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Developing Proficiency in Pedagogical Integration of Emerging Technologies: An Educational Design Research of a Community of Practice at Makerere University

Thesis presented for the Degree of Doctor of Philosophy in the Department of Education, Faculty of Humanities,
University of Cape Town

October 2017

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Abstract

This thesis investigated the development of proficiency in pedagogical integration of emerging technologies amongst educators at Makerere University. Limited educator CoPs focused on pedagogical integration of ETs inhibit educator potential to contribute to quality learning through pedagogical integration of ETs. The general question in this thesis is how social architecture in an educator CoP provides opportunities for enhancing proficiency development in pedagogical integration of ETs. Based on educational design research framework and situated learning theory, a community of practice as an intervention was designed and implemented between 2014 and 2016. Data was collected through observations, focused discussions and interviews from five educators who actively participated. An interpretive thematic analysis was done from which findings indicate that a social architecture in community of practice enables educators to initially accept that they are less experienced and potential members and then, join forces in a community to take charge of their transformation process. A social architecture enables drawing on individual talent and exploiting synergy between individuals with varying experiences; the process also comprises specific actions and engagements, which when shared in a social environment help motivate, inspire and evoke emulation of a practice. A community of practice provides an ideal context that enable educators to be more honest in evaluating their own technology skills and gaining confidence in seeking to develop skills. Pedagogical integration of emerging technologies is a practice highly influenced by individual attitudes in a social environment. In communities of practice faced with resource-constraints, the constantly evolving technologies, limited mentorship capacity, and mind-set are among the inhibitors in the social architecture that contributes to proficiency development in pedagogical integration of emerging technologies. This thesis concludes that social architecture in a community of practice contributes to the process of developing proficiency in pedagogical integration of emerging technologies. The design principles that emphasize configuration of a social architecture like interactions, networks and collaborations among educators are helpful in pedagogical integration of emerging technologies. It is therefore recommended that a social architecture in a community of practice be exploited by educators to enhance pedagogical integration of emerging technologies. The original contribution of this thesis is coming up with new design principles and theoretical insights related to a social architecture in a community of practice focused on pedagogical integration of emerging technologies.

Acknowledgements

First, I am tremendously thankful for the generosity of Makerere University with the support of SIDA that afforded me the exceptional financial muscle, without which the research resulting into this thesis would never have been. To all my colleagues who served as participants in the research process, I thank you for making time to be part of this thesis and honestly sharing your experiences.

I am extremely thankful to my supervisors: Dr. Cheryl Brown from the Centre for Innovation in Learning and Teaching (CILT) and Assoc. Prof. Dick Ng'ambi from the Educational Technology Inquiry Laboratory (ETILAB) for your firm patience, understanding, support, and encouragement especially through the trickiest patches of the research process and putting together this thesis. Your amazing support and encouragement gave me the motivation to believe in myself and keep going.

To my colleagues at Makerere University Directorate of Research and Graduate Training (Prof. Mukadasi Buyinza, Ms. Maria Nakyewa, Mr. Lubowa and Mr. Nestor Mugabe) for the coordination of finances during the research process. To all colleagues at the College of Education and External Studies, thank you so much for everything in support of my research and thesis writing. To my friend and colleague Shopi Julius Mbulakende- you were always there standing with me, thank you so much.

To my immediate family- my wife "Her Majesty" Jane Sylvia Migisha, our daughters Caroline Agnes Namome, Vanessa Bethel Namome; and sons: Elisha Jethro Kuloba and Ethan Jonan Walimbwa, thank you for bearing my addiction to the laptop and my being out of the country most of the time during the study period.

Special thanks also go to my parents Mr and Mrs Patrick Kuloba; my brothers Stephen, Emmanuel, Wilson (deceased), Fred, Moses, Alexander and Milton and their families. To my sisters, Dr. Robina Namome Namulunyi and Mrs. Irene Opolot, and their families, thank you so much for the amazing support during this journey, I cannot thank you enough for the constant encouragement. To Fred Wambwa, Jordan Wambete, and Ezra Namukowa, for severally dropping me at the airport during the wee hours of the morning during the frequent trips to Cape Town, thank you so much. To everybody else, thank you for believing in me. Lastly, to God the Almighty who has kept me alive to see this day happen, glory be to You.

Plagiarism declaration

I, **Michael Walimbwa,** hereby declare that the work on which this thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university. I authorise the University of Cape Town to reproduce for research either the whole or any portion of the contents in any manner whatsoever.

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Date: 6th October 2017

List of acronyms

The acronyms used in this thesis are explained within the text. However, just in case there is any unexplained, here is the list.

CoP	Community of Practice
DBR	Design Based Research
EDR	Educational Design Research
ETs	Emerging Technologies
GB	Gigabytes
GD	Google Drive
ICTs	Information and Communications Technologies
LCs	Large Class(es)
LCD	Liquid Crystal Display
LCP(s)	Large Class Pedagog/y(ies)
LMS	Learning Management System
LPP	Legitimate Peripheral Participation
MB	Megabytes
MOOCs	Massive Open Online Course(s)
MUELE	Makerere University Electronic Learning Environment
PgDip	Post Graduate Diploma
PLN	Personal Learning Network
PPT	PowerPoint
SDGs	Sustainable Development Goal(s)
SL	Situated Learning
SSA	Sub-Saharan Africa
UCT	University of Cape Town
URL	Uniform Resource Locator
VUCA	Volatility, Uncertainty, Complexity & Ambiguousness

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CHAPTER ONE: INTRODUCTION

> *"A group of men in the dark touch the elephant to learn what it is like. Each one feels a different part, but only one part, such as the side or the tusk. They then compare notes and learn that they are in complete disagreement".* John Godfrey Saxe 1887

1.1.0 Background

One of the United Nations' Sustainable Development Goals (SDGs) call for the provision of quality education and promotion of lifelong learning opportunities for all (United Nations, 2016), with the appeal to stakeholders to proactively contribute to the process. This call places educator's role in pedagogy in perspective because pedagogy contributes to the effectiveness of the workforce. Pedagogy is the study of how best to teach including a comprehensive plan for an educational programme to offer new and improved manpower to fulfil the rising needs of a dynamic society (Leach & Moon, 2006; Akker, 2013). To effectively perform this role, educators need the proficiency that enables them to work in an increasingly complex educational environment. Proficiency refers to a high degree of competence or skill in performing an activity (Kikanza, Delores, Randall, & Raymond, 2012). Effective pedagogy in the 21st century embeds effective usage of information and communication technologies (ICTs).

The present century education is characterized by ongoing changes in the ways human beings share, develop and communicate using digital technologies. Given the pervasiveness of digital technologies in people's lives, there is need for an educational system that provides skills of how to use these pedagogically. The young are heavily digital individuals (Anderson, 2010) and this has implications on the concept of quality education. Therefore, quality education in the 21st century implies integration of the pervasive digital technologies into pedagogy. Educators providing education to the young need to model technology usage in pedagogy as an attribute of providing quality education. Quality education is characterised by the developing of 21st century skills including problem solving, critical and creative thinking, communication, collaboration; media, information and technological literacy (Fisher, Exley, & Cioban, 2014).

Although many higher educational institutions have successfully increased the number of digital technological equipment and tools in the attempt to provide quality education, there is still a gap in effective pedagogical integration most especially in resource-constrained environments (Karsenti, Collin, & et Harper-Merrett, 2012). Resource-constrained environments are described as contexts with limited budgets towards ICT usage, their pedagogical integration and skills acquisition (Brown & Gachago, 2013). Resource-constrained environments therefore face insufficient techno-pedagogical skills, poor attitude towards usage of technologies in teaching and learning, and a lack of ability to keep up with the rapid changes in technologies that require constant knowledge update. These challenges are exacerbated by an additional challenge of large classes (Aubert, Daiglepierre, Le Quentrec, Pedró, & Loiret, 2015). Large classes (LCs) as a global phenomenon in higher education environments are described as those in which characteristics and conditions present themselves as inter-related and collective constraints which obstruct quality and meaningful teaching and learning (Lipinge, 2014). The 2015 Dakar African Higher Education Summit confirmed the large class scenario in Sub-Saharan Africa (SSA) by pointing at the soaring student numbers (African Higher Education Summit, 2015).

Within the LCs the level of interaction between the educator and the student is low or sometimes non-existent and therefore directly affecting the level of engagement (Schanzenbach, 2014), a situation characterizing many SSA region countries. The government of Uganda for example, in 1997 introduced the policy of expanding access to secondary education- Universal Secondary Education (USE) in 2007. This has seen more learners accessing secondary education and thus more learners for the subsequent university level (Aubert, Daiglepierre, Le Quentrec, Pedró, & Loiret, 2015). Makerere University, which is the largest public higher educational institution in Uganda, has had an increased annual intake of about 12,000 students per year, with a total student population of about 40,000 (Makerere University, 2015). With only about 1400 educators, the average educator-student ratio on a programme is far higher than the 1:50 stipulated by the regulatory body, the National Council for Higher Education (NCHE). The educator-student ratio in departments that offer core courses is often as high as 1:800 (NCHE, 2014).

The ratios indicated depict complexities in the pedagogic process of large classes which inhibits the quality of education. In terms of interaction, large classes have too many students for any single educator to effectively teach as they inhibit the level of interaction. Yet a characteristic of effective teaching that describes quality learning is interaction between the student and the educator (Ramsden, 2003). Within the large classes educators resort to the traditional large class pedagogy (LCP) of lecture methods even with its known limitations (Hénard & Roseveare, 2012). This is probably because it is easier to understand the process of lecturing and educators themselves were taught that way and therefore they are deeply attached to it themselves (Awono Onana, et al., 2014). Yet, in a lecture of between forty-five minutes and two hours, it is difficult for students to comprehensively engage in discussions, interact with the educator and internalise concepts (Hornsby, Osman, & Matos-Ala, 2013). Even with the addition of tutorials, lecture teaching method is ineffective because the groupings tend still to be too large, for meaningful interaction (DeRogatis, et al., 2014).

Quality pedagogy in the 21st century can be delivered through integration of emerging technologies (ETs) (Lwoga, 2012; Thota & Negreiros, 2015). ETs are described as the ICTs used in new ways and new contexts for the transformation of pedagogic practice (Veletsianos, 2010). Although frequently used, ETs have different interpretations in different contexts. This thesis concentrates focus on ETs in the context of education, where they usually refer to the implementation of ICT tools and techniques to support teaching and learning activities. These technologies include but are not limited to: hardware and software, computers, smartphones, internet, multimedia presentations, social networks, simulations, virtual reality, videos, learning management system (LMS) and Google applications including Google Drive (GD) among others. Pedagogical integration of ETs is a process that can be easier with collaboration among educators.

The reference to pedagogic integration of ETs focuses on strategies of manipulating and using ETs like the Internet and Google for locating, sharing, distributing and storing learning materials. These technologies are also used for

designing, uploading and managing materials on a learning management system, and sharing materials using available software. ET usage also embodies using videoconferencing facilities, finding useful video materials for engaging learners on YouTube and creating and using social networks like Google+, Facebook and WhatsApp. It also includes the usage of hardware like liquid crystal display (LCD) projectors and interactive boards for instruction. These tools although variously used in developed contexts are emerging in the developing contexts and therefore creating a need for educators to attain the necessary proficiency in using them effectively in large class pedagogic practices.

Improved educator proficiency in pedagogical integration of ETs has shown not only increased levels of interaction between the educator and the student across geographical distances and times, but also offer more interactive learning that improves the quality of learning, by incorporating synchronous and asynchronous communication strategies (Prensky, 2010). Pedagogical integration of ETs is an aspect of teaching practice by educators with other activities being research and community outreach. Each of these activities is demanding in terms of creativity and time for execution (Altbach, Reisberg, & Rumbley, 2010). In addition, ETs have the potential to reach many students through mobile, distance and ubiquitous learning opportunities, provided the skills of usage are present in the users. This means technology, appropriately used, can help in delivery of quality education in the large class scenarios characterising higher education today (Karsenti, Collin, & Harper-Merrett, 2012; Moore, 2013). Because this is the case, every educator needs to be have the skills to effectively integrate ETs into pedagogy.

Proficiency development in a practice environment draws on the configuration of a social architecture (Bedadur, 2013) . Social architecture is described as a design plan for an environment that encourages development of a desired range of social attributes like relating to other individuals, discussing and contributing to group ideas, interacting (Baran, 2014). Social architecture here implies an environment that supports interaction and collaboration in any organised community which is the basis for individuals to support each other in

going about a practice. Social architecture has a basis on exhibition of social attributes including individual, social skills and peer relationships. This thesis focuses on how the social work place environment is used to the benefit of the pedagogical integration of ETs. This is because appropriate configuration of a social architecture has far-reaching implications on educator's ability to effectively engage in pedagogical integration of ETs.

Effective engagement in ETs usage is described as a high-level efficiency in daily preparatory and administrative work, guiding students in usage of technologies as standard facilitating tools, and designing up-to-date, attractive and effective instructional materials (Foley & Masingila, 2013). Even with the benefits of effective pedagogical integration of ETs, educators may not have dedicated time to learn it due to the available social architecture most especially in resource-constrained contexts. Therefore, pedagogical integration of ETs as a practice is not as mainstream as it is supposed to be in such contexts with some few educators engaged in the practice yet others not keen. In this way, *educators act like a group of men in the dark who touch the elephant to learn what it is like, each touching only one part. Instead of comparing notes to find out the bigger picture, they resort to arguments as to who has the most appropriate description of the entire elephant.*

Social architecture is an attribute of a community of practice (CoP). A CoP is defined as a group of practitioners who share a passion for something they do and learn how to do it better as they interact regularly (Wenger & Wenger, 2015). Practice is the act of engaging in an activity repeatedly, for improving and mastering it (Wenger & Wenger, 2014). With appropriate social architecture, a CoP can provide situated learning (SL) opportunities for its membership. SL is a theory about how practitioners acquire proficiencies, through legitimate peripheral participation (Lave & Wenger, 1991). Appropriate configuration of social architecture in a CoP accelerates SL of pedagogical integration of ETs (Tolley, Johnson, & Koszalka, 2012). This is because such a community has individuals with diverse levels of experience in teaching with ETs, which when shared could contribute to enhanced skills among both new and more experienced educator practitioners.

Through community initiatives educators master pedagogical integration of ETs in LCs as a practice, most especially the ability to share innovative practices like distance, virtual, mobile, interactive and individualized approaches to learning (Boughey, 2015; Foley & Masingila, 2013; Exeter et al., 2010). These are experiences that educators as pedagogy specialists using ETs in education engage in their attempts to contribute to quality education, a UN sustainable development goal. In resource-constrained contexts however, educators find it challenging to effectively engage in pedagogical integration of ETs because the social architecture in the available CoP is not designed purposefully to provide this service.

1.2.0 Research focus

There are limited educator CoPs focused on pedagogical integration of ETs in resource-constrained higher education contexts (Aubert, Daiglepierre, Le Quentrec, Pedró, & Loiret, 2015; Thota & Negreiros, 2015). Even when some of these communities are helpful in induction and modelling of effective pedagogical practices, their social architecture is not purposely focused on pedagogical integration of ETs as a practice. Therefore, educators continue to struggle to effectively engage in pedagogical integration of ETs as they engage in teaching. This inhibits the educator potential to provide quality pedagogy using ETs and eventually contribute to quality education. The focal issue in this thesis is how a social architecture in a CoP can best be used to accelerate proficiency development in pedagogical integration of ETs.

1.3.0 Research questions

The broad question in this thesis is: how social architecture in an educator CoP provides opportunities for enhancing proficiency development in pedagogical integration of ETs. This question entails answering the following sub questions:

a) What activities are in a social architecture of a CoP aimed at proficiency development in pedagogical integration of ETs?
b) How does the context of a social architecture in a CoP influence the proficiency development in pedagogical integration of ETs?
c) How does a social architecture provide for active participation in a CoP to enhance proficiency development in pedagogical integration of ETs?

d) How does the community in a CoP enhance proficiency development in pedagogical integration of ETs?

1.3.1 Objectives

The thesis is aimed at attaining the following objectives:

i. To explore the activities in a social architecture of a CoP aimed at proficiency development in pedagogical integration of ETs.
ii. To examine the context of a social architecture in a CoP and its influence on proficiency development in pedagogical integration of ETs.
iii. To analyse a social architecture in a CoP that provides for active participation to enhance proficiency development in pedagogical integration of ETs.
iv. To evaluate the role of a community in a CoP that enhances proficiency development in pedagogical integration of ETs.

1.3.2 Purpose

The purpose of this thesis is to theorize usage of social architecture in a CoP to foster development of proficiency in pedagogical integration of ETs. The focus was on how the content, context, active participation and community in a resource-constrained environment, influences proficiency development in pedagogical integration of ETs. The focal issue is the usage of a social architecture to drive engagement and enhance collaboration among educators in pedagogical integration of ETs. The purpose of the thesis is therefore to come up with new insights and design principles for usage of a social architecture in a CoP to promote proficiency development in pedagogical integration of ETs. Through these insights, this thesis comes up with a useful framework for other researchers and practitioners to use when configuring social architecture in a CoP that enhances development of proficiency in pedagogical integration of ETs.

1.3.3 Justification

This thesis is justified because pedagogy in large classes can needs transformed towards the effective usage of integration of ETs. The thesis contributes to knowledge pedagogical integration of ETs in LC environments. The thesis is therefore justified because it provides guidelines and principles of effective

usage of social architecture in a CoP to enhance proficiency development in pedagogical integration of ETs. The design principles developed helps in clarifying robust interventions most especially in resource-constrained environments and making use of the available social environments to interact, share experiences, knowledge, skills and mentor each other in pedagogical integration of ETs. In exploiting the social architecture, educators learn how to maximize their benefits from social environments through interaction, sharing experiences, knowledge, skills and mentoring each other in pedagogical integration of ETs.

1.3.4 Significance

This thesis is significant in that it clarifies how appropriated social architecture in a CoP enhances the process of proficiency development in pedagogical integration of ETs. Educators most in resource-constrained environments must struggle to attain the necessary proficiency in pedagogical integration of ETs. The thesis explores the affordances of a social architecture in a CoP focused on pedagogical integration of ETs that can be taken advantage of for enhanced development of proficiencies. The thesis is also significant because by building on usage of a social architecture in a CoP and SL practices, it develops an integrated approach contributing to theorization of usage of social architecture in a landscape of practice. The thesis contributes to designing a low cost social architecture in a CoP for proficiency development in a resource-constrained context. This thesis provides guidelines into the exploitation of a social architecture in a CoP to help educators contribute to quality education provision as they engage in pedagogy using ETs.

1.4.0 Methodological overview

This thesis used educational design research framework that involved collaboration with other educators as practitioners to refine the research focus and design a CoP as an intervention. The CoP was implemented in three cycles called iterations, and came up with the refined design principles that may be usable in designing for similar interventions in resource-constrained contexts. Both quantitative and qualitative data were therefore collected. The research used mainly qualitative methods of data collection which allows a more robust

understanding of phenomena in EDR. Data captured were transcribed as indicated and during the transcribing process, more clear insights into the data was gained. Data from observations, focussed discussions and in-depth interviews was subjected to interpretive content analysis in mostly inductive fashion.

1.5.0 Motivation for this research

The researcher is in a teacher education environment with keen interest in pedagogical integration of emerging technologies. The researcher has been supporting colleagues in pedagogical integration of ETs, but without a CoP in place, this support was not sustainable. The journey for this research started in 2010, went for a post-graduate diploma in educational technologies at the University of practice. He was inspired by the training and the inspiration pushed him to pursue a master's degree in educational ICTs at the same University of Cape Town. His study at master's degree was titled educator initial adoption of e-learning at Makerere University. It was during this study that he got motivated to establish a community of practice specifically in pedagogical integration of emerging technologies, which he studied during the philosophy degree.

1.6.0 Concept definitions

Large classes (LCs) are described as classes in which characteristics and conditions present themselves as inter-related and collective constraints in obstructing meaningful instructional procedures (Lipinge, 2014).

Emerging technologies (ETs) are defined as the information and communication technologies tools and concepts used in new ways and contexts to transform pedagogic practices to highly engaging, interactive, mobile and virtual practices (Veletsianos, 2010).

Design-based research (DBR) is a systematic flexible framework aimed at improving educational practices through iterative analysis, design, development, and implementation of an intervention, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories (Wang & Hannafin, 2005).

Intervention is defined as a tentative solution to a problem in a research focus in design-based research (Amiel & Reeves, 2008). In this thesis, it is the

operationalization of a CoP aimed at accelerating pedagogical integration of ETs which is regarded as the intervention.

Design guidelines are defined as specific and usually context-dependent rules followed to achieve the design principles (Plomp, 2013). In this thesis, design guidelines are a set of open statements intended to guide the development of desired environment for effective pedagogical integration of ETs.

Design principles are defined as characteristics of a planned learning environment; what it should look like and its procedure; how it should be developed; and usually take the form of empirical statements (Herrington, McKenney, Reeves, & Oliver, 2007).

Educational design research (EDR) is a model of DBR that specifically deals with design to improve teaching and learning environments through the design and implementation of interventions, (Mckenney & Reeves, 2012).

Pilot is defined as a preliminary version of an intervention from which other forms are copied. A pilot is an early sample, model, built to test a concept and act as replication to be learned from (Plomp, 2013).

Resource-constraint is defined as limitations on staffing, equipment and other necessary resources for accomplishment of a project (Bozalek, et al., 2013). This thesis is focused on limitations in availability, access and skills in pedagogy using ETs.

Situated learning (SL) refers to a theory of how beginning practitioners acquire proficiencies, through the process of legitimate peripheral participation leading to full membership in a CoP (Lave & Wenger, 1991).

Social architecture is defined as an environment that encourages development of a desired range of social attributes that can lead towards improved practice (Baran, 2014). Here, it is a focus on the environment that supports educator interaction and collaboration, which forms the basis for individual educators to support each other in perfection of pedagogical integration of ETs as a practice.

Legitimate peripheral participation (LPP) is a description of how practitioners considered beginners in a practice become experienced and eventually experts in the same practice through collaboration, interaction and engagement with the already experienced (Lave & Wenger, 1991).

Community of practice (CoP) is defined as a group of practitioners sharing a passion for something they do and therefore learn how to do it better as they interact regularly (Wenger & Wenger, 2015).

Pedagogy is defined as the theory and practice of teaching and learning in an educational environment (Leach & Moon, 2006). The focus of pedagogy is how best to teach for full development of human capabilities.

1.7.0 Summary of chapter one

This chapter presented the background which focused on the evolvement of pedagogy with ETs and the large class scenarios. The research focus was on pedagogical integration of ETs in the large class settings. The research questions, objectives, purpose, justification and significance of the thesis have been stipulated that focus on how effective integration of ETs into pedagogy is done. The chapter also presented the methodological overview and concept definitions. The next chapter (two) is a literature review.

CHAPTER TWO: LARGE CLASS PEDAGOGY AND EMERGING TECHNOLOGIES

> "Literature adds to reality as it enriches the necessary competencies that daily life requires and provides". Lewis 2006

2.1.0 Introduction

This chapter describes large class pedagogies and usage of ETs in teaching and learning. The basis of this literature is on what Lewis once said, *literature adds to reality as it enriches the necessary competencies that daily life requires and provides and the explanation here confirms this.*

2.2.0 Large classes

Researchers have diverse views on the concept of large class environment which in some disciplines means fifty to seventy students in a single class, and yet in others such a class is considered normal (Jawitz, The challenges of teaching large classes in higher education in South Africa: A battle to be waged outside the classroom, 2013; Mulryan-Kyne, 2010; Exeter, et al., 2010). In the sciences for example 100 students in a class is considered a large class, while in most humanities courses, that same number is considered manageable (Foley & Masingila, 2013). Therefore, as a concept, a universal definition of a large class is problematic because they differ per discipline, level, nature and perception (Kerr, 2011). The different descriptions of a large class agree on the single aspect of the number of students in a single class that makes the available resources inadequate for effective lesson delivery. Even with the seemingly no consensus on the definition of a large class size environment, this thesis draws on the description of a large class as one in which characteristics and conditions present themselves as inter-related and collective constraints that obstruct meaningful teaching and learning (Lipinge, 2014). In the SSA, large class size environments are a typical characteristic of many disciplines in education- as big as 500 to 700 students with a single educator in teaching session (Foley & Masingila, 2013).

By 2010, universities in the SSA region had an estimated enrolment of over 4.5 million students, having soared from about 250,000 in the 1990s (World Bank, 2014). This means that in a period of only ten years, the student enrolment in the SSA region increased by over 210%. However, the increase in student

numbers has not been met with similar proportionate increase in educators; leave alone the static infrastructure like lecture halls, computers and other instructional materials required for effective teaching and learning environments (UIS, 2014). The implication of this is that in the same ten-year period, university lecture halls continued to get more students leading to overflow (Hornsby, Osman, & Matos-Ala, 2013), which gives rise to questions into the quality of education and the proficiency of educators in delivering instruction.

In large classes amidst limited resources, educators should struggle as they engage in pedagogy specifically curriculum design and development. Strategies educators use in large classes includes dividing students into groups of fewer numbers (Singer-Freeman & Bastone, 2016). A class of 400 students is divided into two classes of about 200 each, which remain large anyway. A setback in this practice is that it becomes tedious to teach the same concept in the two classes; the educators should contend with explaining the same concepts multiple times in the different groups. Even with the possibility of peer assessment, another setback is in assessment of student course work and examination scripts- the marking, sorting and entering marks becomes laborious if it is done manually as is the case in many SSA region universities (Foley & Masingila, 2013).

Higher education in the SSA region is characterized by high student numbers and fewer educators that are mostly ill-prepared in terms of skills in large class pedagogies most especially in usage of technologies (Maringe & Sing, 2014). Student numbers have implications on the quality of instruction given by educators and therefore calling for the need to support educators to embrace transformative pedagogical practices (Anderson, 2010). Indeed, there is evidence through literature that confirms the negative effect of large class settings on educator motivation to engage learners in a teaching session (Schanzenbach, 2014). Amidst such a crisis, one wonders whether the higher education environment is in any way coming up to empower educators therein to cope with large classes (Tolley, Johnson, & Koszalka, 2012) and therefore deliver quality education.

Large class settings have been perceived as a strategy to access university education in the SSA region (Foley & Masingila, 2013) and therefore even with the challenges; LCs are here to stay. This implies LCs will not only continue to challenge didactical skills of educators, but will also continue to pose issues of insufficient competence in their management by educators. The continued lamentations by the educators are not about to be the solution either. Educators need motivation to be forward sighted and take the strategy that promotes engagement and reaching out to more students in LCs using some transformative large class pedagogies (Boughey, 2015). With inflated educator-student ratio, amidst limited competencies in the practice in teaching LCs, educational institutions need to put in place deliberate attempts to support educators in attaining competencies for effective delivery of instruction using transformative LC pedagogies.

Hornsby, Osman, and Matos-Ala, (2013) assert that for every educator whether beginning or experienced, teaching LCs presents challenges including the ability to cater for the diverse student learning capabilities as there is no single class with students who all have the same capabilities. This challenge makes the use of popular use of the traditional lecture based teaching practice untenable as it reaches out to less than a quarter of the total student numbers in a single lecture. The way forward therefore would be educators gaining the required proficiency in alternative pedagogical initiatives that can reach out to more learners than the traditional lecture methods.

2.3.0 Pedagogic strategies for large classes

There is a tendency for educators to take on instructivist pedagogies in LCs than the that the soci0-constructivist ones. This is because large class pedagogies require educator dedication, concentration, determination, excellent communication, good preparation, creativity, innovation and patience (Mohamed, 2013). These attributes may not be necessarily taught to an individual educator in a one sitting session. The same attributes are challenging tasks because they are developed over a long period of practice. Even when these attributes are developed during practice, they require so much support to be sustained. Because of such a challenge, educators need to dedicate practice time in preparation and innovation to deliver effective instruction in the LCs

while learning from others. Effective delivery of instruction in LCs is a difficult task to educators as LCs affect motivation, perception and educator sensitivity that are core contributors to effective teaching (Exeter, et al., 2010; Maringe & Sing, 2014). In addition, teaching in a large class also inhibits educator opportunities to offer comprehensive feedback and interaction with students (Lipinge, 2014). As LCs increase and change in nature and size, there are more practical problems.

LCs have negative effects on learning especially significant in terms of teaching time and management (Robb, 2012). Educators in smaller classes are more likely to effectively cover a wider range of topics in the prescribed course syllabus to the understanding of the learners than those in big classes. LCs require more effort and demand on the educator's ability to deal with time and organization, and hence require extra time devoted to teaching. For instance, in a large class, an educator becomes more concerned about how to complete tasks and exercises instead of concern for the learning outcomes from teaching (DeRogatis, et al., 2014). Thus, there is less time for actual teaching and exercises and less use of the time given to teach, because there are distractions from student enquiries during class time. However, all these are experiences that happen to different courses and individual educators and therefore the attitudes formulated towards LCs.

LCs are ironically perceived as among the most successful available option to meet the growing demand for higher education and therefore they are a reality, here to stay, despite the associated challenges (Foley & Masingila, 2013). To this effect, educators need to become innovative in providing more engaging instructional activities and reaching out to students. Some educators have successfully sought alternatives to enable them deliver effective instruction in LCs; however, this practice cannot just be fixed in other contexts without piloting (Tolley, Johnson, & Koszalka, 2012). Indeed, some educators have used the most effective to help deliver instruction including use of analogies, metaphors, similes and examples that represent concrete images and connect to the student background (Jawitz, The challenges of teaching large classes in higher education in South Africa: A battle to be waged outside the classroom, 2013). However,

even when these strategies are claimed to be working well, they fall short of offering educators the opportunity to provide the 21st century curriculum development (Maringe & Sing, 2014) to the students. As LCs take shape, they prompt educators to rethink engagement in effective pedagogy in higher education as a process of bring out manpower able to contribute to sustainable development.

LCs have evolved and so are large class pedagogies over the years. Lipinge (2014) describes the growth of a regional university in SSA during the period between 1992 and 2013 while encountering large class sizes most especially at undergraduate level. Lipinge laments at the way the university handled professional development for the educators to be able to effectively teach in the same large class settings (Lipinge, 2014) in that same period. The implication is that higher education institutions should institute strategies that enable educators to access continuous professional development programs to cope with challenges in the practice of delivering instruction amidst the growing student numbers. Nevertheless, due to the many limitations in resources faced by the higher educational landscape, only a few educators access such programs, leaving many wanting and struggling.

LCs bring many diversity issues (recognizing that individuals are unique in their own way) to recognition. The diversity issues in the 21st century class consist of reading level, athletic ability, cultural background, personality, religious beliefs, gender, language, social class, culture, prior learning among them (Snowball & Boughey, 2012). There has always been diversity in the classroom, but today it is important to embrace it and make positive use of it. Educators need the proficiency to value diversity and to model a sensitivity attitude given that diversity increases as class sizes increase. To cater for such diversity, educators need to work collaboratively by sharing experiences encountered. Therefore, a forum that enables one to seek such experiences including mapping knowledge and identifying deficiencies in pedagogy of LCs is necessary; such a forum need to operate on SL principles (Beetham & Sharpe, 2013). Catering for diversity in LCs requires educators to be innovative, adaptive and flexible in the pedagogic process.

Pedagogical integration of ETs happens in a landscape of practice characterized by volatility, uncertainty, complexity and ambiguousness (VUCA) (Reeves & Reeves, 2015). Volatile is due to the constant dynamics of change in terms of the technologies and tools, which becomes unpredictable in as far as which technology is in the offing and will be appropriate. The confounding issues in this practice are numerous making it extremely complex to grasp. Indeed, the mixed meanings attribute to a technology, and its tools are equally existent making the practice environment ambiguous.

2.4.0 Emerging technologies usage in large class pedagogic processes

ETs including worldwide networks have transformed learning environments through contact of both human and non-human resources (Anderson & Elloumi, 2004), and therefore the resources from all over the globe facilitate transformative pedagogical processes through the technologies. From these new pedagogical approaches, the rapid change in the roles of educators have also emerged. ETs are adaptable to different tasks in pedagogy and are user-friendly (Mak & Pun, 2015). Within pedagogy, ETs can perform various tasks including instructional delivery, statistical analysis and graphing among others. In each of these functions, there are more specific tasks that technologies are adaptable to perform per instructions given by the user. With this new era, educators can no longer afford to be in their comfort zone (Ng'ambi D. , 2013).

ETs have proved useful in teaching and learning environments (Herrington, Herrington, & Mantei, 2009). However, while technologies have characteristics for effective curriculum design and development, research supporting proficiency development in the practice of embracing pedagogy with technologies is limited (Jawitz, The challenges of teaching large classes in higher education in South Africa: A battle to be waged outside the classroom, 2013). Even when pedagogy in the 21st century has a profound influence from the dramatic rise in use of technologies leading to new ways of teaching as a professional practice for educators, many educators should struggle to make a breakthrough. For effective operation, therefore, educators need to appreciate technologies are useful in multitasking, networking, distance and mobile learning. Educator effectiveness in the 21st century curriculum design and

development, means ideally having the proficiency to use the new technologies (Bates, 2015).

Pedagogy in higher education of the 21st century calls for strategic value of innovative teaching and learning as key differentiators and sources of competitive advantage for educational institutions (Bozalek, et al., 2013). The competition is apparent on the educator ability to use the ETs in pedagogy for delivery of quality education. In an environment with growing competition and globalisation, leading educators are embracing pedagogy with ETs with others steadily gaining proficiency in their usage. The possible technology tools are social networks, massive open online courses (MOOCs), smart boards, multimedia, video, learning management system (LMS) and Google among others (Ahalt & Fecho, 2015; Holland & Holland, 2014). These technologies are rapidly becoming key forces in transforming as well as broadening instruction, curriculum development strategies (Johnson, et al., 2016). Globally, the same technologies are used to transform pedagogic practice.

Potential benefits in usage of ETs in pedagogy exists as appropriately used, the technologies have the potential for reshaping of teaching and learning to increase flexibility. This may occur using internet-based technology tools such as Moodle, as a learning management system with its attributes like discussion boards, chat rooms, news, quizzes, lessons and may be designed as a blended approach (Fong, et al., 2014). These technologies make content available electronically and remotely, as well as face-to-face classroom tutorials and lectures. Therefore, ETs encourage anytime, anyplace interaction between educators and learners that has revolutionized the pedagogic process. The kind of interaction is regardless of time and space (synchronous and asynchronous) and therefore takes learning experiences even to the learners who are not able to travel across distances. In these cases, interaction tools such as mobile telephones, online forums, chat, e-mail and many others can facilitate communication and discussion for meaningful learning across geographical and time lines (Ahalt & Fecho, 2015).

With ETs, innovative ways of curriculum design and development represents new approaches by educators and reflects better ways of using more technology

tools including computer-assisted instruction, websites, social media (SM), LMS, distance and interactive technologies (Bozalek, et al., 2013). Therefore, educators with proficiency in the usage of technology tools are helping in transformation of pedagogic practices, in higher education in the 21st century. This implies that for educators to be delivering quality education, they need to be conversant with usage of the new and interactive methodologies in pedagogy that come because of ETs (Herrington & Parker, 2013).

Today's educational experiences present redefined competencies including creativity, curiosity, complex communication, problem solving, collaboration, flexibility, interpersonal skills, and the ability to synthesize information across disciplines (Goldman & Lucas, 2012; Herring, et al., 2015). The interconnectedness of these experiences therefore requires educators who model these redefined competencies, literacies, by using available ETs in pedagogy. Indeed, new literacies emerging focus on the intersection of the internet and other informational and communications technologies reminding educators that they are required for effectiveness. There is therefore the need for educators as practitioners to work in networks to develop proficiencies in exploiting the potential of the new learning tools (Marcelo, Yot, & Mayor, 2015). The argument here is that educators in this present century to be considered as engaging in effective pedagogy, should have the proficiency to model and integrate these essential skills within and across various disciplines as part of a reframed pedagogic process.

Appropriate usage of ETs does not only have the potential to enable the ability to engage in e-learning, which means providing anywhere and anytime access to knowledge; but is also capable of providing opportunities for networking and communication that allow knowledge sharing and participation (Anderson, 2010). This is an attribute of the 21st century pedagogical practice in curriculum development that most can be delivered to learner using both synchronous and asynchronous technologies. With the ETs presenting such opportunities, the role and capacity of educators to use them in pedagogy has become more critical than ever. The challenge is that many educators have not been appropriately empowered to integrate the technology tools into pedagogy

(Maier & Warren, 2013). It is however clear that collaborative action in the development of proficiency in pedagogical integration of ETs is possible. Nonetheless, most studies advocating for pedagogical practice with technology emphasize the advantages technology brings to an environment (Moore, 2013; Reeves & Reeves, 2015).

As seen from the many cases, it is imperative that 21st century educators have the proficiency in pedagogy with ETs (Ng'ambi & Bozalek, 2015), because used appropriately, technologies have the potential of revitalizing instruction. There is hope that the digital era presents new opportunities to educators in practice most especially in contexts where the technologies are seen to be asserting their position in pedagogy. Indeed, research indicates that ETs and their affordances promise to help educators grapple with some of the instructional challenges in LCs such as delivery of instruction (Burns & Lawrie, 2015), interaction with learners (Hornsby, Osman, & Matos-Ala, 2013), interaction across distances (Al-Eraky, Donkers, Wajid, & Van Merrienboer, 2015). These are issues that give rise to strategies for transforming pedagogy in the 21st century across higher educational institutions.

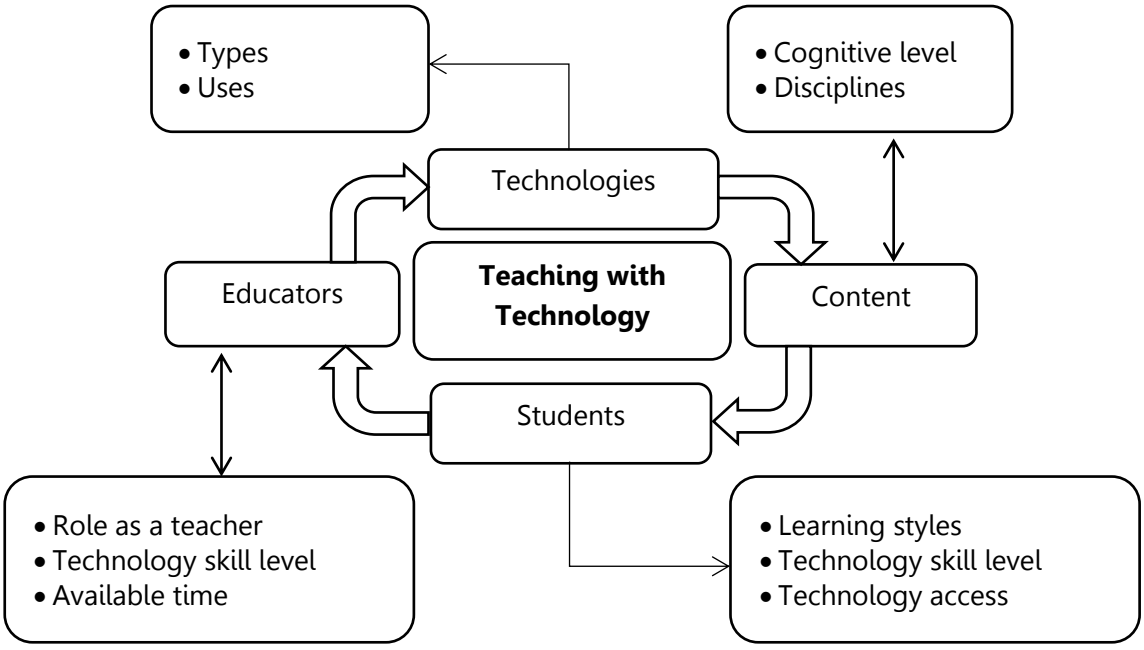

Figure 1: Model environment in the practice of teaching with technologies

Source: Adapted from University of Michigan (2015)

Figure 1 is a summary of an environment that supports transformative pedagogy using ETs in a higher educational institution. Even when it is drawn

based on systems approach and is largely instructivist, it illustrates how the initial process of technology usage takes place in a 21st century environment in which educators engage in curriculum design and development and the other others therein. From the figure, the model of teaching with technology involves four components: educator, students, content, and technologies (University of Michigan, 2015). This model however, is silent about how the educators attain the necessary competences to engage in pedagogical practice. Educators should consider their own experience with technologies, the amount of time they have for planning and perspective of their role as instructors. In addition, they carefully consider the students and their exposure and access to technology their preferred learning styles, as well as issues requiring collaboration and teamwork. The available technologies in such an environment are considered per their functions which can also ideally be explored and shared among educators who are ready to work as a team. The model however assumes availability and access to technologies which is not a case in resource-constrained developing contexts. The presumption is the integration and therefore changes in one part require adjustments to the other three to achieve the same goals (University of Michigan, 2015).

2.5.0 Summary of chapter two

The chapter presented literature related to large classes indicating they are prevalent and characterize the higher educational environment today amidst limited resources for quality teaching and learning. LCPs which embeds technology although expensive have been seen to be the strategy and alternative in teaching. Pedagogical integration of ETs is now not an option but a necessity for every educator in the 21st century. The next chapter (three) is the theoretical framework.

CHAPTER THREE: COMMUNITIES OF PRACTICE AND SITUATED LEARNING

"It is the theory which decides what we can observe." Albert Einstein (1879-1955)

3.1.0 Introduction

This chapter presents the theoretical framework, detailing CoP and SL theory.

3.2.0 Community of practice

A CoP is a group of people who share a passion for something that they know how to do and who interact regularly to learn how to do it better (Wenger & Wenger, 2015). This thesis therefore considers educators who are engaged in pedagogy using the available ETs as a CoP. Practice is the act of engaging in an activity repeatedly to improve or master it (Wenger & Wenger, 2014). The practice referred to in this thesis is pedagogy with ETs. It should be noted out rightly that the level of mastery of activities in a practice varies from one individual to another (Wenger, Trayner, & de Laat, 2011). A CoP therefore symbolizes the diversity in the skills and knowledgeability of the membership, ranging from the inexperienced to more experienced in an identified practice. The categories of membership in a CoP work together on specific initiatives to produce outcomes that benefit the advancement of the community's expertise (Wenger, 2007). It is the consideration of this thesis that educators engaged in pedagogy using ETs form a CoP that is working towards enhanced practice.

In a CoP, there is a focus on identification of individuals and creation of learning networks enabling knowledge and skills related to whom to approach and consult given a practice problem (Baran, 2014). CoPs are not therefore about only bringing new knowledge, but also helping in the growth of the knowledge needed internally within a specified practice. Learning networks, where practitioners can find and identify networks that may prove useful in learning can be exploited for this purpose. This implies that it is possible to use experiences of members known in a practice to begin to build and sustain networks that can support all practitioners in that practice. Nonetheless, practitioners with more experiences must be active participants and willing to form a core cohort that mobilises and bringing aboard other practitioners.

3.2.1 Domain, practice and community

A CoP operates on three concepts: domain, practice and community as presented in figure 2.

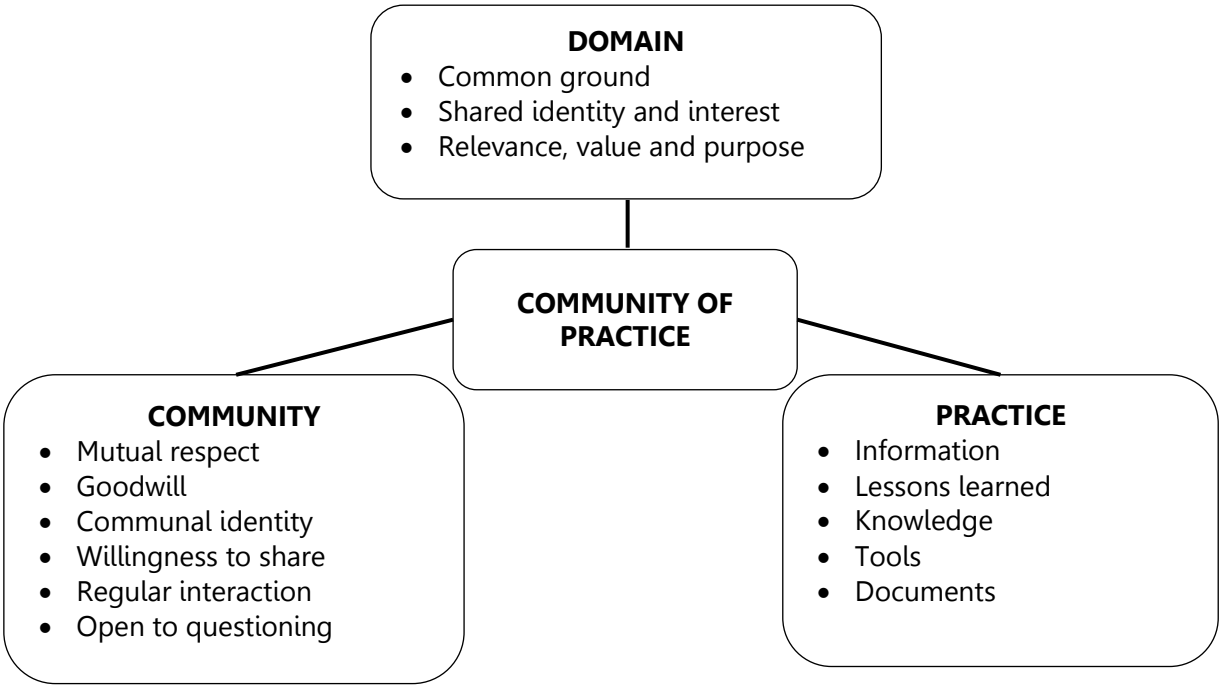

Figure 2: Aspects of a community of practice

Source: Lave & Wenger 2015

A domain is the issue that matter to all individual members subscribing to a community including a common ground, shared interests, identity, values, and purpose (Wenger, 2015). In this thesis, the domain is the usage of ETs in pedagogy. In this domain, ETs and LCs are issues that exhibit and bind the membership together in their pursuit of the same as goals of effective 21st century pedagogic approaches.

A practice involves the developed, shared and maintained knowledge including information, tools and documents (Wenger & Wenger, 2014). In this thesis, practice in resource-constrained environment is characterised by large classes, ineffective pedagogies and the limited ETs available. It should also be noted here that the knowledge and technologies vary from one environment to another. Indeed, this thesis is focused on resource-constrained environments where the skills and the technologies are not in abundance. Practices also include experiences and lessons learned by different practitioners at different levels (Bannister, 2015).

The community on the other hand are individuals that constitute the membership (Wenger & Wenger, 2015) that Individual members in a community know where and from whom to find information. The membership of the community in focus in this thesis are the educators engaged in curriculum development using the ETs available to them. The

purpose of a community in development of a practice is to share and discuss best practices, design communal solutions, mentor practitioners and advance knowledge and effective implementation of evidence based best practices (Goodyear & Casey, 2015). However, commitment and collaboration among the membership becomes vital because excellence in performance is a credit to all those involved.

These three elements potentially create an environment that gives a clear focus on a CoP as an environment usable for accelerated membership and increased benefit in as far as proficiency development is concerned. It also gives practitioners joining such a community opportunity to envisage carrying out tasks together and supporting each other with the aim of perfection of performance of practice as they engage collaboratively. CoPs are different from other groupings in terms of consistency and establishment of a criterion for acceptable performance in a practice, mentorship and contribution back to the community (Wenger, 2015). Individuals, who attain the required experiences, should be ready and willing to share their newly acquired status through mentoring others and in this way, there is continuity and sustainability of a community.

A CoP focuses on the social fabric in a practice that includes mutual respect, communal identity, and willingness to share resources valuable to a community, goodwill to members, regular interaction and among the membership (Wenger, McDermott, & Snyder, 2002). Attributes of a CoP include mutual engagement, joint enterprise, and repertoire sharing (Wenger, 2015). Mutual engagement refers to the membership of a community interacting with one another during going about duties to clarify, define and change performance. This implies that it is not just a matter of working together, but going beyond to informal sessions where collegial discussions related to implications of what they go through during their daily routines and how it affects their practice. Joint enterprise refers to the membership of a community agreeing in principle to work together on the experiences and challenges they have in the process of practice. This implies that practitioners as colleagues are ready to share the experiences they attain in practice otherwise this may not take place unless individual practitioners are ready to open. Repertoire sharing refers to practitioners coming up with methods, tools, techniques, stories and behaviour patterns in common that they can refer to when need arises either immediately or later in a practice. This implies that with a CoP in place,

proficiency development is easy because practitioners as individual members have somewhere to begin in problem solving instead of reinventing the wheel.

In a CoP, the model for engaged practitioner participants and partnership calls for group problem solving, reflection and support for a flexible practice environment (Bannister, 2015). The focus here is on the collaboration between practitioners in brainstorming ideas, solving problems and supporting each other both formally and informally. Approaches in a CoP enhance the dynamic interplay of community and network processes that practitioners identify and engage in (Wenger, Trayner, & de Laat, 2011). Through this process, individual practitioners can learn and gain a lot through actively participating in community practices and processes. The community also benefits as it claims the knowledge of individual practitioners belonging to it. Tapping on such approaches, induction of beginners and innovation of the experienced becomes easier. These approaches could also form the basis for practitioners to develop proficiencies in going about a practice.

CoP platforms reflect the double nature of management of knowledge and thus promoting an interactive learning environment (Jagasia, Baul, & Mallik, 2015). Whereas in traditional learning structures, learning of a practice relates to competition among individuals, in a CoP success depends on the membership passion for the practice and the support they offer each other therein. In a CoP learning focuses on continuous fostering for effectiveness, personal energies and the relationships for maximization (Wenger, 2015), but not competition relating to who is doing better than the other is. Traditional learning structures however, require individual practitioners to learn all that on the menu with no consideration of where their passion is. The implication here could be that practitioners become more interested in participating in the community activities since they are mandatory as 21st century practitioners need to have a good level of proficiency in practice. These approaches could contribute to a more ideal process to proficiency development in a practice.

Active involvement in a CoP offers membership access to learning by doing, including modelling and mentorship (Burns & Lawrie, 2015). This has a basis on engagements in a CoP including access to expertise and learning by doing through contexts. In a CoP, practitioners get encouraged to be good at their practice to get recognition from the

community as excelling performers. In this way, what and who they recommend as experienced is more authentic than those not recommended by the community. CoPs are platforms used for sharing knowledge and experiences, networking and turning knowledge from research into practice (Rosenberg, 2012). This platform is a combination of practitioner knowledge and experience with published information. The platform also supports evidence based practice and is open to both explicit and tacit knowledge gained through individual experiences. Figure 3 illustrates the benefits of engagement in a CoP.

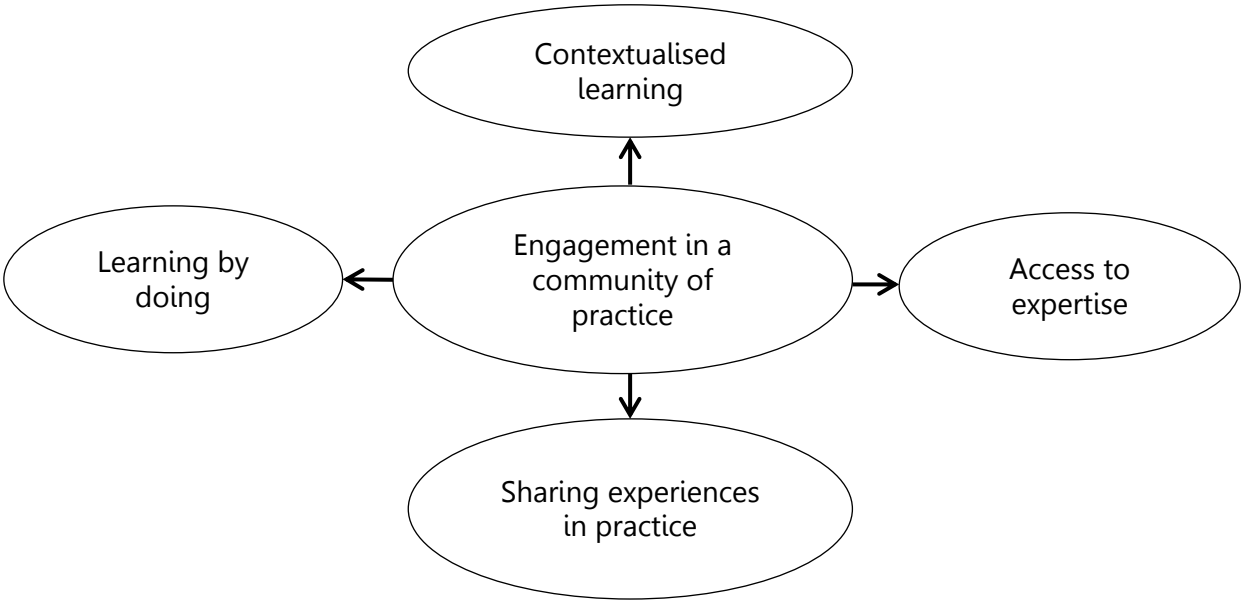

Figure 3: Benefits of involving in a community of practice

Source: Wenger, 2015

In a community, no practitioner claims to be an island and indeed in most practices, there comes a time in a practice when practitioners need some other practitioner for help in challenges encountered in daily routines of practice (Cheng, 2015). It does not matter the level of practice but generally in a CoP, practitioners go through similar patterns like encountering a problem, seeking certain information and experiences, discussing a development, mapping knowledge and practice (Wenger, 2015). With an activated and well led CoP, individual practitioners do not need to necessarily go far to get issues sorted as on many occasions, they can look internally or this should be the beginning; after-all a CoP stewards' knowledge on behalf of an institution (Murillo, 2011). It is here where individual practitioners need to develop good interpersonal attributes in a practice because as practitioners, there is need to know when one will need to approach some other practitioner for help including searching online for a YouTube video or sending

emails. With this mutual interdependence, the process of proficiency development is open to all the membership.

In a CoP, there can be modelling of skills development and practice enhancement harnesses through collaboration (Allen, Seaman, Lederman, & Jaschik, 2012). CoPs come with benefits such as allowing a blend of workplace-based supports for practitioners that ensures application of newly acquired knowledge and skills in real settings. Such support exists because members are able and ready to share experiences as colleagues. The support of this nature has potential to practitioner learning and paves way for internalization and application of the acquired skills for planning and using pedagogically sound approaches (Bell & Mladenovic, 2015). In a CoP, collaboration is said to be highly developed as a dynamic process where practitioners volunteer to come together to create something truly unique and creative. In collaboration, the process is democratic (Robb, 2012). Participants in a CoP engage in collaboration processes commonly interdependent making the outcome a pleasing blend that fits together well. Individual participants in collaboration however, should be able to work together, as equals, for the greater good.

A CoP being a social arena benefitting from it is largely from active participation and sharing of experience (Buckley, Jakovljevic, Bushney, & Majewski, 2013). The interaction, collaboration and engagement involved in a practice and the ability to undertake complex activities through cooperation therefore bind members together and enable a foundation for building relationships and gaining trust. Navigation in these activities is increasingly a decision practitioners make, but it is imperative that such activities are availed to enable learning on practice. Therefore, a proficiency development process can no longer just be about exposure to concepts in a one-time workshop (O'Hara, Pritchard, Huang, & Pella, 2013). Instead, in an era of accountability, proficiency development requires a fundamental change in practice enabled through learning from and with others in a CoP.

3.3.0 Situated learning

Situated learning (SL) is a knowledge acquisition theory, which asserts that learning normally occurs as a function of the activity, context and culture (Lave & Wenger, 1991; Wenger & Wenger, 2014). SL occurs when learning activities are embedded in real-world contexts and allow practitioners to become members of a CoP (Wenger & Wenger, 2014). In this case, real-world contexts refer to large classes in resource-constrained contexts. SL appropriated describes adult learning processes as it focuses on the content, context,

participation and the community in which the learning takes place. The content focuses on modelling experiences that enable practitioners to gain higher order thinking skills. The context refers to the circumstances and facts surrounding the practice environment. Participation is the active and collective engagement in problem solving in a practice. Learning a practice involves critical focus on social interaction through which practitioners become actively involved in a CoP, which embodies beliefs, and behaviours to be acquired (Wenger & Snyder, 2000). SL focuses on how individuals acquire proficiencies in a practice through social co-participation.

SL opportunities are availed and drawn on through personal learning networks (PLNs). A PLN is a group of people with whom one engages with as they learn a practice (Anderson, 2010). Damarin (1993) describes learning networks as those in which information processing is possible through hearing, reasoning, visualization, and reflection so individuals tend to learn more easily by having models to go by and emulate. SL therefore provides for making learning environments as comfortable as possible as it gives those in the learning position the feeling of a comfortable environment that allows them to feel and freely learn with others. SL has been used to evaluate learning in constructivist learning environments (Cotner, Loper, Walker, & Brooks, 2013). The finding proves that with SL, content is presented differently, where those intended to learn need to actively engage and learn as they observe the model. In SL, the teacher serves as a coach and there is metacognition to enable learners to reflect as part of the learning process.

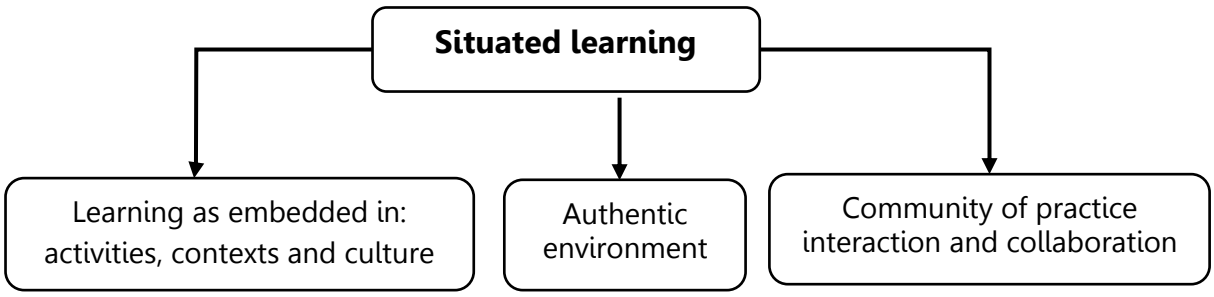

Figure 4: Situated learning attributes

Source: Cotner, Loper, Walker, & Brooks(2013)

Figure 4 indicates a SL environment as positioned in activities, contexts and culture and the learning process also embedded in authentic environments. SL environments are enabled through participation in the activities, specified contexts and acceptance of cultural values among those interacting and collaborating in a community. SL

environments therefore call for observation, discussion of problems and mentorship in professional relationship and provision of feedback (Fuller, 2007) in a far as performance is concerned. Based on SL, PLNs develop through interaction, collaboration and engagement among individuals from both within and without an environment. However, this model fails to explicitly explain how individual attitudes contribute to SL.

In SL environments, knowledge co-produced between actors and therefore engagement between parties in a CoP is critical (Damarin, 1996). Even with engagement in the same environment and tools, individuals are bound to learn different skills and knowledge. Damarin describes SL by using the metaphor of the distinction between travellers and tourists. Travellers and tourists visit the same city but get different experiences. The tourists' goals are naturally to see all the sights, learn their names, make and collect fabulous pictures, eat the foods, and observe the rituals of the city. Travellers, on the other hand, seek to understand the city, to know and live briefly among the people, to understand the languages, both verbal and non-verbal, and to participate in the rituals of the city. At the end of the visit in the same environment, tourists see more monuments, but the travellers know more how to use the public transportation to get their way. The implication here is that participants in a SL environment get different experiences as they participate in the community based on the preferred purposes.

SL relates to real work environments that embed activities, contexts and culture that shape relationships between practitioners (Schols, 2012). Existence of professional relations among practitioners in similar environments can therefore be used to jumpstart SL in a context. Wenger emphasizes the importance of context and setting in a landscape of practice (Wenger, 2015) clarifying on collaboration to gain a better understanding of practice. This implies that SL can enable practitioners to learn on the job to perfect their practice as they engage in normal routines in collaboration with others as colleagues. This also means that SL activities infuse routine practices and may not therefore demand extra dedication to learn. However, for all these to be effective, membership needs to be open, accommodative and positive to criticism as they perform their daily routines.

SL was also used in a study that sought to establish design principles for mobile learning environments using several ETs (Herrington, Herrington, & Mantei, 2009). In this, study findings focused on practitioners personally exploring alternative viewpoints that comprise such learning environments. The findings also pointed to collaboration among

practitioners and knowledge authentication in a context. These findings were in the context in which was a resource-rich in terms of technologies and skills. It was the wish of this researcher to find out whether SL applied in a resource-constrained context can lead to similar findings most especially in a proficiency development process in teaching with technologies.

The benefit of SL environment in proficiency development is going beyond the once-off short courses and workshops although these are beneficial. Short courses and workshops of course spark off the development of PLNs in practice environments as individuals meet and engage with others in the neighbourhood and beyond. Anderson (2010) asserts that during the short courses and workshops, enthusiasts begin formations, which eventually are joined and followed by others within proximity, meeting together informally to talk about issues and co-produce knowledge thus the initiation of networks. These networks grow through the influence of activities, contexts and cultures operational in a specified environment. In this process, practitioners develop the capacity to work together, discuss problems, share experiences and provide support for one another with a view to improving their skills in a practice. Nevertheless, the once off short courses and workshops may not necessarily offer ample time for internalizing and accommodating daily routine chores (Cheng, 2015).

SL practices in an environment are influenced by socio-cultural practices, tools, power and role relations, professional etiquettes that influence the shaping of perspective of practitioners towards a practice (Jonassen & Land, 2012). SL environments therefore present such attributes for educators to exploit as they go about their practice. These attributes guide practitioners in professional relationships and identification of who has which experience and who can take lead in initiating a mentorship process. In this way, SL environments guide educators in development of proficiencies through actively participating in real practice environments, and addressing real problems in natural environments (Wenger, 2015). Institutional frameworks avail strategies that help in developing PLNs that involve sharing ideas and resources, collaboration, and expertise in different ways. The focus of a SL environment is to view individual practitioner engagement in practice as a social process occurring through individuals interacting and co-producing information and experiences as they relate to each other in daily routines of practice.

Priority emphasis in SL is on the contexts in which the practitioner thinking, doing, participating, and learning takes place (Wenger, 2015). SL practices takes place in contexts where practitioners acquire knowledge and skills in a practice, which is applied either immediately or in future. In addition, there is a presumption that best learned knowledge is in practice contexts that reflect how the same knowledge is obtained and applied in everyday situations (Wenger, 2015; Wenger, 2007). With this approach, therefore individual practitioners can engage with learning networks that guide developing professional skills in a practice. The context of such a practice influences reflection on where and how acquired knowledge is applicable either immediately or later. The implication of this is that SL guides educators to reflect on what they are doing and how they feel it should be done, which leads to appreciating various approaches to practice.

SL informs design of activities that can guide practitioners in the growth of deep, collective knowledge base (Wenger, Trayner, & de Laat, 2011). This means that in the process of SL, individual practitioners who are keen and curious in the activities quickly garner the kind of knowledge and skills they need from such activities and experiences. This is because the content of activities provides opportunity for free questioning to understand processes and their implications in daily routines and practices. Such content presents problem solving scenarios (Hung & Yeh, 2013) to the practitioners, engaging educators in critical thinking and analysis as they attempt to solve a given practice problem at hand. Such environments enable modelling and scaffolding processes to take place. They therefore setup practitioners in situations that challenge a practitioner to think, work together and get solutions out of such problems. Once a practitioner observes how others sort out a scenario, there is a likelihood that they take the same procedure to sort it when it happens again whether immediately or in future.

Table 1 presents generic attributes to a SL environment and their challenges related to their attainment. The attributes include diversity, exploration, diversity composition, interactivity, facilitation and collaboration among others (Herrington, 2015). These attributes put in place a context for an environment that enhances building of relationships and networks that enable interactions between practitioners in a CoP. With such attributes, existent in an environment, they enable practitioners to identify where to ask for information and seek support in a practice environment through both formal and informal ways of practice (Herrington, Herrington, & Mantei, 2009). However, related

challenges include inappropriate tasks and the general lack of mutual understanding among practitioners. The essence here is that through SL, practitioners in a practice have exposure to multi-disciplinary approaches useful in development of proficiencies. Working within a multidisciplinary environment boosts practice learning as individuals intrinsically compare themselves with others.

Table 1: Attributes to situated learning and their related challenges in a CoP

Attributes	**Challenges**
Collaboration	Limited opportunities
Interaction	Lack of mutual understanding
Exploration	Limited engaging opportunities
Higher order skills	Tasks are not appropriate
Multidisciplinary	Methodology variations
Facilitation	Limited expertise
Diversity composition	Fewer models to look up to

Source: Fuller, 2007

SL practices take place in both informal and formal settings; and sometimes may occur without the practitioner realizing that learning is taking place or without making a conscious and deliberate decision to learn (Harvey, Ensor, Garside, Woodend, & Carlile, 2013). Practitioners although highly autonomous in their execution of duties, interact in formal and informal environments when they get opportunity. With a focus on this kind of environments, SL occurs within social contexts, there is an emphasis on presentation of knowledge needs in contexts that support problem solving in a practice environment. The emphasis here are the kinds of attributes that one must exhibit while operating in a SL environment.

3.3.1 Activities in a community of practice intended for situated learning

Provision of appropriate content is a basis for SL (Sharples, et al., 2015). The design of content meant to provide SL opportunities is in such a way that it puts emphasis on modelling experiences that enable practitioners to develop higher-order thinking processes rather than the acquisition of the facts independent of the real lives. This takes the form of educators modelling activities while those who need to learn carefully observe based on their experiences and sometimes learn by doing. Content meant to provide practitioners' experiences need to involve observation and base on modelling from within

the group. This enable practitioners to emulate the values and behaviours liked and discard the disliked from such observation. Cheng (2015) asserts that, content aimed at developing proficiency is in the practical process that involves reflective thinking about the same process.

Activities intended for enhanced proficiency development must be authentic to provide viable learning experiences (Herrington, 2015). Authentic refers to the real content knowledge, applicable in a related setting either immediately or soon (Herrington, Reeves, & Oliver, 2010). Authenticity of content enables practitioners to get skills which are either usable immediately or in future of their careers and practices. This is because practitioners can observe others already experienced in the practice. In addition, authentic content ensures that knowledge and skills attained through SL practices could be transferable to other related environments. This implies knowledge and skills relating to an environment can be applicable to similar practice environments. Embedded in life and daily routines of practitioners, this content simulates events that engage the practitioner.

A perspective of SL guides the location of content into activities that put practitioners in an environment where real practice problems are encountered (Goodyear & Casey, 2015). In this way, through observation in such scenarios, practitioners can make their own meanings of why certain things happen, a useful meaning-making process in practice. This means that SL practices encourage locating content in settings of practice that shape the thinking and doing processes to accomplish knowledge and skill tasks through mentorship (Murillo, 2011; Bell & Mladenovic, 2015). The content therefore entails activities aimed at mentorship, practical problems through modelling, collaboration, collegial support and active participation at the workplace (Wenger & Wenger, 2014). However, for this to take place, there is need for trust and confidence in the knowledgeability of the membership regarding a specified practice.

By making content part of the daily routine, emphasis is on enabling practitioners to engage in dialogue and negotiation of meaning of experiences, and framing them in terms of issues and concerns of collaboration. In SL, locating content strategically ensures involvement in activities, and afterwards going through moments of dialogue regarding actions and their implications to practice. In this way, practitioners can think about perfecting and concretizing practice through collaborative reflections. However, when the outcomes of dialogue and reflection deviate from one's intended plans and objectives, of

course they do not need to concretise it (Pharo, Davison, McGregor, Warr, & Brown, 2014). This provides opportunities for individual practitioners to work together in investigating problem situations, and making experiences applicable to approaches in a practice. The focus here is on the application rather than retention of knowledge and skills attained from content presented in a session related to a practice as the mark of successful learning.

3.3.2 Contexts in which situated learning is enabled

Context in a SL environment refers to the circumstances and facts that surround the environment in a practice (Cheng, 2015). SL environments focus on the context in which the learning takes place. Contexts for activities aimed at SL are vital because they are environments sensitive to the tasks practitioners must complete for consideration as successful in mastery of a practice. The context in operationalizing a practice embeds the values, beliefs, and environmental cues by which practitioners gain mastery of the process of a practice (Wenger, 2015). Contexts imply drawing out and using experiences of educators as practitioners as a means of engaging with and intervening in the social and material environment. Individual practitioners in a context of a practice hold powers to approve who has what category of knowledge relating to that practice and other practitioners. It therefore implies that for successful development of proficiency in a practice membership recognises powers of who knows what on either attempt to effectively operate in a practice. Nonetheless, it is not always true that approval by such powers is the only way of deciding legitimate knowledge as this landscape of practice comes with lots of politics at play (Wenger & Wenger, 2014).

Contexts intended for enhanced proficiency development does not mean just bringing live problem issues to the practice environment, but gaining a re-experience of events from multiple perspectives (Al-Eraky, Donkers, Wajid, & Van Merrienboer, 2015). Contexts therefore draw from the multiple perspectives where practitioner experiences contribute to the bigger picture of ideal practice. Such contextualized practice learning provides the setting for practitioners to explore personal and other people's experiences in the real practice and problem-solving situations. This means that activities meant to enhance a practice are based on the context that enable practitioners to explore multiple voices that come through, with some voices probably saying things do not work, some advising for alternatives and some to the worst saying it is not worth the time. In terms of large class

pedagogy and emerging technology usage, contexts need to provide for some technologies to begin with.

In developing contexts, there are resource constraints that force educators into struggling to develop proficiency in transformative pedagogies that involve usage of ETs (Hénard & Roseveare, 2012). Even when these contexts are sometimes seen as providing opportunities to exploit low cost and ubiquitous technologies (Ng'ambi & Bozalek, 2015), the technologies themselves are limited. Such limitations depict the environment in which educator practitioners with different values and beliefs interact and collaborate in the process of practice. This context enables educator practitioners to share similar experiences related to the technologies they have been exposed to. Even when this context should ideally boost the proficiency of an individual in a practice, the limiting constraints in the context hinder the ability to gain knowledge (Ashford-Rowe, Herrington, & Brown, 2014). Activities meant for development of proficiency in pedagogy using ETs and held in such contexts therefore require collective action, collaboration, action and involvement in a sociocultural phenomenon rather than individual practitioners acquiring general information from a decontextualized body of knowledge (Floding & Swier, 2012).

In SL, context models experience in ways that practitioners create opportunities to live activity in real-world practice challenge, knowledge and skills and therefore getting theories transferred into practice (Kreber, 2013). SL contexts aim at allowing individual practitioners to create meaning from participation in the real activities of daily routines within that same practice (Mak & Pun, 2015). This has a basis for relating SL to the needs and concerns of practitioner value systems. This implies that contexts which enable practitioners to deal with experiences that become useful in their creation of meaning most especially related to the situations encountered in daily practice become more proficient.

3.3.3 Active participation and enabling of situated learning

Participation seen as active and considered a vital process in SL environments includes practitioners actively and collaboratively working together to solve problems related to practice in everyday life circumstances (Hung & Yeh, 2013). Through active participation in activities for a given practice, SL gets an enhancement. Participation is an approach that enables individual to be included and have a greater say in how they should go about

practice in ways that are effective to them. Through active participation, there is problem identification and consensus agreement on solutions for the benefit of practitioners who actively take part in the identification of the issues at hand. Active participation entails meaningful engagement in activities related to a practice which is vital in the process of proficiency development.

Through active participation practitioners interchange ideas, attempt to solve problems, and actively engage with each other as materials of learning a practice (Wenger & Wenger, 2015). In this way, active participation enables practitioners to be able to be proactive in identifying the uniqueness of practice and ways of effectively going around problematic scenarios by asking for help and other unplanned ways of discovery without asking including just getting inspired. Active participation ideally involves a focus on practitioners and how they are welcomed aboard the practice; how comfortable they become and thus how much they contribute. This implies that when practitioners receive an unwelcome attitude in a practice, they quickly become inactive as far as participation is concerned, which inhibits learning of that same practice. Active participation is intentionally organised and increases collegial welcome, perceived as telling others that "*you are welcome and feel at home*", "*you have our support in this practice*". Providing a welcoming environment determines the amount and level of participation in the activities of the community.

Bannister (2015) explains that active social interaction among practitioners takes a heavy focus in SL environments. There is a focus on a practitioner making a deliberate move to join and actively participate in a practice, with analysis and reflection to share their unspoken understandings and create shared knowledge from experiences. In active participation, individual practitioners collaboratively work in teams and therefore benefit from the familiarity the team provides overtime, which enhances group membership. This implies that promoting active participation takes time to be recognized and materialize in SL practices. Actively participating means that solutions get easier in acceptance and ownership by the membership, as participants feel accountable for what they produce, which in a way improves allegiance to local solutions.

Active participation draws on individual experiences, critical reflection, abstract conceptualisation and active experimentation of available ideas in a practice.

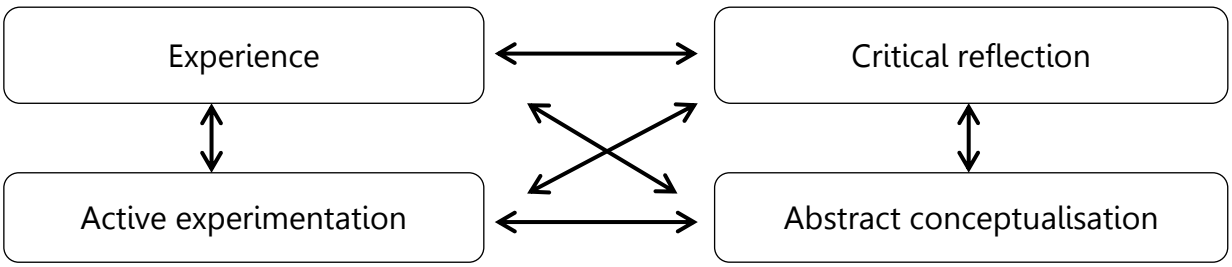

Figure 5: Interactive principles in situated learning

Source: Orey 2010

Figure 5 is a model from Orey (2010), which describes how active participation in a situated practice-learning environment comes from a nonlinear process. This process occurs when an individual practitioner learns from within a group. Individual practitioners in a group draw from experiences, which allows active experimentation of ideas. In this process, there is also conceptualization of what would have been abstract through collective critical reflections. Active participation in this process facilitates a rigorous action and calls for refinement of the known and obvious ideas based on individual experiences. This kind of participation is not necessarily linear as it can start at any node. Nonetheless, for the process to be complete, all the nodes need to be present. Anyhow, it represents the non-linear approach to activities that happen in the process of SL.

Active participation allows practitioners to engage in SL through drawing on other's experiences, experimentation and critical reflections (O'Hara, Pritchard, Huang, & Pella, 2013). However, actively learning from each other's experiences varies from individual practitioner to another even when such practitioners perform the same roles in practice. The interactive processes in a community enhance development of proficiency through learning from and with each other. The more realized process of proficiency development is the interwoven relationship between experience, critical reflection, active experimentation and abstract conceptualization of phenomena, which is determined by the group dynamics at hand. Because such dynamics in every community are never constant, there are no expected linear moves in the relationship between the concepts in SL of a practice.

3.3.4 Community environment and situated learning

A community is a social unit that shares common values in a practice; it is a group within which individual practitioners create and negotiate meaning of the situation in practice (Wenger & Wenger, 2015). Communities influence SL because they determine and

promote valued norms. Indeed, in a community, individuals struggle to be associated with the valued attributes. Communities provide practitioners with a platform for collaborative engagement in a practice through interpreting, reflecting, and forming meanings of the practice (Mor, Ferguson, & Wasson, 2015). In this way, there is sharing of perspectives from categories of practitioners implying the passing on of the most valued and effective attributes of practice. This means that a community provides a platform for sharing of experiences through action, as other practitioners are there to help one put together the meaning of the experiences. One attribute of a community is the diversity of experiences that can be shared in a practice.

A community provides a forum for dialogue, negotiation and discussion for practitioners as to what is working and not working and can be documented and transformed into functional knowledge for that specific community (Wenger & Wenger, 2015). In these ways, individuals engaged in community practices develop more confidence in the same practices. This confidence is instilled by the community membership as they dialogue, negotiate and approve of what has been done and how. Wenger further asserts that a community in this case does not necessarily imply co-presence, a well-defined identifiable group, or socially visible boundaries. This is the reason why borders in a practice are flexible and dynamic, implying that they are not made of an iron curtain, but are based on motivation and commitment for a specified community activity. Communities are accommodative, thereby providing a platform that allows free entry and exit. The implication here is that a community environment provides practitioners a platform to voluntarily participate and share personal understanding of the events they perform. Such sharing is what inspires and motivates others to eventually contribute to the process of enhanced proficiency development in a practice.

Communities provide the setting for social interaction needed by practitioners to engage in dialogue and see the various diverse perspectives on issues of mutual interest (Lave & Wenger, 1991; Gherardi & Perrota, 2014). The availability of diverse perspectives within a community makes a practice interesting and concrete since individuals must weigh the multiple perspectives. A community therefore provides the stewardship for the body of knowledge as created and valued by the membership (Rosenberg, 2012). Otherwise, without a community, practitioners having new ideas and actively participating in an activity for the first time would not be having a point of entry. A community provides the

cultural knowledge through which new members learn to perceive, interpret, and communicate experience through interaction with other members (Murillo, 2011). This implies that the community provides mentorship, modelling, apprenticeship and scaffolding of valued and cherished attributes of a practice that are worth passing to the next generations of practitioners.

A community is ideally a platform that caters for and deals with the dynamics of individual practitioners in a practice and sieves opinions to get more refined knowledge (Jakovljevic, Buckley, & Bushney, 2013) and therefore contributes to ideal knowledge. The practice here is that a community has the mandate to approve one's claimed knowledgeability as a counterbalance of individual practitioners. For a community to consider one as knowledgeable in a practice, one requires to give attention to those members already experienced and observe carefully, remembering the observed behaviour and having the ability to replicate the behaviour, and a motivation to act the same way (Wenger, Trayner, & de Laat, 2011). In these ways, communities are supposedly platforms for displaying the known and approved attributes by the membership collaboratively and the procedures therein contribute to proficiency in practice.

3.4.0 Summary of chapter three

This chapter presented the theoretical framework, detailing the mean of CoPs and a comprehensive analysis of what takes place in a CoP. The chapter has also presented detailed related to SL and how it takes place in a community. The content, context, active participation and community are detailed with their implications on the aspects which a specified community is focused on addressing. From that detailed within each group of educators, effective delivery of instruction using technologies as a common theme can bring some of them together. As they come together, they build trust among themselves to share the knowledge they have as individuals and thereby develop shared practice and collective intelligence. The next chapter (four) is the process of legitimate peripheral participation.

CHAPTER FOUR: LEGITIMATE PERIPHERAL PARTICIPATION

'Rather than asking what kind of cognitive processes and conceptual structures are involved, they ask what kinds of social engagements provide the proper context for learning to take place'. William, F. Hanks 1998

4.1.0 Introduction

This chapter describes the process of legitimate peripheral participation and pedagogical integration of ETs as a practice.

4.2.0 The process of legitimate peripheral participation

Legitimate peripheral participation (LPP) is a description of how individuals considered as new (beginners) become more experienced and eventually considered experts (mature practitioners) in a practice (Lave & Wenger, 1991). SL takes the process of LPP, happening through collaboration, interaction and engagement with individuals already experienced in a practice. LPP begins with the assignment of easier engagement tasks to beginners as they learn to do the more difficult ones. In this way, the beginners get an environment in which they can learn from the experienced through observation, modelling and emulation.

Used as a concept, legitimate in this thesis refers to early career educators as beginning practitioners of a CoP that have not acquired the required competence to be more experienced practitioners. This means therefore that the beginning practitioners are not necessarily new members to the practice except that they are making their initial entry into a practice as beginners. Peripheral implies that the beginning practitioners start at the edge of the social learning environment as they negotiate their way inwards; and participation indicates learning through practicing (Voogt, Fisser, Pareja Roblin, Tondeur, & van Braak, 2013). Within the process of legitimate peripheral participation, a beginner moves from the periphery of community to the centre, and becomes more active, engaged within the culture, and hence assumes the role of experienced practitioners. Beginners also must go about duties as they are guided and in collaboration with more experienced colleagues.

Although Lave and Wenger use the word peripheral, they clarify that there is no real centre as the loci always moves around depending on the level of commitment and interest (Lave & Wenger, 1991). Indeed, often Lave and Wenger use the term that also refers to the movement around the centre (centripetal). This implies that in a CoP both the beginners and the more experienced practitioners need each other as they work in complementary relationships. This is because beginning practitioners cannot easily transit

to experienced practitioners in a community without mentorship from more experienced practitioners. This lead to the assertion that there is no community that can survive without beginners lest it becomes extinct (Wenger, Trayner, & de Laat, 2011). Therefore, there is a balance of power relation between beginners and the more experienced in the process of legitimate peripheral participation. Figure 6 is an illustration of the LPP process.

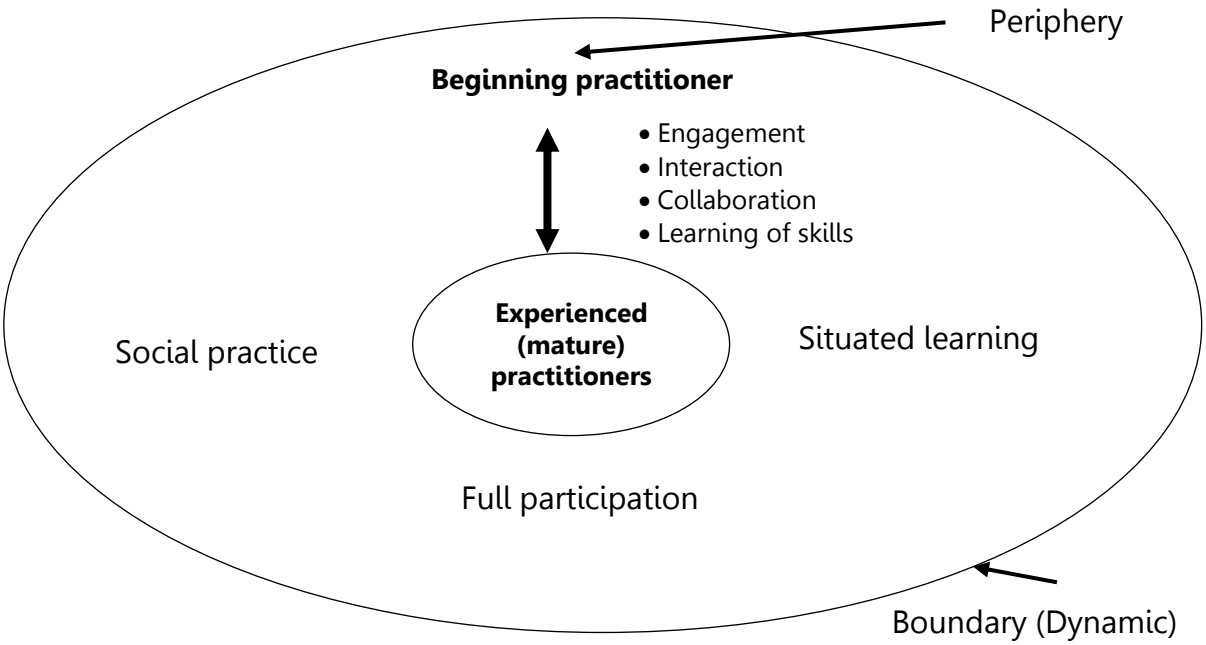

Figure 6: Legitimate peripheral participation
Source: Atherton 2013

Figure 6 is the process of LPP that enables beginning practitioners to start participation in community activities from the periphery as beginners, moving to the centre as they gain experience and eventually becoming experienced (Atherton, 2013). As beginning practitioners become more active and engaged within the practice, they eventually assume the role of experienced, technically referred to as mature practitioners (Wenger & Wenger, 2015). The journey from beginner to mature practitioners happens when one fully participates in a social practice, attained through engagement, interaction and collaboration. The process of a beginning practitioner moving from the periphery to the centre is not a once off, it keeps evolving if one is active in a practice. This means that membership of an individual to a community involves making several trips to and from the peripherals to the centre. Beginning practitioners make steps towards active participation from the peripheral, but over time are drawn inwards towards the centre and become more engaged and more complex (Floding & Swier, 2012).

LPP is an apprenticeship model where allowance is granted to the beginning practitioner to initially undertake basic tasks and as they become more experienced, they are given tasks that are more complicated until they fully participate and become practitioners in a practice (Wenger, 2007). The premise here is that beginning practitioners actively engage in a practice as more experienced ones guide them and eventually, the beginner becomes more experienced themselves. LPP takes place in an authentic environment in which practitioners acquire knowledge that can be applied in a related environment either immediately or in future (Herrington, Reeves, & Oliver, 2010). In LPP, authentic learning occurs when learning includes the uses of inventive and realistic tasks that provide opportunities for complex collaborative activities. Implementing authentic learning experiences meant for enhancing LPP requires more dedicated time and effort than the lecture and discussion delivery models (Herrington, 2015) as usually is the case in pedagogic processes.

LPP leads to gradual construction of practitioner identity and a practice in a shared career because it creates common grounds and a sense of common identity (Schols, 2012) between the beginners and the more experienced membership. The different specializations and levels of experience in a shared career avails the chance to draw on each other's experience and work together for a common cause (Floding & Swier, 2012). This eventually provides opportunities for beginning practitioners to acquire experience and share knowledge and skills through mentorship and active participation in collaboration with more experienced practitioners. LPP enables beginning practitioners to initially take on the role of observers of the activities in a practice as the experienced ones model them. A key issue in LPP is scaffolding and assistance towards the beginning practitioners by more experienced practitioner peers to encourage greater and more skilled practice (Reeves & Reeves, 2015).

In the learning of a practice, some individual practitioners never make it to the centre and forever remain at the peripherals as the move to the centre depends on the level of commitment, interest and motivation (Gherardi & Perrota, 2014). It is therefore not automatic that the process of LPP leads everybody to the centre. LPP brings about multiple levels of participation (Wenger, Trayner, & de Laat, 2011) as presented in figure 7. Because involvement produces learning in multiple ways and an area of mutual, engagement has different levels of relevance even to practitioners performing the same

roles. Indeed, people usually move in and out of these categories and this confirms the metaphor of the sandpit.

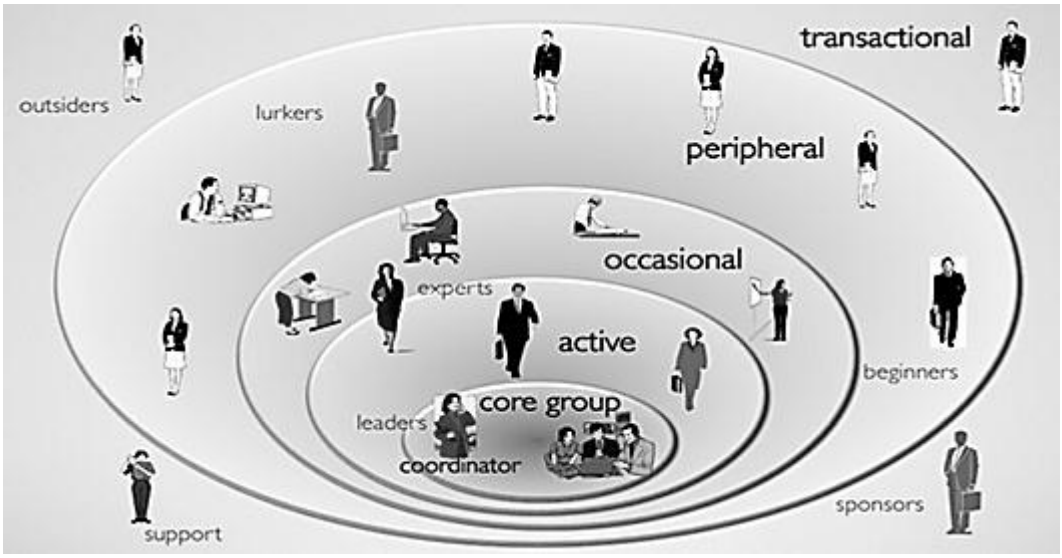

Figure 7: Levels of participation in a community
Source: Wenger 2015

From figure 7, there is an indication of different levels of participation from transactional all the way to being a member of the core group (Pharo, Davison, McGregor, Warr, & Brown, 2014). The transactional level- outside, is where one is aware of the main issue but is still looking at other people to start interaction. Then comes the peripheral level followed by those operating from the occasional level and finally active and core levels. As one gets to the active level, they become more and more immersed in the activities of a practice, finally forming a core group of participants in that practice. The degree and level of participation in a community differs depending on the individual expertise of members (Wenger & Wenger, 2015) . Those who display more expertise become involved in more activities with more difficulty and responsibility, and these are the ones at the centre either as leaders or coordinators or core group members.

4.3.0 Community of practice, situated learning and emerging technologies

The link between CoP, SL and LPP can be summarised through envisioning LCP related to using ETs in a CoP. The principles of an operational CoP focused on pedagogical integration of ETs are useful in helping educators learn from and with each other as they grapple with these challenges. Equally, SL principles involve social collaboration and interaction which can be used to enable practitioners to attain the necessary proficiency in the pedagogical integration of ETs.

Becoming involved in a CoP means experiencing issues within the context and seeing to believe in tangible ways (Burns & Lawrie, 2015). A proficiency development process through a CoP begins with individual educator practitioners accepting the position of unqualified and potential members. Actively being part of the activities, learning in a CoP being observational underlies attention, retention and motivation. SL, LPP and a CoP have attributes of social learning processes. Orey (2010) specifies diversity composition of a community, abstract conceptualisation and performance based approaches. Herrington (2015) argues for authentic environments and networking. Wenger argues for culture and values, induction, voluntary approaches and inspiration in a proficiency development process.

Development of proficiencies in pedagogical integration of ETs, should not focus learning the operation of technology equipment, instead it should focus on pedagogy that focuses on developing 21st century skills including critical thinking, problem solving, reasoning, analysis, interpretation and synthesizing information. For educators to engage in effective pedagogical integration of ETs, they must also engage with activities and environments that model and inspire them into attaining these skills. However, the pedagogic landscape in higher education is a complex practice that draws on extensive variety of resources, which are highly limited specifically in the SSA (Fry, Ketteridge, & Marshall, 2009). Although educators in higher education are usually the most highly qualified academics, they have difficulties in effectively operating in the landscape of pedagogy with technology for the first time. The requirement is therefore on observation, emulation and trying out of processes and keeping up to date with the developments as those already experienced support them. Effective operation in a complex landscape of pedagogy that integrates ETs is a result of a gradual process of collective actions in seeking for knowledge and perfecting practice, and thus making the go it alone (Geertsema, 2014) approach ineffective.

In the processes that emerge spontaneously, educators network and discuss common challenges in LCP. Arising out of learning in a CoP, the educators in focused on this domain display characteristics of processes more generally: developing structure, complexity in relationships, active boundaries, ongoing negotiation of identity and traditional meaning, (Wenger & Wenger, 2015). Figure 8 is therefore a combination of Lave and Wenger (1991), Orey (2010), and Herrington (2015) views related to the LCP

using ETs as a focus in a CoP. The flow of the attributes as follows a certain pattern where under content experiences come first and collaboration is at the end. Under the context, pedagogic skill comes first and knowledge mapping comes last. Under participation, regular interaction comes first and confidence building last. Under community, mutual respect is first and while expertise is at the end. The figure summarises the discussion that links principles of a CoP, SL practices, large class pedagogy and usage of ETs discussed so far. The constructs come from (Fuller, 2007; Orey, 2010; Wenger E. , 2015; Cotner, Loper, Walker, & Brooks, 2013).

<table>
<tr><th colspan="4">Situated learning environment</th></tr>
<tr><td>Activities
Experiences; Problem solving;
Authentic environment;
Technology tools;
Practices;
Communication;
Networking;
Innovations;
Creativity;
Shared interest;
Collaboration</td><td>Context
Pedagogic skill;
Requesting information
Large classes
Access to technologies
Diversity
Voluntary actions
Teamwork
Lessons learned
Knowledge mapping</td><td>Participation
Regular interaction;
Sharing experience;
Learning by doing;
Visiting;
Critical reflection;
Meetings;
Confidence building;
Insightful actions</td><td>Community
Mutual respect:
Culture & values;
Relationships;
Discussion of developments;
Shared repertoire
Mentorship;
Teamwork;
Leadership;
Collaboration;
Expertise</td></tr>
<tr><td colspan="4">Proficiency in pedagogical integration of emerging technologies</td></tr>
</table>

Figure 8: Summary of views from the literature

4.4.0 Summary of chapter four

This chapter described the process of legitimate peripheral participation in detail and how it helps people in a community to get along with others and understand that each participant may be at their own level but they contribute to the large whole. The chapter detailed the link between CoP, SL and pedagogical integration of ETs as a practice by describing the experiences, pedagogical skills, regular interaction and shared repertoire as having implications on the operationalization of the CoP. The next chapter (five) is the methodology.

CHAPTER FIVE: METHODOLOGY

"We need to make knowledge accidents happen on purpose, regularly, and most importantly with intent". Al Zollar 2014

5.1.0 Introduction

This chapter introduces educational design-based research (DBR) framework and explains why this thesis prefers calling it educational design research (EDR). The chapter also details the phases of the research.

5.2.0 Research methods

EDR researchers incorporate various methods if the systemic validity of the activity holds (Plomp, 2013; Kennedy-Clark, 2013). Therefore, predominantly qualitative research methods were appropriate in EDR frameworks because they were in alignment with the research questions. The thesis therefore predominantly used qualitative research methods. Miles, Huberman, & Saldaña (2014) asserts that qualitative research methods are useful because they offer the many advantages and provided the following:

- Synergy among respondents, as they built on each other's comments and ideas during discussions.
- The dynamic nature of the interview and group discussion process engaged participants more actively than is possible with surveys.
- The opportunity to probe as the researcher had opportunities to ask for clarification, enabling the researcher to reach beyond initial responses.
- Opportunity to observe record and interpret non-verbal communication as part of participant's feedback, which was valuable during interviews, discussions.
- Opportunity to engage respondents in play using exercises which led to overcoming the self-consciousness that inhibit spontaneous reactions and comments (Miles, Huberman, & Saldaña, 2014).

Qualitative methodologies were therefore used because they focus on data with its emphasis on lived experiences as fundamentally well suited for meaning individuals place on the events, processes and structures of their lives, and for connecting these meanings to the social world around them (Miles, Huberman, & Saldaña, 2014). This

systemic validity was present when the research and the inferences drawn from it informed the questions that motivated the thesis in the first place.

5.3.0 Design-based research framework

In 2003 a group of researchers from different institutions identified as the design-based research collective, formulated a set of guidelines called design-based research (DBR), that has been broadly used to inform research (Bedadur, 2013). DBR is a systematic but flexible methodology aimed at improving educational practices through iterative analysis, design, development, and implementation of an intervention based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories (Wang & Hannafin, 2005). DBR has a dual goal of finding a workable design for learning and of creating theories of learning while the design of the research itself undergoes changes. In DBR, the researcher should document why the design of research underwent the changes and the lessons learnt from the process. Al Zollar said, *in research there is need to make knowledge accidents happen on purpose, regularly, and most importantly with intent*. These happen when appropriate methodologies are employed in a research.

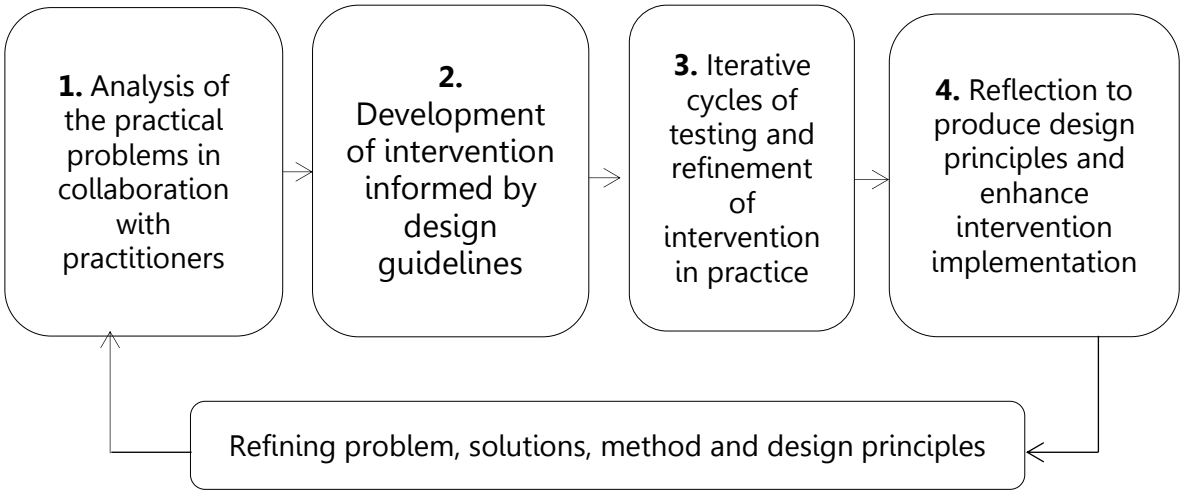

Figure 9: Phases of Design Based Research
Source: Adapted and modified: Herrington, McKenney, Reeves & Oliver (2007)

DBR has its focus on real world educational problems and the overall goal of improving learning environments and the learning processes (Herrington, Herrington, & Mantei, 2009). DBR as a methodological framework comprises operations, collection of multifaceted data and in-depth proving of theory to bridge the gap

between research and practice in education. Further characteristics of this framework are: situation in real educational contexts; focus on the design and testing of an intervention; use of mixed methodologies and multiple cycles that involve collaboration and partnership between researchers and practitioners; and resulting into design principles (Anderson & Shattuck, 2012; Kelly, 2013; Plomp, 2013).

Some other terminologies like design experiments, design research, development research, developmental research and formative research are also used to describe DBR (Wang & Hannafin, 2005). Plomp (2013) argues that DBR is like all systematic educational and instructional design processes that involve analysis, design, evaluation and revision activities iterated until a satisfying balance between intended ideas and their realization has been achieved.

5.4.0 Educational design research and its phases

From DBR, a generic model of DBR called educational design research (EDR) evolved (Mckenney & Reeves, 2012). There is a difference between design as a research framework in educational contexts and the process of design in human computer interactions (Kennedy-Clark, 2013) . Design as viewed from a research approach, is done in a context that values the creation of knowledge. Because of the focus of this framework on educational environments, this thesis therefore prefers to use the term EDR to avoid the confusion with DBR as used in fields like human computer interactions and computer science designs.

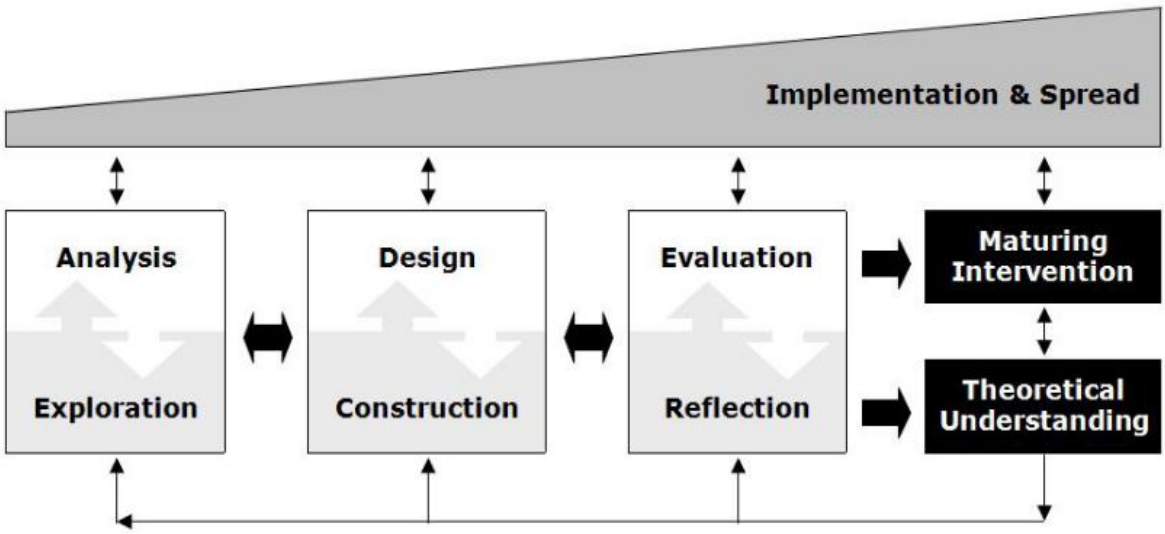

Figure 10: Educational Design research
Source: McKenney & Reeves 2012

It is ideal to get an introduction to the phases involved in EDR, divided into four distinct phases namely: analysis and exploration of a practical educational problem, design and construction of an intervention, evaluation of the intervention through reflection to produce refined principles as the intervention matures and one develops a theoretical understanding of issues. These all happen while the intervention is being implemented and spreads as illustrated in figure 10.

EDR is used here because it is a systematic but flexible framework aimed at improving specifically educational practices in real-world settings, and leading to contextually-sensitive design principles and theories (Kennedy-Clark, 2013). The focus of EDR is on enhancing the proficiency of educators in pedagogical integration of ETs available to educators for effective pedagogy in LCs. This is because EDR has had a strong influence of the educational technology research that addresses practical educator needs and gets the same practitioners involved, instead of treating them as research subjects (Anderson & Shattuck, 2012).

EDR is aligned with SL and specifically focuses on how individual educator practitioners learn in the practice contexts given an intervention (Amiel & Reeves, 2008). This therefore makes the EDR framework to blend well with SL theory as applied in this thesis because of its focus on development of proficiency in a practice. The EDR framework puts emphasis on how educators take advantage of SL opportunities in a CoP environment to learn how to use ETs for teaching in large classes. The focus of EDR on multi user environments also blends well with the principles of LPP as applied in this thesis because educators are not at the same level of expertise in this practice, some have more experience than others.

The usage of EDR frameworks aims at adding social value to educational technology research. Educational technology research has for long been focused on technologies and not the problems as faced by the educators who engage in usage of technology for teaching (Reeves & Reeves, 2015). How educators engage in this practice, the challenges they encounter and how they sort them out through interaction and collaboration are components of social architecture in focus. The process of writing this thesis involved the researcher working together with educators in a model CoP environment focused on pedagogical integration of ETs. Adding social value to education research is not an easy task however, as pedagogic usage of ETs in large

classes brings in a highly complex operation environment that calls for dynamism and proficiency development among educators as practitioners.

The use of EDR framework in this thesis enabled drawing from and sharing the most practical experiences in the practice and research (Tolboom & Kuiper, 2014) related to pedagogical integration of ETs. The framework allows for some individual experiences to be documented and benchmarked for either reuse in future or in similar environments. In this way, practitioners in each domain can have a starting point other than scratch. Furthermore, the EDR frameworks adopts the participation of educators as practitioners, by changing their role from research subjects to active stakeholders especially during their daily pedagogical routine using available ETs. In this way, educators feel more as participants and not subjects of the research process and therefore actively support and learnt from each other as they share experiences. It is clear from the explanation that EDR comes from DBR although EDR is clearly focused on educational issues.

5.4.1 Selection of educator participants

Because of the highly-situated nature of EDR, participants are central to an investigation (Herrington, McKenney, Reeves, & Oliver, 2007). EDR is not an activity that an individual researcher can conduct in isolation from practitioners (Reeves, 2006). For individual practitioners to be considered as participants, in a study of this magnitude, they must have some attributes including flexibility and sense of introspection (Brockbank & McGill, 2003; Beaty, 2011). In addition, for an educator to be selected as participants in this study, they needed to have had capacity to be open and responsive and to engage in meaningful interaction with others. A minimum four years' experience of consistent teaching at university was used as another parameter for the purposive selection of educator participants.

To build capacity in teaching with ICTs on the African continent, the University of Cape Town (UCT) designed a modular Postgraduate Diploma (PgDip) Educational Technology programme. Several educators from Makerere University graduated on this programme and about twelve of these are based at the College of Education and External Studies (CEES). Since I am based at this college too, it became easier for me to identify these educators. These were a target of this research as they were deemed to have gained sufficient experience from their exposure to technologies through the

programme and trying out of several technologies. This was another consideration for selection of an educator as a participant.

In addition, the primary basis for selection of a participant was their willingness to participate and a strong sense of motivation to teach LCs with using the available technologies. All the participants were vigilant, eager and willing to share their experiences and strategies in pedagogical integration of ETs. These are all attributes that promote vibrancy in the activities of a community and therefore helped in the selection of educators. Five educators were more consistent and active in taking part in the model CoP activities and fulfilled the preconditions for selection to participation. The five therefore formed the core participants from whom data was collected.

5.5.0 Data collection process

EDR permits the use of all and any types of data to reach an operative or effective design (Amiel & Reeves, 2008). Both quantitative and qualitative data were therefore collected. The use of qualitative methods data collection approach allows a more robust understanding of phenomena in EDR (Wang & Hannafin, 2005; Kennedy-Clark, 2013). In conformity with EDR framework principles of cycles of data collection, the data collection for this thesis was done in three iterations. A summary of cycles of data collection, numbers of participants and the activities of focus is presented in Table 2.

Table 2: Flow of activities, number of participants in data collection

Phase	Weeks	Participants	Activity
2013			Planning meetings
Jan-March 2014	12	112	Needs assessment survey
April-October 2014	20	7	First pilot of the CoP
November 2014	04	7	Initial data analysis
December 2014	04	7	Adjustment of design principles
January-June 2015	20	6	Second pilot of CoP
July-August 2015	08	6	Data analysis
September 2015	04	6	Adjustment of design principles
October-December 2015	12	5	Third pilot of CoP
January 2016	04	5	Data analysis
February 2016	04	5	Individual interviews
March-August	24	5	Data analysis

From Table 2, it is seen that the thesis development took place over a period of four years with planning meetings in 2013. A needs assessment survey was carried out in 2014. The findings of the needs assessment survey (Appendix II) and their details are for another study all together. What was focused on however, was those issues that helped to shape this study. Between April and October 2014, the first pilot of the CoP including theoretical presentations and practical demonstration of the pedagogical integration of ETs were effected. This was followed by the analysis of the initial data and adjustments in the initial design principles.

Between January and June 2015, the second pilot of the CoP was effected. Activities still included theoretical presentations and practical demonstration of the usage of ETs in pedagogy. This was also followed by the analysis of the second set of data obtained and adjustments in design principles. Between October and December 2015, there was a third pilot of the CoP. This time, the pilot of the CoP included more refined design principles in teaching LCs using ETs. This was followed by the analysis of the data collected. One-on-one interviews with the educators were held in February 2016.

5.5.1 Instruments and tools used in the data collection process

Online survey, observations, individual interviews and focused discussions were used for data collection. However, it should be stated here that most of the data analysed was qualitative. The online survey and its results (Appendix II) contained several questions on themes related to LCs and usage of ETs in pedagogy. An online survey allows the researcher to find out information such as facts, attitudes and opinions (Cohen, Manion, & Morrison, 2013). The survey therefore strengthened the focus on individual knowledge, skills and usage of a range of technologies that were at their disposal as they interacted.

Observation during the participation in activities were done with the use of an observation guide, Appendix III. An observation guide is a form prepared prior to data collection and defines the behaviour and situational features for observation and recording during the observation (Neuman, 2014). Observations focused on the attitude of educators, the confidence they exhibited and the relationships that were developing among the educators while engaged in the practical process of curriculum design and development and integrating the technologies they had been exposed to.

More observations were further done during the focused discussions and even personal interviews, when the participants explained their personal experiences.

Through focused discussions, participants revealed their experiences and shared what was working or not in pedagogical integration of ETs. Focused discussions occurred informally during the activities and were recorded and transcribed, thus capturing the most pertinent data. During focused discussions, the researcher was directly involved in the research process which helped in direct observation and identification of shifts in interaction dynamics among educators. Notes of such shifts were kept and carefully transcribed as in Appendix IV.

Another tool used in the data collection process was a personal interview guide, Appendix V, involving asking questions and getting answers from participants. An interview guide used in the interview process takes a form of face-to-face interactions (Miles, Huberman, & Saldaña, 2014). Although the preliminary interviewing process took place throughout the process of implementing the CoP activities, useful data was equally realized from the interviews held towards the end of the research process. These interviews were aimed at clarifying, confirming or dispelling what had been obtained from the survey, observed from individual practitioners, and collected from the focused discussions.

5.6.0 Role of the researcher and ethical issues

In EDR, the researcher is an integral part of the team, and their role as a *nuance variable* (Mckenney & Reeves, 2012). In this way, design researchers can embrace and compensate for by clearly describing their presence in the research setting and discussing their real or potential influence on the data. The researcher also played the role of the coordinator in the conduct of activity sessions. On the issue of researcher bias, not having an objective, external researcher role aligns with EDR principles. The researcher is a specialist and a tutor of educational technologies and formally and informally offered support to all educators in the unit who sought his expertise as they attempted to teach with technologies. This continued to be the role of the researcher even in this research process. The other educators as participants were also experienced in pedagogy issues and therefore helped to corroborate issues that the researcher focused on.

Table 3: Research questions focus, theoretical, data collection and analysis

Research question focus	**Theoretical aspect**	**Data collection methods**	**Analytical constructs**
What activities are used by a social architecture in a CoP aimed at proficiency development in pedagogical integration of ETs?	Activities	Observations, Focused discussion group and In-depth interviews	Problem solving, Technologies and tools, Common ground experiences, Teaching with technologies, Authentic practices, Developments, Visits, Personal learning networks, Communication, Experiences.
How does the context of designing social architecture in a CoP influence proficiency development in pedagogical integration of ETs?	Context		Requesting for information, knowledge mapping, Pedagogical skills, availability and access to emerging technologies, Diversity in disciplines, environmental cues, collaboration, limited resources, large classes, volunteering, teamwork, lessons learned.
How does social architecture in a CoP enable active participation to enhance proficiency development in pedagogical integration of ETs?	Active participation		Seeking experiences, visitations, ongoing interaction, Interactive environments, seeking experiences, encouragement, guidance, questioning, inspiration, adventure, group dynamics, confidence building, visiting colleagues, critical reflection.
How does the community in a CoP enhance development of proficiency in pedagogical integration of ETs?	Community		Mutual respect, synergy coordination, discussion of developments, modelling, experts, culture, values, repertoire, mentorship, body of knowledge, volunteering, teamwork Induction, apprenticeship, scaffolding, leadership, shared repertoire.

Table 3 is a summary of the research question focus, the theoretical construct that informed it and the data collection and constructs used in the process of analysis.

Several challenges relating to EDR frameworks include ethical issues on the part of the researcher as part of the practice (Oh & Reeves, 2013). To cater for this ethical dilemma, the UCT School of Education Research Ethics Committee prior to starting the pilots, first approved the thesis proposal. The approval was based on the awareness that the research did not have any ethical issues to stop its execution. The researcher also explained to the educators what the intention of the study was and the way the findings were to be applied. Having understood all these details, educators unconditionally agreed to be part of this research process. Educators were asked to give informed and voluntary consent (Appendix I) before participating in the study and, if they chose to participate at any stage of this thesis, they had the opportunity to withdraw at any time. Indeed, during the data collection period, two educators withdrew with all data pertaining to them being deleted and not used in the thesis. All responses from educators in whatever form are treated as anonymous, and educators are given pseudonyms in the data presentation.

5.7.0 Summary of chapter five

This chapter introduced the research methods focused on design-based research framework, explaining why it is called EDR in this thesis and the detailed the phases of EDR. The selection of participants, data collection process and the instruments used in data collection have been detailed. The chapter included a summary of the research questions, theoretical actives, data collection methods and the analytical constructs. The next chapter (six) describes the analysis and exploration of the problem.

CHAPTER SIX: ANALYSIS AND EXPLORATION OF THE PRACTICE PROBLEM

"Usually, when people get an idea, they are eager to start acting immediately, immerse themselves in the process without creating a system of actions, without being knowledgeable of the matter, without analysing and estimating everything beforehand" Sunday Adeleja 2015

6.1.0 Introduction

This chapter presents the analysis and exploration of the research problem, reflections on the initial design guidelines and how data was processed and analysed.

6.2.0 General analysis of data

Initial data collection and presentation entailed focusing on the sub research questions, the theoretical perspective, data collection method and the analytical constructs as detailed in Table 3. An EDR framework recommends immediate, continuous and retrospective data analysis (Wang & Hannafin, 2005). Interpretative thematic content analysis enables one to develop an understanding, offers an explanation about the main concern of the population of study, and how such concerns are resolved (Roller & Lavraka, 2015). In interpretative thematic analysis, a new understanding of the environment develops inductively based on observations that are summarised into conceptual categories of themes, re-evaluated and gradually refined and linked to other themes (Miles, Huberman, & Saldaña, 2014).

Qualitative data analysis used enhances other sources of information to satisfy the principle of triangulation and increase the validity of the conclusions. Triangulation is a method used in qualitative research that involves cross checking multiple data sources and collection procedures to evaluate the extent to which all evidence converges (Neuman, 2014). In the data analysis process, transcribed interviews were analysed along with observations and focused discussions group notes. The multiple sources of data were used in corroboration and convergence of evidence. Used in data analysis, thematic content analysis pays attention to embedded meanings of every single word in the data as part of the analytical process (Miles, Huberman, & Saldaña, 2014).

Because themes were constructed beforehand, data analysis started before the data collection process was completed, and the data collection and analysis were conducted in parallel, with the preliminary analysis used to decide which areas could be examined further in more detail. Coding is an important part of data analysis and

was the process of grouping interviewees' responses into categories to bring together the similar ideas, concepts and themes. The analysis of data involved selection of quotes to support the presentation of the findings. Data condensation happens continuously through presentation, writing summaries and developing of themes; and this condensation is not separate from analysis (Miles, Huberman, & Saldaña, 2014). As data is re-examined and reflected upon, new design principles were created and implemented, producing a continuous cycle of design-reflection-design (Amiel & Reeves, 2008). The focus of the study was on proficiency development in pedagogy using ETs. The presentation and analysis of data therefore follows all the attributes related to this process as stipulated in EDR. The focus of data presentation is a consideration of how breakthroughs happen as educators participated in CoP activities that modelled a focus on pedagogical integration of ETs.

6.3.0 Analysis of the problem- teaching in large classes

This is a preliminary stage where a needs and context analysis was undertaken, and the review of the existing literature conducted. This phase involved working in collaboration with educators as practitioners to identify and explore the research focus. Because this was an academic research that was aimed at obtaining a doctoral degree, this initial phase also saw the development of a theoretical framework that led to full thesis proposal. In this phase DBR framework offers the advantage of mixed method approaches with a focus on consultation with practitioners and researchers (Reeves, 2006; Reeves, Herrington, & Oliver, 2005). During this phase, therefore, the focus was explored in an organic way by the researcher in collaboration with educators. The focus was explored intensively, not solely from an academic perspective, but in the first instance, from the perspective of the researcher who is himself experienced in LCP and passionate about pedagogical integration of ETs. Initial views about this domain were collected from consultations with other educators and the needs assessment. This initial data was analysed to determine the generic practice-based problem in pedagogical integration of ETs that informed the design of an appropriate intervention in the next phase.

Initially, a needs analysis survey (Appendix II) explored the ETs available to educators, the number of students taught and the educator perception about

learning in their classes. The needs assessment also aimed at finding out the level of enthusiasm and attitude towards the process of pedagogical integration of ETs. The other issue focused on included the kind of help they needed to be able to effectively deliver instruction in LCs with the available technologies. It should be stated here that there was no intention of the intervention to focus on the technologies, but was only on their usage in pedagogy.

Table 4: Ways of learning and motivation to teach with technology

Way of learning	Number	%age
Formal training	34	31%
Mentorship	22	20%
Self-training	78	71%
Seminars and workshops	46	42%
Others	4	4%
Motivation		
Very low	2	2%
Low	6	6%
Moderate	24	22%
High	36	33%
Very high	41	38%

N=112

Source: Generated from primary data

From the observations (Appendix III) of educator practitioners, there was an indication that educators as practitioners were concerned that they had insufficient skills in teaching large classes using ETs. Details of the observations are presented in the next chapters. Consultations also pointed to the same challenge, refer to preliminary interview sessions (Appendix VI). The brainstorming sessions also pointed to similar issues. An extensive literature review conducted (Bozalek, et al., 2013; Brown & Gachago, 2013; Jawitz, 2013; Foley & Masingila, 2013) pointed to a similar challenge too. In baselining the practice of pedagogical integration of ETs, initially a generic online survey focused on needs assessment (Appendix II) was administered attracting 112 respondents. Indeed, these were respondents who regularly participated in the sessions except for those considered core participants

(Table 4). The, the following table describes training and motivation in pedagogical integration of technologies.

Questions aimed at understanding how educators started the journey related to how individual educators learnt to use integrate ETs into pedagogy and their motivation to use the technologies in teaching LCs. From table 5, self-training and workshops ranked highest in the way educators learn to integrate technologies into pedagogy, while those who claimed both very low and low motivation in pedagogical integration of ETs are the fewest.

To summarize the challenge encountered by educators in teaching LCs, the following scenario was described by a participant. Imagine the following: *Several times a week, for 120 minutes at a time, over 200 students assemble in a windowless room where they sit on fixed and sometimes auditorium-style seats. Because of the lack of infrastructure, some of these lectures are in halls not meant for teaching including dining halls, so some students will sit on the tables, others stand and others just peep through any available opening where they can access glimpse of the educator. To the worst, some of the students are only able to hear because they are visually impaired or blocked by those standing in front. At the front of the room, an educator, who remains relatively stationary for the duration of the lecture period because they do not have the liberty of moving around a fully packed lecture hall with disorganised and squeezed seats. This educator is in exceptional cases equipped with: a microphone and bookstand; or in more, exceptional cases a computer and projector. Finally, to this scenario add the widely varying motivation and interest levels in the subject matter by the attending students.* These specifics represent the conditions under which an educator must engage students in such a way that they all have a chance to actively participate in the learning process, interact with the educator, ask for clarifications of any material they do not understand, as well as develop critical thinking skills. This environment has led to questioning the quality of instruction by educators

Table 5 indicates that the educators' teaching experience ranged between four and fourteen years. The numbers of students taught in classes ranged from 150 as the least to 1500 as the maximum number of students in a lecture hall. The five educators rated their technology usage experiences in pedagogy using different

terminologies with three considering themselves intermediate and two beginners. It should be noted that the rating of own technology usage experience was based on personal understanding of the educators with no standard gauge used. However, the three intermediate ratings are considered those with good experience in usage of a technology or two, while the beginners are those who are beginning to use a technology. For ethical reasons, the five educators are referred to as E1, E2, E3, E4 and E5 respectively. The core educators used in the data collection process had the following attributes as presented in the table.

Table 5: Description of core participants

Educator(E)	Years of Experience	Students	Technology usage
E1	10	300	Beginner
E2	04	1500	Intermediate
E3	08	150	intermediate
E4	14	800	Intermediate
E5	05	150	Beginner

Source: Generated from primary data

More parameters used to help in understanding the educators include how they initially taught their classes, to which the various responses include grouping students and directly lecturing them in the groups. Another parameter was what educators thought about learning in such classes to which responses included educators asking themselves what is happening; students do not benefit; I do not reach everybody; there is no deep learning; and students do not follow and usually look bored. These responses indicated that there was a very practical problem in teaching large classes and usage of ETs.

About knowledge of each other, educators indicated that they knew each other even by name except one, who did not have very good knowledge of others although this educator indicated having ever seen, and met all the other educators except that he did not know them by name. Knowledge of each other is an ideal in CoP because individuals need some mutual understanding for them to work together. Educators indicated their expectations, with two educators expecting lots of ideas, innovations and support in teaching with technologies like GD for collaborative purposes. Other expectations from educators included: getting cross discipline membership, listening, making teaching easy with technology and learning from

others. E4 and E5 expected to work together, help each other, share knowledge, collaborate and develop positive attitude towards teaching with technologies.

6.4.0 Initial design guidelines for the community of practice

The initial design guidelines for the CoP focused on pedagogical integration of ETs were based on the principles of action learning but focused on Wenger's ideas about why individuals become members in a CoP. Action learning is an approach to learning that involves volunteering to work in collaboration to tackle a practice challenge or challenges and learning from the attempts to improve things (Beaty, 2011). These principles enabled selection of Wenger's table (Table 6) that describe reasons for engagement in a CoP and the ideas therein.

Using these ideas, there was operationalization of a CoP aimed at development of PLNs key in proficiencies development in formal and informal structures among interested individual practitioners to impact on a practice and performance (Murillo, 2011). Through the CoP, practitioners as members can be able to reach out to each other in various ways as illustrated by Wenger (2015). However, there is no guarantee of the type of help a practitioner may need and the period. It is easier therefore for all practitioners to keep on their toes and know whom to approach for a given category of needed help, which however is impossible without some level of networking. There are experiences sought from other individuals within a community be it online or face to face, and in this way, there is creation of synergies.

Table 6 shows that with the increasing knowledge challenges, CoPs provide the challenged practitioners' access to colleagues including a wave of interest in peer-to-peer professional-development activities (Floding & Swier, 2012). Because of technological innovations, pedagogic practice in higher education has undergone significant changes. While the lecture halls continue to form the teaching space, they are enhanced by the integration of newer pedagogical and technological tools as complements (Modernisation of Higher Education, 2014), and thus the need for knowledge mapping. These have come as a challenge to some educator practitioners who require support for effective operation on top of the limited technologies themselves. The implication here is that there are practitioners with

experiences that can be helpful to others when shared and therefore the need for creation of sharing spaces and structures both formal and informal.

Table 6: Implicit ideas for participation in communities of practice

Problem solving	Working together on a design and brainstorming where one is stuck.
Requesting for information	Asking for information regarding where to find something or someone who can help.
Seeking experiences	Accessing someone who has dealt with a similar situation to share their experiences.
Coordinating synergy	Combining efforts to do something faster and more easily.
Discussing developments	Discussing new systems and their relevance as they emerge.
Documenting projects	Writing experiences down so that they help in solving a similar future problem.
Visiting	Visiting a place or someone in their context so that one can learn from them.
Mapping knowledge and identifying gaps	Finding people who know different things so they can add up missing links

Source: Wenger (2015)

From the above, educators would no longer be limited by what is offered geographically nearby, so they can get into what really interests them related to pedagogical integration of ETs, even if the expert is on the other side of the globe, and their colleagues are scattered about and have never met in person. With such an environment, educators get a personal or professional learning community, and curating that group of people takes some time and effort. The strategies that are used to build such a community include:

a. Educators not being afraid to do some hard work and make some mistakes in pedagogical integration of ETs.
b. Educators figuring out what they want to learn about in terms of large classes and ETs, and joining discussions on these topics.
c. Educators actively participating in the discussions related to pedagogical integration of ETs and showing that they are a thought leaders.

d. Educators talking to their colleagues who are interested in collaborating in the pedagogical integration of ETs in large class teaching.
e. Educators not being afraid to build a new community of colleagues whom they are able to freely communicate with
f. Educators being able to observe and watch others who are already involved in pedagogical integration of ETs.
g. Educators starting or joining outlets to share ideas and thoughts and in this way, they start building an audience related to pedagogical integration of ETs.
h. Talking to thought leaders, attending meetups and conferences and keeping in touch with the new people they meet.

So, the activities, contents and participation in the community were aimed and providing an environment for the stated strategies to be enhanced.

6.5.0 Reflection on initial design principles for the CoP

The CoP in pedagogical integration of ETs was implemented, evaluated and refined in each cycle of piloting. Design principles comprising of sharable, published output from the research and that informed further development and implementation decisions were stated. This is done in iterative cycles of improvement that cannot be concluded until satisfactory outcomes are reached (Reeves, 2006). The design principles were further refined through sharing the tentative ones with the practitioners in seminars and presentations. In some cases, a peer review of design principles is done because it is recommended for the overall enhancement of professional practice (Herrington, McKenney, Reeves, & Oliver, 2007). This phase therefore involved a careful reflection on the procedures, processes and conversations (see table 4) during entire period of implementation cycles and participation in the CoP. This phase has a purpose of concluding the outcome of the investigation and how it meets the pre-determined specifications of solving the research focus (Land & Zimmerman, 2015).

The phase focused on the processes that had taken place in all the previous cycles, interactions and the changes educators claimed to have gone through. This was aimed at reporting on the generic experiences of interaction and support for each other during all the implementation cycles. The focus was to understand why the

ETs usage was useful in large class pedagogy. For some time, researching instructional technologies has sought to demonstrate the achievement gains of technology-facilitated learning over conventional methods of teaching with little regard on understanding how and why the gains might have been realized (Kennedy-Clark, 2013). Documentation was done during the entire cycles of piloting which facilitated the process of final reflection to come up with reliable design principles. Plomp (2013) explains that the iterative process ultimately leads to the development of design principles, which are then reflected upon, evaluated and refined.

6.6.0 Data processing and presentation

All data captured through the research process were transcribed as indicated in Appendices IV and VI. During a transcribing process, more clear insights into the data are gained (Neuman, 2014). Data from observations, focussed discussions and in-depth interviews have been subjected to interpretive content analysis in mostly inductive fashion, unlike in the basics of grounded theory analysis (Strauss & Corbin, 1998). The observation note taking process had been done on predetermined preliminary codes of experiences in teaching large classes and usage of ETs. The observation notes taken were read through and the audios listened to immediately after their capture. The transcribing process was done by reading and listening to the interviews, which helped in grouping similar kinds of information into categories and relating similar ideas to one another. To get to this, a coding system and comparative analysis using the predetermined themes of pedagogy practice and usage of ETs as the phenomenon was formulated. Coding techniques were implemented to organize data into themes from the observations during focused discussions and interviews. By putting like-minded pieces together into data bunches, one creates an organizational framework as a basis for data analysis (Suter, 2012).

Analysis of qualitative data begins in the field, at the time of observation, interviewing, or both, as the researcher identifies problems and concepts that appear likely to help in understanding the situation (Miles, Huberman, & Saldaña, 2014). Qualitative data collection and analysis therefore proceeded simultaneously; ongoing findings affected the types of data and how they were collected. The codes

were got from SL theory as applied in the CoP. Codes therefore form what is referred to as themes, which also served as the guide to data presentation and analysis. Presentation of data is based on the structure of the presentation of the research around the predetermined themes (Neuman, 2014). Quotations regarded to be relevant and valid have been presented to demonstrate, inform and further support findings. In some cases, the data has been summarized and represented in tabular form. The exact method of coding used can be described as a form of process coding (Miles, Huberman, & Saldaña, 2014), including the observable data.

6.7.0 Summary of chapter six

This chapter presented the analysis and exploration of the research problem, reflections on the reflection on the initial design guidelines and how data was processed and analysed. The initial design guidelines were based on the needs assessment and engagement with educators and the literature. The data processing and presentation process has also been detailed. The next chapter (seven) is the intervention design and construction.

CHAPTER SEVEN: INTERVENTION DESIGN AND CONSTRUCTION

"There is nothing without action and no (sober and deliberate) action without learning"
R.W. Rivans (1907-2003)

7.1.0 Introduction

This chapter describes the intervention design and construction of the initial intervention.

7.2.0 Description of the community of practice as an intervention

An intervention refers to a tentative solution to an identified research focus (Herrington, Herrington, & Mantei, 2009; Amiel & Reeves, 2008). As part of the research process, EDR frameworks advocate for conceptualization and implementation of an intervention in a natural setting. For such an intervention to be effective, it should be a specific and purposeful activity that has a role to play within a practice although it can also be viewed as a standalone activity. Participation in an evidence-based intervention can spark a major improvement in a practicing environment (Plomp, 2013). Based on this understanding, a CoP focused on using pedagogical integration of ETs was designed. The design of the CoP as a solution was based on SL premised on the ability of a CoP to actively engage educators and enable the co-creation of knowledge, experiences and collaboration as educators interacted in normal routines of pedagogy. In this way, educators would engage with others and learn from them in the pedagogy using the available ETs. The tentative solution therefore was a CoP focused on pedagogical integration of ETs.

The CoP as a solution aimed at providing a practice environment in which educators explored the ETs and shared experiences in their usage in pedagogical integration of ETs. EDR was used to conceptualise and design for a CoP focused on pedagogical integration of ETs as a tentative solution, which actively engage practitioners into teaching with the available technologies like Google, and LCD projectors. The focus was on critical reflective practice evidenced scholarship in pedagogical integration of ETs.

The CoP focused on development of the 21st century pedagogy although it is recognized that integrating ETs like Microsoft Office and other Open Source software into pedagogy to many educators has been and is still challenging (Anderson, 2010). Pedagogical integration of ETs in education cannot be compared with updating textbooks or replacing chalkboards with interactive boards, which activities can

comfortably be carried out by a single individual in isolation. The design for a CoP focused on putting in place an environment in which educators had collaboratively familiarise themselves with how new devices (like interactive boards, video conferencing and others) work and how colleagues use them, before one could work out how to use these same devices during their own pedagogy. The design for a CoP as a solution therefore aimed at providing a sandpit challenge model workplace environment that fosters learning effective pedagogical integration of ETs. The CoP therefore needed to provide sandpit time for educators to collaborate and explore available technologies as they learnt about how they are integrated into pedagogy.

The CoP focused on usage of ETs like Google tools in pedagogy. For example, using google document as a guide, educators had to engage in finding resources online including journal articles, videos, and other files they could be able to offer to their students as instructional materials. Using google documents, educators ensured real time collaboration among learners not necessarily in the same geographical location. Educators were required to collaborate and show a sense of making judgements in as far as their choice of instructional materials used in pedagogy was concerned. This practice also engaged educators to store their materials on GD and share them with others.

Other solutions required educators to design, upload and manage materials on the LMS called the Makerere University Electronic Learning Environment (MUELE). LCs required that an educator can use Microsoft Office PowerPoint to design slides for projection and use in flipped classroom environments. MUELE also incorporated working with several ETs for online communication and collaboration including chat rooms, discussion forums, and uploading, downloading and storing materials. The solution also encouraged educators to find and engage with tools for referencing in academic work including Mendeley, Endnote and the Microsoft Office Word tools. The solution aimed at arousing creativity and critical thinking. The solution was a hands-on project meant to enable educators seek help, collaborate and work in teams in improving proficiency in pedagogical integration of ETs. Putting together the most relevant technology tools and practices by the solution allowed educators to demonstrate and share effort and commitment to high-quality work. ETs tested were many including GD, Mind mapping, LMS among others. Through these ways,

educators built their own personal learning networks by sharing experiences as they collaborated and worked together.

The CoP helped in co-production of knowledge, sharing experiences, apprenticeship, mentorship from within relating pedagogical integration of ETs. The procedure of implementing the solution began with an initial introduction in which educators were introduced to the technologies of their choice that they used in pedagogy. The environment in which the community operated encouraged educators to identify those they needed to work with and share their experiences in the usage of technologies of their choice in pedagogy. Educators also shared the challenges they go through and how they tried to overcome them. The final part of the solution was reporting experiences and sharing developments.

7.3.0 Development of the community of practice as an intervention

The second phase of DBR focused on a solution to the problem identified in phase one, which solution can be implemented in an environment (Plomp, 2013). This second phase continued with a search for the literature to find a relevant theory to guide critical and creative thinking, as well as existing design principles that addressed a similar research focus. Indeed, this is the phase in which CoP was singled out as the theoretical framework. SL in a CoP served as a theoretical framework. The principles of an operational CoP (see section 3.2.0) therefore informed design of the intervention activities that potentially provide a solution to the research focus (Herrington, McKenney, Reeves, & Oliver, 2007).

This phase involved the creation of the draft guidelines governing a CoP as an intervention. This design for a CoP as an intervention took careful thought and analysis because of the need to consider SL principles and the process of LPP as guidelines in a CoP. The design and development of the model CoP as an intervention during this phase was also informed by evaluation conducted throughout planning and development through needs assessments. By the end of this phase, the draft guidelines had been created from review of theory and literature, and from consultations with practitioners. The draft guidelines are detailed in chapter seven.

7.4.0 Implementation of the community of practice intervention

This phase involved the implementation of the CoP as an intervention. Implementation and evaluation of the CoP as an intervention provided further opportunities to refine the design principles. After the first pilot of the CoP with

educators and the analysis of the initial data, the activities were refined and so was the piloting environment. The second cycle of pilot of the CoP was done followed by the third cycle of piloting. Cycles of piloting are a prerequisite of the DBR frameworks requiring that an intervention be implemented in iterations to test its effectiveness. During the final pilot reflection was done to refine the design guidelines. This phase involved a series of implementation of the CoP as intervention in pilots that resulted in the subsequent revisions. The CoP focused on LCP using ETs that saw educators practically engage in sharing experiences as they interacted and collaborated. Plomp (2013) illustrates the iterations of pilots in the third phase using figure 10.

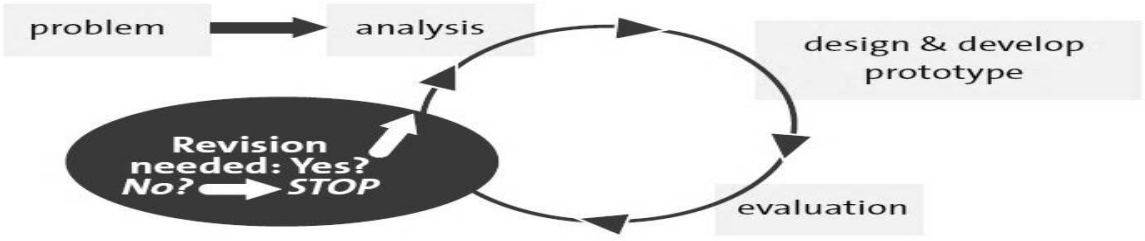

Figure 11: Illustration of a piloting cycle
Source: Plomp (2013)

The purpose of piloting the intervention in this phase is not only to evaluate the intervention performance, but also to come up with and refine design principles (Amiel & Reeves, 2008). Implementation cycles of the CoP in pedagogical integration of ETs was therefore to determine how the CoP was working in practical terms. Because EDR frameworks aim at building a theory around why an intervention works in a certain context (Plomp, 2013), this phase provided the researcher with an opportunity to refine the design guidelines and to gain a more informed understanding of why educator participants thought that the model CoP as an intervention was working or not work at times.

7.5.0 Summary of chapter seven

This chapter described the intervention as the community of practice. There was a description of how this intervention was developed with a focus on educator pedagogical integration needs and how the operationalization was done. The chapter also presented the iterations and their revisions. The next chapter (eight) describes the intervention piloting cycles.

CHAPTER EIGHT: THE CoP INTERVENTION PILOTING

"It is said that a wise person learns from his/her mistakes. A wiser one learns form others' mistakes. But the wisest person of all learns from others' successes". Zen Proverb

8.1.0 Introduction

This chapter presents findings from the piloting of the CoP under the themes activities, contexts, participation and community in which the pilot took place. The reflections of educators and revisions between pilots.

8.2.0 Initial pilot of the community of practice intervention

Attempts have been made to ensure that data from each pilot is presented in the same sections nonetheless, is still cross references across iterations. During the initial piloting of the CoP which took place in the boardroom for about an hour every Tuesdays, sometime was devoted to introduction of the basics of software and hardware and a summarized process of their pedagogical integration. Such activities helped educators in developing familiarity to the ET tools, techniques and their usage in pedagogy. Due to the limited availability of technologies the Bring Your Own Technologies (BYOT) approach was used as some educators had personal devices and software. This made some educators to spend time engaged in collaboratively exploring the technologies and asking each other questions about how they can use the technologies they identified in a pedagogical process. In the initial pilot of CoP, the focus was therefore introduction of educators to each other and to the available technologies.

The data from the initial piloting of the CoP can be easily understood once one draws from the Zen proverb about mistakes and successes and who learns from them. This is because the researcher did not predetermine the capability of educators to learning from either mistakes or successes until there was interaction among them during the implementation cycles. In the initial pilot, educators showed minimal confidence and made several errors and false assumptions while engaging in pedagogical integration of ETs.

8.2.1 Activities engaging educators

Many activities were executed in the initial pilot of the CoP to help educators actively participate. Observed issues here included the active interaction between those who were beginning their career and those with middle experienced in the academic journey. Active engagement of pedagogical integration of ETs as a practice and the way educators felt they were welcomed was generally non-linear as educators had

different levels of experiences even in this initial pilot. Educators said that the initial implementation of the solution helped them actively engage in identifying challenges that they faced in practice. During the initial pilot of the CoP, educators reported that it helped them in actively interchanging ideas and identifying who knows what so that they could get to them for help. Educators said that the solution persuaded them to deliberately join and learn from each other's experiences. E5 for example listed several individuals whom the activities had brought her close to, as she had to ask, get guidance and many times actively engage in the demonstration process. She said:

> *Presentations and demonstrations offered me a supportive community…. I have could find the help I need and the feedback in the process of my learning. I have been very vigilant and I believe it is what has helped me much in mastering some of the skills* (Focused Discussion, E5, 05.07.2014).

Findings indicate that the educators found the initial pilot of the CoP was an arena for interaction where they met and talked about several developments relating to the pedagogical integration of ETs. Observed and reported attributes include meaning making, the boundaries within the community, social interactions within the educators in the community and building the body of knowledge that the educator community cherished in pedagogical integration of ETs. More experiences included modelling and group dynamics management, which engaged educators who participated in the initial piloting of the solution. From the observation of the discussions and interactions, educators believed that a thought of embarking on the pedagogical integration of ETs would have been hard without this CoP.

> *I would not have understood how to use technology in this area without listening to other people's experiences* (Focused Discussion, E1, 04.02.2016).
> *I cannot lie… it would have missed and probably not made a first step to perfection without them* (Interview, P3,22.02.2016).
> *I have learnt how to be patient with people courtesy of the operational community* (Interview, E2, 03.07.2015).
> *The many things I am learning are because of these people* (Focused Discussion, E4, 03.07.2015).

In the initial piloting of CoP, E4 said that even when she was fascinated and aware of using PowerPoint and the LMS she was not conversant with how to design presentations to use in her teaching. "*I have seen some videos on the internet, but unfortunately, I do not know what to do with them when teaching. I was simply born before computers and I and really disadvantaged that way*", she said. She indicated she would need some basics as this was going to help her make some projections while teaching her LCs. In the initial pilot, she also indicated that she was always

working alone in trying to learn how to use technologies which has become so boring for her. She was observed to have known how to use excel to perform basic functions of preparation of class lists. During this initial implementation of the solution, she had a basic mobile phone which she indicated she was using to make calls to her students whenever need arose. However, she was concerned that the mobile phone she had was so basic and sought for advice on which phone she needed that would help her perform more functions with her students than just calling them. The issues of concern to her during the initial pilot of the solution were the failure to teach her LCs using any of the available technologies. She also said if she got a basic induction and somebody to work with in terms of exploring equipment that would force her use the technologies in her pedagogic practice.

8.2.2 The context in which the intervention operated

During the initial piloting of the CoP, educators exhibited attributes that justified their claimed levels of technology usage in pedagogy as beginners and intermediates in the survey. This is seen through their statements that they did not know how to use most of the technologies and they did not have people known for them to go to for consultation in case they needed to use a technology they preferred. In the initial iteration, some of the educators did not think they needed details about technologies like Facebook (E1) and WhatsApp (E5), not even GD (E3), and Smart phones (E4).

Expectations in the initial pilot indicated that LCs were really a pain in the neck and on the other hand, educators were ready work their way into getting skills that enabled them to deliver effective instruction with available technologies in this same classes. The CoP as a solution involved activities that engaged educators in hands on learning from models, reflective thinking and what was believed to be an authentic environment. Each of the educators indicated teaching a three-figure number of students in a single class. During focused discussions in the initial data collection, educators agreed that hundreds of students in the same class were not being properly taught. The following quotations from discussions illustrate this:

> *…because if you are talking about learning, teaching 400 is not possible to achieve learning* (Interview, E1, 22.02.2016).
> *I am not very sure whether learning takes place 100%….* (Interview E2, 23.02.2016).
> *Then, I by now ask myself, wait a minute, has learning happened or it has not happened* (Interview E3, 25.02.2016).
> *You could see that they are not following or they are bored…* (Interview E5, 26.02.2016).

From the above it can be seen that the participants were equally worried about the quality of pedagogy in heavily populated classes and yet they were not able to sit together to craft customized solutions.

The most compelling need during this initial pilot of the CoP was ensuring opening the environment and leadership in pedagogical ET integration that would help kick start educators into learning and support as they tried out the process of engaging in the usage of available technologies. It is little wonder therefore that educators initially claimed to have limited confidence in the practice knowledge about usage of technologies as they had only tried some of the technologies privately and claimed they never shared their experiences before.

E1 in the initial pilot of the CoP was observed to be engaged in asking another educator from a different area of specialisation how Google technologies are used, implying that the boundaries that exist in specialised subjects do not necessarily exist in the practice of teaching with technology. By the end of the initial pilot, improved knowledge of the technologies and generally the pedagogical integration of ET as a practice began to be improved. Educators were also seen to have started gathering knowledge that was in the process of being owned communally and approved as they interacted. It is little wonder therefore that by the end of the pilot, educators claimed that the community was helping them in developing their proficiency in pedagogical integration of ETs. Generally, the observation and interviews point to educators finding the CoP pilot process that modelled an environment kick-starting synergy and group spirit from the membership. The mutual interest in this pilot led to initial establishment of trust and thus members opened and asked the questions they needed to ask. It is understood here that without the deliberate organisation of the community, no such actions would have gone on.

8.2.3 Participation in community activities

During this initial pilot of the CoP, E1 was bold enough to mention that he did not know technologies with such authenticity. He indicated he was very concerned about the teaching and learning in the LCs with any of the technologies because he did not know how to go about the process. It is no wonder therefore that he indicated he was a beginner in technology usage for pedagogy. He was therefore dividing students into small groups. He indicated that although he used the internet to find some

information for personal use, he was not very comfortable with the usage of technology in the instructional process in the LC. To illustrate the low competence in usage of technologies for teaching, he said he did not have a Gmail address except for the official university email address; neither was he on Facebook. His questions during this initial iteration needed direction when he was introduced to the LMS for example he said: *I will need to be shown how to use the learning management system*.

During the initial pilot of the CoP, E2 found the guts to say that he did not know how to use a PowerPoint projector very well, leave alone connecting it to the computer. He did not also know well how to design slides in PowerPoint for display in his teaching. He also revealed that probably he would have known how to use the projector before, but did not even have anybody to ask for help. He said all he based on in his teaching if he tried to use any technology was guesswork and his little ingenuity. In this initial pilot, E2 also said it was a struggle for him to take any concrete decision on which technology to use in teaching and how now. This is even when he was aware that his practice of teaching the many students in his classes was problematic. Even when he rated his personal technology usage as intermediate, he specifically did not know how to integrate most of the technologies in teaching. He has some good understanding of teaching and learning in LCs though.

During the initial piloting of the CoP, E3 indicated that he was going through the challenges of the practice of teaching large classes but did not even know whom to consult for help to go about all this and how to solve this problem as an individual. He also indicated that he had read some literature about LCs elsewhere but still did not have anyone to share with and try out the same strategies that he had just seen in writing. The one technology he was not skilled at using was the interactive smart board and yet he was aware it could enable some interactivity between him and the many students in the class. He was so dismayed even that one such board had been installed in one of the rooms from where he teaches but he did not have the skill to use it! He said he had tried to learn how to use technologies for teaching but his efforts were initially frustrated with the intermittent internet services in the building he was housed. He was very optimistic that participation in the model sessions was going to be useful.

E5 in the initial piloting of the CoP did not know how to design a course on a learning management system. She said her inability to design a course was because she had no prior training in doing so. She said she did not know how to make students in her big class become active as her approaches are limited to delivery of oral lectures (call it instructional approaches). When asked about her knowledge of flipped classroom technologies, she was equally ignorant as she took the literary meaning of the word asking how that is possible to "flip the classroom". She said she had heard of WhatsApp but did not have the expertise of using it to enable sharing of information, but had not used it herself since her phone was basic and therefore could not accommodate the software. It was observed that she had a flash disk of 1GB that she was using to transfer files. She also indicated she did not know whom to consult when it comes to teaching with the technologies in her class. She indicated however, she was more than ready to learn the usage of technologies that can be useful in teaching.

8.2.4 Community in which the intervention operated

Data from the initial piloting of the CoP indicates specifically the compelling need for open organized environment and leadership in which pedagogical integration of ETs like GD. The during this initial phase also indicate the lack of any deliberate focus on pedagogical integration of ETs as each educator seems to be making own attempts and decisions. This is because initially, educators did not focus on the usage of ETs in the discussions, and indeed there was no strong focus on pedagogical integration of ETs. Instead they focused on the usage of whiteboards and chalkboards in as large pedagogic strategies. Such a focus was the one supposed to provide an environment for entry into a proficiency development environment.

The above data coming from the initial piloting of the CoP indicates that at this stage, educators are concerned about the LCs and the way they were being taught. Educators are also concerned about their technology usage most especially in pedagogy and are determined to get a solution. There is an indication of no leadership and coordination focus to pedagogical integration of ETs. Even when some of the educators completely did not know how the solution was structured, they were excited and happy that the initial brainstorming was just the beginning of the process. Educators boldly and honestly indicated their limited knowledge about technologies, but this is seen to be a good start point for anybody who is intending and determined to learn. To determine what had attracted them to the initial pilot, educators reported

that they wanted to see and watch what was happening in pedagogy using the modern technologies. This indicates that the educators' initial expectation was to observe how things are done. From the indications, educators were also happy that they had a beginning point of participating in the CoP.

E1 indicated that the CoP engaged him in thinking hard about teaching with technologies at this initial pilot. E2 was also happy that the activities in the CoP as a solution involved him in observing how technology was used and there after he had to try by himself. E3 indicated that the CoP in pedagogical integration of ETs engaged him in working with colleagues and therefore gaining support from a colleague.

> *I watched others do their things and during my own time I would also try out a few of them* (Focused Discussion Group, E4:24.02.2016)
> *We had to be very innovative in thinking about the technologies we use, they are too many and I kept scratching my head….* (Focused Discussion Group, E1: 23.02.2016).
> *I was lucky to see things demonstrated live on the learning management system, it was easy for me to try them out later* (Focused Discussion Group: E2, 24.02.2016).
> *I had colleagues who know certain things, they were very helpful in this process* (Interview: E3: 26.02.2016)

The above snippets indicate what the educators thought about how the initial piloting of the CoP engaged them in thinking and doing regarding pedagogical integration of ETs. To make sure that the CoP was more engaging in the next pilot, the educators themselves were asked to make suggestion for the adjustments needs. They were also asked about the technologies they were aware of that could be used in improving the pedagogic practice in LCs. This was aimed at dealing with more contextual issues than implementing CoP activities based on ideals that were not be practical in that context.

A summary of comments from educators about how they thought the CoP engaged them in pedagogical integration of ETs is presented in table 8. From the table, it is seen that the activities during the initial pilot of the CoP engaged educators in thinking about practical issues faced during pedagogical integration of ETs including large numbers and how they were contemplating to teach them. Although the discussions during the participation in the CoP were around pedagogical integration of ETs, educators identified working together, being able to see role models and the problems affecting them as major issues and opportunities to engage in the practice.

Aspects that cut across the educators in the initial CoP pilot include the thought that the solution engaged them into interaction with other educators they called 'experts'

and being able to ask for clarifications from the experts and modelling. More experiences include the CoP engaged educators in the thought about their own practices in LCs and how they benefit from them in as far as, their teaching with technology was concerned.

Table 7: Experiences from participation in the initial pilot of the CoP

Educator	Experience
E1	My thought was on many students with differing learning styles and motivation levels; I also thought of the interaction and sharing views as a community; I was happy to be part of a group
E2	I focused on large classes; Teaching and assessing learners using technology; Knowledge of technology; Uncertainty in a practice; Expertise in teaching with technology; Asking questions; Informal approaches to practice
E3	I generally got focused on large class learning environment; Internet technology usage; Meeting experts and specialists; Mentorship; Digital immigrant; and interaction that brings about learning
E4	I got concerned about learning in large classes; I looked at strategies for teaching with technologies; I was determined to work better; Interactions; I thought of the models and liked team working.
E5	I came to know that very few learners benefit from large classes; No active learning; Ineffective teaching in large classes; I was not sure of the session intentions, but I also learnt of the limited technological infrastructure. The sessions engaged me in being honest with what I did not know.

Source: Generated from primary data

The initial pilot of the CoP findings also indicated that the solution promoted learning through the process of observation. This is in conformity with the SL principle of observation and modelling of practice. In this way, educators indicated that they could ask the initial questions related to pedagogical integration of ETs from those who demonstrated some knowledge in its usage.

To be able to engage educators to experience what they did not necessarily plan to experience in practice learning, the initial pilot of the CoP did prepare educators into asking peers for clarification of issues and processes. During the initial pilot of the CoP, activities were structured in a way that it allowed educators to be able to observe and emulate actions that were modelled by the somehow more experienced in environments where technologies were used. This therefore meant that the CoP was

engaging and inspiring to the educators who got prepared and set to practically try out the same activities in LCs.

Educators hinted on their experience in the level of pedagogical integration of ETs as detailed in Table 8.

Table 8: Educator attributes in relation to ETs during the initial piloting of the CoP

Educator	Attributes
E1	Little use of internet to get information; No Gmail address; Asking the question like: show me how to use LMS; No Facebook account.
E2	Little knowledge of designing slides; less knowledge of how to use an LCD projector; Had nobody to ask; Less ideas about iPad usage.
E3	Little knowledge whom to consult for help; Knew something about large classes; Wanted to know more about smart board usage; No specified technology of interest at this stage.
E4	Can't design a PPT presentation; Having a basic phone; Working alone; Knows basics of Excel software in making student lists; No idea about multimedia usage in the teaching process
E5	Less understanding of design for LMS; Having a 1GB flash; Not aware of participation activities; No idea of flipped class technologies.

Source: Generated from primary data

In summary of the findings, the initial piloting of the CoP provided educators with open leadership that compelled the need and avenues to start questioning and appreciating pedagogical integration of ETs. However, for a CoP focused on pedagogical integration of ETs to be able to help in enhancing development of proficiency, educators needed to engage across another pilot to determine the selection and presentation of activities per their preferences and styles of operation. This is because with the feedback from participation in the initial piloting of the CoP were adjusted and made more appropriate for the second pilot.

8.3.0 Second pilot of the community of practice

EDR requirements call for integration of known and hypothetical principles in pilots as a proof that the principles work. The second pilot of the CoP exposed educators to several technologies and their usage in the teaching of LCs. There was indicative observed and reported experiences from educators after having gone through the initial pilot of the CoP and so the second piloting was additional. From the second pilot of the CoP, there was a clear indication that educators were showing increased interest and a stronger argue for skills in pedagogical integration of ETs. By the second pilot of the CoP, educators had already started networking with those whom

they had met during the initial cycle and thus there was a diversification of knowledge related to pedagogical integration of ETs. The need for skills in pedagogical integration of ETs was seen to have grown higher than it was in the initial pilot of the CoP because educators seemed to start seeing a solution to LC teaching as pedagogical integration of technologies.

Table 9: Experiences from the second pilot of the CoP

Educator	Experiences
E1	Use of a website (Google) to get information; Having a Gmail address; Having a Facebook account; Asking help me use the LMS better.
E2	Learning how to design of slides; Learning how to use an LCD projector; Identifying friends to ask; Having a modem and smartphone for internet access, Trying the smart board use.
E3	Knowing whom to consult; Learning about large classes, Intention to use the smart board software, learning to use an LMS.
E4	Planning to use a PPT presentation; Having a tablet; Planning to use MOOCs; Working with someone; Learning advanced Excel software; Learning multimedia, Working with others.
E5	Learning to design courses for LMS; Having a 5GB hard drive; Looking for one to consult; Started participating in activities; Reading about flipped classes; Got to WhatsApp.

Source: Generated from primary data

Table 9 illustrates the generic shift to the positive after participating in the initial pilot of the CoP, but cannot also just be tagged only to the natural exploration of educators. This is because this shift did not happen before participation in the CoP activities and since it happened after initial pilot of the CoP, it can be tagged to this participation. Educators who had expressed that they did not have email addresses are by the end of the second pilot of the CoP had more than one email address. All educators created personal Gmail address on top of their official email addresses.

8.3.1 Activities engaging educators

During the needs assessment, the same educators had indicated they were not aware of alternatives of getting to the students in LCs. And by the second pilot of the CoP, educators indicated that they had the personal Gmail address to enable them to interact more. The initial pilot of the CoP inducted educators into pedagogical integration of various ETs including creating email addresses, using GD and Google Documents and other technologies. These same educators who said they did not know or even frequently use technologies like Emails, Facebook and WhatsApp were now craving to use them including possession of large capacity equipment because

they enabled them to keep more data. The question now is what has changed between now and the initial pilot of the CoP?

During the second pilot of the CoP, educators who said they did not know whom to consult, had opportunities to start identifying whom to work with and whom to go to in case they want to consult on a challenge in teaching with technologies. Educators during the second pilot were drawing plans to use technologies that they said they did not know how to use during the initial pilot of the CoP. Educators were getting more and more interested in pedagogical integration of ETs than they reported in the pilot of the CoP. Observations indicated that the attitude towards pedagogical integration of ETs was moving more towards the positive. Educators who were not initially using any technologies were asking how technologies like GD and Learning Management Systems work. And yet others were trying social networks including Facebook and Google groups and asking how these technologies can help them become more efficient in their work. This level of curiosity although natural, cannot be taken for granted, but attributed to the initial implementation of the solution during which educators were made aware of the technologies and how they are used in teaching and learning.

The initial pilot of the CoP exposed educators to different technologies and their usage in pedagogy. Observation and interviews pointed to the following summaries. E1 was exposed to several technologies and participated in presentations and workshops focused on the pedagogical integration of technologies. During the second pilot of the CoP, observations and interviews indicated that the presentations and demonstrations during did not leave this educator the same. First, E1 was observed to be appreciating the opportunity to be part of the implementation process and through them, he said he had gained new ideas about teaching with the technologies. He is now able to get information from Google to use in his teaching, specifying www.google.com. He realized the limitations of his official email in terms of storing the many emails coming in. He therefore opened a Gmail address in addition to opening a Facebook account for the course he was teaching. This change could not have just come without his voluntary moves and active participation in the initial pilot of the CoP. Indeed, he said the second pilot was strengthening what was introduced in the initial pilot.

8.3.2 Context in which the intervention operated

The practices of E2 had changed as he revealed that he was learning how to use a projector to display his content while teaching and he knew how and where to connect it on the computer. Asked how he had come to know this, he said he had asked one of the colleagues whom he referred to as friend to help him during the initial pilot of the CoP. He also had been helped in learning the design of PowerPoint slides and again he said he asked a friend he met during the initial pilot of the CoP. He had also been taken through the basics of how to find electronic learning materials to post to the emails of learners. He was getting chunks of what he calls very useful learning materials from the internet and thought they were useful to share them with his students. The changes seen in this educator having participated in the initial pilot of the CoP in pedagogical integration of Google technologies and the LMS indicate that the implementation helped him go through the formation stage courtesy of collaboration with others.

Having actively taken part in the second pilot of the CoP, E3 indicated that he had learnt to consult other educators having learnt that he was not alone struggling in the process of pedagogical integration of ETs. On top of that, during this second implementation of the solution, he said he was learning so much from other educators even when he at times arrived late. One of the activities during the pilot included a training related to designing and delivery of courses using the LMS and he indicated he had tried it out during the second implementation. He had come in late but was helped by one of the other educators to catch up. He would wish to try it further now that the confidence in using technologies is building gradually. His confidence was building and he asked for smart board software to be installed on his laptop because he wanted to use it to offer more interactivity lectures to his classes.

E4's language and approach were changing during this pilot of the CoP. She first indicated that she had could learn how to design a good presentation. She also indicated that she had participated in a MOOC and was contemplating to get her students to participate too. In all these, she had found it useful to work with colleagues who did not actually know more than she did, but together, they could figure their way out collaboratively. Whenever things could not work out, they could consult each other and somehow, the consultation usually turned out to be magical because things worked out after. She also indicated that together with her colleague,

whom she met during the initial cycle of activities, they had could learn Advanced Excel and they could be able to use formulas in a worksheet, something they had yearned to know. She got advice from one of the other educators she considered more knowledgeable about mobile learning consider and had been advised to buy a tablet instead of a small phone like she was contemplating to do. So, in this second pilot of the CoP, she came with a tablet and most of the time, she was observed to be comfortably getting and replying emails. She reported she was in touch with the students more on email than it had been without this equipment.

The second pilot of the CoP saw E5 indicating that she was learning how to design a course for the LMS. With the help of colleagues during the second pilot of the CoP, she could create an account and upload files onto the LMS. During the initial pilot of the CoP, she got an induction she identified a colleague whom she described as swifter than her, who helped her go about the process the second time. She said it was not extremely difficult for her to learn the design of a course because she had explored and found tutorials about design of courses embedded on the LMS given the help coming from colleagues. To indicate her growing confidence, she offered to share the tutorial with other colleagues. She was looking around for whom to consult in perfecting her designed course, which she wanted delivered online. She said, as a beginner she needed someone to get her some critical eye, indicating that she identified some knowledgeable people during the initial cycle of activities but had not yet contacted them. Because of the kinds of files, she was designing and the need to move around with them, she had upgraded to a higher capacity flash drive of 5GB. This she said would be used to carry a few video clips and pictures that she would use in the design of the courses she was going to teach. She said she got this knowledge from participating in the initial pilot of the CoP and so this second pilot was adding on.

8.3.3 Participation in the community activities

From the above data, there is an indication that from the second pilot of the CoP, educators have started appreciating their engagement in the activities. Participation in the pilot is an enabler of many of the experiences educators claim. Educators have started the process of identifying whom to network with and generally showing mutual interest in activities related to effective pedagogical integration of ETs. They are happy that they are developing skills through networking with each other. They

express their appreciation in their attempts to indicate whom they have met, and what the individual has been to them. They are constructing their identity as a group able to effectively engage in pedagogical integration of ETs; much as they had initially indicated the prolific in understanding and using of technologies. It is interesting to note that educators who had just come to see and observe what was happening in the initial pilot, are in the second pilot slowly getting actively involved in the CoP activities.

There are issues that strongly came out related to the second pilot in which the practice of pedagogy using ETs like GD was executed. They include the multiple perspectives held by the educators relating to LCs and the technologies, scaffolding of learning experiences, collaboration and meaning making. From the initial pilot, it was observed that educators valued and yearned to effectively teach with technologies, and needed some form of leadership and coordination in the process of learning to teach with technology. Some educators were initially observed to have a somewhat negative attitude about teaching with technologies that were not always available. All these out-rightly formed the multiple perspectives which educators had amidst limited resources that enable the effectiveness of teaching with technologies. The following illustrates the above:

> *an induction… the many tools you suggested and I have been trying them… and we are using Google docs as well as wikis for some few already…. But these are not even there* (Interview, E1, 22.02.2016).
> *With technologies, there is no minimal participative learning… learners are very disadvantaged…. With a projector, I will use less energy…. Unfortunately, it is not always available to me.* (Interview, E2, 23.02.2016).
> *These are the technologies still unavailable although they are not much helpful in this era…. You have personally helped us identify several technologies …I have seen a difference… unfortunately the people who inspire me are not here within.* (Interview, E3, 24.03.2016).

The second pilot of the CoP was seen to influence the development of proficiency in pedagogy of large classes with ETs for example E1 was observed to be mastering several tasks in working smoothly on the LMS, something he had said he was not very comfortable with at in the initial pilot. E2 was also observed to be getting used to drawing on the experiences of other colleagues in the similar situations to bring about a change in his own practice of teaching with technologies. The context in which educators operated was influencing what was later seen as mastering of legitimate knowledge in the practice of teaching with technologies as observed from E3. E4 and E5 were seen to be progressively getting re-experiences of issues they

could do including using emails but initially on a very personal level. This time around, they realized they could use emails to reach out to more students than before participating in the second pilot. The context in which activities were held influenced educators to experience the practice of pedagogical integration of ETs from different perspectives based on which technology an individual had used before.

Table 10: Experiences related to second pilot of the CoP

Educator	Experience
E1	It introduced technologies and skills; Sharing experiences; Induction, Many people with different opinions.
E2	It brought technological skill; Learning with others; problem solving capabilities were also introduced.
E3	I learnt of limited technologies; limited time to explore technologies, Asking questions; Clarification of misconception; Talent exploration; Teamwork and networking.
E4	I met new people in very respectful environment; Dialogue on teaching with technology; asking for what I needed.
E5	Self-reflection; I met many friends and networks explored; In this environment, I am aware of implicit theories of teaching with technologies; limited technological resources including skills; concern, care and team working relations, no technologies.

Source: Generated from primary data

Table 10 is a summary of how educators thought that the second pilot of the CoP influenced their development of personal proficiency in pedagogy with ETs. Some of the educators said the context exposed them to new people and they therefore got the opportunities to ask the relevant questions they had. What cuts across on views relating to context during the second pilot of the solution was that educators felt that the context offered them limited technologies to work with in their learning of the practice of teaching LCs. This influenced the ability to be creative, as they had to operate in the environment of limitations in both the skills and the technologies to be used.

From the data, it is seen that in the second pilot of the CoP enhanced development of a practice as characterised by actions that promoted what educators valued in their perception. It was a deliberate action for the educators in this second pilot to be introduced to the ETs available in the environment that enabled them to start thinking of what technologies and how they can be used in teaching in LCs. The second pilot of the CoP enabled educators to identify individuals they can network with and ask

for help whenever they needed. The second pilot provided an environment where educators enjoyed co-creative mind-set and imagining in the pedagogical integration of ETs amidst the limitations.

8.3.4 Community in which the intervention operated

Other educators also found active engagement during the second pilot of the CoP useful in development of proficiency in pedagogical integration of ETs as illustrated from the in focused discussions and interviews:

> *Situations like these gave me opportunities to listen to different academicians… Before these presentations, I was off in my cocoon and very passive* (Focused Discussion, E2, 05.06.2015).
> *I am now becoming great at sharing Google docs, something I could not do before, I have been proactive in this process* (Focused Discussion, E3, 05.05.2015).
> *I've gained more confidence learning from others as I actively got engaged with entirely all of them* (Interview, E4,22.02.2016)
> *I've learnt so many things from my colleagues including persistence with lots of activities around me* (Interview, E5,26.02.2016).

As a requirement of EDR and in relation to the principles of SLT, during the second pilot, E1 for example was observed to appreciate the fact that as a beginner, he was learning a lot from those whom he thought knew more through actively engaging with them and asking them questions. E4 indicated that the way she was welcomed into the CoP and the kind of activities she was given as an orientation were very useful in allowing her to appreciate the environment that was to be the basis of her acquisition of skills in teaching with technology through active participation. E5 said one would grasp what they needed as a skill because there was active engagement and with lots of choices and freedoms involved. In these ways, during the second pilot of the CoP, educators were seen to be actively engaged in activities that enhanced development of proficiency in pedagogical integration of ET in LCs as a practice.

Table 11 indicates that during the second pilot of the CoP, educators thought shaping pedagogical integration of ETs was influenced by the community in several ways including getting new friends and trying out on ideas that led to empowerment and confidence building. Educators were observed to have had fun as they were working while discussing and debating crucial issues involved in their practice of pedagogical integration of using ETs. Participation also created an environment for empowerment and confidence building as there was exhibition of care and concern from other colleagues. Another observation was participation in the second pilot of the CoP offered educators instant feedback on their performance which enabled them to

adjust and move faster in their mastery of the practice within a community environment.

Table 11: Experiences in the second pilot of the CoP

Educator	Experience
E1	I could get friends and trying out; I got empowerment; opportunities for active listening; interaction with others; Fun as I worked on critical issues from this entire community.
E2	I got empowerment; networking skills; exposure to alternatives; concern and care from colleagues; and mentorship from the community.
E3	Through the community, I had hands-on practice; there was no competition but perfection; new and better techniques; I was also able to actively reflect and have a change in perception from the community.
E4	I am empowered, I attained a sense of commitment, I could seek clarification; explore gaps; and map the knowledge.
E5	I got people who were willing to help; I engaged with critical approaches; getting along with other diverse views; contribution from all; Discovery strategies; Feedback on my performance that helped me develop the competence.

Source: Generated from primary data

From the above data, it can also be seen that through the second pilot of the CoP, the community was a powerful agent in learning pedagogical integration of ETs. The second pilot of the CoP provided a community environment for educators to display their abilities and the platform for knowledge production. This was true because of the recognised expertise which was coming up, and the way beginners were welcomed and the scaffolding of knowledge was concerned. These issues are always overlooked because they are considered obvious and therefore no deliberated activities designed aiming at a vibrant CoP. This presumption is made because this kind of learning is for adult and therefore they are considered to know what they are doing. Such an environment should however, never be misconstrued to mean a community without differences among individual practitioners. It should be a community where individuals have a focus on collective professional growth. These were all identified in the second pilot of the CoP as educators were seen in the support offered to each other as they went about the daily routines.

In summary, the second pilot of the CoP was seen to have helped educators progress, because it provided a collegial environment for positive criticism as educators socially interacted. Those criticized also accepted it as positive criticism with humility and

this positively impacted on their determination to operate effectively in a context with limitations. The second pilot shows a level of transparency and drawing on each other's skills as educators engaged in pedagogical integration of ETs. However, limited technologies and tools affected what individual educators would have wished to learn to get proficiency, as they had to work with what was available. Because technologies were limited in this context, they provided more limited informal opportunities for the discussion of knowledge, experiences, skills and insights influential in the proficiency development process.

8.4.0 Third pilot of the community of practice intervention

Requirements of EDR demand that several pilots of an intervention are done to determine how a design functions. For this reason, there was a third pilot of the CoP focused on pedagogical integration of ETs. The third pilot intended to clarify on what had been observed both in the initial and second pilots, so as they serve as evidence to refinement of the design principles.

Generally, educators during the third pilot of the CoP were observed to have increased their capabilities of using technologies to teach as they asked students to have email address they can use for interactions. The kind of questions educators asked during the third pilot included: the need for help to work on specific activities on the LMS indicate that the level mastery of pedagogical integration of ETs exposed to them. The usage of ETs in pedagogy nonetheless is going high with each subsequent pilot of the CoP activities. The kind of multimedia educators were exploring in the third pilot of the CoP also indicated another move to the direction where technologies are getting more attention. There was a clear indication that all this was because of the growing helpful relationships among educators and the synergy of collaboration. Again, it is reiterated that the changes observed from the educators are not just due to natural changes as there should be something influencing the developments.

8.4.1 Activities in the intervention

Observation and interaction with E1 during the third pilot of the CoP indicated an even deeper transformation of his practice of pedagogical integration of technologies. It was observed that E1 could use simulations in teaching of LCs. The use of basic simulations in teaching is not strange but the way E1 specified the simulation at this level compared to the initial and second cycle indicated a bigger

change. He said he had realised that he needed to interact more with the students and therefore decided to create a Gmail address which had more storage space than the official email that limited him in attaching some documents of more than 10MBs. This educator asked many students to create email addresses and join Facebook so that the interaction could not be limited to the class. It was observed that his questions about the LMS related to more knowledgeable people helping him to find the forums he had created but for one reason or another, he could not access them.

Table 12 is a summary of attributes and experiences for participation in the third pilot of the CoP.

Table 12: Experiences from the third pilot of the CoP

Educator	Experiences
E1	Use of simulation to teach; Advising students to have Gmail addresses; Asking for help to find a specific item on the LMS; Interaction with students on LMS; Facebook interactions.
E2	Cannot be in class without slides; Cannot be without an LCD projector; Working with other people; Smart phone, download of materials.
E3	Consulting colleague for help; Effective operation in large classes; Use of smart board for teaching; Knowledge of recording videos.
E4	Using PPT presentations; Owning an iPhone; Interacting online; Not liking to work alone; Using Excel software; Trying to use multimedia
E5	Uploading course on the LMS; Using GD; Consultation; Planning to try flipped class Interaction on WhatsApp

Source: Generated from primary data

In the third pilot of the CoP E2 indicated equally rapid changes in saying he had mastered how to use a PowerPoint projector. It should be remembered that this educator indicated that he did not have knowledge of usage of a projector in the initial pilot of the CoP. He had equally gotten more advanced in preparing PowerPoint slides and from his own statement, he said he finds it difficult to go to teach without a projector. He said he had worked with other people he met during the initial and the second cycle of implementing the solution, who were keen at exploring the pedagogical integration of technologies. He had taught students how to access the materials from Google scholar and encouraged them to use the materials they would find useful in their studies. Because of his understanding of technology for instruction, he had acquired a smart phone, which he used to receive emails from the students.

He also indicated that the process of attaining these skills took place through his active participation in the cycles of implementing the CoP activities.

Interaction with E3 in the third pilot of the CoP indicated major changes in his conversation related to pedagogical integration of ETs. He said that during the initial and second cycle of implementing the CoP, he could network with colleagues. During this pilot, he consulted colleagues whom he identified to help him in designing a technology-embedded lecture, which he believes worked very well. He asked a colleague to go with him to class just in case he was stuck while trying to use the smart board to teach. He also indicated he was learning so much more about pedagogical integration of ETs. He could record a video from outside his class and that is why he needed to use a smartboard to demonstrate what he wanted to his students. Asked where he had gotten to know how to record a video, he referred to one of the previous implementations that had taken place. There had been a demonstration to the educators on how to record a video using a webcam. What was interesting is that when he was recording his video, he got stuck. He could get the phone number of the one of the educators, they worked together and collaboratively, and things seemed to work better. The power of networking and collaboration can be seen at play in this educator's attempt to enhance skills in pedagogical integration of technologies.

8.4.2 Context in which the intervention operated

During the third pilot of the CoP, observation of E4 indicated her pedagogical integration of ETs was growing. From someone who indicated in the initial implementation that she did not know how to design a PowerPoint presentation to someone who now thinks it is impossible for her to go to class without the same PowerPoint presentation. With guidance attained in the initial and second pilots, she is now having an iPhone, which she said she uses to interact with some of the students online. With her iPhone, she has set up Facebook group where she interacts with students from anywhere provided she has data. Her work practices have changed to the effect that she finds it boring to work alone, she therefore prefers working with other educators because she finds it ideal in problem solving. During the third pilot, she was planning to use multimedia activities to teach her classes, remember this is the same person who had indicated that she had no idea about multimedia and how it is used in instruction during the initial pilot of the CoP.

E5, it was clear too that her knowledge in the practice of using technologies was growing stronger too. She indicated she had finished designing the course and uploaded it to the LMS. She had begun sensitizing students to enrol for the course too. She consulted one of the people around her who gave her an induction and demonstrated to students how to enrol for the course. She designed a simulation of a workplace hazards and because the nature of files she was using in course design had become too bulky, she was using GD for storage. She was more comfortable in projecting how she will use flipped classroom approach because she knew the technologies that are involved. It should be remembered that this educator had asked how a classroom could be flipped in the initial piloting of the CoP. During the third pilot, she also indicated that she could figure out how to reach to her students using technologies and she gave credit to all her participation in the pilots that had introduced her to the strategies of using technologies to get to the large student numbers in a class. She had also set up a WhatsApp group for her class, she would interact with her learners at any time, and this helped her understand how to cater for the academic needs of learners early enough before coming to class.

Table 13 is a summary of educators' experiences related to the third pilot. It indicates that the CoP progressively shaped their practice of pedagogical integration of ETs. Through the third pilot of the CoP, there was more interaction with individuals considered specialists, mentorship, sharing of experiences and exciting insights into pedagogical integration of ETs. In this pilot, participation also influenced collaboration and confidence building, which were also very vital not to forget the modelling of professional conduct of the educators. Active participation gave educators the zeal and will to proactively engage in hands-on activities, and emulate the values of those they interacted with thus building confidence in pedagogical integration of ETs.

8.4.3 Participation in the intervention

From the findings, active participation in the third pilot of the CoP catered for hands on experiences to be attained. However, active participation would not have been possible if educators had the same level of skills, therefore the diversity of skills set level was vital in enhancing the level of motivation and interest. Active participation was a matter of collaboration between those educators with more skills in pedagogical integration of ETs and those trying to make their way into this same

practice. In this way, modelling and scaffolding effective pedagogical integration of ETs was possible. Active participation as a process in the third cycle of implementation was utilized by educators to engage in asking questions and seeking clarification on what they did not understand well in their hands-on practice. From a SL perspective, the finding here implies that learning pedagogical integration of ETs is not separated from the world of action but exists in robust, complex, social environments made up of actors, actions, and situations.

Table 13: Experiences during the third pilot of the CoP

Educator	Experience
E1	Through my active participation, I demonstrated effective usage of technologies by the experts available. The interactions therein and the exposure to the challenge let me to attain the confidence.
E2	Through actively being involved, this educator was seen to be sharing experiences and building confidence. He said the active participation was collegial and professional which made him appreciate efforts of collaboration and active engagement.
E3	Actively engaging with specialists gave me access to mentorship knowledge; Guidance; Clarification of ideas; Collaboration; and pointed to the right direction in my learning the usage of technologies.
E4	In actively participating, I was engaged in selecting ideas; drawing on others, self-discovery; growing skills; collaboration; identifying my weaknesses and the professional conduct which helped me learn more.
E5	I was exposed to diversity of skills; questioning practices; exciting activities; interaction with new and old-time friends; Exploration of new values, beliefs and all this contributed to enjoying the entire process.

Source: Generated from primary data

From the above snippets across the three cycles of testing the CoP, the attitude developing by the third cycle of solution implementation is that of 'no moving backwards'. It should be noted that these same educators had initially expressed little knowledge of the performance and usefulness of these same technologies in large class pedagogy that they are now clamouring for. However, this was happening majorly out of collegial influence and the developing need to effective integration of technologies into pedagogy.

8.4.4 Community in which the intervention operated

There were several observations that could not be necessarily tagged on individual educators, not even the pilots. But they were observed and give an insight into how the CoP was helping to shape proficiency in pedagogical integration of ETs. A summary of the data points to issues that led to effective utilization of the CoP to develop the necessary proficiency in pedagogical integration of ETs. Educators found the freedom to use and refer to colleagues they interacted with during the pilots. The formation of their identity is also seen as educators started to get a strong attachment to the community like never. The data indicates that educators participating in a CoP should be able to consume their own ideas that they share because in this way, they come to put the ideas to a better test. The social architecture should be used for practicing shared ideas as a community. The environment should also be able to provide first-line support. This CoP had a place from where new educators arrived and could ask questions. It was necessary for the members to be keen, observe how new educators get lost, what mistakes they make, and improve therefore improve on the operations based on such experiences. Perhaps the mission confuses them. Teaching gave them perspective of ETs, and learning let them pick new tools over time for effective pedagogical integration of ETs.

Nonetheless, this was dictated by the resource-constraints as explained in the previous chapters. The community was characterized by tolerance of other people's ideas, self-esteem and evaluation of the achievement in the journey so far, free workspaces, regular structuring of the meetings that brought about a smooth learning environment and positivity among the individual educators. There was also a sense of humour that individuals exhibited as they made fun of themselves and their own acts and the levels of commitment for enhanced performance, free access to advice and discussions and fair authority as in Table 14.

Table 14: Recorded details of activities from the three pilots

Theoretical aspect	Analytical constructs	Description of theme	Sub themes or indicators providing evidence of practice	Example of related data (observations, discussions or interviews)
Activities	Large classes	Classes that have many students and hinder a teacher from effective interaction with individual students. Management of large classes Beginning and experienced educators	Number of students taught in a semester Strategies used in teaching the large classes Concerns about large class teaching Expectations from sessions Difference in student learning Need for a solution to large classes Confidence and burn out while teaching Mutual regard Identification of the need	Problem solving strategies Over 300 students; 1500 students,150 students, 800 students, 150 students Groups; Lecturing. Students are bored Innovation, learning from others. Dividing students into small groups I teach from theatres and conference halls Helpful relationship development Shared values Synergy in working together Co-creative mind-sets
	Emerging technologies	Modern technologies referred to as ICTs that enhance both face to face and distance learning teaching and learning methods	Experiences in technology usage Access and usage of technologies like computers, learning management system, smartphones and internet technologies Technologies in one's possession Good YouTube videos not in use Capacity of the equipment one holds, Confidence in teaching with technology Identification of URLs Compelling need Interested in networking Clear benefits	Available technologies Addressing the problem of teaching large classes Progressive knowledge, possession and usage of technologies Got to Google drive applications Sharing google documents Implementing discussion forum Using some technologies to allow them to google Individual consultations Student interaction is what I aim at Communicating to the students Identifying URLs useful for teaching Laptop, iPad, Camera, Smartphone, Buying equipment using own resources
	Problem solving strategies	Undertakings that individual educators engage in the practice of teaching Diversity in the levels of practice	Familiarity each educator had for others Motivation in teaching with technologies Engagement in teaching with technology	Critical reflection, Networking. Knowing all other participants. Active management of group dynamics Being asked questions that enable me think Ready to encourage and motivate other people Keenness and curiosity in participation Regular participation in sessions

From Table 14, many activities according to the findings related to large class environments which hindered effective interaction between educators and teachers. Management of such large classes was also seen to be problematic for both beginning and experienced educators. The large class concept was seen from the numbers of students handled per semester. The strategies used to teach the large classes were largely instructivist and the educators had reasons to be concerned. Therefore, the educators had lots of expectations from the pilot of the communities, thinking it had to provide possible solutions to their dilemma as they were concerned with the different learning abilities, confidence and burn out while teaching. The pilots provided them with a forum to share all these concerns and even collaboratively develop strategies of effective instruction in large class environments using modern instructional technologies.

The ETs in focus here enhance both face to face and virtual interaction between educators and students. There was therefore the evidenced need to share experiences in technology usage for instruction including usage of LMS, smartphones, and other internet technologies. Indeed, the usage of MOOCs was also deliberated on and the technologies that educators had access to were explored including YouTube videos that could be used as open source instructional materials. However, the usage of such technological instructional materials depended on the kind of equipment that one holds and the level of confidence in exploring and manipulating the same equipment. There was therefore the need to address individual educator technology needs and the need to get open source applications like Google drive to help in some of these circumstances.

The activities also focused on problem solving strategies that help individual educators engage in pedagogical integration of technologies. The individual is emphasized here because each participant brought on board a diversity of experiences. So, there was need for educators from various departments to be familiar with each other for trust to be developed and used as a basis of pedagogical integration of ETs. The tools in problem solving focused on critical reflection, networking and knowledge of other participants in position to help. So, there was need for one to actively engage in seeking knowledge and ideas related to pedagogical integration of emerging technologies as presented in Table 14.

Table 15: Recorded issues of contextual issues from three pilots

Theoretical aspect	Analytical constructs	Description of theme	Sub themes or indicators providing evidence of practice	Example of related data (observations, discussions or interviews)
Context	Information seeking	Ways of going about a teaching process Real teaching practice problems	Teaching many students in the class, views related to learning process in LCs. We do reflections which I consider Opening emails as MUELE alternative Limited facilities	Teaching practice problem teaching scenarios Teaching 300 students in a class, No learning here, Using lecture methods only Explain in detail, but not everyone is part Giving students materials in advance Giving students research themes Environmental cues
	Seeking experiences	Issues encountered in teaching Transition from beginner to experienced practice	The feeling that one was not teaching well, the discomfort a teacher has More technologies than expected Tailor made solutions, mutual interdependence	The feeling that one is not reaching all students Level of persistence even when frustrated Technology moving too fast Unsustainable connectivity for students Can't easily bond up with people Confidence in teaching with technologies
	Common purposes	Issue in the practice of teaching with technology in large classes that required joint effort to be tackled	Feeling that large student numbers affected all educators and they needed a solution as a group Exposure to more technologies Agreed on teaching with technology	Not thinking that one would have done it alone, Agreements on problem based learning in teams, Negotiation of meanings, Working with others Formation of Learning networks Negotiation to agree on teaching with technology
	Collaboration	Working in teams in consultation with each other	The ability of educators to know whom to consult on a given issue whenever they need help Learning from others	Knowing whom to consult, Working together with another person in the practices. Belonging to a group made me comfortable Setting out to begin on teaching with technology Inspired as I work in collaboration I am just part of the practice and the group

The context in which the intervention operated is described in Table 15. The context involved information seeking strategies related to pedagogical integration of technologies. The context was also that in which teaching in large classes was a real problem and many colleagues wanted to share experiences. The context involved use and sharing of experiences related to virtual and face to face instructional activities. The context was also that with limited resources both human and technological resources. Seeking experiences related to issues encountered in large class settings as the educators transited from beginners to more experienced ones. There context provided an environment where role models had to be identified and used in promoting pedagogical integration of ETs. Such a context also provided room for a common purpose which is pedagogical integration of ETs as participants had a level of technology exposure they needed to share with others.

Table 16 is a presentation of issues related to participation in the CoP, in relation to seeking experiences and networking which required that individuals become active in all the activities of the community. Participation also focused on exploration of the available technologies and taking notes so that one could be able to try out what had been observed. Participation involved ongoing interaction with membership of the community that involved participation in meetings, seminars and dialogues once called on. In this way educators learnt from their daily practice through reflection related to the process of pedagogical integration of ETs. This is evidenced in the statements like I was helped to learn a new technology, there are different views in one place, we had to strike a balance and the development of personal learning networks. Active participation is also seen to bring about increased confidence in pedagogical integration of ETs.

Table 16: Recoded issues of participation in the three pilots

Theoretical aspect	Analytical constructs	Description of theme	Sub themes or indicators providing evidence of practice	Example of related data (observations, discussions or interviews)
Participation	Active participation	Approach enabling individuals to be included in community and have a greater say in how they go about practice in ways that matter to them.	Induction into the activities of the practice. Such activities are started by innovators Access to technologies Acquisition of personal technologies Legitimate participation	Ongoing interaction Liberty of asking questions Enjoyed participation life Increased through dialogue with experts Increased confidence because I am involved Learning from experience in participation
	Seeking experiences	Techniques, enabling practitioners to create and update organize, concept maps, idea maps that enable them improve performance.	I refer to the notes I take during seminars consultations were easy to make Inspiration to teach with technologies	Learning from daily practices of observation Increased level of confidence has come with help Learning on practice has been extremely helpful I was helped to understand the LMS Dialogues with others as people learnt
	Networking	I knew whom to call relating to MUELE	No lonelier journeys in practice How would I be alone So much learning in teaching with technology	I called someone/ I consulted Dialogue, ask people around me Personal learning networks Different views are in one place of participation Assigning of smaller jobs Performance of harder jobs

Table 17 is a presentation of specific details about the community- an environment for collaboration and working in teams among educators, which was a direct benefit of collaboration. The educators had a task to identify from among themselves whom to consult in relation to which technology. This also had an implication on belonging to a group as it was not easy to consult those people unknown. During this process of collaboration, educators became inspired and looked forward to work in groups relating to technology integration as the Table indicates.

The community involved interactions, mentorship processes and expertise in pedagogical integration of ETs. It was in this community that colleagues could interact with each other both formally and informally and thus share common values. This is an environment which provident opportunity to ask questions, observe what others are doing and critic practice. In these ways, there was development of trust and collegial relationships that were eventually helpful in enhancing pedagogical integration of ETs.

Table 17: recorded issues of the community across the three pilots

Theoretical aspect	Analytical constructs	Description of theme	Sub themes or indicators providing evidence of practice	Example of related data (observations, discussions or interviews)
Community	Interactions	Sharing common values	Helping each other in a technology world Establishing working rules and regulations Organisational structures Formal and informal practices Diversity composition of the society Information provision	Liberty to ask questions relating to technology I have a variety of friends Starting to go to other offices for help Becoming motivated and empowered Collective knowledge base developing Getting to know through informal conversations Shared repertoire.
	Mentorship	A relationship in which a more experienced or more knowledgeable person helps to guide a less experienced or less knowledgeable person.	Real help in real time, patience with Working together and free relating Trust development Inspired to try out	Seeing others do the teaching with technology Introduction to technology by innovative people Developing commitment and sense of identity Respectful for ideas from experienced people Questioning others to understand Ability to accept that one did not know
	Expertise	A person who has special skill or knowledge in some field; specialist.	Activity packed full of learning Information provision They make learning lively	Observing performance of the experts Guidance given by the old members Developed confidence from the collaborative act Explanation and eventually one was on their own

8.5.0 Participant reflections on the piloting cycles

In the pilots of the CoP, educators had to engage in reflection including sharing the experiences and the changes since the initial pilot of the CoP. From the reflections, there are indications that the CoP had brought in an environment for better exposure and focus on pedagogical integration of ETs than had been before.

> *I am amazed I used Google docs and I had my students download it than it would have happened in the lecture. I must say I cannot believe it me doing it* (Focused Discussion, E2, 05.02.2016).
> *I have implemented a discussion forum on MUELE and my students are now interacting beyond the lecture room, I did not know I could do this* (Focused Discussion E3, 05.02.2016).

The strategies of pedagogical integration of ETs to bring a difference in student learning in LCs had been well mastered across the phases of piloting the CoP. In the third pilot, educators said they were more empowered in terms of technology usage and they had started identifying and responding to group dynamics to learn more related to pedagogical integration of ETs. Uniquely, E5 illustrated the level of persistence even when there was frustration during an attempt to share Google documents with students during her reflection.

> *I set up a Google document and I invited students for the first two weeks, I got no response… this discouraged me and I thought I was wasting time… But after attending the plenary session, I came to understand I was not alone. I go the courage to try again, and this happened from the start all through to recently* (Interview, E5,22.02.2016).

This educator said there was no much change through the CoP since he could use technologies before, but he wanted to illustrate what persistence in such a situation means. It is understandable that during the initial cycle implementation of testing the solution, educators were expected to get stuck. What was more important is not what made an educator stuck, but what they did when they became stuck. Reflections indicate that educators knew whom to call and consult to be able to sort out their issues. Indeed, in such times, there was a need for dialogue and asking of the questions related to how you are stuck and the kind of help one needed. E1 said he had been taking detailed notes during cycles of activities so one time he was stuck in the process, but what helped were the detailed notes he had taken as he went over them again and discovered what to do.

By the third pilot of the CoP, educator reflections showed that educators had a variety of technologies including bigger capacity memory cards to transfer files from one location to another, the ability to try out Google drive in delivering lecture material and sharing

some of the material on the drive. E4 said she had so far been inspired through learning that some phones can enable access emails everywhere there is a network and there were therefore plans to acquire a bigger capacity phone by the third pilot.

> *I had to get a bigger capacity phone because my students were emailing me all the time related to an assignment I had given to them* (Interview: E4, 26.02.2016)

Through exposure to technologies, educators said that their pedagogic practices are changing in terms of their way of looking out for and giving materials to their LCs. E2 said he was getting out new materials from a URL he identified and was getting new and better ideas that he can pass on to students. E3 tried out on the pilots of a discussion forum on the LMS to enable more students in the large class participation. Through being asked questions about how they were using technologies in teaching across the three pilots, they said they were enabled to think about their capabilities in teaching with some of the technologies available to them through the networks they created.

8.6.0 Revisions between pilots

To come up with plausible solutions, EDR recommends that adjustments are made between pilots of the intervention. Adjustments in the testing the CoP were based on the concerns raised by the educators. Just to keep tab with the issues educators went through as they participated in the activities in their sought-for-knowledge, they were asked to identify the inhibiting factors as they progressed from the initial to the second and third pilots. Remember transition from the initial to the second pilot took a period of about twenty weeks (a semester) on the average. An educator said that they got more challenges than expected without giving any detailed explanation. However, some educators said the technologies were moving faster than expected as each semester a new computer, new windows, new software and hardware came to be introduced to them. Indeed, in the initial pilot, there was use of Windows XP systems and by 2015, they were phased out from the university. More still, there was a concern related to connectivity to the internet, which was intermittent during pilots. Most of these concerns were technology related with very little control of the researcher. In one of the pilots, the internet went off for a week which disorganised the process of using GD and access to Gmail addresses. Some of the concerns, which the researcher had control over, are explained in detail here and the ways they were attended to in the subsequent pilots.

During the initial pilot, there were generally concerns raised about the structure, content and implementation of the solution activities with educators indicating that too many

technology tools had been put up initially. Educators also raised a concern regarding the time available for mastering all the content presented during the pilot.

> *I feel the need for such technologies and activities. But about what is going to be covered. It all looks good and it is well thought but I am afraid it is too much considering the time at hand* (Focused Discussion Group, E2, 04 .02.2014).

This concern came during the initial pilot of the CoP and was addressed in the second pilot of the CoP in such a way that there was a focus on only a few technologies. The initial pilot of the CoP was cluttered with many technologies including Google, videos, smart boards, Microsoft office tools among others. There was no clear focus of any technology. An adjustment was made in that the second pilot focused on usage of Google technologies and the LMS in pedagogy. In this way, educators appreciated that what they were learning was becoming manageable and focused in terms of how much was being introduced to them and covered.

The next concern was on the number of plenary sessions held in the initial pilot. As a researcher, I made a timeline indicating when plenaries were to be held and that was always after five weeks. Educators however said that they were uncomfortable with the five weeks and preferred plenaries on demand. This concern was addressed by adjustments in the number of presentations and demonstration in the subsequent pilot. In the next pilot for example, plenaries were held on demand and they were more frequent than anticipated.

Relating to the structure of the activities in the CoP, educators needed to cover some of the themes before others; they claimed that one needed this information as a prerequisite to the other. For example, educators suggested to be introduced to the LMS after covering GD applications. The concern here related to sequencing of the content in the activities to be covered as some educators considered that some technology tools they were getting exposed to were 'harder' to operate than others:

> *I agree the tools are all useful and some of us are still ready to learn, however, my problem is the chronology, I wish there was a way of identifying those that are easier to be covered first.* (Focused Group Discussion. E5, 04.02.2014)

This concern was addressed in such a way that an adjustment was made in the chronology of technologies to be covered in that those technology tools that were easier and with which educators said they were more conversant were covered first in the next pilot of the CoP. This was in respect of the principle of 'from known to unknown'. For example, the succeeding pilot emphasized the LMS before Google technologies were emphasized.

Another concern related to scheduling individual pilots over a period rather than concurrently as educators were unable to participate in plenaries held at the same time. More still was the implementation of activities for longer periods than the few hours as was the thinking of the researcher. This concern is further illustrated as follows:

> *I would rather say that you rethink the timing because some of us are extremely uncomfortable with the rash through approach taken because of the time* (Interview, E4, 04 .02.2014).

To address the above concerns, it was considered appropriate in the view of the researcher that since the list of technologies was long, in the second pilot, an adjustment was made in such a way that some technologies were combined and collapsed into general ones since the procedure of usage is the same. For example, there was a consideration of Google Technologies and do lumping of Google forms, Google document, Google pictures and Google sheets among others. Also, the LMS technologies had to include many others including creating and uploading documents. In addition, the pace at which the technologies were introduced was reduced through chunking and frequent breaks between technologies. In addition, the time of interaction was made longer and more detailed than in the previous pilot.

The other concern was that the plenaries were held in an environment that was small with the room not allowing free style sitting, computers locked in their places yet educators preferred free style sitting.

> *We are in a place where computers are tied on chains and we cannot have comfortable space to turn around! Even just turning a computer to face you is a problem because we are sharing them so the other colleagues will complain* (Interview, E3, 04 .02.2014).

The adjustment made here was to take educators to a free style-sitting environment for the next pilot of CoP plenary activities where they conducted further exploration of the available technologies. There was need for an environment that depicted modern pedagogic approaches. During this adjustment, educators were requested to bring their own laptops so that they would be able to work in a free environment.

There was a concern raised about the pairing of educators who seemed more knowledgeable with those who were just making an entry into this educational technology arena.

> *I know I sat near him but that did not mean I wanted to discuss anything with him. Now we were told to turn to neighbours and discuss… OMG, let that not happen again* (Interview, E3, 04 .02.2014).

The adjustment made here was through advocating for educators to choose working with others whom they were sure they were going to benefit and learn from. In the subsequent pilots, educators were at liberty to choose whom to pair with. In this way, educators felt more easy and relaxed learning with individuals they had willingly paired with. On the concern of language, in the succeeding activities, there was an adjustment in the use of technical jargons. As a convener of the activities, I am comfortable with words like uploading, defragmenting, booting and may others. Little did I know that participants were not comfortable with them and therefore, I had to explain every technical word used in the subsequent pilots.

8.7.0 Summary of chapter eight

This chapter presented findings from the three pilots of the CoP indicating the increasing levels of activities, participation and the changing contexts and community in which the intervention was operating. From the findings across pilots, the operation of the community of practice focused on pedagogical integration of ETs is helping educators get to understand the process. Educators are getting focused and enhancing their pedagogical integration of technologies while working with others. The next chapter (nine) is a discussion of findings from the pilots.

CHAPTER NINE: DISCUSSION OF FINDINGS FROM PILOTS

"The only source of knowledge is experience". Albert Einstein (1879-1955)

9.1.0 Introduction

This chapter discusses findings from piloting the CoP and the resultant situated learning that the activities, context, participation and community enjoyed.

9.2.0 CoP piloting in relation to situated learning

This discussion draws from Albert Einstein's statement that the only source of knowledge is experience. This is because the thesis focuses so much on individual experiences as observed and reported in the interviews and it is therefore believed that this is the basis for knowledge. Educators reported their experiences and the observations were also focused on their experiences. Findings in the previous chapter illustrate scenarios relating to SL practices in a CoP, through the LPP process. Piloting process helped educators to actively engage pedagogical integration of ETs. Wenger, Trayner and de Laat (2011) emphasize the importance of SL in allowing collective development of a knowledge base through active participation. It is little wonder therefore that during the piloting, educators found it comforting to work together drawing on experiences as they actively participated in creating knowledge. However, power relations still exist amidst CoPs even when knowledge is collectively constructed, which situations sometime inhibit free participation relating to modelling pedagogical integration of ETs.

Findings confirm that SL is usually unorganised, based on questioning, observation and conversation with those who know (Table 7). Educators actively asked for information, conversed with those whom they considered knowledgeable and in this way, they identified and formed networks that they sustained. The development of practice in this way is a journey sustained through keeping networks alive and appealing to them whenever necessary (Wenger & Wenger, 2014). Networks comprised of educators engaged in pedagogical integration of ETs including those beginning a journey and those more experienced in academia as the knowledge the community. Innovative ideas were generated in productive conversations among educators and therefore, educators are key in achieving a competitive advantage of the institution once they attain the required proficiencies in pedagogical integration of ETs. Specifically, innovative educators in pedagogical integration of ETs are key assets in the formation of vital networks because they turn their unspoken knowledge into knowledge necessary for innovation, beyond the obvious and express knowledge through the sharing spirit (Maringe & Sing, 2014).

Therefore, networking is a vital attribute in the pilots of the CoP that lead to enhancing proficiency in pedagogical integration of ETs.

Findings point to the proficiency development process as taking place through the pilots because an authentic environment was evoked (Tables 12 and 13). Herrington (2015) affirms that an authentic environment makes learning of a practice more realistic and plausible. From the pilots, educators dealt with real LCs and real technologies to gain the required skills. Dealing with realities enabled educators to engage in pedagogical integration of technologies and ask for real help in real practice environment. There is therefore little wonder that by the end of the third pilot, educators could do what they thought was hard in the initial pilot including designing PPT slides. The environment engaged educators in finding solutions to a problem and tried out the solutions in collaboration. The solutions that came from the reality of participation in activities contributed to enhanced proficiency, which agrees with Ng'ambi (2013) idea of a CoP as a sandpit environment enabling proficiency development. For a solution to be approved as working, we could see community collaboration at work. This agrees with Wenger (2015) who asserted that it is the community as an authentic environment that takes the discretion of determining who is knowledgeable.

Findings agree with Schanzenbach (2014) who observed that enthusiastic members in a practice can begin a network, which in the end proves useful in helping other practitioners gain the necessary proficiency. This could be seen throughout the cycles of pilots as some educators volunteered to help others learn attributes of pedagogical integration they already mastered. This was not because they had lots of experience in pedagogical usage of technologies, but they wanted to know more about effective implementation in pedagogy so that they would become more effective. Findings indicate that the initiative to ensure that the community has a vibrant mentorship environment promotes professional relationships among the educators is focused on a domain (Table 10). Schols (2012) emphasizes the value of professional relationships where there in support for each other in a practice environment. In professional relationships, individual educators get inspired through observing what others are doing with the technology tools and decide to emulate. From the findings, voluntary action and professional mentorship helps in the process of proficiency development among the educators in pedagogical integration of ETs.

From the findings, Wenger's principles of a CoP including mutual engagement, joint enterprise and shared repertoire (Wenger, 2015) are seen at play as educators voluntarily accepted to be part of the team to solve their own problems through sharing what they knew, seeking experiences, working together and co-producing knowledge (Table 7). This was seen when individual educators indicated that they identified whom to work with and sought for help when they were stuck as they engaged in pedagogical integration of ETs. Wenger (2015) emphasizes the need for a community in practice development where members work together to find solutions that affect them all collectively. All these attributes were observed through cycles of piloting where educators were happy with the professional relationships and environment that allowed those who thought they did not know to open. In this community, the professional relations led to building of trust and opening to realities where educators said they do not know, or they wanted to know. This was seen to play a role in the confidence building processes, which eventually led to proficiency in pedagogical integration of ETs.

During the pilots, group problem solving strategies are used that lead to communal reflection on issue and support for each other in agreement, Bannister (2015). This could be seen through the act when educators actively took part in the pilots in sought of a variety of ways of engaging in pedagogical integration of ETs. In this way, educators took advantage of the process of LPP to grow together. However, this did not in any way mean that all the educators had to be at the same level of knowledge. This agrees with the levels of participation in a CoP (Pharo, Davison, McGregor, Warr, & Brown, 2014). It is also in agreement with Damarin (1993)'s metaphor of tourist and travellers visiting the same city but getting out with very different experiences. Through the activities, disparities in knowledge levels of individuals working together was almost an issue to contend with as individual educators thought they could not work with those who know more than they do as they engaged in pedagogical integration of ETs (Table 9). It took constant organisation and reminders that it was only a learning process and not a competition.

Professional capacity for the beginning educators to develop proficiency in pedagogical integration of ETs needs building through social architecture. Pedagogical integration of ETs to a beginning educator (Tables 7 and 8) presents a landscape of practice characterized by volatility, uncertainty, complexity and ambiguousness (VUCA) (Reeves & Reeves, 2015). These could be the reasons why the findings indicate only pockets of

educators effectively engaged in pedagogy with ETs. For effectiveness in such a landscape, the requirement is appropriate initial mentorship, modelling, and support from those who have already established themselves. At the centre of such developments are educators who become lifelong learners, individually and collectively as they go about their practice. The problem however is an enabling environment where such initiatives for collective action can be kick-started.

9.2.1 Activities in the community of practice

Human beings are brought together in a search for solutions to problems that unite them (Wenger, 2015). It is little wonder therefore that EDR principles advocate for interventions to help practice problem solving in cycles of pilots. The search for knowledge and skills is ideally a social issue most especially if such a knowledge and skill affects the entire community. Such issues are social problems that engage practitioners into thinking hard about how they can cause the desired change. So, the activities as in the pilot calls for higher order thinking skills (Robb, 2012). In agreement with this view, the findings indicate educators were willing to collectively engage in the pilots that enabled them to develop proficiency in pedagogical integration of ETs. The kind of questions educators asked during the pilots were indicative of this process.

It is no wonder that the piloting of the CoP was considered authentic (Herrington & Parker, 2013) in helping educators concretize their ambitions of developing proficiency in pedagogical integration of ETs by drawing on the social environment. The reason why SL was an appropriated theory is that it implied activities that put a practitioner to engage in higher order thinking. Orey (2010) refers to this process as critical reflection in a social environment. This was based on their expectations to engage with others and have hands-on opportunities during the interactions that take place among practitioners (Table 8). It was also apparent that the pilots in the practice environment enabled a social environment in which educators could network and collaborate in the process of pedagogical integration of technologies. In this way educators had for long nowhere to run and nobody to refer to when they needed some support related to pedagogical integration of ETs.

Although the findings indicate that educators were differently skilled in teaching of large class sizes, they expressed lots of hope in developing skills in pedagogical integration of ETs collaboratively. This agrees with SL practices where individuals with differing skills

work together through LPP (DeRogatis, et al., 2014). Educators expressed satisfaction with in the experiences and engaged in dialogues related to pedagogical integration of ETs. Experiences from educators regarding learning in LC environment indicate an authentic environment. On this basis skills attained from dealing with such a setting are applicable in related settings (Tolley, Johnson, & Koszalka, 2012). The content that engaged educators was therefore designed in such a way that it promoted transfer of learning (Table 12). However, the problem came around the limited technology resources across settings that were not supportive of effective transfer of learning. It was clear that sometimes the technologies suggested to be covered would not be readily available because of resource constraints.

Activities during the pilot present a more appreciated environment for learning a practice through observation and modelling of processes (Goodyear & Casey, 2015). The activities were designed based on educational design frameworks so they enabled educators to carefully observe what was modelled by the more experienced and try it out. This is also in agreement with the principles of LPP as the new educator practitioners had to initially engage in less demanding tasks relating to practice (Beetham & Sharpe, 2013). It is clear from the findings that when it comes to practice learning, activities dictate that everybody takes a different path, and has a different pace. Educators agreed that the activities during the pilots offered a level of creativeness as they were modelled; nonetheless, there were concerns related to the level of creativeness exhibited in such a short amount of time in learning the practice (Table 11). However, the experiences that helped educators to develop skills in pedagogical integration of technologies were designed in such a way that they were meant to do so. This was seen through the level of interest of educators as each presented a very high level of expectation. Therefore, activities which can model practice and exhibit high level of expectation, enhance an efficient proficiency development process.

Murrilo (2011) noted that activities in a CoP should involve collaborations that present to participants the ability to develop professional relationships. Through such relations, there is increased mentorship and collegial support among educators. This is because of the social nature of practice as individuals depend on each other in workplace environments. In addition to the pilots actively engage participants and led to environmental cues, and the social organization that the community developed and

maintained (Table 10). EDR frameworks influenced the design of activities executed in pilots that enabled educators to think of active participation, keenly listen to discussions as they collaboratively created and shared knowledge. SL practices in a CoP draws on these actions to enhance skills development process in a practice (Wenger & Wenger, 2015). So, the activities designed using the EDR frameworks where the educators were involved enhanced the focus on how to exploit networks and a variety of skills for own practice development. Activities engaged in should be seen to help practitioners get to deep reflection about daily routine practices (Mak & Pun, 2015). This is done through reflecting on the relationships between actors and in this way, there is acquisition of knowledge and skills in a practice.

Practitioners consider experiences that enable them link to past actions as important in their present practice (Wenger & Wenger, 2015) so the past actions are not just dumped in the past. Designed from the EDR perspective of engaging educators, activities linked past experiences to the new knowledge and experiences. Educators had a wealth of knowledge and experiences they shared, but lacked the enabling environment in which to share the experiences in such a way that they could all learn from them and inspire each other. The activities in pilots exploited such attitudes to engage educators in interaction, as they could use the environment to link with their previous experience. The pilots of the CoP therefore provided opportunity for educators to concretize the usage of technologies in teaching. In this way, the CoP boosted the process of proficiency development in pedagogical integration of ETs through educator socialization process.

9.2.2 Context of the community of practice

In a practice, contexts engage individuals in collective solving of problems (Wenger & Snyder, 2000). The context in which the CoP as a solution operated was one of limitations in both pedagogical skills and technological tools. Even amidst the resource-constraints, appropriate attitude can be developed through appropriate social architecture in a community. The context therefore presented educators with an environment to formulate positive attitudes towards collective responsibility in pedagogical integration of ETs. This is because educators operated in an environment in which poor attitude inhibited pedagogical integration of technologies and limited technology tools. This could be seen in the way educators talked about the technologies they had not been able to access. The context therefore presented what educators thought about the multiple perspectives, skills mediation through collaboration and meaning making amidst the limited resources

(Table 8). All these affected the process of gaining mastery in pedagogical integration of ETs. In agreement with Snowball and Boughey (2012) the context in which the CoP operated therefore presented an environment in which tasks were seen to be mastered.

Educators need a context that helps them to understand that when technologies are used for teaching, learners become effective in the practice world, with benefits that accrue from team working and collective action. The context therefore provided multiple views that made educators encounter the dilemma of engaging them in SL practices. Wenger & Wenger (2015) describes this as the context of gaining mastery from the experiences of others. In this context, educators were therefore ready to proactively find a solution to the same obstacle as a community influenced by the context in which they operated. The context presents opportunity for educators to declare what they did not know and how it was useful that they get out of such a state in agreement with Fuller (2007).

Experiences anchor practice in the diverse life contexts Lave & Wenger (1991), that enable development of value for tools that make work easier including pedagogical integration of technology tools. Educators are recruited because of good performance in academics; therefore, it is strange for one to accept the position of unqualified amidst peers. Nevertheless, in the context in which the CoP operated, this is not strange, as it showed that the context influenced the development of openness and boldness in as far as the practice among educators. The context as seen from the SL perspective and the EDR frameworks, encouraged working together amongst educators therefore encouraging learning from each other's experiences as an attribute of SL practice (Table1).

As described by Holland and Holland (2014), in contexts where there is modelling of effective use of technology, collaboration leads to both professional development and scholarly reflection in the form of situated practices. This has been confirmed in the findings as demonstrations of how the available technologies worked were key in enabling a positive attitude towards pedagogical integration of ETs. This context provided educators with different experiences in technology tools used in instruction as had been exposed to them during the training and the informal interactions. As required by EDR, educators being involved as practitioners and colleagues, expected a context that brings in support for each other in the development of the pedagogically relevant practices as they interacted. This is what described as a context that leads to re-experiencing issues in a practice from multiple perspectives and other practitioners. Pilots therefore provided

contextually sensitive opportunities to educators to see how technologies are used in teaching LCs through demonstrations.

The context of an intervention provides social interactions spaces in which skills and attitudes are shared and learnt (Hénard & Roseveare, 2012; Fong, et al., 2014). From a SL perspective, the context provides an environment for practitioners with varying skills to make moves towards a community that enables perfection of practice through drawing from the strength of one another. Educators with more access to technologies from the earlier days were more skilled to start their plans of using technology tools than those who completely had no access to the same tools in their practice formation environments. But because of the BYOT model of operation, the context offered most of the technology tools and therefore educators' opportunities to ask and to learn from each other about the various technologies that each was interested in using (Table 15). In a practice, the findings indicate that the context presented access to mentorship that helped educators in progressing well in as far as pedagogical integration of technologies is concerned.

Exploiting a context to enhance a practice requires practitioners to take an initiative by themselves (Goldman & Lucas, 2012; Herring, et al., 2015). It is not about waiting for a community to be formed so that one can participate. No individual in a community is taken for granted, and because of the various skills, they make an enormous contribution to the context in which they operate. The initiative by educators was voluntary based on what they thought they knew or wanted to contribute to pedagogical integration of ETs. It should never be taken for granted that in a context of the same practice, everybody has thorough knowledge of what is done. It is true that this community provided the context for two categories of educators. Those who claimed to be beginners and those who considered themselves intermediates in pedagogical integration of ETs ((Table 14). The context provided a coordination environment that offered opportunities for educators to collaboratively take part in enhancing proficiency development in pedagogical integration of ETs as a practice.

Through the LPP process, a context provides practitioners with the opportunities to attain required competencies (Floding & Swier, 2012; Burns & Lawrie, 2015) in specific practices. Findings indicate that the context provided opportunity for the choice of technology to use based on educators expressed practice needs, as well as what was currently being used in their environment that included the experiences of other educators. This was a

matter of requirement for execution of EDR frameworks requiring practitioners to have a choice in what they need to learn. The contexts enabled educators to begin by discussing and deciding on which technologies they were ready to learn to use and how they wanted to learn. Therefore, it is ideal that a context provides activities that avail a level of flexibility in the choice of the engagements that motivate practitioners into learning the practice (Table 13). In this way, the context provided an environment for dialogue on the process of pedagogical integration of ETs as a socially shared practice.

Practitioners value professional relationships in their learning of a practice (Murillo, 2011). Pilots were held in the context that provided the necessary environment for educators to develop proficiency in the practice of pedagogical integration of ETs from and with each other based on professional relationships. Educators as practitioners attested to the many attributes that came within the context in which the pilots influenced their proficiency in the practice including professionalism, mentorship, dialogue and self-discovery. Occasionally educators said that without this group, they would not have could do certain things the way they are doing them in the pedagogical integration of ETs. Contexts therefore offered the conducive environment for educators to develop relationships and create networks that enabled them to know and consult each other on a more informal basis whenever need arose (Table 16).

Effective contexts in a practice environment are helpful in scaffolding processes relating knowledge and skills to the real practice world (Fuller, 2007; Al-Eraky, Donkers, Wajid, & Van Merrienboer, 2015). Knowledge and skills become values and motivate practitioners into learning. Context provided educators an environment to interact from an SL perspective and therefore learn from each other through actively participating in the activities of the CoP pilot (Table 8). Educators could not have managed to learn all they could without interacting with others, just like all other educators who thought that the context offered them opportunities to learn from each other. This confirms context and its ability as important attributes that influence learning of practices (Orey, 2010). This implies that whatever little a context offers can be used as a learning resource. It is clear that the contexts of educators had limited technology resources to draw from, nonetheless, this did not stop them from starting to develop their proficiency with the few available technologies as they networked and interacted with each other.

9.2.3 Active participation in the community of practice

Active participation has been described as the ability to consider the various alternatives and coming up with an appropriate one in the practice perspective (Hung & Yeh, 2013; Maier & Warren, 2013). Active participation involved educators having real hands on practice with technologies of their choice. Educators could consider the various technology tools and their affordances in teaching as they progressively gained confidence, networked, gradually used technologies in their practice, and showed the willingness to team up. Active participation enabled educators to gain confidence in their attempts to learn how to engage in pedagogical integration of ETs.

Knowing the reasons for active participation in a CoP is important in designing, and delivering the learning activities, as well as evaluating the outcomes of a community (Marcelo, Yot, & Mayor, 2015). Active participation by educators was pushed by what they thought they would benefit and thus enabling learning from each other, solving problems together, and building models for collaboration. Educators faced challenges through participating in the activities which were complex and required collective intelligence (Table 15). The cycles of pilots also confirm that active participation was equally visible in informal spaces where educators exchanged knowledge, insights, and experiences. These informal spaces were a preferred method of learning among educators as professionals and a major reason for active participation. Wenger and Wenger (2014) asserted that informal spaces situate learning in the daily activities of practitioners without requiring extra time and effort. The result of this was the ability for educators to willingly and actively take part in discussions related to pedagogical integration of technologies in more informal spaces.

Findings are in consonance with Moore (2013) who carried out a similar study and suggest that active participation in activities related to a CoP, exchange and interactions converge into common purpose and lead membership in reflective practice to improve and share practices and resolve practice professional problems. The only disagreement here is that actively learning the practice of pedagogical integration of ETs took place by communication, criticism, dialogue, collaboration among the educators in the community (Table 17). Of course, it is discomforting to criticize a professional most especially in the public arena. However, findings here show educators that own learning of a practice can be made more effective by linking the individual practice to collective processes as they actively participated in both public and private spaces. Such approaches to active

participation required practitioners to break out of set roles and relationships, in which they were traditionally seen as knowledge users and actively generate the knowledge themselves through social interactions and actively getting involved in sharing of experiences in a nonlinear way (Orey, 2010). Findings also indicate that active participation was meaningful and shaped practice using trading zones where co-learning and the co-construction of knowledge took place.

The pilots enable practitioners to identify routines and ways of going about a practice (Wenger, Trayner, & de Laat, 2011; Jawitz, 2013). Within social architecture, educators quickly developed shared activities in the practice. From the cycles of pilots, educators learnt to design and upload courses and course materials using different software to the LMS. During such processes within the shared interests, commonly adopted practices establish standards that create a basis for action, communication, problem solving, performance, and accountability (De Hei, Strijbos, Sjoer, & Admiraal, 2015; Herrington, Herrington, & Mantei, 2009). Educators started developing some sort of shared language in pedagogy with technologies as they learnt and said words like uploading and downloading. Through active participation, educators discovered how to use templates to design courses; course design process became faster for everyone because of actively being involved as collaborators (Table 12).

Active participation fosters learning from and with other educators in a community through being asked questions that are different from the ones we are used to. There is much that individual practitioners can learn with and from others that cannot be learnt alone (Rosenberg, 2012; Mohamed, 2013). Each cycle of implementation has its own requirements that the design catered for using the EDR frameworks. Findings confirm that active participation takes the form of reflection on experience (Pacansky-Broock, 2013; Tolley, Johnson, & Koszalka, 2012) as educators asked themselves how they could be able to do certain things without the community. The benefit was feedback that came from the consequences of actions or responses from other educators actively participating. The desire to learn during the pilots is stimulated by the need to actively deal with real problems or engage with real opportunities that motivate active participation by practitioners (Voogt, Fisser, Pareja Roblin, Tondeur, & van Braak, 2013).

9.2.4 The community of the CoP intervention

A community involves interaction, participation and engagement in activities that helps in building relationships, identifying potential networks and getting exposed to different approaches (Wenger & Wenger, 2015). Findings indicated that these accrue due to the appropriateness of social architecture. The cycles of pilots generated excitement, relevance and value that attracted and engaged educators in active participation. The community in which pedagogical integration of technologies took place provided a sense of aliveness and offered an environment in which educators meaningfully engaged in the practice (Table 15). This could be seen in observations like sessions that engaged educators in group discussions, one-on-one conversations and observing educators that are more experienced to engage in the practice. In this way, there was modelling and emulation and therefore influenced development of proficiency.

If practitioners have interest in improving and maintaining, a practice there is always commitment and identification with expertise (Murillo, 2011). The activities designed using EDR principles aiming at enhancing SL involved educators considering individuals more knowledgeable as role models. From the cycles of piloting educators showed their interest in learning together. Membership to this community was self-selection and the function of the community developed member expertise and defined roles. From the pilots, some educators were given accolades for doing very well in supporting others gain the competencies. In these ways, the community provided an arena for new and experienced educators collaborate as they supported each other through their social spaces of interaction.

It is proved that a community provides shared values as colleagues generate pride and loyalty to a practice (Rosenberg, 2012). The community serves as a platform for innovation, motivation and inspiration. From the pilots, educators strove to provide excellent presentations as they usually got prepared and indicated that they had done sufficient hands-on background practice. This is because an excellent performance by educators benefitted the entire community. From this perspective, a sense of empowerment was both a crucial element and a desired outcome of educators in their participation in community activities (Table 12). The community therefore provided an environment for the construction of a transformative community learning environment where practitioners gain a new view of themselves and a new sense of confidence in their abilities (Holland & Holland, 2014). Through the pilots, the confidence in talking about

and using technology for educators grew because of belonging to a community as educators could ask for the information and get timely feedback which is effective in gaining of skills.

A community constitutes an arena for formal and informal activities as basic modalities of practice (Lave & Wenger, 1991). The evolving community negotiated the meaning of practice through contextually sensitive approaches as stipulated in principles of SL. The community also provided opportunities for free participation, continued mutual relationship building as educators consulted each other (Table 16). This is confirmed from educators knowing whom to go to for help and in situations beyond the activity sessions. Vibrant communities draw from both the outside and the inside (Wenger, McDermott, & Snyder, 2002) through formal and informal ways of interaction. Therefore, the networking started from inside one community and ended up dealing with other communities.

Membership in a community implies a commitment and therefore shared competence (Huang, Kinshuk, & Price, 2014) that distinguishes active participants in a community. Shared interest was well defined to determine what knowledge and skills the community needed to steward relating to pedagogical integration of ETs. It is little wonder therefore that educators gave credit to the entire community for having influenced their practice (Table 10). The community provided the opportunities to engage in activities that enabled seeking for help as well as helping others, sharing information, learning together, and building relationships. All these resulted in a sense of belonging and mutual commitment that directly influenced individual proficiency in pedagogical integration of ETs.

A community plays a role in the quick diffusion of innovation (O'Hara, Pritchard, Huang, & Pella, 2013). The community environment provided for a rapid flow of information between and among educators and shared ways of practicing together, the common practices and beliefs about of this kind of pedagogy. A common understanding of the community setting in which educators were engaged was clearly related to pedagogical integration of ETs. This is confirmed through statements like: 'I know why I am here'; 'I need information among others' (Table 9). In addition to the above a community brought in a broad consensus among practitioners related to those who were active and those who were not through legitimate peripheral participation (Lave & Wenger, 1991).

From the findings, it has been confirmed that communities provide a driving strategy to spread best practices (Murillo, 2011). The structure of a community designed based on EDR places the responsibility for developing new strategies for improving performance on the shoulders of those who are responsible for implementing innovative practices (Table 17). By encouraging and implementing communication structures, the community allowed for improved knowledge sharing among educators, teams, and thus shared daily concerns, problems, and solutions with one another, resulting in best practices being adopted in practice. Best practices also spread beyond the immediate educator community and occurred through more frequent conferences and meetings with practitioners. Cycles of piloting provided peer interaction workplaces that foster learning and information sharing from the experience of professionals (Fullan & Langworthy, 2014). Networking presented opportunities for exchanging vital information and therefore confirming the assertion that informal learning organizations are getting increased attention in pedagogy using technologies.

9.3.0 Summary of chapter nine

This chapter discussed findings from the pilots. The level of engagement from literature indicates that the findings are affirming to educator improvement in their pedagogical integration of emerging technologies even amidst the limited resources as indicated in the data. Nonetheless, the process is a little easier and enjoyable as educators work across those with various competences. The next chapter (ten) is the presentation of the refined design principles.

CHAPTER TEN: REFINING THE DESIGN PRINCIPLES

"Innovations come from creating environments where ideas can connect". Steve Johnson 2010

10.1.0 Introduction

This chapter presents the refined design principles related to the activities, context, participation and the community in which the intervention operated and the limitations of this study. First the initial design guidelines are presented and then the refined guideline is presented based on the literature and the findings.

10.2.0 Refined design principles

This thesis, addresses a complex educational problem relating to pedagogical integration of ETs for effective teaching of LCs. The thesis is usage of a social architecture in a CoP for proficiency development. The social architecture ensures collaboration and commitment to enhancing proficiency in pedagogical integration of ETs. The draft design principles (Table 6) and the refined design principles demonstrate the process of constructing theory around usage of a CoP focused on pedagogical integration of ETs. The refined design principles presented here were because of interacting, observing and interviewing educators who were actively involved in the pilots. The draft design guidelines (Table 6) for the CoP were aimed at engaging educators in the following as they perfected pedagogical integration of ETs.

i. Problem solving
ii. Requesting for information
iii. Seeking experiences
iv. Coordinating synergy
v. Discussing developments
vi. Documenting projects
vii. Visiting and
viii. Mapping knowledge

The refined design principles originate in the specific theories underpinning operation of a CoP. During the pilots, educators actively interacted, collaborated, tried out pedagogical integration of technologies and shared experiences. During this process, in case one needed help, they were free to look for somebody to consult for a way forward (Table 12). The aim of this whole process was to find out how participation in the CoP helped educators to gain proficiency in pedagogical integration of the available ETs. A summary

of the process of development and refinement of the design principles is attached in Appendix VII. The following framework indicates a further refinement of the guidelines.

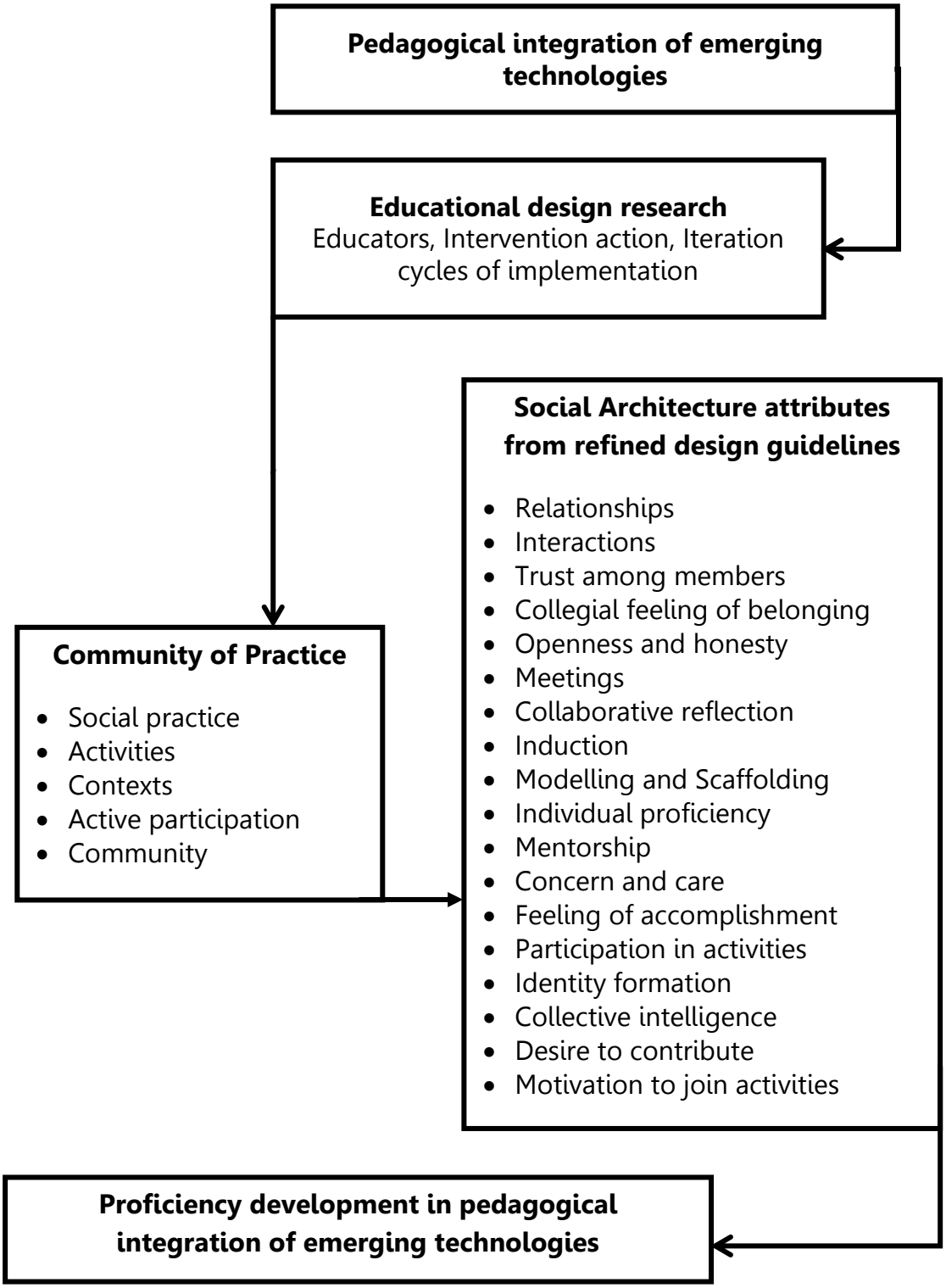

Figure 12: Final theorization

Figure 12 is an amalgamation of attributes in social architecture in a CoP related to pedagogical integration of ETs in a resource-constrained environment. Drawing on the

above, a social architecture encourages networking, collaboration, participation and therefore shared practice. Figure 12 is therefore a presentation of more refined and newer terminologies to depict a newer theorization perspective of what has been described as social architecture in a CoP based on the findings from this study.

Design principles are best expressed in active terms, the presentation is going to be in terms of experiential statements suggested by Van den Akker (Herrington, Herrington, & Mantei, 2009). Statements suggested as design principles take the form of this statement:

> *"If you want to design intervention X for Y in context Z, then you are best advised to give that intervention these characteristics: A, B and C; via procedure D, E, and F; because of argument G, H and I."* (Herrington, Herrington, & Mantei, 2009).

This thesis adopts Lautenbach's (2014) way of presenting design principles straight from the discussions as it appears more simplified for reading about how a principle was arrived at.

10.2.1 Principles related to activities used in the CoP

Activities in focus for a CoP as an intervention needs to be a common ground of interest to educators and this keeps them motivated and inspired as the principle of SL stipulates the shared interests (Table 14). If one wants to design for a CoP for educator development of proficiency in pedagogical integration of ETs, one should engage appropriate social architecture as a resource. This leads to the choice of resources that engages educators in such a community based on *individual voluntary commitment* (Section 8.2.0). This could be seen from observations and statements like- "enjoying the exploration, sharing experiences, this is relevant and important" during the pilots.

With availability of appropriate social architecture, voluntary commitment enables educators to spare time and actively experiment ideas and issues. The design of activities for the CoP should therefore be characterised by content that is *authentic and calls for higher order thinking skills*. This is because of the focus on problem solving in a practice must have a strong focus and mission that influences the reason for starting the existence of a community (Table 11). These can be done through demonstrating the entire process to educators and allowing them to observe as a requirement of EDR. This is because pedagogical integration of ETs is a practice with practitioners having both little and accumulated experiences. The resources used for such a CoP intended for proficiency development should therefore engage educators of little and accumulated experiences

to voluntarily work in close collaboration with each other. In this way, there is modelling by those with more experience was a problem-solving strategy.

The activities used are appropriate social interactions that exist in a CoP as an intervention aimed at proficiency development should therefore be *modelled and the mentorship processes* followed through the interaction between educator practitioners. Through voluntary commitment, educators who are more passionate about pedagogical integration of technology take the lead in initiating and organising activities related to pedagogical integration of ETs. At the beginning educators casually participated in the CoP activities and with time the same members came to be considered experienced (Table 11). However, there is a thin line between pedagogy using technologies in LCs and other generic processes of proficiency development process. This is because such a focus plays a powerful role in initiating a practice that later becomes of institutional focus. The CoP therefore enables individual practitioners to ask for information related to issues they do not comprehend. This could be seen because educators who initially thought did not know were seen to have accumulated more experiences in the second and third pilots; they were apparently perfecting.

A social architecture in a CoP that enhances pedagogical integration of ETs, needs resources to be focused on a strong mission relating to pedagogical integration of ETs. Educators also need to have individual voluntary commitment, authentic content bringing about higher order thinking, modelling and mentorship processes within an ideal environment focused on problem solving and requesting for information related to pedagogical integration of ETs.

10.2.2 Principles related to context of the CoP

Even in an environment with limited technology and limited skills, a CoP should be very sensitive to *the choice of technologies for engagement in a context* (Table 15) If one wants to design for a CoP as an intervention using EDR frameworks for enhancing development of proficiency in pedagogical integration of ETs, most specifically in LCs, it is advisable that activities are designed to help educators take their action in the light of new insights. These insights are gained from allowing educators time to *question and discuss conventional practices* in each context (Table 10). Indeed, SL advocates for active questioning of practices for increased learning. The questioning comes clear as individuals making their way into a practice keenly observe how those already in a

practice go about business in daily practice as they seek for information. This means that educators at various levels of experience ought to be keen at what and how things happen as they map related knowledge. The questioning becomes easier when tasks to be mastered are clearly presented in an authentic practice environment (Table 14).

This is because an authentic environment, which is a focus of EDR and SLT, encourage and promote both *formal and informal social interaction* as educators look out for and identify a network of who can be of help when they need something practice related (Table 13). This is because in a community operation, educators seek for who has experience in using a given technology for teaching, which can be usable by them. In this way, time is saved because there is no reinventing of the wheel. This is true because when SL principles are used, participating educators are encouraged to question routines and experiences to learn better. This was confirmed when educators discussed the technologies available to them, the pedagogic practices in LCs and their multi-discipline backgrounds.

This is true because questioning and discussion of routines also enable educators to *reflect on, share and learn* from others' experiences. Reflection is enabled through educators acting by bringing back accounts of an observed action and its effects on their practice. This can be confirmed through the cycles of activities when statements like: "I was not able to use design PPT before", and "I did not know how to design a course for the LMS before" (Table 14). There is however, limited meaningful reflection without the support of colleagues and thus the need for collective reflection to get other people's input as stipulated in EDR frameworks. Through such collective activities, individual educators re-experience issues from the multiple perspectives given and henceforth start moving from the comfort zones towards proficiency collectively.

If one wishes to design for a CoP using EDR frameworks for enhancing proficiency development in pedagogical integration of ETs, then activities for that community are better based on the choice of *opportunities that personally engage educators as participants*. This comes from such statements like- "what is the meaning of this", "I need to get a better smartphone", and "I need to use Google Drive" (Tables 13 and 14). This is attained because a needs assessment is carried out through which to identify the clear-cut needs the practitioners have themselves stated. This is because educators in higher education are highly independent of each other and what usually brings them together

is to collaboratively seek solutions to challenges they face in their practice. However, it is the educators themselves who must identify and point to the challenges to deal with.

Even so however, the learning boundaries are so thin that these same educators found that they often needed each other and organically bonded in search of solutions through a CoP in teaching with technologies. In this way, they engaged in SL that calls for contexts that *engage participation*, even when it is done amidst the daily routines and the limited resources. The choice of technologies of focus by educators themselves brings about more likely attitudinal change to the effect that educators feel they are part of the problem. However, the participation should take the form of educators taking on LPP where the less experienced are assigned less difficult tasks and move to harder tasks as they grow in experience. This process takes educators into a process of *exploration and inspiration* as they learn on practice together with those who guide them through modelling pedagogical practice using ETs (Section 8.5.0). As time passed, this process increased confidence building process among educators, eventually accelerating the generic proficiency development process.

A social architecture in a CoP intended for development of proficiencies in pedagogical integration of ETs should avail free entry and transparency including free contribution to the community. These aspects enable mapping knowledge and requesting for related information including the choice of technologies to focus on, questioning and discussing conventional developments in teaching with technologies, social interactions, reflection, sharing, exploration and inspiration in the practice.

10.2.3 Principles related to active participation in the CoP

Using EDR frameworks, if one wants to design for a CoP that serves the purpose of enhancing proficiency development in pedagogical integration of ETs most especially in LC environments; there is need to check participant *individual perceptions of the problem* in focus. This is because individual perception is based on values and beliefs of individuals relating to pedagogical integration of ETs. This was confirmed from statements like: "coordinated synergy", "induction", "formal and informal environment" (Table 16). It is better to ensure that individual educators value pedagogy with technology in LCs because this *motivates and inspires* them into active mastery of the practice of pedagogical integration of technologies. It is the combination of the individual perceptions that make a practice interesting to engage in. In this way, the activities related to pedagogical

integration of ETs as a practice are appropriately tagged to the needs of an educator in a context. They allow educators to make trips and visit those they believe have the appropriate experiences (Figure 5). This is the reason why practices in other CoPs focused on some other issues may not be just transplanted. There is need to clarify the issues of concern as these render them more manageable as stipulated in SL principles. This is because when educators accepted to be members of this CoP, their contributions were useful irrespective of their level of experience. Indeed, this is what contributes to the knowledge bank and leads to sustainability of a community.

This CoP comprise a group of individual educators who found that they had a common interest in pedagogy with ETs. They initially met as "strangers" and gradually built trusted relationships with each other and began sharing their unique knowledge and experiences (Table 9). By doing so they soon *developed a shared understanding and approach to pedagogy using technologies* thus building a collective knowledge base, which informed their practice guiding how they approached pedagogical integration of technologies. Even when operation of a successful CoP is heavily context sensitive, the result is the experiences shared that build in each member a collective knowledge base that, on application, improves individual performance and has an intense impact on practice as members become more actively engaged.

Whenever there is appropriate social architecture, educators in similar contexts actively brainstormed on issues that investigated traditional and fundamental wisdom and shape experiences as if it is the case in SL in a community. This is because using EDR recommendations, brainstorming sessions *enable opening* that expose the issues that the activities could focus on specifics as practice needs differed with context and individuals. In this way, educators easily took up the activities as a developed solution and felt part of the solution creation process. This is because in operating as a community, solutions that do not *actively engage educators in their crafting* end up being resented and therefore difficult to implement (Table 11). In addition, with a community environment, solutions that are prescriptive are very difficult to implement and therefore they end up becoming unsuccessful.

A social architecture attributes in a CoP intended for development of proficiencies in pedagogical integration of ETs should help build fair authority, self-organization and pride in measurable success among participants. In these ways, there is enabled sought

for experiences including environments that cater for individual perceptions, developing shared understanding, motivation, opening and crafting of solutions for ownership in pedagogical integration of ETs.

10.2.4 Principles related to the community of the CoP

If one wants to design for a CoP as an intervention that supports educator development in proficiency in pedagogical integration of ETs it is advised that the design for activities focus on *individuals support and challenge to each other during interactions*. This is most especially true because in the context of educators, it makes them highly independent of each other in many ways including the disciplines they handle and the methodologies they use to deliver instruction (Table 17). A community provides the social architecture for diversity to operate to coordinate synergy and discuss related developments. Without appropriate social architecture, educators cannot easily take up challenging voices in good faith in each community. However, criticisms and challenging voices most especially related to practice related issues should be taken as positive. With this on ground, the design of activities aims at engaging *educators in learning to trust each other that in turn enables them to collaborate even amidst criticism* (Table 9). From within a community, practitioners therefore start confiding in each other about practice related challenges. This in a way helps in support for educators across all levels of experience to bear positive criticism and equally learn to live with negative criticism too.

EDR frameworks recommend working with individual educators to improve the practice community. Participation in activities is a choice made by individuals; they therefore do not just sit passively as they wait for solutions to their practice challenges. In a community, they *seek for knowledge and new understanding* and therefore support for each other is attained through deliberately establishing learning networks. In this way as educators share experiences, exchange contact and move away from locations, they can still be *accessible to those who need their support or advice*. Catering for these attributes guarantees acquiring the skills of action, learning, and *becoming aware of group processes for effective teamwork* (Tables 16 and 17). In this way, educators as individuals can put together skill from each other that make a repository of multi-disciplinary convergence, useful in further skills development for a community. This is because issues of collective responsibility make membership in a community a committed to mentorship for each other as members always aim at collectively shining in their practice.

A CoP as an intervention used in pedagogical integration of ETs needs to carefully provide for *time usable in the trial and testing* so that educators familiarise with the technologies and consider where and when an emerging technology can be used to support the pedagogic practice. With the usage of EDR principles, educators used principles of a sandpit to engage in reflection time to become familiar with and capable of using digital tools, gradually they could do this independently and appropriately within a CoP (Section 8.5.0). Preparation and reflection within a community were important to evaluate where and when technologies supported the representation, communication and reflection of specific ideas. Actively reflecting on pedagogical integration of technologies in use within a CoP helped articulate the learning experiences and identified where one needed to spend more time developing skills as they interacted with others.

A social architecture attributes in a CoP intended for development of proficiencies should help put in place an environment for tolerance and free workspace. This is because these attributes enhance individual support and challenge, seeking of knowledge and new understanding, effective teamwork, development of shared understanding, usage of time, and dealing with group dynamics all aimed at coordinated synergy and discussion of development in relation to pedagogical integration of ETs.

Table 18: initial and final design guidelines

Theoretical aspects	Initial design guidelines	Final Design Guideline
Activities in the CoP	Problem solving	a). Focus on problem solving
Context in which the CoP operated	Requesting for information	b). Requesting for information
	Seeking experiences	c). Seeking of experiences
Active participation in the CoP	Coordinating synergy	d). Coordinating synergy
	Discussing development	e). Discussion of developments
	Documenting issues	f). Documentation of projects
Community environment	Visiting	g) Visitations
	Mapping knowledge	h) Mapping knowledge

10.3.0 Limitations of the thesis

Limitations of this thesis include the criteria for selection of participants. Educator practitioners selected as participants in this study had taken a programme leading to a PgDip in Educational Technology at UCT. This was a common reason for their choice and not that they taught LCs. Not all educators taught large classes at the time of the study, but had lived experiences of LCs either as students themselves or had previously taught LCs. The mitigation was that the survey (Appendix II) indicated a general good awareness of LC pedagogic practices even when individuals had not practically taught them, therefore it meant that data was authentic.

Another limitation in this study was the parameters used to test for real beginners to include them in the CoP. There is no accurate measurement of an educator considered to be a beginner in the pedagogical integration of ETs. Therefore, although the minimum experience of an educator was four years teaching, some of the educators had been appointed for more than four years but had done less teaching with technologies. In this way, their perceptions of pedagogical integration of technologies presented may mislead. Even most importantly is determining aspects of proficiency development that could be developed due to participation in CoP. It is difficult to determine the attributes of proficiency development that were indeed attained due to participation in this CoP and those attained elsewhere as the educators were not a control group. The mitigation here was that all educators irrespective of their level of experience had a good understanding of pedagogical integration of ETs thus making the data from them equally authentic.

A more theoretical limitation related to the usage of EDR frameworks. It is known that EDR is a long winding cyclic process. In each cycle, there are lots of interested findings that keep cropping up. In this way, there are too many interesting findings that come up for consideration this further prolongs the research process. The researcher was however aware of this and the fact that the data needed was to fit in the timeframe of five years for attaining a philosophy degree. Therefore, a deliberate decision was taken to limit the data collected to fit within that timeframe.

The last limitation in this thesis comes from the reality of the digital divide. The researcher knew ETs are not equally accessible to educators' due to resource-constraints. Educators did not generally feel comfortable to answer the questions and participate freely in the discussions because they feared that a judgement would be pronounced on them.

Nevertheless, I believed in the obligation to study this phenomenon to understand better how to project it today and harness its potential tomorrow once most educators embrace and can effectively engage in pedagogical integration of ETs as a practice. The mitigation here was the assurance to participants that data would be used to understand and not judge their practice of pedagogical integration of ETs which enabled them to open.

10.4.0 Summary of chapter ten

This chapter presented the refined design principles that relate to the activities, context, participation and the community in which the intervention was operating. The limitations of this thesis are also presented. The next chapter (eleven) concludes this thesis.

CHAPTER ELEVEN: CONCLUSION

"Many ideas grow better when transplanted into another mind than the one where they sprang up." - Oliver Wendell Holmes

11.1.0 Introduction

This chapter presents the review of research questions, final remarks and recommendations.

11.2.0 Reflection on research questions

The usage of a social architecture in a CoP for proficiency development in pedagogical integration of ETs has been put in perspective as the educators participated in cycles of pilots. A few attributes termed as a social architecture have been identified through answering the research questions. In view of the methodology, findings and the refined design principles, it is ideal to review the research questions as a way of concluding this thesis.

The first sub research question related to which activities are used in a social architecture in a CoP aimed at proficiency development in pedagogical integration of ETs. The first objective of this thesis related to exploration of activities used by a social architecture with the purpose of proficiency development in pedagogical integration of ETs. It has been found that the resources for a CoP of this nature should engage educators in seeking information and networking, which a social architecture can be used to develop in relation to the significance of this study. Such resources include: individual voluntary commitment, higher order thinking, modelling and mentorship processes with problem solving and requesting for information related to the practice. Therefore, activities in a social architecture need to explore affordances of a social architecture focused on benefits from knowledge, skills and experiences of others with varying experiences in problem solving related to this practice. There is need to focus on continued use of technologies in a social environment in which mentorship and collaboration can take place. On this basis, this research question can be reviewed to consider how usable resources in a CoP motivates educators for enhanced pedagogical integration of ETs.

The second sub research question related to how the context of designing a social architecture in a CoP influences proficiency development in pedagogical integration of ETs. In view of the second objective focused on contextual issues that influence pedagogical integration of ETs, it has been found that from an SL perspective, the context presents scenarios of challenges related to both limited technologies and high student

numbers that engaged educators into looking for effective solutions. The purpose of this study related establishment of a context that enables proficiency development in pedagogical integration of ETs. In view of appropriated social architecture, educators were forced to think hard as an issue of innovatively solving such practice problems. The context in which pedagogical integration of ETs was carried out although with limitations was an authentic practice environment, which enabled educators to collaboratively engage in mapping knowledge and finding more information about ETs while learning from each other and solving problem together. Such attributes of a social architecture provided for voluntary sharing of experiences and challenges and therefore helping each other to gain more skills while in practice. This question can therefore be reviewed to focus on how a context of a social architecture with limited technologies is utilized in enhancing pedagogical integration of ETs as a practice.

The third sub research question related to how social architecture in a CoP enables active participation in a CoP with the objective of enhancing proficiency development in pedagogical integration of ETs. This was purposed on a social architecture that provides for active participation in the process of pedagogical integration of ETs. The CoP did not adopt transmission model that made practitioners passive receivers of already processed knowledge. Instead educators were actively engaged which led them to identify who knows which technology, seeking knowledge and how they used it and how to get to who knows what. It is therefore concluded that social architecture should provide for active participation in a CoP by understanding individual perceptions that forms the initial basis of building trust and relationships. As a significance of this study, it is established that these are foundational to proficiency development in pedagogical integration of ETs. This sub-research question can therefore be reviewed to focus on the complexities that a social architecture should sort out for a smooth process of collaborative learning of pedagogical integration of ETs.

The fourth sub research question related to how the community in a CoP enhances proficiency development in pedagogical integration of ETs. The fourth objective related to evaluation of the community in which a CoP enhances proficiency development and therefore through the cycles of pilots, it was found that individualised practices are modelled in a community through discussion of developments. As a significance, appropriate social architecture therefore provides for coordinated synergy and

individuals to find an environment for supporting and challenging one another through SL. A social architecture in a community provides an enabling environment for understanding how educators interact and use available social spaces to share knowledge and learn from each other's experiences in a community. This sub research question can be reviewed to focus on how a community focused on pedagogical integration of ETs provides an environment for educators to learn from each other and thus develop proficiency in practice.

The main research question in this thesis related to a how social architecture in a CoP is configured to enhance development of proficiency in pedagogical integration of ETs as a practice. The purpose of this study was focused on theorization of how social architecture in a CoP enhances proficiency development in pedagogical integration of ETs. It has been concluded as a significance of this study that social architecture in a CoP is a low-cost attribute that can be drawn on to enhance proficiency development in pedagogical integration of ETs. Therefore, appropriate structures for LPP embeds interaction between educators and learning from and with each other. In this way, social architecture provides an environment for collaboration, interaction, active engagement and mentorship in pedagogical integration of ETs enabling provision of quality education as a requirement of the UN SDGs.

11.3.0 Final words

Pedagogical integration of ETs is a practice that can be learnt through engagement in a CoP focused on the same. The social architecture of such a community should focus on sharing experiences in manipulation and usage of ETs including google to locate, share, distribute and store learning materials, design, upload and manage materials on learning management systems. The process also involves networking and collaboration in the design and sharing of materials using software like Microsoft Office and other Open Office software; using videoconferencing facilities, finding useful videos and materials for engaging learners on YouTube, and creating and using social networks like Google+, Facebook and WhatsApp. The social architecture in a CoP provides useful attributes at the disposal of interested educators in development of proficiency in pedagogical integration of ETs.

It can be concluded that pedagogical integration of ETs draws on the social architecture available in a CoP. Social architecture enables educators to get inducted and mentored as thus individuals gradually become a social organ. This social organ cherishes working together in promotion of pedagogical integration of technologies. The social organ has embedded social architecture usable in the development of proficiency in pedagogical integration of ETs. Figure 8 (Chapter 4) is a summary of literature review from which tables 14,15,16 and 17 are derived as a summary of the findings presented and discussed in this study (Chapters 8 and 9). Some of these issues were found to be outstanding opinions in informing pedagogical integration of ETs and are presented as refined design principles (Chapter 10).

This thesis has presented a simplified process of an appropriate social architecture in a CoP focused on development of proficiency in pedagogical integration of ETs. It is therefore recommended that educational institutions deliberately establish communities of practice focused on pedagogy using ETs. This is because communities of practice operate on social architecture that provides opportunities for collaborative engagement and motivation of educators into deeper exploration of ETs, and their usefulness in pedagogy. Educators who gain membership to such communities get exposed to creative ideas and innovations helpful in pedagogical integration of ETs thus building a critical mass of individuals able to deliver quality education using technologies. Educators in the 21st century can use social architecture in a CoP to develop proficiencies in pedagogical integration of ETs that eventually enables them to contribute to provision of quality and lifelong education as prescribed by the UN SDGs.

11.4.0 Recommendation

It is recommended that CoPs be deliberately established that directly focus their social architecture on proficiency development in pedagogical integration of ETs. This should follow a down-up model with academic departments taking charge of their own support and practices due to the varying technology needs in disciplines. A centralized place in an institution that coordinates and supports the synergy between the departments can oversee departmental level practices. With establishment of policies favourable for such structures, educators can draw on them for enhanced support, inspiration and encouragement in pedagogical integration of ETs.

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Appendix I: Consent form

Researcher Name: Michael Walimbwa

Name of Institution: University of Cape Town

Dear respondent,

I would like to invite you to take part in this research study titled: *"Developing Proficiency in Pedagogical Integration of Emerging Technologies: An Educational Design Research of a Community of Practice at Makerere University"* which is being undertaken in partial fulfilment of the requirements for the award of degree of Doctor of Philosophy degree from the University of Cape Town. This document outlines the purpose of the study and gives a description of your involvement as a respondent. You have been selected to take part in the study because of your experience in instructional delivery and knowledge of the information and communication technologies used in instruction. Findings of the study will help in coming up with guidelines that create an environment for educators to learn from each other's knowledge, skills and experiences in teaching with emerging technologies. Your participation remains anonymous and data will only be accessed by the researcher and the two supervisors.

The following conditions will be met:

1. Your participation in this study is voluntary. You have the right to withdraw at any time should you wish to do so.
2. Your name will not be revealed to anyone either verbally or in written form in the thesis or anywhere else.
3. Audio recordings from the discussions (if any) will not be used for any other purpose other than this study and will not be played to anyone else. The recordings will be deleted when the thesis is finally submitted.

Please respond to the questions below by ticking either no or yes:

Do you give permission to participate? **YES** **NO**

Do you give permission to recording? **YES** **NO**

I agree for the information I give to be used for the purpose outlined above only.

Name_____

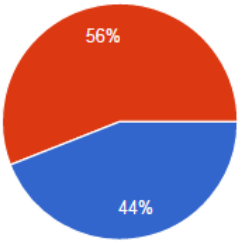
Signature_____

Date_____

Appendix II: Survey and results

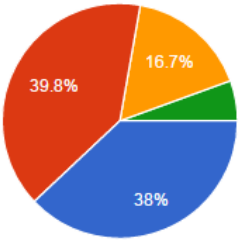
Section One: Demographic Data

1-1. Gender (choose one)



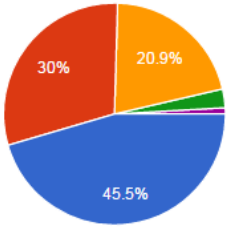
Female	**48**	44%
Male	**61**	56%

1-2. Age range in years (choose one)



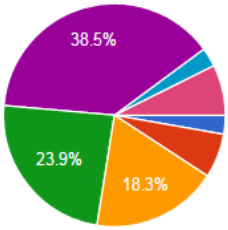
26-35 years	**41**	38%
36-45 years	**43**	39.8%
46-55 years	**18**	16.7%
56 years and above	**6**	5.6%

1-3. Highest academic qualification (choose one)



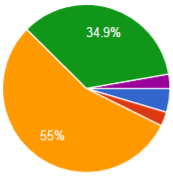
PhD	**50**	45.5%
PhD candidate	**33**	30%
Masters Degree	**23**	20.9%
Masters Degree Candidate	**3**	2.7%
Other	**1**	0.9%

1-4. Current academic rank (choose one)



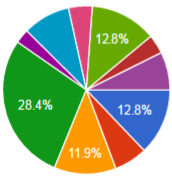
Professor	**3**	2.8%
Associate Professor	**7**	6.4%
Senior Lecturer	**20**	18.3%
Lecturer	**26**	23.9%
Assistant Lecturer	**42**	38.5%
Teaching Assistant	**3**	2.8%
Other	**8**	7.3%

1-5. Current technology skills (choose one)



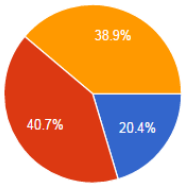
I can not rate it	5	4.6%
Beginner	3	2.8%
Intermediate	60	55%
Expert	38	34.9%
Other	3	2.8%

1-6. College or School you belong



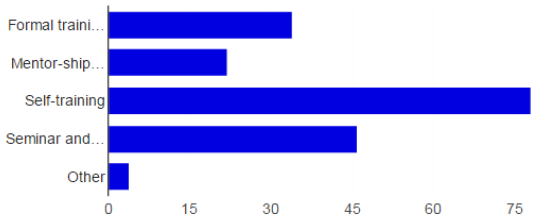
College of Agriculture and Environmental Sciences	14	12.8%
College of Business and Management Sciences	7	6.4%
College of Computing and Information Sciences	13	11.9%
College of Education and External Studies	31	28.4%
College of Engineering, Design, Art and Technology	3	2.8%
College of Natural Sciences	10	9.2%
College of Health Sciences	5	4.6%
College of Humanities and Social Sciences	14	12.8%
College of Veterinary Medicine, Animal resources and Bio-security	4	3.7%
School of Law	0	0%
Library staff	8	7.3%

1-7. For how long have you worked at Makerere University? (choose from the list).



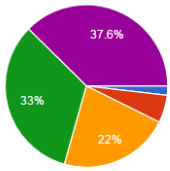
1- 5 Years	22	20.4%
6-10 Years	44	40.7%
Over 11 Years	42	38.9%

1-8-1. How did you learn to use information and communication technologies in curricula?



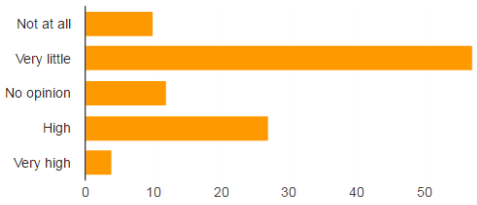
Formal training (Certificate, Diploma or Degree)	34	30.9%
Mentor-ship by another person	22	20%
Self-training	78	70.9%
Seminar and Workshop	46	41.8%
Other	4	3.6%

1-8-2. How is your motivation to use information and communication technologies in curricula?



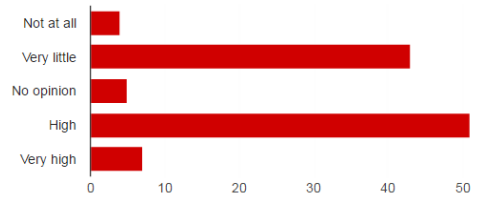
Very low	2	1.8%
Low	6	5.5%
Moderate	24	22%
High	36	33%
Very high	41	37.6%

1-9-1. Peer participation and review [1-9-0. Comment on the extent to which the statements below describe the environment in which you teach while integrating information and communication technologies into curricula.]



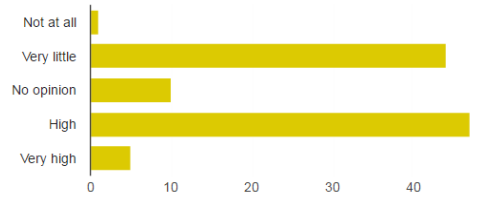
Not at all	10	9.1%
Very little	57	51.8%
No opinion	12	10.9%
High	27	24.5%
Very high	4	3.6%

1-9-2. Sharing experiences [1-9-0. Comment on the extent to which the statements below describe the environment in which you teach while integrating information and communication technologies into curricula.]



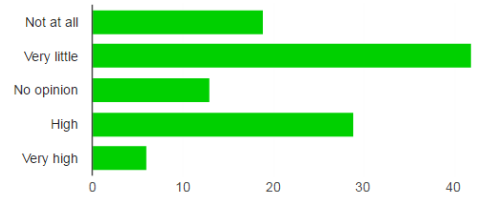
Not at all	4	3.6%
Very little	43	39.1%
No opinion	5	4.5%
High	51	46.4%
Very high	7	6.4%

1-9-3. Interactivity among peers [1-9-0. Comment on the extent to which the statements below describe the environment in which you teach while integrating information and communication technologies into curricula.]



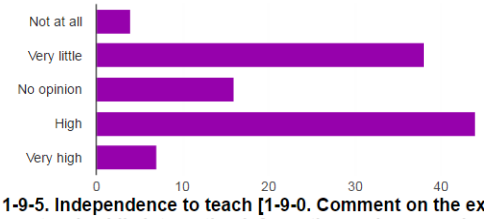
Not at all	1	0.9%
Very little	44	41.1%
No opinion	10	9.3%
High	47	43.9%
Very high	5	4.7%

1-9-3. Team teaching approaches [1-9-0. Comment on the extent to which the statements below describe the environment in which you teach while integrating information and communication technologies into curricula.]



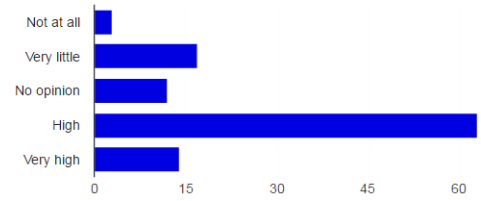
Not at all	19	17.4%
Very little	42	38.5%
No opinion	13	11.9%
High	29	26.6%
Very high	6	5.5%

1-9-4. Innovation in teaching [1-9-0. Comment on the extent to which the statements below describe the environment in which you teach while integrating information and communication technologies into curricula.]



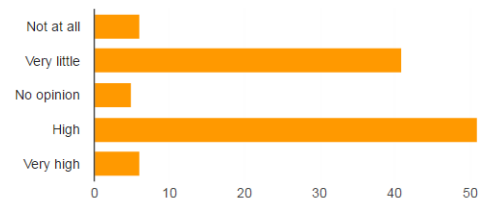
Not at all	4	3.7%
Very little	38	34.9%
No opinion	16	14.7%
High	44	40.4%
Very high	7	6.4%

1-9-5. Independence to teach [1-9-0. Comment on the extent to which the statements below describe the environment in which you teach while integrating information and communication technologies into curricula.]



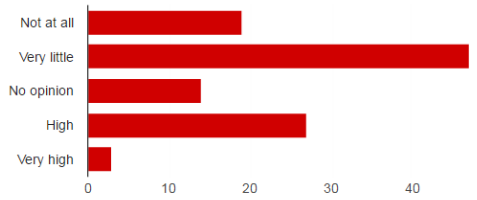
Not at all	3	2.8%
Very little	17	15.6%
No opinion	12	11%
High	63	57.8%
Very high	14	12.8%

1-9-6. Availability of information and Communication Technologies [1-9-0. Comment on the extent to which the statements below describe the environment in which you teach while integrating information and communication technologies into curricula.]



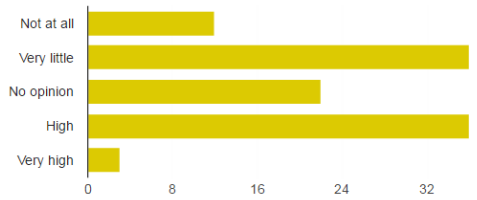
Not at all	6	5.5%
Very little	41	37.6%
No opinion	5	4.6%
High	51	46.8%
Very high	6	5.5%

1-9-7. Mentorship [1-9-0. Comment on the extent to which the statements below describe the environment in which you teach while integrating information and communication technologies into curricula.]



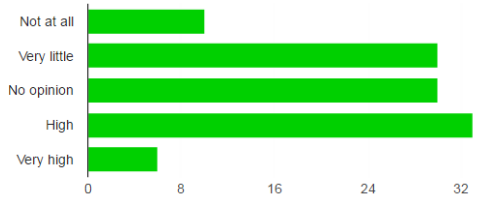
Not at all	19	17.3%
Very little	47	42.7%
No opinion	14	12.7%
High	27	24.5%
Very high	3	2.7%

1-9-8. Questioning conventional practices [1-9-0. Comment on the extent to which the statements below describe the environment in which you teach while integrating information and communication technologies into curricula.]



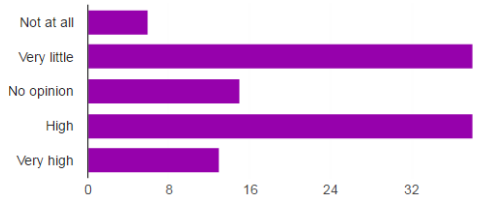
Not at all	12	11%
Very little	36	33%
No opinion	22	20.2%
High	36	33%
Very high	3	2.8%

1-9-9. Reflective practice [1-9-0. Comment on the extent to which the statements below describe the environment in which you teach while integrating information and communication technologies into curricula.]



Not at all	10	9.2%
Very little	30	27.5%
No opinion	30	27.5%
High	33	30.3%
Very high	6	5.5%

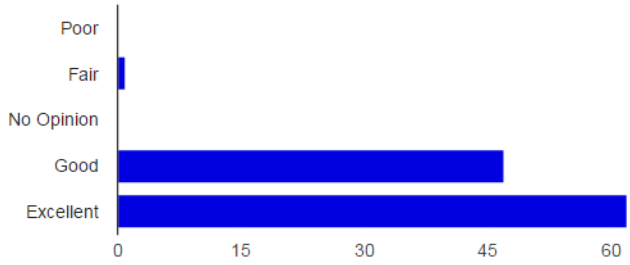
1-9-10. Networking and collaboration [1-9-0. Comment on the extent to which the statements below describe the environment in which you teach while integrating information and communication technologies into curricula.]



Not at all	6	5.5%
Very little	38	34.5%
No opinion	15	13.6%
High	38	34.5%
Very high	13	11.8%

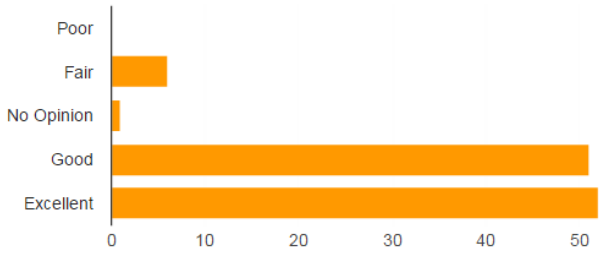
Section Two: Device Knowledge, Accessibility and Use

2-1. Laptop computer [2-0a. Your knowledge of each of the stated technology tools in teaching.]



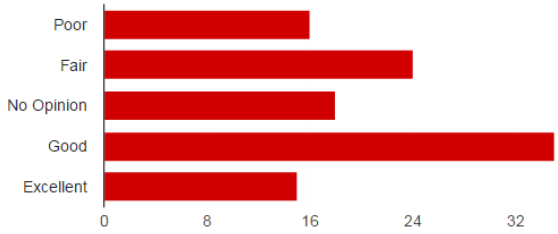
Poor	0	0%
Fair	1	0.9%
No Opinion	0	0%
Good	47	42.7%
Excellent	62	56.4%

2-2. PowerPoint projector [2-0a. Your knowledge of each of the stated technology tools in teaching.]



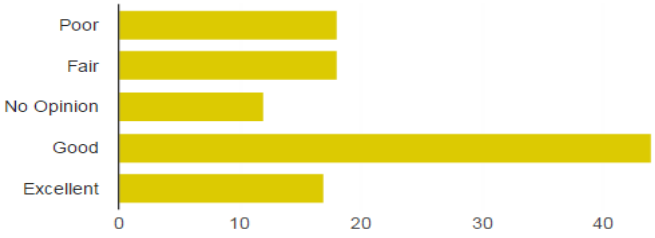
Poor	0	0%
Fair	6	5.5%
No Opinion	1	0.9%
Good	51	46.4%
Excellent	52	47.3%

2-3. Learning Management System [2-0a. Your knowledge of each of the stated technology tools in teaching.]



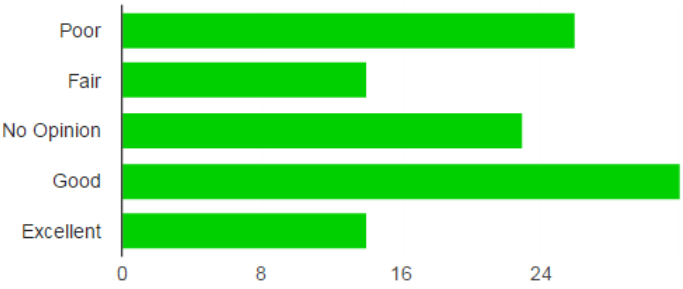
Poor	16	14.8%
Fair	24	22.2%
No Opinion	18	16.7%
Good	35	32.4%
Excellent	15	13.9%

2-4. Smart phone [2-0a. Your knowledge of each of the stated technology tools in teaching.]



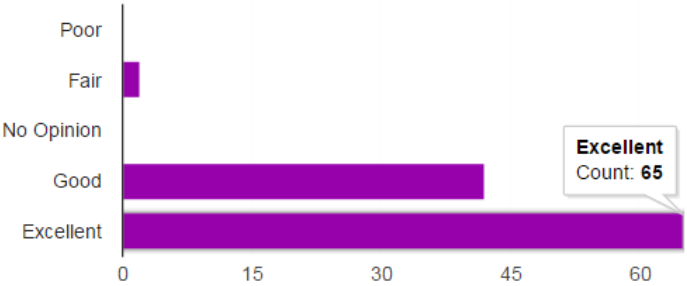
Poor	18	16.5%
Fair	18	16.5%
No Opinion	12	11%
Good	44	40.4%
Excellent	17	15.6%

2-5. IPad [2-0a. Your knowledge of each of the stated technology tools in teaching.]



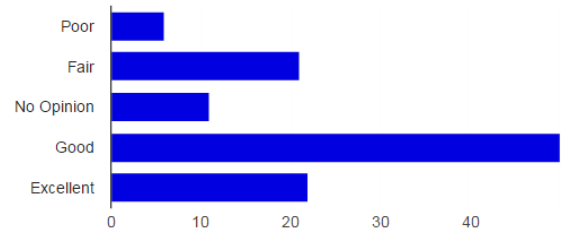
Poor	26	23.9%
Fair	14	12.8%
No Opinion	23	21.1%
Good	32	29.4%
Excellent	14	12.8%

2-6. Internet [2-0a. Your knowledge of each of the stated technology tools in teaching.]



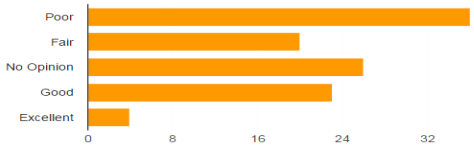
Poor	0	0%
Fair	2	1.8%
No Opinion	0	0%
Good	42	38.5%
Excellent	65	59.6%

2-7. Open Educational Resources [2-0a. Your knowledge of each of the stated technology tools in teaching.]



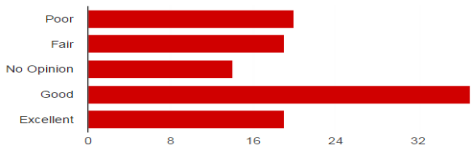
Poor	6	5.5%
Fair	21	19.1%
No Opinion	11	10%
Good	50	45.5%
Excellent	22	20%

2-8. Smart board [2-0a. Your knowledge of each of the stated technology tools in teaching.]



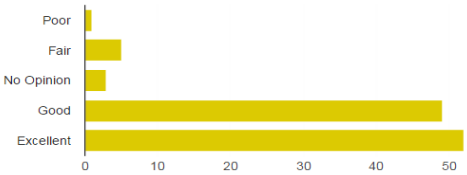
Poor	36	33%
Fair	20	18.3%
No Opinion	26	23.9%
Good	23	21.1%
Excellent	4	3.7%

2-9. Digital Camera (video and still photography) [2-0a. Your knowledge of each of the stated technology tools in teaching.]



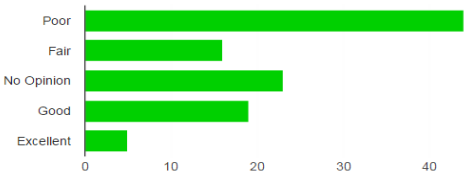
Poor	20	18.3%
Fair	19	17.4%
No Opinion	14	12.8%
Good	37	33.9%
Excellent	19	17.4%

2-10. Microsoft Office Word, PowerPoint, Excel, Access [2-0a. Your knowledge of each of the stated technology tools in teaching.]



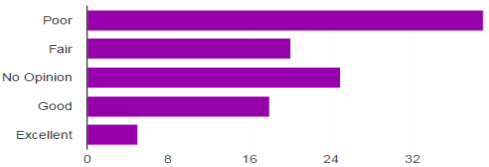
Poor	1	0.9%
Fair	5	4.5%
No Opinion	3	2.7%
Good	49	44.5%
Excellent	52	47.3%

2-11. Podcasts and vodcasts [2-0a. Your knowledge of each of the stated technology tools in teaching.]



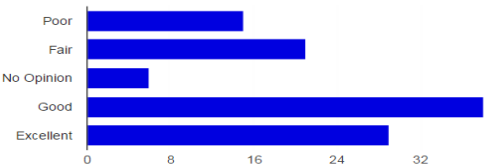
Poor	44	41.1%
Fair	16	15%
No Opinion	23	21.5%
Good	19	17.8%
Excellent	5	4.7%

2-12. Simulations [2-0a. Your knowledge of each of the stated technology tools in teaching.]



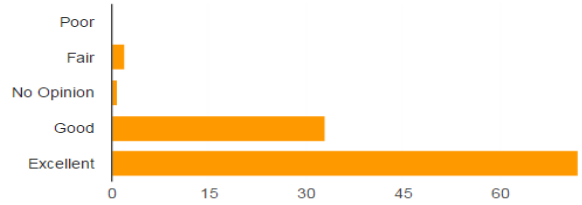
Poor	39	36.4%
Fair	20	18.7%
No Opinion	25	23.4%
Good	18	16.8%
Excellent	5	4.7%

2-13. Social network tools (Facebook, Google+, WhatsApp) [2-0a. Your knowledge of each of the stated technology tools in teaching.]



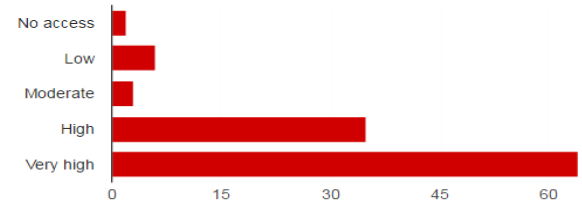
Poor	15	13.8%
Fair	21	19.3%
No Opinion	6	5.5%
Good	38	34.9%
Excellent	29	26.6%

2-14. Email [2-0a. Your knowledge of each of the stated technology tools in teaching.]



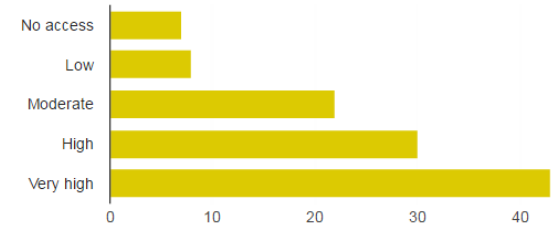
Poor	0	0%
Fair	2	1.9%
No Opinion	1	0.9%
Good	33	30.6%
Excellent	72	66.7%

2-15. Laptop computer [2-0b. Your access to each of the following technology tools in teaching.]



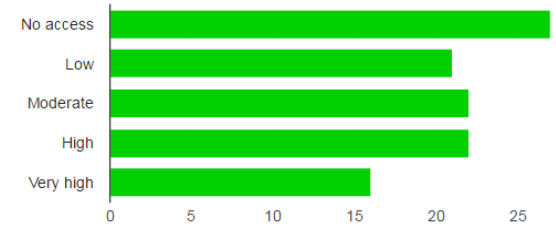
No access	2	1.8%
Low	6	5.5%
Moderate	3	2.7%
High	35	31.8%
Very high	64	58.2%

2-16. PowerPoint projector [2-0b. Your access to each of the following technology tools in teaching.]



No access	7	6.4%
Low	8	7.3%
Moderate	22	20%
High	30	27.3%
Very high	43	39.1%

2-17. Learning Management System [2-0b. Your access to each of the following technology tools in teaching.]

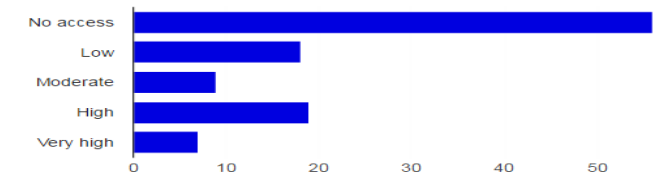


No access	27	25%
Low	21	19.4%
Moderate	22	20.4%
High	22	20.4%
Very high	16	14.8%

2-18. Smart phone [2-0b. Your access to each of the following technology tools in teaching.]

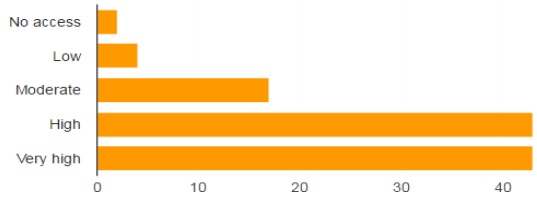
No access	33	30%
Low	27	24.5%
Moderate	12	10.9%
High	19	17.3%
Very high	19	17.3%

2-19. IPad [2-0b. Your access to each of the following technology tools in teaching.]



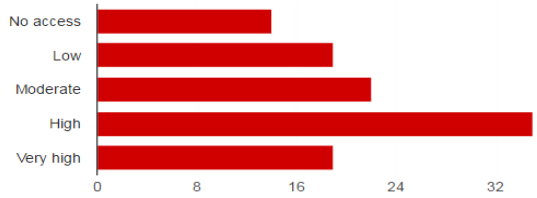
No access	56	51.4%
Low	18	16.5%
Moderate	9	8.3%
High	19	17.4%
Very high	7	6.4%

2-20. Internet [2-0b. Your access to each of the following technology tools in teaching.]



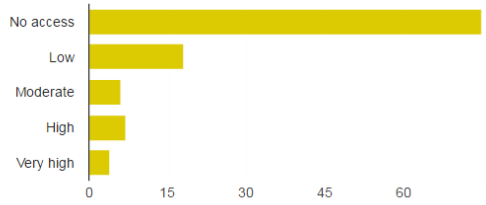
No access	2	1.8%
Low	4	3.7%
Moderate	17	15.6%
High	43	39.4%
Very high	43	39.4%

2-21. Open Educational Resources [2-0b. Your access to each of the following technology tools in teaching.]



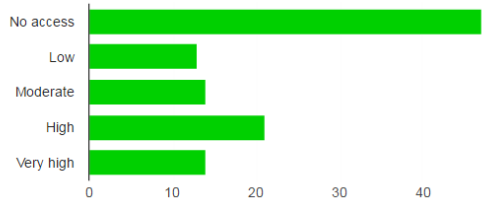
No access	14	12.8%
Low	19	17.4%
Moderate	22	20.2%
High	35	32.1%
Very high	19	17.4%

2-22. Smart board [2-0b. Your access to each of the following technology tools in teaching.]



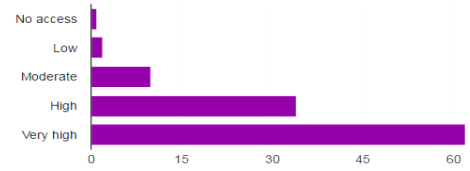
No access	75	68.2%
Low	18	16.4%
Moderate	6	5.5%
High	7	6.4%
Very high	4	3.6%

2-23. Digital Camera (video and still photography) [2-0b. Your access to each of the following technology tools in teaching.]



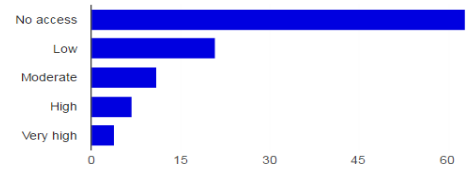
No access	47	43.1%
Low	13	11.9%
Moderate	14	12.8%
High	21	19.3%
Very high	14	12.8%

2-24. Microsoft Office Word, PowerPoint, Excel, Access [2-0b. Your access to each of the following technology tools in teaching.]



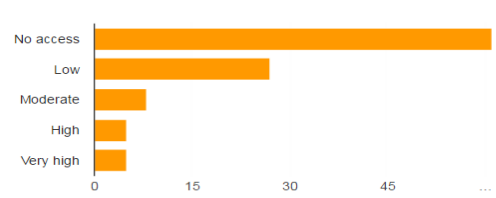
No access	1	0.9%
Low	2	1.8%
Moderate	10	9.2%
High	34	31.2%
Very high	62	56.9%

2-25. Podcasts and vodcasts [2-0b. Your access to each of the following technology tools in teaching.]



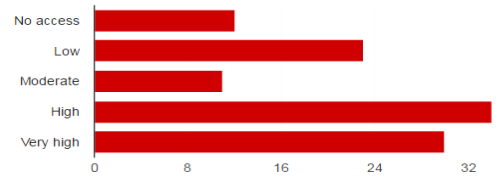
No access	63	59.4%
Low	21	19.8%
Moderate	11	10.4%
High	7	6.6%
Very high	4	3.8%

2-26. Simulations [2-0b. Your access to each of the following technology tools in teaching.]



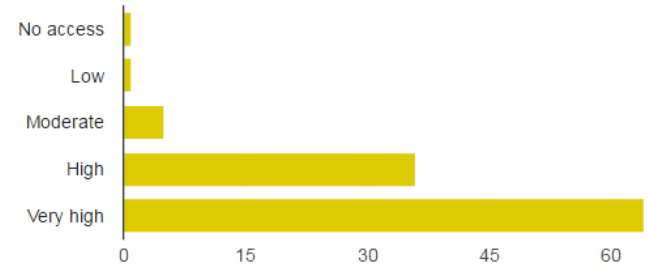
No access	61	57.5%
Low	27	25.5%
Moderate	8	7.5%
High	5	4.7%
Very high	5	4.7%

2-27. Social network tools (Facebook, Google+, WhatsApp) [2-0b. Your access to each of the following technology tools in teaching.]



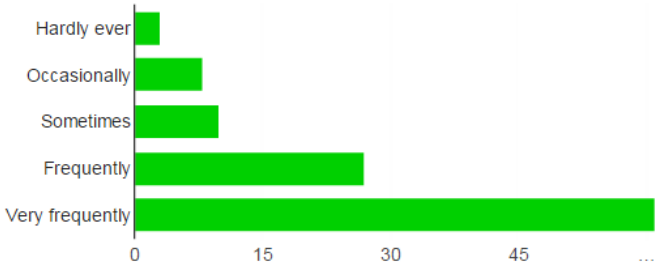
No access	12	10.9%
Low	23	20.9%
Moderate	11	10%
High	34	30.9%
Very high	30	27.3%

2-28. Email [2-0b. Your access to each of the following technology tools in teaching.]



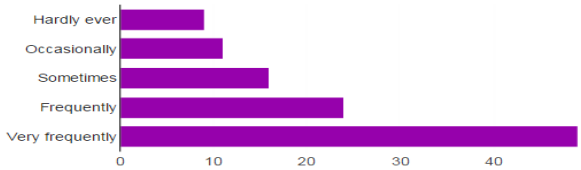
No access	1	0.9%
Low	1	0.9%
Moderate	5	4.7%
High	36	33.6%
Very high	64	59.8%

2-29. Laptop computer [2-0c. Your use of each of the following technology tools in teaching]



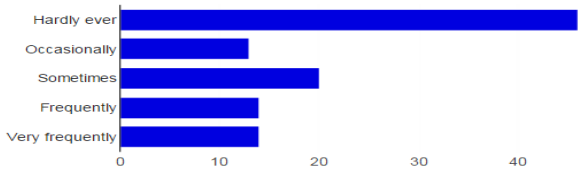
Hardly ever	3	2.8%
Occasionally	8	7.3%
Sometimes	10	9.2%
Frequently	27	24.8%
Very frequently	61	56%

2-30. PowerPoint projector [2-0c. Your use of each of the following technology tools in teaching]



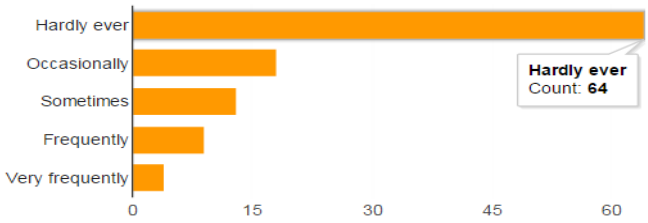
Hardly ever	9	8.3%
Occasionally	11	10.1%
Sometimes	16	14.7%
Frequently	24	22%
Very frequently	49	45%

2-31. Learning Management System [2-0c. Your use of each of the following technology tools in teaching]



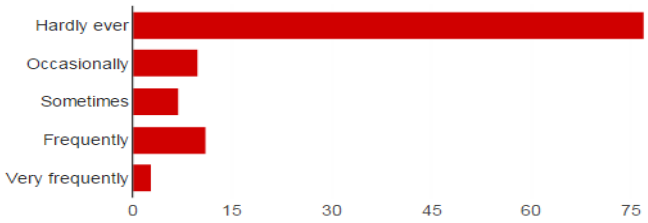
Hardly ever	46	43%
Occasionally	13	12.1%
Sometimes	20	18.7%
Frequently	14	13.1%
Very frequently	14	13.1%

2-32. Smart phone [2-0c. Your use of each of the following technology tools in teaching]



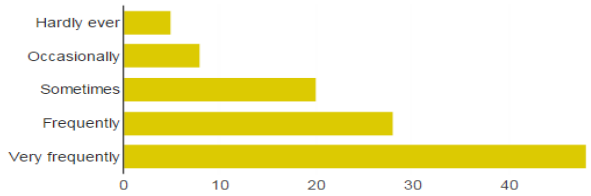
Hardly ever	64	59.3%
Occasionally	18	16.7%
Sometimes	13	12%
Frequently	9	8.3%
Very frequently	4	3.7%

2-33. IPad [2-0c. Your use of each of the following technology tools in teaching]



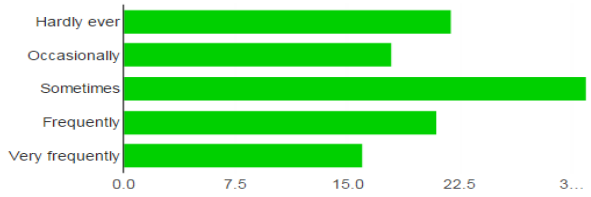
Hardly ever	77	71.3%
Occasionally	10	9.3%
Sometimes	7	6.5%
Frequently	11	10.2%
Very frequently	3	2.8%

2-34. Internet [2-0c. Your use of each of the following technology tools in teaching]



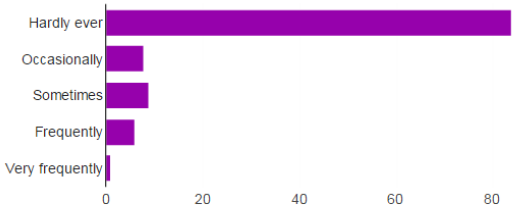
Hardly ever	5	4.6%
Occasionally	8	7.3%
Sometimes	20	18.3%
Frequently	28	25.7%
Very frequently	48	44%

2-35. Open Educational Resources [2-0c. Your use of each of the following technology tools in teaching]



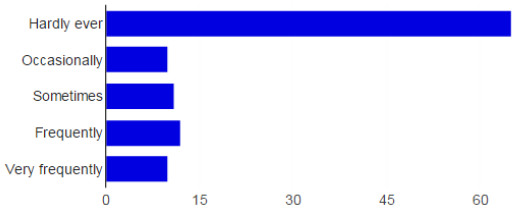
Hardly ever	22	20.4%
Occasionally	18	16.7%
Sometimes	31	28.7%
Frequently	21	19.4%
Very frequently	16	14.8%

2-36. Smart board [2-0c. Your use of each of the following technology tools in teaching]



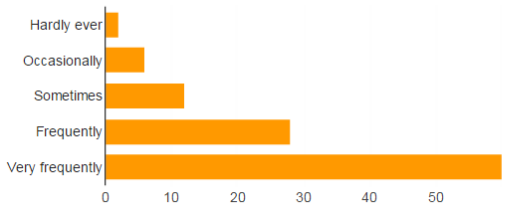
Hardly ever	84	77.8%
Occasionally	8	7.4%
Sometimes	9	8.3%
Frequently	6	5.6%
Very frequently	1	0.9%

2-37. Digital Camera (video and still photography) [2-0c. Your use of each of the following technology tools in teaching]



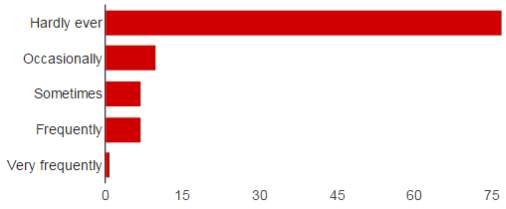
Hardly ever	65	60.2%
Occasionally	10	9.3%
Sometimes	11	10.2%
Frequently	12	11.1%
Very frequently	10	9.3%

2-38. Microsoft Office Word, PowerPoint, Excel, Access [2-0c. Your use of each of the following technology tools in teaching]



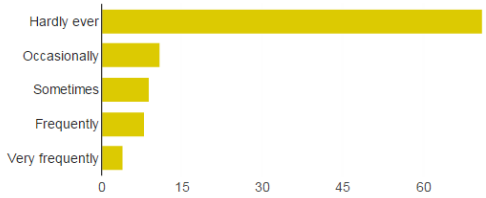
Hardly ever	2	1.9%
Occasionally	6	5.6%
Sometimes	12	11.1%
Frequently	28	25.9%
Very frequently	60	55.6%

2-39. Podcasts and vodcasts [2-0c. Your use of each of the following technology tools in teaching]



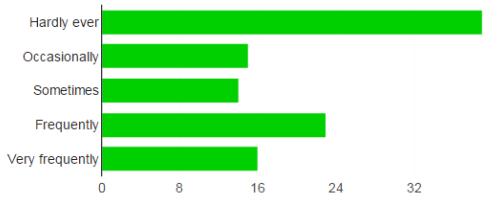
Hardly ever	77	75.5%
Occasionally	10	9.8%
Sometimes	7	6.9%
Frequently	7	6.9%
Very frequently	1	1%

2-40. Simulations [2-0c. Your use of each of the following technology tools in teaching]



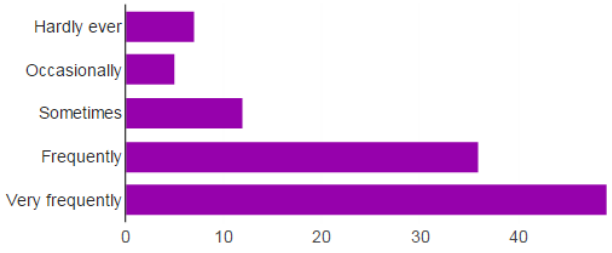
Hardly ever	71	68.9%
Occasionally	11	10.7%
Sometimes	9	8.7%
Frequently	8	7.8%
Very frequently	4	3.9%

2-41. Social network tools (Facebook, Google+, WhatsApp) [2-0c. Your use of each of the following technology tools in teaching]



Hardly ever	39	36.4%
Occasionally	15	14%
Sometimes	14	13.1%
Frequently	23	21.5%
Very frequently	16	15%

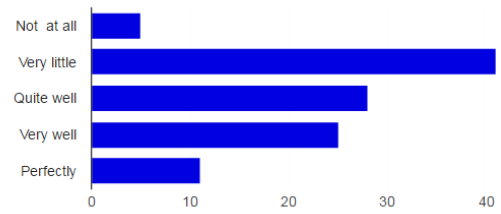
2-42. Email [2-0c. Your use of each of the following technology tools in teaching]



Hardly ever	7	6.4%
Occasionally	5	4.6%
Sometimes	12	11%
Frequently	36	33%
Very frequently	49	45%

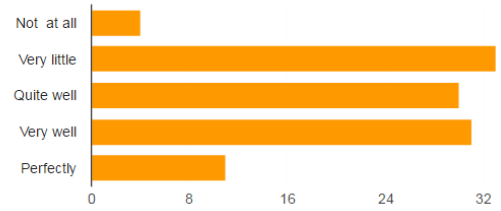
Section Three: Integration environment and inspiration to use information and communication technologies

3-1. Learning from others. [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



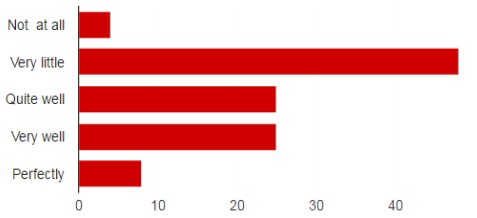
Not at all	5	4.5%
Very little	41	37.3%
Quite well	28	25.5%
Very well	25	22.7%
Perfectly	11	10%

3-2. Sharing information. [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



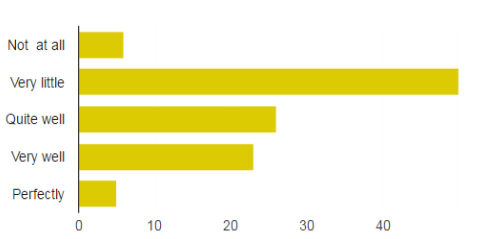
Not at all	4	3.7%
Very little	33	30.3%
Quite well	30	27.5%
Very well	31	28.4%
Perfectly	11	10.1%

3-3. Getting tips. [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



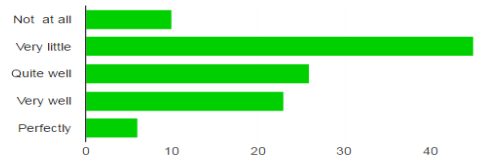
Not at all	4	3.6%
Very little	48	43.6%
Quite well	25	22.7%
Very well	25	22.7%
Perfectly	8	7.3%

3-4. Sorting out some challenges. [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



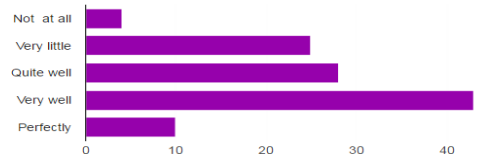
Not at all	6	5.5%
Very little	50	45.5%
Quite well	26	23.6%
Very well	23	20.9%
Perfectly	5	4.5%

3-5. Creating social space for learning more. [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



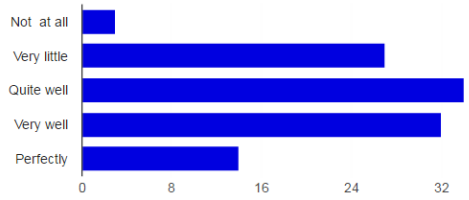
Not at all	10	9.1%
Very little	45	40.9%
Quite well	26	23.6%
Very well	23	20.9%
Perfectly	6	5.5%

3-6. Keeping abreast with knowledge. [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



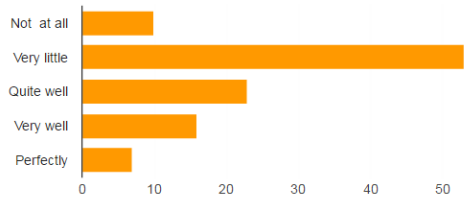
Not at all	4	3.6%
Very little	25	22.7%
Quite well	28	25.5%
Very well	43	39.1%
Perfectly	10	9.1%

3-7. Gaining experience and skills [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



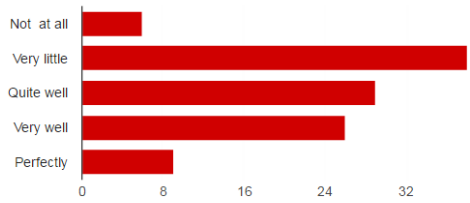
Not at all	3	2.7%
Very little	27	24.5%
Quite well	34	30.9%
Very well	32	29.1%
Perfectly	14	12.7%

3-8. Mentorship [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



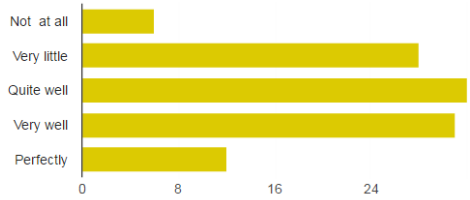
Not at all	10	9.2%
Very little	53	48.6%
Quite well	23	21.1%
Very well	16	14.7%
Perfectly	7	6.4%

3-9. Inspiration and confidence. [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



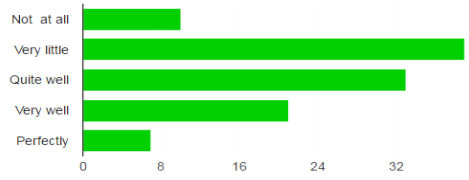
Not at all	6	5.6%
Very little	38	35.2%
Quite well	29	26.9%
Very well	26	24.1%
Perfectly	9	8.3%

3-10.Building relationships and networks. [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



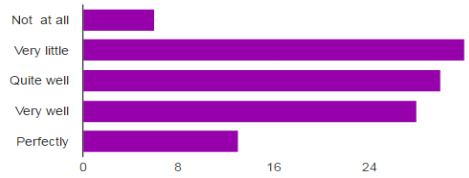
Not at all	6	5.5%
Very little	28	25.7%
Quite well	32	29.4%
Very well	31	28.4%
Perfectly	12	11%

3-11.Access to multiple perspectives and responses. [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



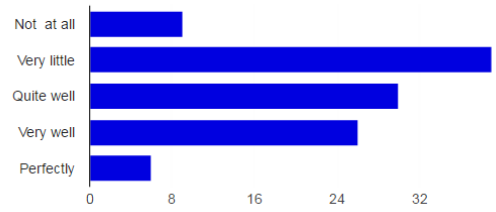
Not at all	10	9.1%
Very little	39	35.5%
Quite well	33	30%
Very well	21	19.1%
Perfectly	7	6.4%

3-12. Creation of new knowledge. [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



Not at all	6	5.5%
Very little	32	29.4%
Quite well	30	27.5%
Very well	28	25.7%
Perfectly	13	11.9%

3-12. New tools, techniques, cases, stories, concepts and perspectives [3-0. Does the environment you work in provide the following opportunities for you to integrate information and communication technology into curricula?]



Not at all	9	8.2%
Very little	39	35.5%
Quite well	30	27.3%
Very well	26	23.6%
Perfectly	6	5.5%

3-16: Forms of support

Phone call [3-16: Which of these forms of support would most inspire you into integrating information and communication technology into curricula.]

Ineffective	15	14.2%
Uncertain	43	40.6%
Effective	48	45.3%

Email [3-16: Which of these forms of support would most inspire you into integrating information and communication technology into curricula.]

Ineffective	4	3.7%
Uncertain	10	9.3%
Effective	93	86.9%

Centralized support desk [3-16: Which of these forms of support would most inspire you into integrating information and communication technology into curricula.]

Ineffective	20	18.7%
Uncertain	51	47.7%
Effective	36	33.6%

Decentralized support desk [3-16: Which of these forms of support would most inspire you into integrating information and communication technology into curricula.]

Ineffective	6	5.8%
Uncertain	45	43.3%
Effective	53	51%

Someone to consult around me [3-16: Which of these forms of support would most inspire you into integrating information and communication technology into curricula.]

Ineffective	1	1%
Uncertain	23	21.9%
Effective	81	77.1%

3-17: If you would wish to share with us (in detail) how you learnt to use technology for teaching, please write your email here.

3-17: Please state what you think could be done to enhance your increased integration of information and communication technology into curricula.

availability of computers and fast internet to both staff and students. the computers must be serviced and maintained. currently itsan individual staff efforts to have a laptop!

training in itc use

Training and workshops

Introduce computational Labs universal to all Makerere Staff especially in Mathematical programming

improved infrustructure such as computer labs, laptops, projectors and power in all lecture rooms

Provide basic infrastructure , software and continuous support for learning

Refresher courses to acdemic staff members plus providing of the tools by the institution.

Installation of ICT equipments in the lecture rooms

Training in use of ICT tools in teaching

Access to hardware for both the lecturers and students.

The Adorption of the modern technology could be one of the good measures.

availability/access to new gadgets for teaching

Trainings

equip lecture rooms

Training in ICTand curricula development

More bandwidth around the University

provide elearning facilities to bith students and staff

provide better access to the internet and improve current LMS to be readily available.

University should integrate e-learning into the curricula and provide the required facilities and training

Technical skills training into content development, technical staff support during teaching where ETs are used

Online training to use LMS

we need more access to these technologies and therefore we need management of the University to intervene by equiping our offices and lecture rooms with such new technologies

enabling infrastructure and softaware training

More trainings and awards giving to those using ICT. This will motivate others

Infrastructure/Equipment and internet connectivity

availability of steady internet WIFI connectivity and ICT tools like I pads for each student. Create learning platforms

Increased internet access especially for students

Provision of hardware such as laptops, IPads, Smart phones etc by the institution

Get the actual hardware (laptops and projectors) especially. Also have reliable power and internet for both staff and students.

Handson training, sharing experiences with members using modern ICT in teaching, an enabling and supportive work environment

deeming it compulsory

University could develop a programme of sensitizing and training academic staff to use information technology.

the university should avail lecturers with the necesaary tools to make this intergration practical and achievable
get the resources
Power projector should be installed in lecture theatres.
There needs to be support and training for all staff especially those who are new in the system. This training is necessary because even though people can use the interent they may not know how to use it for educational purposes
provision of ICT tools
Managable class numbers and avail necessary equipment
improve access to ICT
facilitating CEES with the necessary equipment
Recognition
provision of critical software support system in the institution
Increase student access to information services
having full time internet access by all students during and outside classes
Regular workshops organised by the ICT experts. There should also be ICT tools like Moodle which can be applied in teaching students.
First availability of the hardware. Give chance to people for the software
Training
integrating ICT across all courses
Attitude is central in integrating ICT in curricula
1. Avail information technology tools; 2. Train staff to use these tools; 3. Perhaps make it compulsory to use these tools (?)
reliable availability of Internet
enabling policy should be put in place to support teaching, and assessment using these technology.
Chnage mindsets of policy makers, teachers and students
Training of curriculum implementers in the integration ICT in the curricula
Starts with upgrading internet connectivity
improved infrastuctures
i need formal training and materials accessed to me. i also need to take the opportunity that normally arise
1. improved access to both technology & internet; 2. Training & mentorship
leadership that cares about and motivates integration of ICTs in curricula
Provide laptops to all staff
Install ICT support systems in lecture rooms
I think there is need to increase on the bandwidth and hence internet speed as well as its reliability. Having a slow connection and an intermittent one at that, is a hindrance. Also the need for one to have a laptop is a must! Most laptops are personal. If one cannot access a laptop, it becomes to use it in curricula teaching.
There is need for infrastructure such as white boards and smart boards. There almost to access to the required tools such as computers. The facilities available can never facilitate such integration if we take into account the student numbers we handle.

Availability and easy access to ICTs in the School/College
The University should buy computers and software for staff and maintain them. The problem with Makerere University is that it does not value ICT even though they frequently talk about it. The internet is slowest and most of us use our own hardware and software. Even when you acquire skills, the institutional atmosphere does not allow one to share.
Installation of modern technology and establishment of a teaching technology unit like is the case in many top universities in the West.
Avail more computers, improve internet speed, solve issue of power outages, frequent training to update skills
fix projectors in eack lecture room
Make the internet faster and reliable
availablity of e-resources and gadgets eg laptops, iPads etc
Through holding seminars and workshops to equip people/us with ICT skills
frequent refresher courses
If it was to be made compulsory
Avail all the necessary hardware and offer training to staff
provide the software that is required for my discipline
Increased band-width, and improved access to such technologies
increased on job training
Skills training on the use of possible technologies
Make the resources egequipmet available, but also an orientation in their proper use for me and my students.
provision of facilities(hardware & software) and better bandwidth
faster internet
Having refresher courses about new developments in ICT
More Training
Create more awareness among students
Increased awareness on the institutional technologies
Infrastructure development
Information Literacy into curricula should be applied in all colleges and integrated in the course outlines (curriculum), so that students are able to gain knowledge in new technologies and apply it in their day to day activities. Occasional Training for all staff, will build lecturers' knowledge and confidence in passing on new knowledge to students.

Appendix III: Observation guide

1. Educator introduction
2. Statement of experience in technology usage
3. Indication of knowledge of the colleagues
4. Expectations from the sessions
5. Technologies introduced to during the PgDip in Educational Technologies
6. Technologies in one's possession now
7. The technology that one tried and level of experience they were gaining
8. The lessons they are getting from usage of a technology
9. The challenges they experience and how they were sorted
10. Whether they found other participants useful in the learning so far
11. Any new technologies they were getting exposed to
12. Further guidelines expected from the sessions to help them learn better
13. The technology that one tried and level of experience they were gaining
14. The lessons they are getting from usage of a technology
15. The challenges they experience and how they were sorted
16. Newer technologies they had in their possession
17. Whether they found other participants useful in the learning so far?
18. Further guidelines expected from the sessions to help them learn better

Appendix IV: Transcribed focused discussions

Date: 14/05/2014

Educator One introduction

I am at the rank of Assistant Lecturer, teaching with 10 experience. On the average, I teach about 300 students

An interruption from one of the participants… No we teach a thousand….

Ok, ok, hundreds of thousands of students…. *Laughter*…… But serious, I get a nightmare when teaching my 300 students. I really ask myself what kind of learning is taking place in such environment, where the teacher has very little time with the students and stakes are high that students in this class are not attended to when it comes to individual differences in learning and motivation. I actually fear to teach in my classes because I am not sure I am teaching sometimes.

Experience in technology usage

Regarding using of technologies for teaching, I must say that my level of using technology is low, very, very low, but I have tried to use technologies most especially the Learning Management System to teach in the past years. I sometimes visit the internet to get information about topical issues and yes, I use that in teaching my students. I have also used slides to teach when I am projecting them. I also know of other technologies that can be used to help in teaching large classes… but I can……. [Silence]. But I can be able to switch on a computer and look for what I want, send an email and yes… do all that staff that are always personal.

Question from a colleague…. Why not use the technologies for teaching…?

Answer: There is no policy that compels me to do so, I have a choice… yeah…

I do think that the usage of technology for teaching in my opinion should be a God given issue most especially when it comes to teaching here at Makerere. But this is not the case.

Knowledge of the colleagues participating

I have met some of the colleagues here for other issues and reasons neither related to teaching large classes nor teaching with technology. You see some of these things needs someone to draw your attention to them, look here, if Walimbwa [the researcher] had not talked about these two, I am not sure I would even pay attention to them. I know everybody body here although not by name, I know we are all lecturers here. By the way, let me take this chance to say thank you for building for the future [motto of Makerere University].

Expectations from the sessions

My expectations form these sessions are many, I am want to go to the economics saying that 'man's needs are insatiable'. I expect meetings to offer me a supportive opportunity in my ambition of getting the skills in teaching and learning with technologies. I am not a very talkative person but I really expect to ask too much, this is just to prepare you people for my questions….Hmmmmm… Stretches a bit.

I am excited about this; I expect to learn more about the operations of a MUELE. I did not know I would be part of this group I expect lots of ideas but I also commit myself to being loyal and open in the meetings. I understand many of these initiatives fail because of personality incompatibilities. I expect to know how to get my students to have email addresses so that they can be able to get to me. I actually expect to know how to create Google groups for myself and the students I teach too. There are many technologies that are germinating like millet these days and yes, I expect a fair introduction to them and how they are used in the teaching process. And my last expectation is to work with everybody who attending these sessions to help me improve my ability to teach with technology.

Interruption by a colleague…. Are you so selfish, you should say working together to improve our abilities mot my ability…? Laughter…

I guess I have answered all the questions on the slide… please remind me if I have not said something…

Demonstration on how to use a Learning Management System

Educator Two introduction

I have close to 12 years of experience in teaching. The class I currently teach has about 800 students in total, I am not sure how many female and males are there…. Laughter. It worries me so much that I cannot ensure that I have looked at everybody's students especially in experiments in a very limited time. I do not take time because everybody must have their work looked at to get that satisfaction. I do have an understanding of the psychology of human learning, but I can confess there is no for Devine intervention in the class I teach. In particularly small lecture rooms, I even fail to move around like a teacher does and so I remain standing like a statue in front of the learners.

Experience in technology usage

What is your technology experiences……? Frowns……well, during my undergraduate days, we were required to submit typed course works. Although many times I would take my drafts to the secretarial people to type, I tried to do it myself privately as I realized it was for my own benefit in future. And yes, I did the typing of most of my course works through those days and got used to typing and using computer technology.

I therefore have no laptop, but I can see my friend here with one so I will borrow from him in case I need one [laughter] as I would not wish to use my money to buy one right now until I get a loan from the university [laughter]. With this environment of no electricity [coincidentally power goes off and a prolonged laughter again and one participant says "Are you a prophet of doom…] and every time you want to use a computer, there is no power!

Power comes back on…. Okay, now I can tell you more, I know that video conferencing can

Knowledge of the colleagues participating

Do you want me to tell you whether I know these people? Hooohohoho. According to courts of law, that is a contentious question…. Laughter…… but let me see…… I can say I know three colleagues by name and the rest, I am meeting them for the first time. I just hear about them on TV and see them on radio.

Expectations from the sessions

Well, am not sure of what I expect to be done here…. I will however listen because the topic looks very pertinent to my teaching. I joined these meetings because I feel they are here so that we talk about things that concern our teaching and want to find a solution to some of the challenges. I must be careful to say some simply because…….. [Silence]…….I believe in home grown solutions and I think these meetings are aiming at exactly that. I expect to learn how to use Google Documents

I anticipate lots of support from the originators of the idea so I am quick to embrace it.

I will listen because the topic looks pertinent to my teaching with technologies

I like it that this meeting cuts across departments and so I expect interdisciplinary in our experiences.

Educator three introduction

I am an Assistant Lecturer and I have taught for 8 years. I have had had so many challenges when it came to teaching these numbers in one lecture room. I teach about 130 students and I have always thought that my students do not benefit enough from my teaching as many attend lectures through the windows, windows, and some actually ventilators... [Laughter by the audience as she frowns]. My friends, this is no laughing matter, I feel like crying… [Sudden silence for 15 seconds]. I have always wanted to see the learners interact and engage deeply with the content I teach, but I have not been able to because of the numbers. I teach from a place which is actually a dining hall, it is a big place with very few benches and broken tables. Sometimes my students have to stand; those who seat have to write on their laps. I don't expect miracles in that environment. It hurts me that we are operating is such a situation while we call it a world class university.

Experience in technology usage

I have always been good in using some of these technologies, but with the expected experts, I think I am going to be great, not only me but even my colleagues! I need to get things from the horse's mouth and experts will definitely push my understanding higher. I had always wanted to see the learners in my large class interact and engage, but I had not been able to, within a lecture. Who would not like to make teaching easy? You are playing with the answers… That is a permanent and pensionable solution my dear… It is long overdue; we needed to do that as soon as yesterday… I do not know how to use Web 2.0 for pedagogy but I have a 1 GB memory stick which I am using to…… [Laughter]. I for example know that simulations can work out as an instructional technology, but I do expect a to go deep into this not me, for me I expect to explore only what is possible for business statistics including advanced excel and those other technologies appropriate in teaching business related courses.

Knowledge of the colleagues participating

I know all these colleagues; my brother here is the youngest in the house. But Makerere has so many lecturers in different colleges, why would you expect me to know all of them, for what? [Laughter]

Expectations from the sessions

My expectations from the session is that … mmmmmmm…. to make teaching easy? It is long overdue, we needed to do that as soon as yesterday… I expected to learn from these grate teachers how they have done things, you never know I can also become grate. I expect cross-fertilization of ideas and increase in opportunities for innovation in teaching. I had always wanted to see the learners engage, but unable to, within a lecture, so I expect to learn how to use technologies to make their learning more interactive. I actually expect to learn more about Excel Worksheets most especially the google one….

Interjection from the audience…. Do you know of any technology that can help you become interactive? Yes, I know there is something…… smart board…. And I have seen Mr. Walimbwa is training us in the usage of one in the Conference hall, I certainly know….

Educator Four introduction

I teach in the College of Education and External Studies. I started teaching in 2001 and therefore I have 15 years' experience in teaching. My classes comprise of 400 students on the average. In a class with 400 students, you cannot expect deep learning in a place where so many students are herded on to each other like cows grazing! The teaching is absolutely affected by the large numbers and so is the learning.

Experience in technology usage

I have very little experience to do with teaching with technology, I have a background in computer science. Although I have heard of some technologies and indeed I own some…. For example, I own a mobile phone… [Picks it from his pocket and puts it on the table to the amusement of colleagues]. I use the university internet service. I stay around campus so I can access all these technologies related services 24/7 except for the power issues that disrupt us. This hour it (power) is on, the next hour we get to a black out…… that is how we operate here and we are becoming used.

Knowledge of the colleagues participating

I do not personally know anyone of these colleagues.

Expectations from the sessions

Working together, helping each other and supporting one another is my biggest dream, because there is no man who is an island anyway and we all teach the same students. I anticipate getting the soft skills from colleagues, I have an engineering background and need to get soft all the time. Without a shared interpretation of issues in teaching and learning, it becomes difficult to discuss meaning. I know with this meeting, I can do better anyway, I will just try harder now, it is just higher, if that is the answer you want…. I expect to learn how to use the general technologies usable…. Not any particular one….

Question… But there are too many technologies to learn, can't you single out any particular one?

Woowww…….. I have heard of web 2.0 is that specific enough…… [No… that is a consortium]

Okay, we shall choose that consortium……

I believe in home grown solutions and I think these meetings are aiming at exactly that. So what workshops and sessions like this should be able to do is to work on the mind-set.

Educator five introduction

I know I am coming last so I will be very brief in my introduction, I am called 000000000. I have taught for 5 years and my classes are 150 students per group. I teach at the College of Education and External studies specifically teaching Language Education. I am not very sure of the discussions, I know I received an invitation for this workshop and I am here. I will get the details here I believe. Talking for a psychology perspective… teaching a large class, am going get you this scenario: I give tasks to groups and tell them to discuss and present. I tell them to append names of their final drafts; they write names of everybody including those who had gone for their own business (not in class) while we were in class.

But how do I know this? It is difficult since I can't take roll call of the class; big classes are just a nightmare with students who have no self-drive and want to be pushed to learn.

Experience in technology usage

Assuming all of us here were asked whether we know how to connect a projector to a computer and we all said yes, will the facilitator pay critical attention to the connection of the projector? Of course not, and could be that some do not actually know how to connect, they just have to move with the crowds. I always try to use a projector in my teaching. The one big problem I have is that I do not know to design beautiful slides for my presentations. On many occasions I just project the word documents. There is need to deploy the technologies we have and start supporting each other in benefitting from them.

Interruption, why are you here?

I…….I come to these sessions not so much as an expert as one who is ready and willing to share what I know with all of us. Because I know that all that is needed are collaborations across departments and formation of powerful working teams. I have an ordinary phone that I use to call students

Knowledge of the colleagues participating

I know all these colleagues, I have been very active in MUASA and therefore gone to many all colleges and met most of them personally.

Expectations from the sessions

I expect to develop a positive attitude towards technology as this will enable me to work towards exploiting the benefits of the technology in my teaching. I expect to learn how to use computerized grading of students. I expect the session to provide opportunities for interaction and participation in modern teaching and learning. If we come out of this we a working paper, we can inform our university Senate to make an appropriate policy on teaching with technology. This is because the environment is ready for teaching with technology and that technology is valued by all educators. I get stuck while trying out some of the technologies, I even don't know whom to consult for help and so I expected to get some of these things sorted here. I also do not know how to design a course for a learning management system.

Second pilot

Date: 08/06/2015

Program schedule
Presentation by researcher
Presentation by educators
Discussions

Summary of Discussions

Dear colleagues, it gives me pleasure to be here again with you as a follow up of the sharing experiences regarding teaching with emerging technologies. In the last session, we shared our understanding of large class settings. We brought out our technology experiences and we tried to find out how much we know each other as colleagues. Presentations were made demonstrating how a selection of technologies including the learning management system, Google documents, Social Media and other web 2.0 technologies are usable in teaching. I could read from the interactions then that we felt convinced that the solution to teaching large classes was partly in our ability to learn how to use those technologies. Indeed, we all pledged to continue to try to use the technologies at our disposal as much as we could. But in the same session many questions cropped up. It is now about four months of our trying and today we are here to understand how the process has gone this far. Today, we would like to focus on how we are progressing, what is working and what is not working in this process. The structure of the presentation today will continue to explore the technology you have tried in the four months and how the technology is appropriate or not for your teaching. It will be necessary that you share with us whether you asked for help, from who and how you found that help in your usage of technologies. It will also be important for you to tell us what you think we can do to help you in your better usage of that technology. Lastly, it is useful for colleagues to ask questions that enable all of us understand how we are performing in as far as the usage of technologies is concerned.

Educator one

My goal has always been to use these technologies in my teaching. During the presentation and my trying out, we talked about things that concern our teaching of large classes and we have tried to find a solution in favour of all of us as in technology. The presentations and demonstrations offered me a very supportive opportunity in this ambition and kick started me on the process. The presentations and demonstrations in April were very useful to me. I have been trying out using the MUELE and it has started to work for me. Sometime back before the meeting when I was teaching alone, it was difficult, I had no one to consult, and I thought this was really boring. Last time we were having the sessions, I got an opportunity of getting the phone number of 000000000,

Question, so sorry, I came in late, but did you get the phone number?

Answer: yes, I also need it, I failed to get it the other time, yet I needed to get some clarification …….

Okay, can I continue now? Yes, go ahead…

I just got the number but did not know that it would be important at some point. When I got stuck connecting my laptop to the projector to display MUELE, I called him and he directed me on phone and boom, it worked!

The trends of me participating in the session are pointing me to the rightful direction. In the learning session in April, I discovered that I needed to carry my notes everywhere with me, but the memory stick I had was too small, only 128 MB! I have now bought a bigger capacity [1 GB]. I am making very good progress if you can allow me to describe myself that way.

Joke…. My technology usage skill is growing yes…., I like it that this meeting cuts across departments otherwise I could not tell you more about MUELE than I did in the first meeting. I am now confident using my iPad to monitor my students as they learn on MUELE. I know who is participating and who is not even when I am at home. I am even exploring how new applications on the iPad might help me to differentiate and assess within large class environment. I have found videos and I am planning to watch them in detail as I think about the possibilities of doing this myself.

In the April presentations, I met and interacted with colleagues, I could not have met for this particular purpose. I had fun with colleagues while learning. In the few months of trying out, I have had to refer to the documents and manuals given during the learning sessions, there was this particular document [tutorial] on using MUELE.

Anything you are proud of so far?.....

Thinks for a moment ……. Eeeeeeeh yes…. I have identified the URLs where I get information for teaching and I referred students to them. I realize more students are digging out the information by themselves. I gave them a coursework that required them to personally visit the internet and they made presentations towards the same. In such an environment, every student came with a new idea and therefore listening to them as an academician made me more educated, I am personally happy that I attended the sessions, because I am learning from others as they complement me and have been using the ideas I got from them. I also have a yahoo and Gmail address in addition to the Mak mail which has very limited storage space.

Educator two

I have been implementing the usage of Google documents in teaching my large classes. I have used them in teaching my students four times now and I feel it is trying to make a difference. During the presentation, I learnt how to design a Google document and invite students to be part of it. I realized the kind of equipment I should be having must have Google Drive and indeed all Google applications. Without them, I realize I was missing out on something in this digital revolution, I had not explored enough, but yes, the

exploration during the trying out is working on me seriously because I now own and am learning to use more powerful equipment like my Nokia N Series to access my students.

Before these meetings I was kind of off in my little cocoon. I am amazed I used Google Documents in my lecture and I had more students down load it that I would have taught it. I have now believed during this trying out that I knew the technologies, but had a problem with integrating them into my teaching. I would not personally figure out the way forward in how use technologies. The discussions we had so far have enabled me figure out where to begin. Now, it seems I am taking shape in integration. I learnt a lot from the literature we gathered regarding ETs and large classes. But I also learnt more through the interactions I've had with these colleagues.

During the trying out in the past few months, I would look at a situation where I had no body to call and refer to when I got stuck somewhere, for me this trying has provided challenges and opportunities for me to make a contribution towards my teaching with technologies. I am amazed I used Google Documents in my lecture and I had more students download it from Google drive. What surprised me is that my colleagues told me everything about my professional life, I asked them where they got the information and one told me it is on LinkedIn and Google Drive…… I was dumb folded, because I was used to telling all the stories only in class. Many asked me to help them put up their biographies too.

Before the trials, I had no one to consult, the meetings and trials have helped me identify very many individuals to go to whenever I need help. I actually used to be very limited in ideas because I would be alone, now we are many and it makes a difference to me during the trying. I have already planned how to implement Collaborative learning environments and flipped classroom in my classes. Indeed, colleagues helping me have a very heavy background in natural sciences, others in humanities, others in business related disciplines.

There were times we had expertized presentations and tips in the meetings and I must confess this helped me during the trying out; I also therefore believe that this helps a lot as for example I did not know how to use a projector in delivering my lectures and an expert demonstrated it. I had no laptop to use for teaching, but I am increasingly getting it in my mind, I need a laptop urgently because my students will benefit from my teaching.

Educator three

At the beginning I thought I would not manage, but group dynamics played on my side and now I have tried out using Google Documents most especially using the Google Sheets collaboratively.

Have you gotten any issue to clarify in group dynamics? Yes, but I will say that later for now…. I had always been struggling to send spreadsheets as attachments to my students,

with the team work, I am great at sharing just the Google Sheets. Trying out the use of Google spreadsheets gave me a sense of ownership of the practice in our particular department!

I am an intermediate user of technologies and I didn't see any way I could get into a master through trying out the usage of the technologies as the demonstration indicated to me that I can also be able to do it. I feel the ALS provided me with guidance in my walking the talk.

I tried out in the usage of many web 2.0s including using Wikipedia and my digital camera- were being talked about and used. I really got confused then and I was at danger of mixing them up.

How did you sort out the confusion you had?

Because I believed that this community opened up space for dialogue on every issue in the university, because, this is where to get amicable solutions, the need to work in teams and not focus on individuals. I was able to get the basics and ask the people around me. Trying out was the time when I had the liberty to question everything that was being said during the presentation and demonstrations.

I have implemented a discussion forum and my students are now interacting more usually about issues beyond the lecture room. The discussion on web 2.0s was very helpful in my understanding. In the discussions, there was use of examples of the tools available and how they are used. The demonstration was so much with expertise that I followed it during the trying out. The trial sessions were action packed with a blend of fun and working together with my students as I was learning how they were using the technologies outside the normal lectures.

I personally never thought that I can be able to teach using simulations and in the first sessions I said it, but I got this expert who identified some of the simulations in economics, I swear I have been thrilled at how students also used the excel sheet to simulate book keeping practices. I am looking forward to get another training and learn how to design my own simulations. I have acquired a Tablet that will make it able to do my private learning. I am planning to use more Web 2.0 in teaching and that is why I even got a 4 GB flash drive to continue taking home some of the documents I find useful and informative.

Educator four

The past few months have been encouraging …. we're all trying to work each other through together in trying out the learning management system. The LMS discussions and implementations were so fancy, telling us how to use videos… etc. Nevertheless, I feel more empowered now with the knowledge I gained through participation. I was able to use the diagnosing and addressing problems in teaching large classes was university

wide. Through the trying of the LMS, I have been able to build my core capabilities and knowledge competencies that I could not have gained without the trials. It was during the trials that I became more encouraged to try out new technologies than before, because what I was trying out seemed to be working. Take an example of a repertoire of instructional strategies, resources, and lesson ideas that I can demonstrate in my technology toolkit.

The people I am working with in the ALS are always very professional. I am sure if those people reacted rudely to my wrong answers I would quit, after all there was no obligation that I have to be here up to the end. But they are too professional even when I sometimes I think I provoke them. My trying out has made me more comfortable and confident already.

May I ask a question please…. yeah ask: What do you think was missing?

Answer: What was missing was how to teach large classes successfully with a technology cohesive sense.

With the facilitators, I had the liberty to ask what I did not understand and indeed from the beginning they had encouraged us to feel free to ask questions. I on many occasions failed to arrive early enough, but I would catch up because I would ask from those who were early enough.

Past the idea that we're just doing a team meeting about a technology or two now. This is more important than that. And we're in this community with the idea of helping each other be more successful and be more successful for the large classes as well. I am more ready for big classes now than ever before; thanks be to these kind of workshops

Question: What are the lessons for you?

Answer: I am beginning to learn that every day is a learning one and everybody around me can be very resourceful. I was not able to start on using any technology and I am not sure I would have started as a self-initiative. I needed some motivation really.

Question: Do you have any problem with the questions coming up here?

Answer: Questions are unavoidable, most especially when one wanted to understand the technology. I actually questions last time and that is when I realized the need for acquiring a personal modem to get the answers from Google while I am at home. In addition, I now have a tablet, which puts me on the move while I work. I have an external hard drive to ensure I do not lose my data in case of theft of the laptop.

Interjection: By the way, talk about it…. I wonder who steals laptops here. Last year they stole mine and it took me back like five years behind…… murmurings……

Lastly, I thought we never teach the same things and we really did not have any reason to collaborate, but the sessions have proved this wrong, we actually need each other more than it appears.

Thank you very much..... clapping.....

Educator five

The entire semester to me has been full of hills and valleys. I did pilot the Google Documents in trying to get my students to work together. I set up the document and invited students whose email addresses I have to be able to edit the document. For the first two weeks, I did not see any of them trying to get to work. This made me think they probably did not have access to the document. I went to some of them and asked whether they had seen the assignment, it was only one who told me she had seen it. This discouraged me and I thought I was wasting time with people who did not understand what to do. But It seems my verbal remind helped because in the fourth week I go about four of them working. Since this was a trial, I just went on with the four. I wanted to know how they were going about the assignment and what assistance they needed me to provide. I received emails from two indicating that the problem had been the slow connectivity and yet they had very little time in the computer lab. To me all these were learning scenarios because I first came to understand that before I use the technologies, I had to sort out the problem of connectivity to the students. They had tried to use the wireless network which is extremely slow.

What do you think is working out so far in your technology use?

During the trying, I was able to refer to the notes I had taken during the sessions. An example is when I had to go back to the steps of setting up a document for students to be able to other. Although I disagreed with most parts of the process then, I referred back to it. This has taught me that although the resolutions were contestable, I wrote them down and during implementation, I used them.

Do you think your being part of these meetings has helped you in any way?

The participation in the seminar helped me understand how to use things like the LMS because colleagues always asked me questions that made me think much during the implementation. It is not always that I had to agree with my colleagues; we respected each other even when we disagreed when it came to certain issues. Even with the students during the trying, they asked me things I was not able to answer off head. I only had to find some time and walk to Mr. Walimbwa office for briefs that were always handy and useful. The trying has proved an environment with wonderful ideas. There is no doubt that I am going with enormous ideas from here and that these ideas are making a big implication on my practice.

Did you have any technologies before?

I had all this equipment but just had a plan to use them in future, now, I have been inspired by the ALS, I do not think I have any future I am waiting for, and I am going to start immediately. My friends and colleagues have contributed to this entire performance, by encouraging me, they keep telling me yes I can be able to use the technologies, they have always advised me to start small. I think this is the reason why I have fewer students participating in the Google than I expected.

Any challenges you are getting so far?

My challenge in the process of implementation was the difficulty for me to bond up with other participants initially, I thought other colleagues were showing off what they knew in technology and sincerely I was not sure they would not laugh at my ignorance. I took a self-defeatist approach and yes, I was all by myself. It took the decision of one of them to enable me open up and here I am now. I perfectly use google drive and social media…Try me in innovative use of technology… and you will certainly understand that I am not the same as when we started in April. I am surely getting empowered through the process. I am reading new things regarding research and learning with technologies, as well as discussing ideas in the same area. The reason I have not bonded so well with my colleagues is that they are so good and multi-tasking…. they are too quick for me and naturally I get this jealous, although I am getting rid of it recently. However, I can say that the sessions gave us the chance to getting connections to colleagues we consider expert in teaching with technology.

When I was trying out the google documents, I got stuck in the middle of the process but I knew whom to consult for help and yes it has worked now. I am actually learning how to design courses for the learning management system. Even when I am jealousy, I feel supported not blamed by colleagues and honestly I thank them for treating me that way. I feel that all the criticism that I personally got were in good faith and quite professional I can say. But I also imagine the kind of people who brought up such critiques were very honest and concerned about me and how I would feel on reading them.

Third pilot

Date 13/12/2015

Presentation by the researcher:

Friends, I cannot hide my excitement that all of us have come this far. From the time we started these technologies talk sessions you have shown the commitment to them. You have supported me most in this project as a researcher. We have explored and used a number of technologies in our teaching. I personally want to say, you have shown me love, most especially given the fact that you were under no obligation to participate in this sessions. But you have shown that you are eager to learn, learn and learn more. We have shared our experiences and frustrations with each other in our usage of the

technologies. In this particular session we would like to continue to share and try as much as possible to respond to issues that colleagues bring up in ways that will help them learn more and better. In this session I would like you to share your views on what you think colleagues have contributed to your knowing and how you think your teaching large classes has changed since your participation in the sessions. You can be kind enough to share with us the technologies you found particularly useful. Not to bias you, I would like to also say that it will be useful for us to get what you found disappointing in both the process of the sessions and individual educators you have been with in this process. Today's session is going to be shorter than other sessions as we have to end by lunch time. Once again let me thank you.

Educator one

Before the sessions, I considered myself and a 19th century person how colleagues respected me and my humble contribution made me who I am now. I am not sure I could have done it this way this soon. I joined these meetings because I felt they are here for a common good of teaching with technologies in large classes. I am really believing that the solution will be tailor made, not imposed on us from anywhere else. In the sessions, I've met colleagues, I could not have met for this particular purpose. I was honest in my previous sharing of experiences but did not know whether it made sense to my colleagues. I was however surprised that everybody thought I had done it well. This just gave me the determination of sorts to continue working hard on teaching with technologies. There has been mutual interdependence with each other. Through the sessions, I could see myself as an upcoming expert in teaching with technology as I had increased access to expertise in e-learning across the University from Mr. Walimbwa. His speeches have been very motivational and encouraging in enabling me personally master the usage of the LMS.

The sessions have helped me as a knowledge worker to stay current in teaching with technologies. I could not have known that things as small as WhatsApp and as social as Facebook can be used in reaching out to students, I learnt all those things here. Although I have not yet got the time to try out all the technologies I have been exposed to, I feel I have the basics when it comes to where and how to start. But I have also learnt that technologies cannot change my teaching much, but I can change my teaching with technologies provided I have the willingness to do so.

For the time before these sessions, I had no one to consult over technologies, but now with these meetings, I have identified very many individuals to go to whenever I need help. This community has helped me build common language, methods, and models around competencies of using ETs in large classes… I am not sure I could have done it this way this soon, without my colleagues. I now have the confidence in teaching other educators about ideas for differentiation and assessment through software packages like Excel which I did not know before. Let me tell you, it is not that we were taught, it is just

that a software was described with a few illustrations and yes, we had to go an explore them by ourselves. To me this was the best approach as I do not think I would have had enough time to sit down and learn step by step. The sessions exposed us to networking tools like LinkedIn, Blogs, Google+ and Facebook including Google Drive.

I was excited to use Prezi for instance, because I became an expert in a few days. I cannot believe that this happens. I use simulations in teaching my classes. I have actually encouraged many students to get email addresses so that we interact after classes. Exploring how these apps might help them to differentiate and assess within large class environments. The sessions have exposed us to the ideas and the solutions, further implementation is mine, and I will have only myself to blame if I fail to. I have to write a proposal for funding immediately.

Educator two

Since last year, I have enjoyed many things from participating here, I actually thought that knowledge is only current, but there is a lot I learnt from history! If such a community existed before, I believe so much would have been documented already and done already. I tried out to capture a video and upload it on to the learning management system. I came here first without even knowing how to shoot a video, edit it and use it for my students to learn. I did not even know there was something called movie maker, which I used to put pictures together, add sounds and project it during the teaching process. My students seemed to appreciate it more than they had always done when I explained the same concepts without the movie.

In the process I had opportunities to ask for real time help, otherwise it would mean going to read again ooohhh. I would ask some of my students and I was impressed they are real digital natives because some of them perfectly knew how to go about the issues in a digital way although some bigger majority were not very conversant with the systems. I have had improved problem solving skills in the period I participated in the sessions. But this was learnt from associating with the people who participated in the sessions. Whenever I needed help, it is not about calling, it is about walking to the next door for help, because I believed there is help just around me! I realized the power of neighbourhood at my office place. Be sure that there is something that a neighbour can be able to offer you on many occasions. I am amazed I used some of the strategies that my neighbours explained to me in my lecture and I had more students download the movie than I would have taught it in a normal lecture session.

I have also learned how to be patient with colleagues. There was one who really nagged me with asking so much. Much as I thought that some of the questions were good for understanding, this guy would sometimes ask question that were either irrelevant or trivial. So on many occasions I felt like telling him that is obvious or irrelevant.

Did you tell him so?... No, I did not, I did not want to do that…

I as well have been able to use the LMS to create an assignment in this course that required students to collaborate to create a digital presentation of their work. I found it more appealing to the learners, actually, more learners were able to collaborate. But the idea of students collaborating was not mine, I just learnt it during the sessions when somebody explained it and demonstrated it. I really felt it was so creative and I should try it and indeed I did try it.

From the sessions, I thought there was a lot of diversity in the group which gave it flavour. Look here, I did not expect to have anything to do with colleagues from veterinary for example since I am from education. But in this group I have discovered that there is a lot for me to learn from them. They have very creative ways of teaching their large classes that I had not been exposed to before. So the group work this far has been very useful in our interaction as we had useful ideas from different circles that made each of us a whole.

From the last few sessions and across the implementation, when I am working on something and I get stuck, help is just a call or an sms away, I know who exactly to get to at any time. The power of my small phone has also been used to full capacity. I was even luckier that I was able to get replies to my sms almost instantly. But sometimes it was nagging because as you send an sms when in the middle of something like requiring urgent help, somebody takes ages to reply and by the time they reply, you have struggled out of your dilemma and maybe you do not need the information anymore.

The biggest of all is that there could have been no better opportunity to discuss and network with very supportive people. I feel that my colleagues in the sessions still remain my mentors up to now, and past now because I know we shall continue to meet and interact more often now. But I am also happy about Mr. Walimbwa as an expert for having facilitated the session. I have personally been inspired and motivated to also acquire and use an iPad… pulls out one…. I also I know how to capture the screen of the computer! I used to see many beautiful pictures illustrating the desktop but I did not know how it is done; now I know. When I am working on something and I get stuck, help is just a call or SMS away, I know who exactly to get to at any time

I am personally convinced we have achieved it this far. There are many technologies that we have explored here that seem so powerful and useful to my teaching. I could not have got this if the people who facilitated used the hard computer terms. To me as a teacher, people getting an opportunity to ask many question related to what they have learn means that they have actually learn not crammed. Knowledge is sharable. I have been trained video shooting and editing and now I am an expert, anybody who wants can approach me.

Educator three

For the last three semesters, I have seen quick diffusion of innovation among members (e.g., rapid transfer of best practices). It is not the technology that empowered us, it is the

skills and knowledge that we attained in collaborating with other people all through the semesters of working together. During the sessions, I had the liberty to ask what I did not understand and indeed from the beginning the facilitator had encouraged us to feel free to ask questions.

I have benefitted from these sessions but I must say relating to other people sometimes can be very problematic to me particularly. I cannot play blame games anymore because we agreed on everything we intended to implement mutually and when anything backfired in terms of an inappropriate technology, I was accessible to information regarding how to sort it out. I do remember the manual that we printed out taking us through step by step design and upload of a course on the learning management system. This environment has embedded knowledge and expertise that can only be tapped on when you can relate with everybody.

I would not be here without respect, colleagues respected me and my humble contribution made me who I am now. In technology usage, colleagues were just so much better and after a few years, I found the way, and followed what someone I met at a workshop. I was always late for the sessions but my colleagues helped me catch up on many things… I would also ask them and they would be happy to tell me what was covered when I was not there yet. My friend here was sure I never got lost in the deep sea of the various technologies at my disposal. I had to ask so much, because I remember when we were learning how to implement collaborative distance learning environments, there were always issues to deal with. It was quite a challenge but life continued.

I believe that these sessions opened up space for dialogue on issues of teaching and learning in the full to capacity lecture room in the university. Working closely with my partner and the whole team was without doubt the biggest influence on my learning how to use the technologies. I can now design a beautiful presentation in Prezi even when I have only two minutes. Before, it could take me several days! I had fun with many of my colleagues while learning and the time I would have taken while configuring out issues is shorter. I remember whenever we would get stuck, we would gaze at each other and have a good laugh and get back to work. I still insist, I am more empowered, I use some applications of the iPad to engage my students. I actually use some Web 2.0 in teaching including Facebook, google hang out etc. I now depend on cloud computing to save my data, before I used to carry my flash everywhere, now, I almost carry nothing with me but can still work whenever I get connectivity. I was an intermediate user of technologies for teaching and I didn't see any way I could get into a master.

Educator four

The journey started last year and we have interacted with different people having different styles, some of whom have been teaching for 20 years and others that have been teaching for two. What has contributed to my learning are the norms that gave us ways to go through the meetings and conduct them as professional, but this went past the idea that

we're just doing a team meeting now. I have used this community to become knowledgeably skilful in using emerging technologies for teaching. I have been trying out Google drive to get my learners engaged. I think even when Walimbwa leaves this University we are going to get many people around whom he is mentoring to replace him.

The participation in the seminars has empowered me, I can now share all the powers with the e-learning unit, because with the empowerment, the unit needs me more. I can be able to get many other colleagues on board. When the teaching with technology seminars started here, just a few of us joined and no-one was ever hugely better than the other. Commitment to certain issues most especially if this is aimed to improve their working conditions is what drives me. The have focused on technologies and how they can help us in teaching large classes. That is the commitment I mean, semester one you are there, two the same and three you just feel like we have just started, that is how I feel…

I have had more rapid solutions to my immediate problems in teaching with technologies. My learning sense of identity is clearer now that I can work on my own when it comes to setting up my technologies and using them, I can do this with some kind of independence than I did at the beginning. Issues of Google Drive and Social Media have been well covered in the workshops and I actually feel more confident using and talking about them now. From interactions through the sessions, I have come to learn that there is a tacit knowledge that is part of the action and there is group knowledge that is part of the group practice. We could have not known how to connect the projectors to the laptops at the beginning. I guess all of us except Mr. Walimbwa did not know, there was a day he came late and found that we had done the technology connection, remember that time when it rained?

I have actually acquired and work at home using my modem. When we started the technology sessions, I did not have a modem at home as I was used to my office wired internet. I found out how useful it is to have a modem so that I can work home. But this makes me addicted to work. I have an iPhone and use google drive to back up all my data I have no more troubles; these are all things I did not have before. I have developed along with the development of organized integration of technology into pedagogy in Makerere University and become more focused with these sessions, so I give credit to the colleagues.

Educator five

In this digital era, I couldn't have been better managed without LinkedIn. What else could I do without Google in a huge class like mine? Past the idea that we're just doing a team meeting about a technology or two now. This is more important than that. And we're in this community with the idea of helping each other be more successful and be more successful for the large classes as well. With Michael as a facilitator, I had the liberty to ask what I did not understand and indeed from the beginning he had encouraged us to

ask questions. The action learning sessions has exposed me to networking tools like LinkedIn, Blogs, Google+ and Facebook. I actually realized that all these tools are usable on a smart phone and therefore I bought a smart phone that enables me keep connected 24/7. How else would I have known that smart phones are that useful? I thought that all these can only be on a PC.

What else could I do without Google in a huge class like mine? I formed a google group and told my learners to get and share the materials from that group. This helps me so much because learners themselves also contribute to the materials in the group. But I learnt that this was possible only through the sessions. I would not be where I am without the support that was given in the group sessions as they did help direct me to a direction I was really aiming at.

We have used and we're in this community with the idea of helping each other be more successful and be more successful for the large classes as well. Look at the difference between classes and the different strategies we have share here and imagine you were alone for all this time, how much of it would you have discovered or read? I really feel this is the only way to go, working together and trusting that together we can. I have gained respect for diverse perspectives and minority views. It was time for us to disagree and be different but still remain working together. One time I was the only one opposed to using Social Media in teaching. Even when I did not agree with everyone in the debate, the next day was another day and we worked together without even remembering we had disagreed the previous day.

I did not anticipate doing this all by myself given my background training not being connected to any of these technologies. I could not even make any connection between my teaching and technology, but as you can see now, things have changed. Those of who have participated in the technology sessions now have a professional identity at this pace. This is not to say I was not a professional before anyway, but that understanding the process of teaching with technologies has shaped my professional practice. I thank all my colleagues for being there for me during the sessions. My students are responding in a very positive manner to every technology initiative I am making.

Look at the quality of interaction that we have here and things are coming from our own heads! The sessions have shown that we are not as bad as we considered ourselves before. The sessions have got me here and now, I am able to open up to new friendship and collaborative learning ventures, it is encouraging …. We're all trying to work it through together. So what workshops and sessions like this were able to do is to work on the mind-set. Because when people develop a positive attitude, they tend to work towards exploiting the benefits of the technology.

We have developed a shared appreciation and common meaning for technologies that we are individually and collectively using practice. Participating in meetings made me

learn a lot, I am more effective in using the technologies I did not use before interacting with colleagues can now respond to my email with the level of immediacy it deserves.

I have uploaded a course on the learning management system. I have come to conclude that technology is here to empower me deal with the crowded students in my classes. Without these sessions, I don't know where I would have learned even a single technology.

Appendix V: Interview guide

Biographic data:

1.Your academic rank/title

2.Years of teaching

Large class settings

3.Please approximate the number of students you teach each semester over the past six semesters

4.Please briefly explain how you deliver instruction to your classes

Usage of emerging technologies

5.Any training or induction in using technology in teaching?

6.Rate your awareness about the hardware and software technologies

7.Tell about how you have used any technology in teaching

8.Comment about your accessibility to technologies for teaching

9.What do you think could be included in a training session aimed at helping in your usage of technologies for teaching?

10.What are the challenges in your trying to use a technology in instruction?

11.How do you think these challenges can be tackled from a local perspective?

Community of practice issues

12.How much do you value the usage of technologies in your teaching?

13.Do you know of colleagues who are good at using technologies in teaching?

14.What do you like about their usage of technologies?

15.Comment about your own usage of technologies for teaching?

16.How would you comment on learning from colleagues in your usage of technologies e.g. asking for help from them, seeking their experiences, discussing developments with them etc.?

17.Please explain how your usage of technologies for delivery of instruction has changed over the years of interaction with these people.

Appendix VI: Transcribed interviews

Date: 22/02/2016

Educator one

You know I am working on how to support staff mostly the academic staff in the usage of these technologies for teaching large classes. We have been piloting strategies for a community of practice for the last three semesters and you have been actively involved. Most of the issues were captured during the process of participation. This interview is aimed at getting your own experiences of participation in the pilots. Our focus is to make sure that we try to put aaaaaaahh what I call a community of practice. So you will see me asking you how ready you are and what you think you can contribute to such a community of practice. So we want to put up an environment where yes, if you are stuck, then there is nothing that stops you for asking for help. Because we really have problem in our teaching technologies, and we never discover that help is just next door, we always want to go for it may be somewhere very far. So in this discussion we focus on the technologies you are aware about and how do we share what you know with other people from our local perspective and yes, of course in future we shall look at them from the global perspective.

Alright, so am, I will be close to you, the questions are a little structured, so you do not have to worry, if there is anything you do not understand you can ask for clarification, ahhhh let us begin with your academic Assistant lecturer.

How many years have you taught here?

Taught as an Assistant Lecturer?

No teaching at the university

I think ten okay let us say over ten years.

Okay, ammm… let us look at the classes you teach over the years, approximately if you can just approximate, how big are they how many are they in class?

Per class, hmmm, my classes are range, sometimes I have over three hundred students and sometimes at most I have four hundred students.

Oh, that is a large number.

Yeah it is.

How do you teach them? Briefly tell me how you manage these large classes.

Ammm… I do divide the classes in accordance to groups and initially we had, what we normally do is we kind of do reflections at the end, after discussions like at the end of the semester, I request students to fill in kind of reflective…. I mean to a form to try and kind on how reflect how we can improve these group discussions. So initially we would have around ten students, but the students said that they can't all get chances to participate for example so they suggest that we reduce the groups to five although it is very challenging, though we are going to reduce the groups to five so that they can get chance to participate in the groups.

Okay, thank you, let me ask you a question. What in you, in you as a teacher, what do you think about learning a class of four hundred students?

Ammm… learning, I like the idea that highlighting learning. Of course if there is to be learning in a large class size, then my thinking is that we should try to reduce the classes as far as like groups, in groups so that because if you are asking about learning, 400 it is not possible to achieve learning, I mean real learning because it is a large class size, you can't listen to people's thinking which I think to me is very, very important because a teacher cannot tap on student's thinking, I do not think there is any learning. So what helps us to tap on their thinking is if you can get them into groups so that you can listen to each and every student's thinking then learning takes place.

Okay, so are you taking any steps towards making sure that learning takes place?

I do, I personally I do ammm… of course now, as I said we do reflections like last semester of course we had some, I was not part of teaching but we had some challenges of large classes and I tried to make, students tried to reflect so I have considered their reflections. What we are going to do this semester is to reduce the groups to five and also to enco… encourage.

To five students or five groups?

Five in a group, because initially, we had fifteen, and them we reflected and then they suggested so that we made them ten, now ten, some people are saying that in the ten, there are others still who do not participate.

My thinking is that how can we help everyone in that class to participate so this semester, we are reducing them to five and we want to see how this will work, if it is possible, perfect, if it is not, then we can go back to ten in a group.

How much time do you have to cater for all these too many groups? Look at a situation where you have two or three hours' day, I mean per week?

Yeah…. Always we for example what we do, we have requested students to create more time outside the normal timetable sessions, because we always have challenges with time. So we have created like over Saturdays, I am here and available because I really want to help the students anyway. The most important thing now is to see how best I can help these students, so I am trying, am requesting them to create more time, if I get one extra hour, I think my interest is really to create more time to teach, not even teaching but peer, peer group teaching so that we can have them graduate at better teachers.

Okay, have you considered using technology any of the technologies to help you in teaching these large classes?

Perfect…. Ammm.

To five a background, do you remember a year ago when you gave us …… aba I call it what…. an induction? There are many tools you suggested could be used and yeah, I have been trying out some of them. You can remember I have come to you always for clarification… But let me just give an example, I have considered, first of all in my first lecture yesterday, let me just give what is happening, with the second year student, I was asking them whether they are on Makerere University Electronic Learning platform, second year students, right and they say, they did not get seem to know anything about it. I am sorry I asked whether you [the researcher] had exposed them to these tools. And then they did mention that they had not been exposed to it at all.

So as an alternative, I suggested to them to open up emails for example, so that they work on emails if they were not aware about MUELE. And then I requested them to to… everyone else should have an email, I think they can work with emails in case they do not know MUELE to help us in communication so in as far as second years, that is where we are.

But third years, of course some of them are on MUELE platform and we are using Google Docs as well, and Wikis for some few. By the way, it is not the whole class, I am not taking about the whole class because I realized I couldn't go with the whole class and students who particularly had interest and also had laptops and then had access, for third years I considered ammm. Cases, a case, a starting point.

Tell us more about how you have, how you intend to use these emails, Google docs, how do you intend to use them in your large class. Or MUELE or any of the technologies.

Okay, first how I intent to use emails first. In the classes, that second year class, I requested them to get me their emails because I intend first of all if they have any kind of questions, they want to interact with me. For example I gave them a list of materials and some of them said they have not subscribed and so I will be able to download whatever teaching material and then I send them onto their emails and also I want, someone may need clarification because since it is a large class some people may not grasp anything during the classroom time so I have requested to send me an email so that I can be able to clarify and then share with the whole class, because I am sure if it is one's concern, perhaps it may apply to the whole class, so we share with other members as well.

Does this mean that you yourself you have very good access, knowledge and ideas…?

I do, I do.

You do?

Yes, I do

Okay just few things about how you came to have this knowledge. Tell us whether it was self-training, workshops, what is it that inspires you into getting this knowledge about usage of technologies?

What inspired me, what inspires me? I need to understand the question?

Okay what inspired you and what is inspiring you now, from the beginning up to now. And even right now, you could have things that motivate you into technology usage, so you can begin from the past and come to the future.

Okay…. perfect. Ammm… in the past, I have always had a passion for ICTs for example, amm…. You, I have been interacting with my colleagues and Michael [Walimbwa] is one of them, you are very passionate with the technologies and so I was motivated.

I should also tell you now that you have asked, the sessions we have had with you have been so inspiring. I hope you are not going to think I am praising you…. But you are so good, you are so caring to make sure everybody knew which technologies. How to go about it, where to get help…. Sincerely, you were such an inspirational factor to me.

And also I learnt best slowly by slowly and looking at trends, technologies are to help us in improving our practice. So is we get more people like you taking the lead… ammmm yeah, we shall be there. Technologies help us improve the quality of teach so as much as I kept reading about them and finding out the opportunities, how best can I use these opportunities to be able to learn about these technologies. I got involved in massive open online courses to help me integrate this knowledge in my teaching and so I finally got a chance and I did a post graduate diploma of integrating ICTs in education and I think that really boosted up my understanding of how to integrate ICTs in the teaching and learning process.

How much as a… oh, oh, oh okay, we can conclude now that you value technology so much in your teaching of large classes and you would like to do more than what you are doing now to get more perfect.

Yes, yes, yes, I am

Okay…. Ahhhh.Let's talk about, let's talk a little bit more about the people around you who have inspired you, do you think, ahhh, do you think you have learnt anything from the people around you who have used this technology or who use it.

Yeah, I have learnt from the ones who use these technologies, my colleagues, of course they are not many, they are just few of the colleagues who are using them and I have seen that they have been able to handle large classes for example, I mean a number of them open up like one of my colleagues was using, I think he was using google docs and then students were able to comment about language, I mean Luganda, regarding how do you state that, how do you state this and at the end of the day, he was, he mentioned that I think my students have really improved in their statement on how to analyse Luganda language writing so when I looked at that I thought I could also be able to borrow a leaf from what people are doing in other disciplines for example what can apply to my discipline so it has been very good and also amm. the people who are teaching educational technology have also tried to ensure that students get on the learning management system which is what we use actually here, it has really boosted my understanding in using technologies.

Okay, do you use a projector?

Ammm…. I would want to use it but, I have seen the new one in the conference hall, but… but…

No, no, don't worry, tell us

I want to use a project…. Why, my idea I know in future I am going to acquire my personal projector, thanks be to you and how you trained us in its usage. But because the projector that are available, sometimes you need to get the own to use them. I have used them for just conferences here not for teaching and some I have to rent them and the one that has been recently acquired, I think I have not yet used it.

Do you intend to use it?

I intend to use the one that has been installed.

You are comfortable and confident in using it?

I am confident because you one time took us through the basics and I also know that I can lean more on job, I do not need to be trained every time, but since I got that initial training I believe if I started I cannot fail, I can in the process.

You are self-motivated?

Yeah, I can be able to learn.

I think that is a good one, ammmm let's look at a few challenges that weee…. That we get through while learning how to use these things, whether learning with other people or learning alone, what do you think are the challenges?

Learning alone….

Whether learning alone or learning with other people, I would like you to share with us any challenges that you find

Learning with other people sometimes… when you are learning with other people, many times is interest, I think the major challenge with other people when I am talking about other people I mean each has self-motivation. So all the other people if you don't have interest, you do not do it. So interest is one of the things and then another thing is that many…. Internet of course I was having a project last semester with some of my students and I must say we were learning together, but what, what, what I highlight is that the ones with interest even endeavoured to move around much as we have a few functional computers in the lab, they endeavoured to go to the main library, I saw that really is about their interest and also ammmmm……. Some of them really said that internet fluctuations is a challenge, yeah and also equipment, sometimes we don't have functional computers for example our computer lab in school of education has a number of computers, but you find that very few of them are functional so that becomes a challenge and also another challenge of being self-motivated, because sometimes I want to attend like massive open online courses because of my drive to learn more, but my biggest challenge has been internet fluctuations because I can't download some of those materials that they send us and so many times, I end up lagging behind in the massive online courses so it is a big challenge for me to. So my biggest challenge actually me as an individual is fluctuations.

Yes, but you seem to have these challenges, do you have a plan for getting over these challenges? A personal plan.

My plan of course I use my modem, I always use my Orange modem, and my plan in future, I am going to use the money that I have, I am going to acquire a projector, whether through a project I don't know but personally I am going to make an initiative to acquire a projector so that we can be able to to use it in class.

How willing are you to, to motivate another person, another colleague in this university to to get mmmm to get to use these technologies or you don't see, do you think it is your role of you say that is not my role?

No, am very willing to encourage other… other members of staff to to use these. Of course, I have not talked to them about it but you know, there are some people who just the mention of the word technology is just scaring to them. Sometimes they say, you know for me those are your things, and then we have these traditional people who

say you know I think technologies can't do anything but I mean we keep on encouraging them. I think for me being an early adopter, I think I can start and then people can see what I have done and probably pick some, some lessons from what I have done if they think really they can do it because…. And that is why there is reason to encourage because I have seen in the CEES and university strategic plans putting emphasis on integrating ICTs in teaching., so whether we want it or not, we must integrate ICTs in teaching and learning so the earlier we start the better and to also encourage other colleagues to try and integrate ICTs. But we can't wait, I mean, let's start and we model for other people.

Okay, so your motivation or your inspiration to use these technologies is because it is in the policies and strategic plan? It is no because you are really interested but the written documents stipulate so, is that what you are saying?

Noooo... I already, as initially I said, I have a passion for improving the teaching and learning of history using technologies, that is the passion that I have. But this has also been enhanced by policy, I mean when you you are using something and you see a policy supporting what you are using then you just know that you have to do it. I mean it boosts you up, other than if it wasn't highlighted anywhere. So we need to look at policies trying to encourage you and your practice, because then you will realize that you are really doing the right thing and you will encourage others as well to do it.

Okay…. Well thank you very much aaaaaaa…. Anything you expected me to ask that I did not ask?

Amm. Sorry, you just did not tell me, you didn't tell me your main objective, what exactly why you are here.

Just one question, what do you oversee as the biggest challenge

I see the disorganized strategy as the biggest challenge. What should come first, is it installation of the systems and then training or vice versa?

Date: 23/02/2016

Educator Two

You know I am working on how to support staff mostly the academic staff in the usage of these technologies for teaching large classes. We have been piloting strategies for a community of practice for the last three semesters and you have been actively involved. Most of the issues were captured during the process of participation. This interview is aimed at getting your own experiences of participation in the pilots.

Your rank
Assistant Lecturer
How many years you have taught
Four years
You started in 2009?
No, it was 2012 so these are four years
How many students do you teach per semester?
Ho!! Close to 1500
Wow… 1500

Yes, including retakers
How do you teach them, 1500?
In a lecture room, in a lecture theatre or a conference hall, I don't use rooms, I use lecture theatres, conference hall. I stretch my voice [laughter] until it disappears, but I have adjusted, my voce can now reach everybody but at first it was a challenge, yeah, but of course the basic thing if the environment is quite, my voice can reach everybody and if can be heard, if it is not, if the lecture is in a dining room and there are saucepans banging in the neighbourhood room, it is a distraction, but if it is quite room like here, they can hear me.

What do you think about learning in such an environment?
Learning…. I am not really very sure whether learning takes place 100%, but I know teaching takes place 100%, but on the side of learning in such a number, I am not very sure but learning takes place because at the end of it all, they do, they sit an exam and pass.

And you thin a very body has learnt something because they pass an exam? Is there participatory learning?
No, participative learning is minimal. In fact, you will find that we are not catering for the introverts who are shy to put up their hands and all that are ignored in such numbers. And you keep seeing that these are the very people and students who keep putting up their hands may be once in a while, you probe and say,you lady in red, you led in black, can you also say something? Because even knowing their names, it is quite problematic. But in that approach of probing that you will find that there are students who may end up finishing a semester without participating in a single lecture.
Learning, if I have to put myself in the shoes of the learner, I find that they are very disadvantaged [silence] it is like they are struggling for the fittest, whoever is in front will hear more, whoever runs to a lecture room like those who have to run to other lecture rooms like dining rooms, if you come late, you will get a back seat, you will not hear anything. I don't envy them because I feel the environment the learning environment is not very friendly and conducive for effective learning, yeah.

How have you tried to use technologies in your teaching?
Yes, at least projections, that one we keep using because with even 1000 sometimes 500 in a lecture theatre even the blackboard itself is very small so we may have a projector, you can project and at least this big number can be able to view and follow the lecture as it progresses.

Okay, ever used a learning management system?
I tried, posted, but students had difficulty in accessing the material so I resorted to the old tradition of using the chalkboard, the white board and the projector.
But Remember, you gave us a very good explanation of the technologies and tools we can use in out classes, to me it made a lot of sense and I have been trying out some of them. I actually requested you to email me that presentation that you gave some two or three semesters ago…… Anyway.

For example, I have been looking at the curriculum people using projectors, public address systems, computers and I do believe they have helped. But I think the equipment used is personal and also departmental. But if you come to psychology [department] we do not have those projectors and I am also using forward to using a projector in my teaching.

You should remember that you have all along helped give us the basic training in usage of these technologies over the semesters, we have gained some theoretical understanding. However, we do not have the equipment to use otherwise, we would be happy to because the basics skills, we have them.

With a projector, I will use less energy, concentrate on explaining what I am displaying but now I am teaching like a secondary school student teacher, reading paragraph, comma, they are saying we beg your pardon, it is a challenge, but I feel technology can help for example is more students had computers work would be easier than it is now. But I have heard of universities where every student is given a laptop on admission, that would work, projectors, that would work, but this pencil, paper, marker paper are very traditional and not as effective at least according to me.

And ever had training in using ICTs yourself?
Yes, I got one training I think in Cape Town in 2011

Tell us more about that
That was a Post Graduate Diploma in Educational ICT we studied things about emerging technologies where some of these gadgets were coming in, we studied things to do with the theories and how the theories are infused in the technologies that we are using, how really technology is moving hand in hand with learning. And I think it was worthwhile attending.

Did that course change your views, your practices in as far as using technology is concerned?
It changes in theory but in practice, partly because first, the technologies we were talking about, we would not find them here. Use of technology requires time and the time available via the timetabling and the all those things, you will find that you have one hour or two hours in your case. Therefore, you find that okay fine, should I just use a podcast, should I put it on MUELE so that they can access then they listen to it then they come we deliberate and all that, so you will find that the time and the resources especially the infrastructure itself which is available may not be enabling us to use these technologies, but the technologies themselves are good only that some of them we are yet to have them.

Do you have any personal technologies?
Yes, I have those one at least by the time 2007 I had them, I acquired the first laptop, all through I acquired a digital camera, at least those are… I have a mobile phone which can, a smart phone which really can access internet, WhatsApp and all those social networking tools. I have personal devices in fact many times, I am using my personal device, my laptop for those lectures, it is not institutional.

So that means you have invested in yourself
Yes, I have put money in myself for personal use, but once in a while I use it for institutional purposes. Because you cannot, if I want to project I cannot say they have not given me a laptop so I should not project, no.

Do you think your investment in your self is paying off?
It does, how, initially we just used to go to the computer… internet cafes, for internet, for a computer and you know how costly it can be. So when you have your own laptop, any software that comes, you install, internet, you access, you want maybe to teach up

to late when the computer lab is closed, you just go with your lap top, connect and you project. So you find that, that it is really, if my laptop crashes, that is like another kind of setback. You feel one of the things that should be part of you on top of the family, a laptop comes there, the phone comes there, so those have become like you know things not to live without.
Okay tell me more, who do you define as an expert?

I do not know how to measure expertise, but I look for people who are in the IT section of the university and the school of education to find out how I can be able to go about this and that, how do I arrange this graph, how do I align this document so, all that, I am not paying them to help me, but I am leaning from them just because they are within my proximity. I am also learning by doing with those I feel know more.

Do the experts feel happy to help you?

Yes, I think they do, the few people I have tried to ask for help are just generous enough to willingly give it to me. I do not get headache trying to get their help. When I call them, they are willing to help.

Basic human rights?..... Laughter
Ahaaaaaaa

Let's talk about mentorship, do you think you have been mentored in any way?
Mentored to use ICT, mentored to teach?

To use ICT in teaching
Maybe, I don't know if I can differentiate training and mentorship?

Mentorship is looking up to someone that becomes and inspiration and supports you on a similar journey.

Because like the facilitators in Cape Town the Cheryl and the Dick and the like, the way they used technology was superb, pre course task online, people are just all over Africa and they are getting the task, they are getting feedback all those things that was fine. That was part of like a training. If it is mentorship of saying somebody in the department, in the college is using it and I am admiring and all that, it has not been that far. I can't say I have been mentored by this person, he has been telling me how to use this, to use that to use that.

What about you yourself, have you been able to mentor anybody
At my level of Assistant Lecturer, I can mentor somebody, but at my level of Assistant Lecturer I should be able to mentor either a teaching assistant a new assistant lecturer who is joining the department.

Are you ready to do that?
Yeas, I am ready but with policy issues now that teaching assistants are not there, we are not recruiting any more teaching assistant so you would mentor that this is the way I teach my course, I use this gadgets, we should use this, we should use that.

Can you train anybody?
For me I do not have any problem in training others in things I know I do not have any problem, although now it is that there are many other technologies that I do not know, which I also need to be mentored to learn before I can mentor others.

Can one catch up with the ever changing technologies?
Aaaaa no, there will not be a time when somebody will be able to catch up because technology is evolving and you will find ourselves going back to the old technologies and all that. But the ability to adapt to what is ideal for that purpose and that time. Because even these technologies are so many that you cannot know all of them, but these ones that are relevant for you for teaching and learning, for social networking, you, if I am going for maybe a social function, which technologies do I need, if it is class with students which technology do I need. If it is communication to colleagues and publications, which technologies do I need, so that ability of knowing and isolating the technologies that you want, that are beneficial to you and you lean them. The rest that are not beneficial to you leave them out for those other people, so that catching up there, you are looking at something, and something is again advancing, so we just need to be up-to-date, updating ourselves so that we can catch up with the relevant skills we need.

Let's talk about a few challenges in your process of learning to teach with technologies
[Sighs] aaaaahhh on and off, sometimes you find that you have carried your gadgets, power goes off, sometimes you find that you may access YouTube maybe in a lecture theatre, internet is not enabling you to down load some of those videos and all that. So you are not very sure whether that technology is going to be working at the time you need it to work that is the biggest setback. Even these gadgets are still few, because you find that you want to use a projector, it is maybe used in a conference, now in a workshop. I wish every lecture room could have a projector where you just go, connect teach, go away, another person coming to teach from there, comes with his laptop or her laptop, connect, use, go away.
I think we also lack somebody I would call a mobile technical person, this mobile technical person is free to be accessed and I if I wanted to do this, do you have this software, I wanted to use this, and do you have it.

A kind of support person?
Ahaaaa…. Can you come, I am challenged here and this person anytime is there. You know, such a person is missing on group and so many people get frustrated with the technicalities they cannot handle.
In other words, you are suggesting that if we had a unit it is ideal to have someone who could attend to people in as far as technical support is concerned.
Yes…. The best name could be a floating person, floating…. You, you, can I, I am challenged, I am in the middle of the lecture, can, is it a call away to call that technical person from one of the places, can you come, my files on the learning management system are not being accessed, the passwords have all been rejected can I…. because I am in the middle of a lecture, I need that support almost instantly. So a nearby person or not physical but can respond almost with these technologies instantly.

Comment about colleagues, do not judge them but comment about their attitude towards using technologies for teaching.
Attitude I can't measure it. Maybe indicators of them using or not using, most of them are not using technologies, because most of them are old and these old people were

not trained they are not the technology people so they prefer their handouts, they prefer their notes they prefer their physical presence in the class, something like that.

Any suggestion for a training or an induction?
Trainings, have taken place but they are not not realizing usability

Why?
Using technology first begins with the attitude, adoption and confidence. So the trainings that are there, they orient people to these technologies but people's attitude is not changed. Then when the attitude changes that at least maybe that one can work, they again don't have the confidence to stand before their students and use the technology. So the component of confidence is challenging and needs to be worked on in forums like seminar series like the ones you have introduced.
But also maybe if policies can help, in this university, you should not teach traditionally full stop. If you have to go to class whether you are a new graduate, professor, you have to use projectors, you have to use smart boards, and your course must be online.

Isn't that dictator ship?
Dictatorship, sometimes it is necessary to bring people on board

People would be resist it
Among the terms of reference for you to do the work here because this is the way to go. You know, that thing would force people to learn because just like the banks, go the the bank, you want fifty thousand shillings, they will say we are not going to give it to you across the counter, please go to the ATM [Laughter]….

And if they give it to you across the counter they will charge you more and you find that even those ones who have not seen a chalkboard are able to go and use the ATM, because it is conditioned that for you to do, to get the money that you want, which is yours, you are the one who put it there, you should get it from the other side.

So you think such an approach would work
It would because people used to resist those technologies and all that like even I am told now visas. Is it UK or US visa. Don't come to the consulate, fill your form online pay, then we can give you the, if you want to come to America you have to comply with the rules, if you do not want, you stay.

Thank you for sharing about teaching and learning with technologies

Date: 24/02/2016

Educator Three

You know I am working on how to support staff mostly the academic staff in the usage of these technologies for teaching large classes. We have been piloting strategies for a community of practice for the last three semesters and you have been actively involved. Most of the issues were captured during the process of participation. This interview is aimed at getting your own experiences of participation in the pilots.

I think we start by telling me your academic rank?

Academic rank?

Yes…. Lecturer, Senior Lecturer… Laughter……

No, no, no, of course I am an Assistant….

An Assistant what?

Assistant Lecturer.

And how many years have you taught?

At the same rank or what?

No, since you started teaching

Okay… I began here in 2008, so I don't know how many years those are.

We shall calculate that but they seem to be eight or so…

How many students do you teach approximately… per year or per semester?

I have taught across levels so……

Kindly let us talk about undergraduate

At undergraduate, I am talking about day students, about seventy and evening about eighty so, I am talking about a hundred and thirty averagely.

Per year?

No per semester.

But I remember one time you taught curriculum [course] so you have sometimes taught more than that?

Laughter…… Yes, I taught curriculum and those were so many students and I can tell you do not remember the number now.

Okay, but even then, eighty students in a class compared to the infrastructure around here… is a big class to handle. What is your view?

Yes, I agree there are issues there?

I would like you to tell us summarily, what do you think happened in a class with such numbers and less infrastructure, do you think these people are learning?

Of course they are learning but within constraints, they are learning but within constraints.

What are the constraints you are talking about?

Of course the student lecture ratio is aaaahhhh…. Too high because you are talking about seventy-five students in one small room with a lecturer. Aaammm, you talking about teaching a language course lalalanguage is like you know…. A complex

discipline, it is not like any other humanities where you…. You are going to talk about content, where some facts are there.

You are talking about. Language, you are talking about communicating and therefore learning in language means communicating so if you are talking about communicating to each stu…. Each student effectively, there are issues there as it becomes difficult.

Ammm.. Talk about the way the students are in your class, the way they sit… you think they are comfortable? Where do you teach from? I mean the lecture rooms?

Of course our normal lecture rooms here with immovable chairs and yeah. all sorts of issues, you know how small they are, you know how under resourced they are…. [laughter] Ammmm…. We have a very small language resource centre there. The ….that should be a modern language resource centre with, I mean it should be well equipped. But all we have a re books and a few old old machines.

I have seen some tape recorders there are they still helpful?

He picks a cassette tape from the book shelf and shows it to me, while holding it, he says you can see this particular… aahhh these are the technologies that are still there although they are not much helpful in this modern era.

You can imagine teaching students for instance the skills of listening, you are teaching this student how to teach listening skills and all that is provided is the cassette recording, which is not very common to the students these days., you can question the relevance now. So unless you are thinking beyond what the institution provides then you cannot rely on institutional resources to teach the students, so you have to think beyond what the institution provides, think about…. ask the students to bring in their own devices. As a lecturer, outsource your own technologies

Now that you talk about technologies, let us talk about your ability to use these technologies in teaching… one thing, let us talk about the journey, you, you, you, could you fairly reflect back and tell us when you started using these technologies, the modern ones I am meaning?

You mean in my teaching….

Yes…

Eeeeeeehhh, I think that was early in 2008, I begun like aammmm…. A teaching assistant on temporary terms when I was teaching in curriculum and I was teaching an educational technology course., so as early as 2008 is when I started using the technologies.

Okay, ammmm, do you ammmm in your in your conviction, do you think that technologies can make a difference in teaching most especially in large classes?

The technologies?

The technologies yes…

Do I think they make a difference in teaching?

What is your opinion, do they make a difference or they are just promoting the normal traditional teaching and learning practices?

Okay…. First let me make this submission, you have personally identified a number of technology tools and illustrated to us how we can use them on several occasions…. And many time you have left us to try out a number of them and to me… I have seen a big difference.

I think there is an issue here… we know that technologies cannot make a difference by themselves, so maybe you are talking about using technologies in a sound manner, we deliberately appropriate these technologies to… to guide ammmm… or transform students understanding of a given concept. So I think if technologies are used in a pedagogically sound manner, they make a huge difference.

Let's talk about you, do you think they are making a difference in your practice?

Significantly yes.

Okay… mmmmmm which technologies, let's talk about the hardware and the software, which ones have you specifically used

I have used a number of technologies, I keep on trying so many of them, projectors, Google drive, laptop, mobile phone technology, I have used quite a number

And what do you use them to do on your teaching? Let's talk about the large class, what do you think are the things that technologies are helping to sort out?

Are you trying to ask me how I use the technologies to deliver to the large class?

Yes.

Alright, I will still refer you back to the trainings you have given us, I have taken some of the technologies and used them further

I will give you an example, a very recent example because I intend to communicate to my students…. He reaches out for his computer and turns to me to explain… I go to……. I create a group on Digo……

What is Digo, what is digo?

Digo is a social bookmarking tool but it has possibilities for ahhhh engaging your students, I use these tools this time not to specifically bookmark resources for my students but also to extend students ahhh to engage students in an extended interaction and discussion beyond the class.

Because this is a language class, I expect them to be writing, I expect them to be in dialogues, and so I uses digo to enable them exactly do that….

Look here…… he reaches out for the screen of his laptop, pointing to student's discussion and dialogue.

I need a technology such as digo where I can do for instance post a discussion, topics and then students will come and post and we have the threads running through as they share and agree or disagree on a topic and then every student comments on each other's posting and in the process, the dialogue grows bigger and bigger. So you can be able to mmmmm. use this space as a dialoguing space, but in the process you are tracking the views of all these students in this space as cannot be done in a normal lecture class.

You could see when I post these threads, the responses are enormous.

For example, here I was talking about 'ensomesa ye bitontome' teaching of poetry and in only a single thread, I have about 300 posts. In just a single thread, you can see how much the students

This is a private group so I am able to know that these comes from only students in my class.

How do you learn about the process of using these technologies?

I have had formal training, I did a masters in educational technology and I also have a post graduate diploma in ICTs which exposed me to many of these technologies. And many times I have learnt all by myself the department of going about using all these technologies. All the formal training di was to help extend my thinking about the technologies and the pedagogies, but not any specific technologies.

The learning challenge I have is what tasks match what activities and looking up the technologies that can support me depending on a given task at hand.

Talk about mentorship you have in this environment…

Unfortunately, the people who inspire me are not here within. I was given the biggest mentorship on my post graduate diploma at the University of Cape Town, these guys did not teach me technologies per se but they opened me up to several reasoning. They did not teach me content, they are not content experts but they taught me some adequate pedagogical approach with technologies, so that pushes… I go on that experience. I draw on what they are doing in their courses and combine it with the numerous trainings you conduct here. I look at the kind of tasks you people design when you are training like reflections and I do exactly the same thing.

Are you able and willing to share with other your experiences that you are talking about here?

Of course I am, I am, I would say I am modelling technology use in my department, unfortunately I have not extended to the whole school because we have as much need in the department like in the department I am talking about, I think all the members from this department come for support from me. Say how we can use wiki spaces, blogs and many others. They might not know a particular technology but thy come and describe a kind of activity they want to engage the students in and we together figure out how to do it with technology.

So you do support these people.

But the fact that I use technology and other colleagues are not using within the same course, they are pushed towards usage. Students complain that other groups are using technology and we are not and that pushes the lecturer to come to me and inquire how I do it so that they can also be able to do it.

I was thinking that causes some friction between you and the colleagues?

No in the end the colleagues appreciate it because they are looking for alternatives to deliver instruction using technologies.

Let's talk about the kind of challenges you face and how you try to go about them

The challenges…. of course we are talking about the institutional challenges. At first it is to do with the attitude, trying to propose an alternative to their learning and they resist and so you have to clarify this is the reason you are doing this. But in this environment, the solution is you ask your colleagues and they give you their version of things.

Another one is the institution appreciating what you are trying to do. Engaging students in this kind of learning is not only a lecture room task as it requires doing much more work away from the class. He points to his screen and says, I have to read all these and respond to students individually. The institution will look at how many hours I have been in the lecture room and not how much time I have taken to digitize the materials etc. I teach a methods course of two credit units, meaning I meet students for two hours per week, but a single online task may need fifty hours. The institution does not seem to appreciate that.

What are some of the challenges you are finding in your usage of technologies and you think they are stopping other people in their attempts to explore the usage of technologies?

I think there is lack of motivation, because if computers for example are personally owned, I know people who may not even, some people may not even use these computers, because they do not have them in the first place. But if every lecturer was given a computer at their desk, it would be easy to try out all the basics that you train us back in office. I think this would encourage what practice, but there are people who now just handwrite their things and take them to the typist, so they are not training themselves to use computers. The university would come in and say each lecturer has a computer at their desk or an IT allowance which enables one to purchase a computer and other accessories including a projector in the long run.

And also the other challenge would be why are we not trained as staff how to use computer applications in our teaching, because we are helping students and encouraging them to go to use online resources but when even we ourselves don't know how to use them to download some of these things because we don't know the different sites.

If for example a reference got lost where a student can get it if you have not tried to teach them and if you have not used it yourself, how are you going to help a student look for a reference that has gotten lost. So I think we need like refresher courses every time can the department have a computer training and of course the university should do that and I don't think it will be expensive, to say this semester we are at the school of education and training all lectures how to use this package of applications because as you know, if you are supposed to supervise masters or even undergraduate students, how will you know issues of plagiarism? We need lots of training on top of the inductions that you are giving us.

What is your view about something like a community of practice in teaching with technologies most especially in the school here?

What do you mean, a community of practice?

I mean something like the seminars and the talks we have been engaged in, do they make any difference in your practice, and are they useful?

I think somehow we are doing that already in my department, on top of the sessions you have taken us through. What we usually do in except for when a particular lecture comes to consult on how to use a technology that is individual one on one consultation. We have departmental meetings and in these meetings, one of our strategy is regardless of the purpose of a meeting, we have an item on the agenda to share about one research and innovations in pedagogy. Now what we do in these meeting, we have a short fifteen minutes' presentation where we share technologies in language learning. So somehow, we are taking people through the steps and then we are seeing that this is even a stronger motivation for staff.

So a meeting is just not a meeting, because staff come to benefit so many things to benefit.

Thank you so much, I think that clarifies a number of questions.

Date: 25/02/2016

Educator four

You know I am working on how to support staff mostly the academic staff in the usage of these technologies for teaching large classes. We have been piloting strategies for a community of practice for the last three semesters and you have been actively involved. Most of the issues were captured during the process of participation. This interview is aimed at getting your own experiences of participation in the pilots.

Let me begin with what academic rank are you?

I am an Assistant Lecturer

How long have taught at this University

I have taught since 2001 something like 15 or 14 years.

We shall compute them don't worry.

Which programs have you been teaching on?

Basically I have taught on multiple programs actually I have also taught in multiple universities.

Let's limit ourselves to this university

Okay, but I have taught on courses more into IT courses but on different programs, so in business, in education, in economics, yeah.

Okay, about how many students do you teach per class averagely?

I will tell you that for Bachelor of Science, you can go up to two students. On Bachelor of commerce, it ranges from 800 to 1000.

Let's look at the 800 students, how do you teach them?

These classes usually, are divided into …. physical teaching, instructional teaching they are divided into groups. The class is that big, but because you can't handle…. we don't

have that space for one place so we divided them up into groups of about 400 and so in class you give instruction.

How do you teach like a class of 500 people?

Mmmmmmmm…. Of course there are limitations, but I am going to tell you exactly what happens, in these classes the students will come in class and you will just come in because you have already the notes. Usually I give the hand outs in advance so by the time you reach the class, the students already have the hand out and therefore for me I am going to go through the handouts but before, these are external students, but the speed at which I go through the handout is much faster because they already have copies. And most especially, I pick out things that are difficult to understand by the students themselves and they are the ones I try to do emphasis on, if it requires some computation calculation, I will be able to demonstrate in that class.

Now, what is your take about learning, you as a teacher, you are teaching 400 students in a single shift, do you think they are learning well in such a large class?

Now, to be honest with you, overtime, the concept of learning has eeeeeeeeeeh started coming in myself, you understand. Like in terms of my post graduate diploma at the University of Cape Town. Then, I by now, I ask myself wait a minute, has learning happened or it hasn't happened? So in terms of instructing I do that, but I have also don additional, I have also put on additional use of technologies.

Tell me more about that…

Yeah because now, I, because I realized it was I wouldn't use maybe the learning management system which is MUELE, so that time I started by trying out social media.

First tell us more about why you wouldn't use the learning management system.

Yeah because I had a small background of accessibility and the the the, in terms of weight bandwidth of muele, was a little bit light and sometimes our students who are external would not access the platform with ease from wherever they would be. But also aahhh in the country we all know that access to internet is limited to town centres and some of the students we are teaching are coming from very far upcountry so it was quite difficult. And yet access to mobile, access to mobile technology and social media was moving a little bit faster. So I thought that maybe I would get more interaction with students, get to understand them better and also to benefit, each of them benefitting from one another so my creating a social network, Facebook specifically so that I can be able to see them interacting more, if it means provoking them so as to interact more, because I have this belief, we read about Anderson's … those interaction frameworks, where he says that when there is too much interaction, there is learning that is likely to happen. But in a class where I have 500 students and I am seated in front, I cannot guarantee learning, you understand, I will be instructing, true, telling them you go through this, but it might be very difficult for me to measure whether learning has happened, yeah, apart from doing exams.

Now tell me one more thing, how did you get to the strategy that I think I can use this technology to enable my students learn more beyond the class interaction?

How did I get to the idea that I can use the technology, okay, now, it is not because aahhh, it is not because that I went to UCT that I learnt how to use these technologies?

Because at UCT you were more recently.

So it was because I was using these tools, but not using them in classroom teaching. I was using them for my personal activities. But then, ammmmm, I had not read into more things like use of social media as a technology, I should say that what prompted me to use Facebook specifically was when I visited a university in Australia and they tried to explain how the social media was helping them in the teaching process and when I reached here, I thought that I should try out some of these things and that is how I ended up trying them out to see how they are. But I also realized that one of them was just trying them out but after when I got formal educational training.

That is the UCT?

Yes, the formal education training, then it changed my thinking, just having the tool and people accessing the tool and having information there might not necessarily mean that there is learning happening. So it was really that time that I was provoked, provoked and asked that what was the educational goals that we were trying to achieve. What was the gist of the strategy, what learning was happening here? So that was what brought out my usage of technology. This made me to improve on the environment in which I was already using the technologies so it became very easier for me to tototo go into it yeah.

So how much do you value technology, how much more do you value technology more than the last time you had no training?

Mmmmmmmm... I honestly, first of all I, I I am from maybe we should say how much do you value educational technology, because the whole thing here is that I, I, I am from a computer science background at undergraduate so I knew that technology is quite good. But one thing that I have realized that there is a need to do a merger between a discipline and technology. Like for example education specifically, people should understand learning processes and how they merge well or integrate well with technology. Because otherwise just having the technology without having the teaching and learning skills and understanding of these processes may be very good. And for me specifically, I now see the value of technology just because it is much better than how I would see it without having that formal training.

So have you helped anybody or are you planning to help anybody to acquire these same skills you have now?

Yeah, I definitely can be able to do that, because I have also written a paper and presented in one of the conferences, I got one paper on social media, showing my experiences in how I used it and how things are through those mediations and things of that kind and it was quite good. But I also went ahead and wrote another paper which was also on to the integration, the matching of tasks with technology and it was quite also interesting. It was not just social media, it was a group environment, so I see that was all the knowledge that was coming in from usage of social media and trying to use my experiences of how this with my education knowledge and technology knowledge matching them together and getting something out. So basically, I, I, I can even myself I have done that for.... through publication, but I have also encouraged many people around me to try to use technology

Tell me more about that… encouraging more people

Yeah, because aaaaah, one thing I have realized, I need to talk about this very carefully because one thing I have realized that when you encourage someone to start to use technology, then you must scaffold that person not for just a short time, it is much more time than actually you would have expected and given that this is not institutionalized, the social media industry is not institutionalized, you know social aaaah social media for learning, we do not have a place where you can go for support, then that person will definitely heavily be relying on you.

So what I have done is basically, when I left to do my PhD, I tried to, there is a course I was teaching and I said please can you still create web pages to use in the teaching. But of course the will and the experience, personal experience of how to provoke learners to try to interact is different from somebody else. So I would…. I was able to create these pages and those people were in charge of the pages, but I would see that there is something that is not happening in terms of what the teacher was supposed to do something for the learners or put something that would create incentive for the learners to be engage on the platform. And I was even force to get back in when I was not even a teacher of the course and I was telling students that please make sure you use this platform because there five additional coursework marks for being able to use it. I was actually not saying the truth, but I was trying to make sure that I was trying to tell him that please when you say that, you will find more students participating.

And I would tell them that you know of course research shows that they also have a negative effect on those things on motivation but I was thinking

It can be one way of helping. But also in CoBAMs for example, because I, the students I was using Facebook, in this classes. Now they, they the teachers that I was teaching with because it was team teaching, now the teachers who came on board when I was there also they realized I was using Facebook and they saw how interesting it was and they continued using it. But sometimes I see that the volume of interaction went low other than the way I was doing it myself as a person. But I have tried actually to help people, perhaps if I had not gone for my PhD, maybe I could have done more and would have mentored more staff.

Talk about the mentorship you have hard in this specific aspect of teaching with technologies. Any models you look up to in the way they do this?

Ammm… Honestly……

Even if they are not within this university, they may be out there….

Honestly, I have, when know when you attend a course which is online, then you will appreciate, you start appreciating people, but now doe me, I should first of all say that for the course of UCT, I appreciate the intelligence of Dick Ng'ambi, the level of intelligence that he has and most especially the intelligence on how to summarize work, which is a very key component, reading work and then being able to give a summary a very short summary which a key thing of the online environment, I appreciated that very much and I of course I always look forward to being like him though sometimes I think he is too intelligent for me.

Don't mind, you cannot be him, you will be useful

Then I also appreciate, I have attended a course though I did not finish it by Tony Carr also from UCT and the way he handled and manages courses online is quite interesting.

So those people have played a big role in your practice of teaching with technologies?

Yes, they have played a big role in my learning. But I have also attended a MOOC, towards online and the way they not only the teaching side but here we look at also the structuring of the course, structuring in terms of technology enabling the aspect where people can do the interaction with ease. And I also think that that was a platform which has been very influential in trying to think and practice. But UCT has been a big inspirational factor in my practice

What motivates you in putting lots of money in these technologies?

I think at the end of the day I look at what I achieve, if it cannot benefit the university it will benefit me, if it benefits the university, it first benefits me and in the process, it benefits the university. Okay the university has not invested in me in terms of IT so I am investing in myself so that as I benefit myself, I benefit the university. I do not feel the loss because I am so used to where I am working in terms of provision of necessities.

We are thinking of a community of practice in teaching with technologies…. What is your take on it?

I think, me my thinking is that people should be retrained and they attend more trainings on this platform but also the other thing is that people should be given, people should do practical training, they do the training in their courses themselves so that when they are doing instead of like just training them and they come back, if you can train them when they are working. For example, if like…. Eeee… you get a student, you interest a student in using MUELE for example, and then you… you. go into a classroom or environment and you try to support them from there throughout the course while you are teaching them on their own course and then encourage them do this and add this component and add the other, what would happen this way, then which is a scaffolding thing. Over time, then you can let them survive on their own, for me I think that by encouraging them, what I see is that many people are interested in these areas but they do not have the confidence to go into there. So if you are there with them and showing them that when you getting a problem I am there to support you then they will be there, you understand.

So in essence that technologies make a difference in your practice of teaching?

Yeah, technology makes a difference in teaching and learning

And the training you are suggesting is a hands on with lots of standby support

Yes

Not a one off?

In that way, people will not do anything, but when you, if you give then maybe a short training and then you ahead with them on their courses as part of the continuation of the training itself until the end of the semester, it is very important, like you have done with many of us over the past semesters, but of course some of us have not been full

time but you can see the changes that you are creating for now. The impact is beginning to be felt. I am very sure with this mode, you or I can say we are going to achieve more from them than teaching them and letting them go on their own.

So seminar series can be an extended?

Yes, that would be a good model and it can be extended to cover support in the real teaching environments. That is where people have to talk about their experiences, their challenges and their progress as well. And that seminar series played a very big role in broadening my … you know sometimes when you share experience plus academic side, you get feedback relating to how things are and you get to know as you always emphasize from different people how they feel about these things and that can help them even when they are doing their own courses.

Because right now we can say that Walimbwa is also, sorry this guy Kirunda is also running a course on Facebook and he confesses that he got the idea from the seminar series. They say that this guy can do this, then I can also do it. So if you create an environment where people are free to interact and share experiences, they are able to learn from each other. And also through such forum, people will get to know that if I get a problem, I know the pool of people from whom to ask

Very soon you will be requested to share this experiences with others are you ready?

For me I am an Open Education Resource and I believe in sharing and actually for me I would wish to see more people on board than just a few. So that our university goes at higher level of standards. When you visit other universities, you see that they are moving very fast to use technology in teaching than us so what should we do. That is why we need to get more people on board and then we can move together.

Mention some of the technologies (hardware or software) you have been able to use?

They are quite a lot, remember what you have been introducing to us but we must know that each of the educational goal and activities have their technologies that can be used. It might be that someone decided to use Facebook, a projector, PowerPoint, Twitter or google depending on what they want to achieve at the end. There is an aspect of contextualization of the learner and the network of learners. But currently we have classroom technologies like projector, whiteboard, smart boards and those that enable more mobile learning. But of course we also think about the videos and video recordings which tome are very powerful in extending teaching.

Because now, we are not we have Learning management environment like MUELE which also enables uploading and downloading of videos. But of course this also depends on the finances and the internet speed whether we can be able to afford all these things that we are talking about.

We also have social media which has been very free and we just need to be careful and plan how to use it so that at the end there is learning taking place. Of course even students and teachers have reservations towards them, because of what is there on the platform

Any specific challenge you are getting in the process of learning to teach with technologies?

Yeah, generally, I can pick a leaf from some of the things I have but one key thing is what influences to pick on the technology we use is the technology itself. How usable is the technology that we are going to use is it easy to use and all its functionalities?

But also we need the training, we have challenges of people who do not know how to use the technologies and the training so that when people for us to be able to teach more effectively, so that me, when I know how to provoke learners, I know when to use what.

And also ensuring that what drives your stuff is actually the education not the technology, I keep driving that home very carefully.

I have attended a workshop in Berlin about LMS and they were emphasis that now that issues of access and skill in using technologies is done, we need to focus on learning. So basically for us in Africa and in Uganda, we have a challenge, when you look at the platforms, sometimes there is a volume of work that is not appreciated by the institution in Makerere here. Like if you have interactions with 1000 students, you will be overwhelmed by the write ups and someone gets bored with the text they have to read. In one of the classes the student said they always posted questions that have no answers from the instructor. So as much as you are trying to do all that you can, you are overwhelmed.

A platform like MUELE which should be accessed, there are problems of bandwidth and the platform is not accessible by the students out there. And if you are talking about distance learning you are talking about a student trying to access material at the time they want. So people are studying anywhere and they need access which is at times unavailable.

Suggest some of the solutions

A key eLearning team should be in place with programmers specifically relating to e-learning. These basically program the LMS trying to find out good practices out there that can be emulated here. Because we are very lucky that we are using an open source platform. Here we have left the end user like Abigail or Tito to deal with the platform without any back end people. So when you tell them to change this and that, that is not their core interest. So there is a problem of management within our e-learning.

Thank you so much

Educator five

Date: 26/02/2016

You know I am working on how to support staff mostly the academic staff in the usage of these technologies for teaching large classes. We have been piloting strategies for a community of practice for the last three semesters and you have been actively involved. Most of the issues were captured during the process of participation. This interview is aimed at getting your own experiences of participation in the pilots.

Let's start with your title and how long you have taught here

Assistant Lecturer, master's holder. This should be my fifth year

How many students are in your class on the average?

So far on average…. ahhh they are about one hundred and fifty that is both day and evening

How do you teach them?

Well, aahhh having some little background of techn… educational technology, I am beginning to blend a bit so part of the work we do online and part of the work we do, most of the work we do in class, but before I joined the course, it was basically face to face.

Yeah… before you take me to your only, how do you think about the face to face learning environment without technology in a class of one hundred and fifty students?

That is one of the major reasons I had to look elsewhere because personally, we have a challenge of space. While we have ammm these groups both day and evening, again it was also hard, it was also hard to squeeze them into a room, a 40-50 seater room, so they always dodge and they would always find it boring squeezing in a room, facing the lecturer and the lecturer is talking to them, they…. You could see that they are not following or they are bored, they are there because they have to be there, but the interest, they did not show so much interest, they did not like… ammm the love for learning was not there. You would see them fidgeting on their gadgets, laughing away while you are busy teaching so I got worried and concerned and I interviewed a few of them and they said madam, these things you are teaching us we already know them, we can find online, why are you even wasting time talking to us. I said, yes we understand that face to face is part of your package so you have to be here while…. Ofcourse it got me thinking, there is a point here that we are not at… we are not communicating, we are not at the same page….*[Laughter*]

So let's go back your technology usage practice, what drives you?

What drives me personally mmmm, technology sometimes keeps me out one, it keeps changing and learning to use stuff…. Gadgets to do a, b,c,d and something else comes up, soooooo, I got intimidated [laughter] I was intimidated soooo and the second drive was my class, as I have told you already is between 150, 100 to 200 students and these students were always on the social networks and they are always fidgeting around with their gadgets, state of the art gadgets, some of them do have them and I was like, if I am teaching and you guys are fidgeting away it means there is something about technology, and I did not want to be left behind [laughter] at least.

You did not want to be behind your students

Mmmmm.

Okay, so let's talk about … have you had any training or induction in the usage of these technologies?

Yes, apart from, the fully fledged one is the one I have just completed a post graduate diploma in educational technology in Cape Town. It was really an eye opener, which opened my eyes to so many things and mmmm, it sorts of gave me a confidence that I don't need to be a wizard [laughter] that intimidation that I had, I mean who am I to use technology, after this course I learnt that you do not have to be a wizard to use technology. It is all about how you use the available technologies and the affordances of the available technologies to work and solve problems within your community.

How is your own awareness of the technologies?

Personally, mmmmmmm... of course I have done quite a bit of reading and it had sort of pushed me into a position where I can say well, I think with the literature that is coming on and opening our eyes, I could say may be 6 out of 10 or 7 if is on that scale, I am about there.

How about accessibility?

Accessibility is one of our challenges, mmm, while, yeah, what we have these learners have technologies, mobile phones, also all of them have smart phones and have all these gadgets. Mmmmmm, I think in terms of the strength of the band wagon, I mean bandwidth, we are still struggling. Mmm, I am one person, I am a fun of YouTube but [laughter] It is off many times, so access really has become a problem in this university. You cannot download aaaaYouTube videos. But we are we are getting there.

We have for example [reaches a modem] this new gadget here and it is beginning to solve... this is smile telecom modem, which is portable, it is a 4G, it portable and ...

Is that personal or institutional.....

It is personal.

Woww, is everything I am seeing here personal [laughter]

Everything here laptop, I have an iPad, smart phone everything is personal [Laughter]

You are equipped to full capacity?

I had to because if you are to do something with technologies which by the way can support our teaching and learning, then we have to get out of that comfort zone where we always blame the low band width, the power and all that, we need to get there, let's leave that for the experts to solve or for the institutions and just try to find a way to do what we are supposed to do to make our work comfortable. So with these... aaaa.... My problems with YouTube are sorted are almost solved because this is a 4G and I can download anything without limitations in seconds.

Let's talk about mentorship issues? Who has mentored you into this and how is your relationship with them?

I would personally, I would say that we have a team of powerful women and men coming up to show a difference in teaching and learning with technologies in this university. Actually may have come through this course the post graduate course on and they are trying to make a step into helping other in the usage of technologies.

Let me begin with you, you have been so instrumental in helping us use the projector, the public address system and now the smartboard, yeah you are really so instrumental and supportive. I have seen colleagues work with technologies and come for help from you and at no time have I heard that you are not available for their help.

One is Paul Muyinda, I interacted with him on a few things when I was writing my research papers and he was quite useful and he is mentoring me in so many things. And then I have Dorothy Kyagaba I have also interacted with her and there is a lot I have benefitted. I also have David Kabugo has also helped me to explore the various

technologies that I can use in teaching, over sixty of them. Yes, at a local level yes. The rest I have just read about.

What are the specific inspirational issues from these colleagues that you have mentioned, do you feel comfortable?

I will say I am comfortable, because first of all they are my colleagues so we are on collegial terms and for example Paul has been in this business for a long time being in the distance learning department, so I can say he is an expert, he has written quite a bit and he is very energetic, when it comes to, he has a passion.

What about you yourself? Are ready to mentor someone else?

[Laughter] I think so, I think so although I don't think I have gotten to that level where I think I am very comfortable, I am still learning a number of things.

Do you think you will get to a level where you think yes the confidence is here?

I think so, I don't know.

But what is you have is now enough you can share it?

Yeah, we have been sharing at departmental level, with students by the way some students are very good, they are very, very good, I have got some bit of mentorship from them.

From your students?

Yeah, because sometimes when we are we, we, we do not focus on the technology per say but there are certain things that I find some students very good at. We have some good, really good students who can say but madam, how about if we try it this way, I think it would work better, for example, recently we were trying to break away from the traditional drawing of the schemes of work that boring table and staff and well, I told my students and said, why don't we go online and find out what there is, can't we try to draw a scheme of work and bring in all these visuals, us some apps to create a scheme of work that is really appealing to you the teacher so that you don't have to keep it under the shelf and some students have come out with very beautiful work and very, very very useful insights.

What have been the challenges in your learning journey to use technology to teach?

I think the biggest challenge was having that thinking that you can import something, or you are afraid about it and you get excited and you say yes, this is going to solve my problems or make my problems disappear, because if it worked in Hong Kong, it will work here. So you bring it thinking YES, this is it [laughter] One size fit all… I know…

And then you get there my dear, it does not work at all!!! So you have put in so much in terms of preparation, you have put in long hours of reading and preparing and then you get it to a point where you test it and it is not working. One example was we were trying to learn about analysing arguments in texts because I teach language and my, half the class are really struggling, how do I identify an argument, how do I know that this is, this idea supports the argument so I read about it and came up with these beautiful ideas from somebody argument mapping and I am into… Yeah, this app is going to to miracles, woohhh, I am telling you it was a disaster. So ended up wasting do much time which the university does not appreciate and I felt guilty that I wasted

the learners' time because we kept on trying and trying and the thing was not working and there are so many things that we had not considered so many things including our context here, our philosophies, what sort of philosophies are embedded in this application, from where it is coming from, our context here so we ended up spending a lot of time.

So I am learning a bit of things and by the time you get to what works, you have already wasted a lot of time, yeah and sometimes I feel guilty about that.

But the good thing is that you are learning from that… and so it makes a lot of difference. So we are trying to build hat I call a community of practice and so we are thinking of getting you on board, what do you think we can do in as far as structure is concerned?

I would love to, why not? But that should mean you are ready to share these experiences that you are telling me here.

But you do not have to be afraid that you do not know anything because you know

Thank you so much.

Appendix VII: From initial guidelines to refined principles

COMMUNITY OF PRACTICE IN PEDAGOGICAL INTEGRATION OF EMERGING TECHNOLOGIES AT MAKERERE UNIVERSITY										
Theoretical aspects	Issues of focus	Initial design guidelines	EXPERIENCES IN PROFICIENCY DEVELOPMENT THROUGH PILOTS							Final Design Guideline
			Pilot One- February 2014	*Concerns*	*Adjustments*	Pilot Two- May 2015	*Concerns*	*Adjustments*	Pilot Three- December 2015	
Activities in the CoP	Large class teaching Technology usage Learning styles Motivation levels Interaction at work Belonging to a group at work	Problem solving Requesting for information Seeking experiences Coordinating synergy Discussing development Documenting issues Visiting	Little use of internet to get information ; No Gmail address; Show me how to use LMS; No Facebook for me.	*Structure- the arrangement of sessions was too close to each other with a marathon approach* *Participants were not free with each other* *Content- It was believed to be too much based on the limited time that educators had to attend the sharing of experiences*	*Structure- arrangement of sessions was pushed to three weeks far from each other and the speed of coverage was reduced* *Encouraged the participants to feel free with each other* *Content- Instead of covering all the authoring tools, in a single session, we focused on one per session*	Use a website (Google) to get information ; I have a Gmail address; Help me use the LMS better; I am on Facebook	*Computer lab arrangement did not allow for free sitting*	*Sessions were moved to a more convenient room that allowed free sitting*	Use of simulation to teach; Students to have Gmail addresses; Help me find a forum I need from the LMS; Interaction with students on LMS; Facebook interactions	a). Focus on problem solving b). Requesting for information c). Seeking of experiences d). Coordinating synergy e). Discussion of developments
Context in which the CoP operated	Large classes Teaching and assessing with technology Knowledge of technology Uncertainty of practices Learning environment Interaction Digital migrants		Didn't know designing slides; Don't know how to use an LCD projector; Nobody to ask; No idea about iPad. Don't know design for LMS; I have 1GB flash;			Learning how to design of slides; Learning how to use an LCD projector; Identified a friend who to ask; He has a modem; Bought a smartphone to access internet	*The environment was too small with fewer working technologies* *Experiences were hard to match in terms of similarity*	*Shifting to a large environment and requesting members to bring their own devices.* *Experiences needed not to be matched*	Can't be in class without slides; Can't be without an LCD projector; Working with other people; Smart phone Download of materials.	

	Expertise sharing	Mapping knowledge		*Implementation- was seen to favour only those educators with good knowledge of the ETs*						f). Documentation of projects g) Visitations h) Mapping knowledge
Active participation in the CoP	Concern about learning in large classes; Available technologies for use in teaching; Exploration of strategies for teaching with technologies; Determination to work better; Interactions; Models, Team working spirit.		Don't have whom to consult for help; I knew something about large classes; Don't know smart board usage; No technology of interest. No idea about multimedia.		*We reduced on the pace of implementation to cater for those who wished to take more time studying a given tool*	I know whom to consult; I am learning a lot about large classes, I intend to use the smart board software, I am learning to us an LMS.	*Requiring information about a tool to be given before the engage in implementation*	*Handouts were printed and given to the participants a week before the sharing of experiences exercise*	Consulting colleagues for help; Large class scenario is interesting; Using a smart board for teaching; Recording videos. Planning to use flipped class. Interaction online; Not liking to work alone	
Community environment	No active learning; Not sure of the session intentions; Limited technological infrastructure; Opportunity to be honest, thoughtful events;		Can't design a PPT presentation; I work alone on; I know basics of Excel software; No idea of flipped class technologies.			Planning to use a PPT presentation; I have a tablet; Plan for use a MOOC; Working with someone; Learning multimedia	*Authoring tools were different versions from computer to computer. Some used Internet Explorer, others Google Chrome and others used Mozilla*	*Decided to install Microsoft off 2010 so that participants used the same software. Adjusted to use of Google Chrome by everybody*	Uploaded course on the LMS; use Google Drive; I consulted; Interaction, Using PPT presentations; iPhone; Trying to use multimedia	