi Adamu

School of computing and Communications,

Lancaster University, Lancaster

United Kingdom.

Dear Sir,

RE: Request for Participation in a Technology Enhanced Learning User Study

We reference to your letter dated 4th July 2018 on the above subject matter requesting for our assistance to participate in a user study about understanding our best practice to the design, development, evaluation and deployment of technological learning solution to be used within the eLearning ecosystem.

The research aims to improve elearning practices and better develop understanding of technology and how well it fits the African cultural context. We are very much interested and willing to contributing to your research.

In view of the above, I wish to convey to you the Managements approval for you to engage with team members in our organization.

You are also requested to share your findings with the organization for the betterment of our local practices.

For further inquiries, you may reach our officials as follows:

Dayo Akinpelumi; dayo@bilyakconsulting.com +234 909 119 9841

Mahmood Yakubu; mahmood@bilyakconsulting.com +234 803 376 6615

Yours faithfully,

Akinpelumi Oladayo Benedict
Business Development Manager

1a Adedeji Adelowo Street,
Off Admiralty Way,
Lekki Phase One,
Lagos, Nigeria.



Fax: +234(1)270 8109
Tel: +234(1)270 8110
+234(1)454 1453
email: info@socketworksng.com
http://www.socketworksng.com

26/07/18

Muhammad Sadi Adamu
Lancaster University,
Lancaster,
LA1 4YW

Dear Muhammad,

Re: Request for Participation in a Technology Enhanced Learning User Study

Sequel to your letter dated 23rd July, 2018 requesting for participation in a Technology Enhanced Learning User Study, approval is hereby given for you to interact with members of staff of Socketworks Limited to carry out the study.

We wish you the very best in carrying out your research work.

Yours truly,
For: Socketworks Limited



Oluwale Ogundipe, PhD
Managing Director/CEO



2nd July, 2018

Mr. Ademu, Muhammad Saqi,
Lancaster University, UK,
m.adamu@lancaster.ac.uk
Tel: +44741856421, +2348038873570,

Dear Muhammad,

Re: Request for Participation in a Technology Enhanced Learning User Study

We received your request to work with FlexiSAF for your PhD research in Technology Enhanced Learning. I write to confirm our acceptance to participate in this study and believe the outcome will be of paramount importance to education in

As a technology education company, FlexiSAF is excited in this research and would give its maximum support during the course of the project.

Thank you.

Yours faithfully,


Faiz Bayer,
CEO, FlexiSAF

HEAD OFFICE:
No 25 Ibadan Street,
Area 3, Garki, Abuja.
+234 (0)705 988 7123

Traveller, your footprints are the only road, nothing else.
Traveller, there is no road; you make your own path as you walk.
As you walk, you make your own road, and when you look back you see the path
you will never travel again.

Traveller, there is no road; only a ship's wake on the sea.
Traveller, your footprints, from There Is No Road, Antonio Machado (2003)