Information and communication technology use in higher education: Perspectives from faculty

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ABSTRACT

The paper discusses how the faculty finds it difficult to apply their experiences in teaching and use of information and communication technology (ICT) for teaching and learning at the University of Botswana. Although technology was available and accessible, adopters of technology at the University of Botswana find it hard to use technology in teaching and learning, little research has been done on faculty experiences from a micro level (Instrumentalist) Product Utilization theory's perspective based on diffusion of innovation theory. The study explores faculty demographic information finding the technologies, artifacts and teaching methods they used. Nine participants took part in the study from the Department of Adult Education, Faculty of Education, at the University of Botswana by means of responding to an interview based on interview guide. The findings from the study shows that the majority of faculty use teacher-centered as compared to student centered approach, they used specific compatible technologies relevant to their teaching experiences in responds to the university systems mandates, and distance education using technology ultimately to online learning was very low due to lack of infrastructure in rural areas. The university administration should take into consideration understanding faculty from a bottom-up level as core effective implementers driving change.

Keywords: *ICT, e-learning, educational technology, higher education, University of Botswana, Micro level, Instrumentalist theory, Diffusion of Innovation theory, teaching and learning*

INTRODUCTION

Despite the power of information and communication technology (ICT) (inclusive of e-learning and educational technologies) to improve and transform teaching and learning practices in higher education, ineffective implementation is a globally well-known issue in institutions of learning beyond the reach of increased technological advances with little evidence that faculty experiences in teaching using ICT's are effectively adopting and diffusing the integration of ICT into everyday pedagogies. Jacobsen (1998) reported that *"faculty comments provide evidence that the integration of technology supports a shift from a primarily 'knowledge-transfer' mode of content delivery to a more 'knowledge-construction' type of teacher-student interaction"* (p. 172). The point made by Jacobsen relates to the experiences of academic teachers in teaching and the use of technology where academic teachers acknowledge the fact that their f2f mode of teaching changes. The use of technology changes, shifts and/or transforms their role of teaching from teacher-centered, that is, knowledge transfers to student centered, where the knowledge is constructed by learners through teacher-student interaction. The factors inhibiting are such as a belief, experience in more traditional teaching practices and individual attitudes towards educational technology in education as well as the faculties own contentment (compatibility) with e-learning and their ability to use them all as a result in varying experiences and effectiveness in adoption and diffusion of ICT integration from face-to-face (f2f) classroom to online learning. The compatibility of an innovation is the level at which individual experiences are compatible with the new technology. This refers to the beliefs, experiences, values, needs, skills, knowledge, and characteristics of individual technology adopters (Rogers, 2003). If compatibility does not exist the innovation will not be adopted (Samarawickrema & Stacey, 2007). The faculty finds it difficult to apply their experiences in

teaching and use of technology for teaching and learning in higher education. Although early adopters are experienced in teaching and in the use of some technology, studies have noted that there are those who resist being early adopters because they do not want to change the teaching methods, preferring to use the same traditional modes of f2f to online teaching (Jacobsen, 1998). Laronde (2010) found that professors who were using computers said the internet was unreliable and too slow to be used in class. Many also commented that they would not be able to move around in a classroom with 40 B.Ed. students using laptops plugged into electrical outlets.

Although technology was available and accessible, adopters of technology at the University of Botswana find it hard to use technology in teaching and learning, little research has been done on faculty experiences from a micro level (Instrumentalist) Product Utilization theory's (Surry, 1997) perspective based on diffusion of innovation theory (Rogers, 2003). Several studies revealed that the use of technology increases workload when developing learning materials, and when all students access technology individually and send more than one email to the lecturer (Laronde, 2010; Less, 2003; Shea, Pickett, & Li, 2005; Samarawickrema & Stacey, 2007). For example, Samarawickrema and Stacey claimed, in their research, that early adopters' workload was increased by technology. Early adopters tend to use many of the features in Learning Management Systems, for example, and the resulting overload is sometimes difficult for them to manage. Dealing with student posts and responses was also overwhelming. For example, Birch and Burnett (2009), in their study of academics claimed that some early adopters found it easier to just update the printed materials, which they were familiar with using, rather than using technology, because it increased their workload.

On the other hand, Rogers (2003) views that adoption and diffusion of technology innovation is a linear and a normal S-Curve distribution process. He meant that once an innovation technology is introduced in the system (organization) from a macro level (Determinist) Systemic Change theories (Surry & Farquhar, 1997), technology ultimately is adopted by all adopters, not taking into consideration the consequences and non- or incomplete adopters. Jacobsen's (1998) argument captures the thrust that Rogers' theory is assumed to be universal to all situations, yet adopters are different and all situated within diverse social systems, hence demographic factors such as age, qualifications, experiences, and gender are varied. In addition, a study by Samarawickrema and Stacey (2007) claims that Rogers' theory does not include both physical and intangible complex objects. They suggest Actor-Network Theory as an alternative with the argument that the Actor-Network Theory treats all humans and non-humans as equals because the social world is materially heterogeneous. The reason for Samarawikrema and Stacey to have used Actor-Network Theory was to also include other factors that support and or impede the diffusion and adoption process, which have been excluded by Rogers' theory. They argue that these other factors *"consist of a complex network of several human and nonhuman actors who interact and negotiate among themselves and impose roles on each other"* (p. 317). Thus, their critique focuses on the fact that Rogers' theory (2003) focuses solely on technology and excludes environmental and external conditions. Research shows that it is important for organizations to understand based on adoption and diffusion of innovation technology theories, individual early adopters' from a micro Instrumentalist theory's perspectives, beliefs and perceptions from the compatibility perception in order to positively influence the adoption rate. Otherwise, if adopters' experiences, needs, and values are not compatible with how the early adopters perceive the innovation, it will not be adopted and hence makes it difficult to apply their experiences and use of technology in the system; higher education.

Although technology was available and accessible, adopters of technology in universities in Africa find it hard to use technology in teaching and learning. Their experiences were often not compatible to the new technologies in the system, and students mostly do not access the available technology for use based on various reasons such as costs, lack of electricity, and lack of skills and knowledge on how to use some specific tools associated with the technology. In the context of Africa, at times

users or adopters, even when they are aware of the potential benefits, are not ready or are unwilling to fully embrace the ICT (Obiri-Jeboah, Kwarteng, & Kyere-Djan, 2013). As mentioned, it was observed that some adopters of technology innovation in universities are technophobic. Masalela's (2006) findings of the study suggested that the adopters of ICT at the University of Botswana were intrinsically motivated to teach online courses while non-adopters noted personal needs and extrinsic motivations for participation. Thomas (2008) found that although e-learning at the University of Botswana was implemented but only a few lecturers adopted and diffused it, similar to Rogers' (2003) findings, with innovators at 2.5% and early adopters at 13.5%. Thomas (2008) recommended that change management require a team approach: top-down, bottom-up, and inside out for its success, similar to Masalela (2011) views.

In summary, many universities inclusive of the United Kingdom, North America, and Australia compared to Africa are offering f2f courses through blended distance education to fully online learning. This shows that many universities are in the transition and transformation process, with courses being taught through both modes of delivery. Universities from all contexts generally adopt and diffuse ICT innovation for teaching and learning to facilitate the accessibility and availability of their courses and programs locally, nationally, and globally. The faculties in these universities display differences and difficulties in adopting technologies; there were those who were more innovative than others based on their experiences as early adopters and those who were late adopters who resisted adopting technologies due to their needs, values, experiences, and beliefs, with reference to the University of Botswana.

Purpose Statement

The primary purpose of this paper is to explore what difficulties the faculty at the University of Botswana finds in applying their experiences in pedagogies using technology. A secondary purpose was to understand the artifacts and media used for teaching. The study intends to research how faculty teaches and use technology and what types of artifacts and technologies they generally use in teaching from a micro Instrumentalist theory's level perspective based on diffusion of innovation theory.

Questions:

1. How do they teach use technology and artifacts in pedagogies?
2. What types of artifacts and media/technology is faculty using for teaching and learning in the university?

The paper is organized in the following format, firstly describes and discusses the literature about the conceptual framework used in this paper, the universities in context on their transformation process finding out the experiences of faculty teaching, artifacts and technologies used for pedagogies; secondly the research design methodology used; thirdly, findings; fourthly; discussions; and finally conclusions.

LITERATURE REVIEW

Theoretical Perspective

Rogers (2003) Diffusion of Innovation (DoI) theory has been used widely to understand why the adoption and diffusion of innovation varies across different social systems. Many studies, theories, and models in the field of DoI have been informed by this theory (e.g. Burkman, 1987; Davis, 1989; Dube & Gumba, 2017 Hall & Hord, 1987, 2014; Surry & Farquhar, 1997; Surry, 1997). Of the many

relevant studies Rogers's theory has been used to understand the organization from a macro level perspective on diffusion of technology and why some individuals from micro level adopt technology innovation and others do not. Rogers' (2003) theory expands on the views of micro level Product Utilization Theories by creating an understanding that the end users as adopters operate in the organization as members of the social system (at macro level) in which they operate and can influence the diffusion process for social change. He claims that the adoption and diffusion of technology innovation is based on the interaction of the organization from a macro level with individual adopters at a micro level as members of the social system. The emphasis of this paper therefore, is focusing on individual adopters as change agents from a bottom-up (micro) level approach on how they operate in the system: organization as the macro larger scale of a systemic change with a top-down approach.

In addition, Rogers (2003) argues that the S-curve represents only successful adopters and excludes incomplete and non-adopters. The exclusion of non-adopters means that there is the premise that the innovation will be adopted and diffused by all members operating in the social system. The S-curve perspective also denotes that there is a one-way adoption and diffusion process based on the time and rate of adoption. The assumption made by Rogers is that all new products/technologies follow a 'normal' distribution. Rogers meant that when an innovation is initiated in a social system it would be diffused and adopted by all and not re-invested or rejected. Rogers (1962) defined this critique as a pro-innovation bias. This means that the adopters follow the same route as an S-curve shape, where an innovation adopted is distributed normally at different percentage rates. This means that there is a bias towards the need to diffuse technology without considering the consequences (outcome), non-adopters and incomplete process of the adoption of the technology. In this regard, the review of the literature focuses to understand individual adopters application of experiences from a micro level bottom-up approach of an Instrumentalist theory by exploring what and how they teach, use artifacts and electronic media, and approaches used on face-to-face (f2f) to distance education to online learning in higher education.

Teaching and Learning with Technology in Higher Education

Studies have generally reported that universities are experiencing a paradigm shift, whether as a single and/or dual mode institutional transition or by moving from f2f delivery to distance and blended to online learning (Bates, 2007). Studies have concluded that this was an ongoing digitization of higher education through use of technology (Castaneda & Selwyn, 2018). Similarly, ICT was used in tertiary institutions as a catalyst for the professional development (Melki, Nicolas, Khairallah, and Adra, (2017) to facilitate faculty use of technology for pedagogies. It was generally noted that there were different modes of teaching, such as f2f, blended, and online learning (Chiasson, Terras, & Smart, 2013; Johnson, 2008; Keengwe, & Georgina, 2011; Redmond, 2011; Vyas, 2010). This process facilitated the accessibility of available courses and programs that use technology in teaching and learning, as noted in Figure 1, which clearly defines the differences of these modes of delivery.

Nunan, Reid, and McCausland (2002) conducted a case study describing current developments in the change process undergone by the University of South Australia in developing from a dual mode to a flexible delivery mode for all its courses and programs. They claim there were three modes (f2f, distance, and online) of teaching and learning that used technology, involving a shift that was teacher-centered, utilized distance education, and was learner centered (see Figure 3). They further argue that there is a shift from teacher-centered f2f to distance education to online learning. They said that student-centered learning was facilitated by the use of ICT that enabled them to control their learning as shown in Figure 2 use of different terms such as f2f, blended learning and distributed learning.

In Figure 1 Nuan et al. (2002) noted that f2f can be used without e-learning but can still be called blended because of the use of classroom aids such as computers and internet in the classroom. Chiasson, Terras, and Smart, (2013) and Vyas (2010) argue that synchronous learning happens when teacher-student and student-student interaction are engaged at the same time and in the same online space, whereas, asynchronous learning is where the interaction happens at different times and through online spaces. The authors meant that f2f and online learning or fully online or mixed with technology in f2f is as noted in Figure 2. Similarly, universities globally are going through changes and transformations in their modes of teaching and learning for flexible learning, where courses and programs are offered through three modes as is noted in Figure 1.
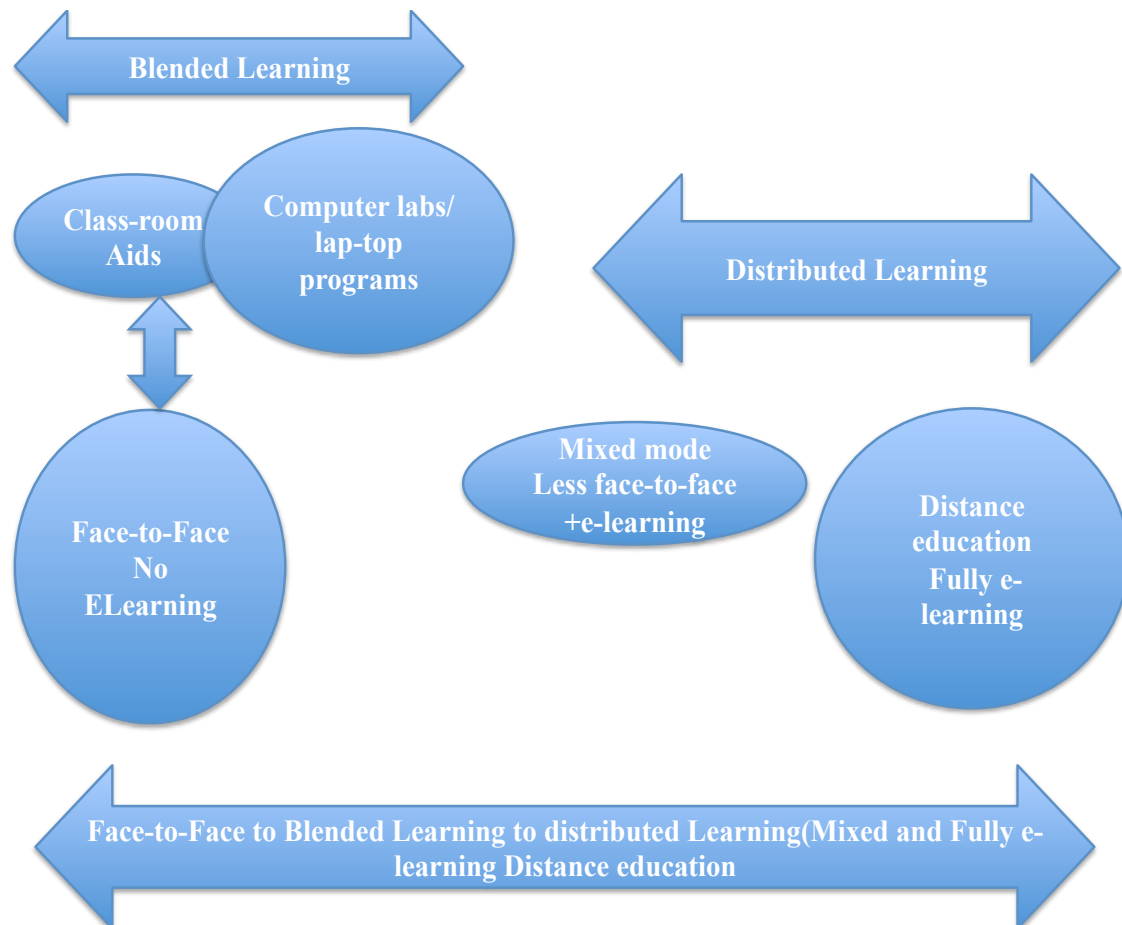
Figure 1: *Key Characteristics of Different Modes of Learning*
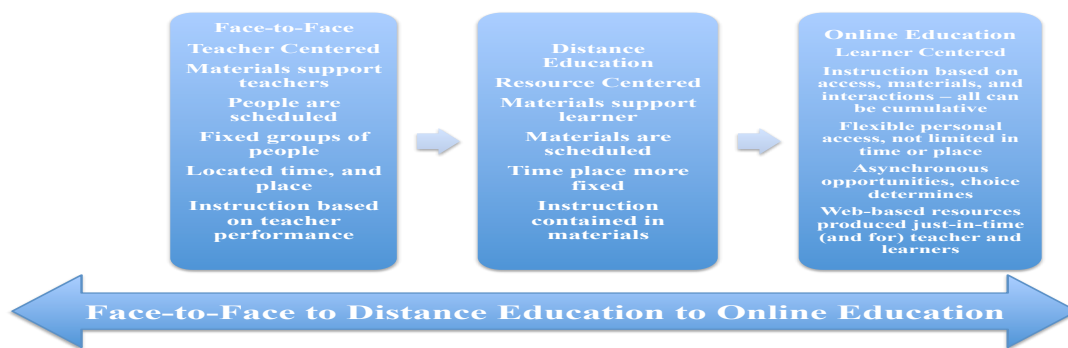
Source: Adapted from Nunan, Reid, and McCausland, 2002

Globally, universities, including those in Africa, are transitioning or have already moved, from f2f, to blended education, and now to fully online learning offering the same courses and programs through a web-based system. Universities are competing in the market for students and or workers who are interested in advancing their careers, the space (internet connections, network, and bandwidth), types of technologies to use, classrooms, academic teachers, and administrative staff. On this basis, Bates, (2011) commented:

> *The last development predicted during 2011 will be moves in some states and provinces toward shared software services between institutions. The rapid development of new technologies, the high cost of upgrading mission-critical software such as financial, student information and learning management systems, and the high risk of changing from one supplier to another puts a particularly heavy burden on small to medium sized institutions (p. 17).*

Blended Learning

Distributed Learning

Class-room Aids

Computer labs/ lap-top programs

Mixed mode Less face-to-face +e-learning

Face-to-Face No ELearning

Distance education Fully e-learning

Face-to-Face to Blended Learning to distributed Learning(Mixed and Fully e-learning Distance education

Figure 2: Different Forms of E- Learning
Source: Adapted from OECD, (2005) and Bates and Poole (2003)

The increase in universities offering the same courses and/or programs from f2f to online has challenges, such as the type of academic teachers, types of students'/distance learners, workload, incentives, time management, and types of technology, organizational support, accessibility, availability, infrastructure, technology policies, role changes, structure, and context. For example, De Gagne and Walter (2009) based on their paper on online teaching experience, a qualitative metasynthesis (QMS), similar to Macy's (2007) study on the transitional experiences by faculty nurses from face-to-face to online, identified issues affecting the transition process such as professional development and faculty support, role changes, teaching strategies and differences in course deliveries, work intensity, time management, and faculty emotions (see Figure 3).
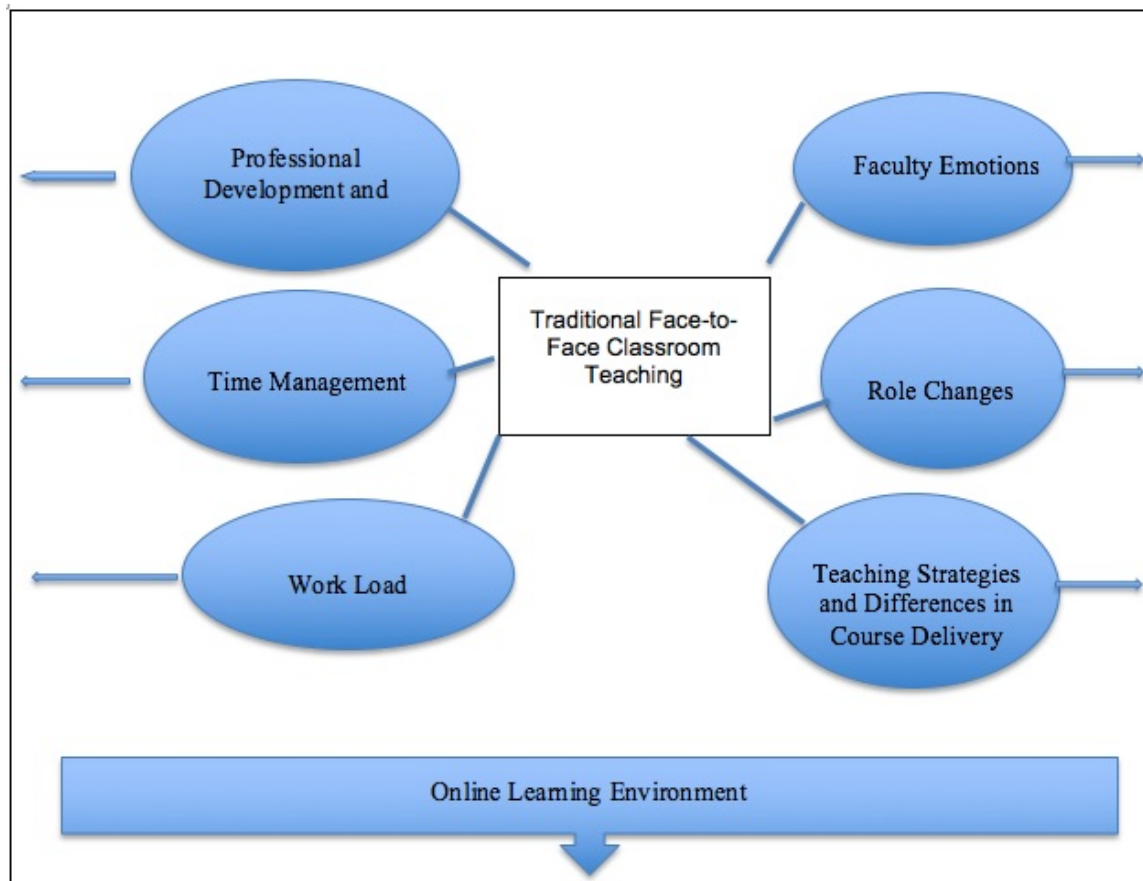
Figure 3: *Factors that Influence the Transition Process*
Source: De Gagne & Walters (2009); Macy, (2007). Illustrates how online educators perceive online teaching through their personal experiences from traditional f2f classroom to online learning

Higher education systems are shifting, and changing from f2f to distance education to online learning, offering courses and programs to all in need using e-learning technologies. More specifically in the African context, faculty in universities, although supported by the university system through training and professional development, are generally reluctant to adopt and diffuse technology innovations for teaching and learning as compared to faculties in the context of the United Kingdom, North America, and Australia.

Educational institutions shifted to new modes of learning, education developed through stages, move from to, convert to, new learning process, and education has grown through these stages (f2f to online). In Figure 1 there are different forms of e-Learning: f2f without e-learning, blended learning with more f2f contact and classroom aids, computer labs and laptop programs, distributed learning inclusive of a mixed mode with less f2f and more e-learning, and distance education with full e-learning. In addition, faculties with experiences in f2f teaching, transition from traditional f2f teaching to online environment through a process of role change, professional development and support (De Gagne & Walters 2009; Marcy, 2007; see Figure 3). The researchers in distance education such as, Bates, (2000a, 2007, 2008); Garrison, (2000); Keegan, (2000); Moore, (2007); Moore, and Kearsley, (2012), defined transition not in isolation but in the context of distance education because f2f teaching and learning in education transformed, and was used in distance

education with print-based materials by then, which was later facilitated with the use of technology in teaching and learning. The transition of education transformation in Africa therefore, is compared to the British, North American, and Australian education systems.

Pedagogies and Use of Technology in Western Universities

Britain, the United States, Canada, and Australia moved through different stages in the transition process of their educational reformation. For example, although "*University of New South Wales Australia's move to mainstreaming online and blended learning through enhancing the digital literacy of teaching staff still has a long way to go, other institutions and countries, both developed and developing, can learn from its experience in redesigning …*" (Mirriahi, Alonzo, McLntyre, Kligyte, & Fox, (2015, p. 13). The United States shifted, and changed from f2f to distance education in the 1950s when technology such as TV, radio, and later as the World Wide Web (WWW) were available. Britain followed a similar pattern (Gunawardena & McIsaac, 2004). Whereas, from a Canadian university context, Harasim (2000) argues that there is a shift with online education emerging as a new paradigm. Online education grew through several modes of learning such as f2f to a mixed mode: blended to distance education. This was evidenced in 2003 and 2005 about the three different forms of e-learning transformed and moved from f2f to blended to distributed learning as noted in Figure 2. The trajectory appears to be development, growth, shift, and change of education from f2f to blended distance education and then to fully online learning (Gunawardena & McIsaac, 2004; Harasim, 2000). Bates (2008) claims that the transformation of distance education was facilitated by new technologies. He mentions five generations and stages of distance education, which is similar to a process of moving from the first level or stage to the next as was reported from the Botswana context by Mutula in 2002, revealing the characteristics of different modes of teaching and learning.

The process of changing f2f courses to online learning in a university transforms faculty experiences and processes (Chiasson, Terras, & Smart, 2013, see Figure 3). This means that the mode of teaching using technology involves a shift from often a teacher-student f2f classroom that utilizes direct interaction to a more student-based technology-driven, virtual, online or web-based contact. According to Ray (2009) cited in Chiasson, Terras, and Smart (2013) from the University of North Dakota, in the United States context, "for these reasons, a face-to-face (f2f) classroom experience is difficult to replicate in the online environment without adjustment" (p. 313). According to these authors, a synchronous instructional style is comparable to f2f, whereas an asynchronous instructional style does "retain conceptual, pedagogical framework from f2f but had to use different technology tools for presentation of content and for student interaction" (p. 313). The transition process is a means where modes of teaching are changing from a teacher-centered to a student approach using technology for teaching and learning and this change is where the faculties find themselves unprepared (Chiasson, et al., 2013). Similarly, Reid (2009) argues from a Canadian university context that when technology is used the delivery mode and classroom structure changes. The changes have impacts on the experiences of adopters' behavior as they familiarize themselves with the new technology. Similarly, Claire, Anders and Linda, (2017) concluded that, "*Although novice teachers initially held more teacher-focused conceptions, they demonstrated greater and more rapid change than experienced colleagues. Experienced teachers tended to exhibit little to no change in conceptions*" (p. 73).

In summary, the above studies from the United States, Canada, and Australian contexts reveal that these transitions change the system of education in the university. The mode of teaching and learning changes from traditional classroom f2f to fully online, although some universities also use blended distance education, depending on their needs and context. The other point noted from the studies was that the transition changes the adopter behavior, mode of teaching, approach, and strategy in developing materials for blended and online learning (De Gagne & Walters, 2009;

Marcy, 2007). In this regard, Castaneda and Selwyn (2018) concluded that, "*Each context of ICT use provides a specific complexity in the context of use",* (p. 139).

Teaching and Learning Using Technology in African Context

African countries that were colonized by the British had an opportunity for students to advance their careers through programs by correspondence through the mail with print-based materials offered by foreign universities such as London, Cambridge, and Oxford (Adekanmbi, 2007). According to Adekanmbi, local privately owned and government assisted institutions emerged after independence. As a result a number of African countries became involved in distance education as a way of promoting education. The University of South Africa is the largest distance education university in Sub-Saharan Africa that still uses print-based materials for distance education. In more developed countries, universities have moved away from print based programs choosing instead online or blended modes. Distance education in Africa still, by and large, uses print based materials (Dodds, Nonyongo, & Glennie, 2002; Haughey, Murphy, & Muirhead, 2008; Mpofu, 2005; Perraton, 2007).

The University of South Africa was first founded in 1873 (Dodds, Nonyongo, & Glennie, 2002); it was the largest distance education provider in Africa and in the world. According to Boucher (1973), Oxford and Cambridge Universities used the University of South Africa as an examining agency. It is well known globally for its distance education, and offered a range of programs from a certificate to doctoral studies between 1946 and 1959 through correspondence, which was predominantly print-based at that time. Other universities emerged from it such as Technikon and Vista University. The University of South Africa embraced technologies such as radio, video, and audiocassettes to breach the distance between the university and students in the 1970s (Boucher, 1973). It has seven regional centers in South Africa, serving students in all nine provinces locally and others from international states. The University of South Africa offers its programs in both modes, although it started as a predominantly distance print-based mode and currently is increasing its use of technology for global markets. The University of South Africa has gradually transitioned to a combination of print distance education with a residential f2f component, to an online model. The University of South Africa also assisted the University of Botswana, Department of Distance Education Unit by allowing them to use their materials while they were in the process of developing their own.

Botswana became involved in offering programs through correspondence (mail) and courses that were predominantly print-based from 1960 to 1965 (Nhundu & Kamau, 2002; Tau, 1997, 2008). It was in 1966, when Botswana gained independence that they began to use more technological resources in their correspondence courses, such as radio and television. According to Jones (1979), as cited in Tau (1997) 700 teachers were trained through the correspondence programs to cater to the demand for teachers due to the increasing student to teacher ratio. The system of education in Botswana after independence in 1966 went through changes and moved to other modes of teaching and learning, such as f2f teaching with an intention of ultimately using online learning technologies. This was the time when Botswana developed the Department of Non-Formal Education, which was later moved to the current Botswana College of Distance and Open Learning. The other section for adult learning was moved in 1982 to the University of Botswana, now called the Department of Adult Education at the Faculty of Education. The Department of Adult Education was in collaboration and coordination with the Department of Distance Education in the Center for Continuing Education offering f2f programs and courses through distance mainly blended with the f2f and print-based mode.

Studies on higher education in Africa revealed that universities were faced with challenges such as the high cost of computers, a lack of infrastructure, and the need for workers with more knowledge, thus emphasizing the need for them to be very focused and strategic in their use of e-learning

(Bates, 2007). Similarly, in 2018 Karunaratne, Peiris and Hansson found that implementing small scale ICT projects in developing countries was challenging. In addition, Moakofhi, Leteane, Phiri, Polele and Sebalatlheng (2017) identified "*four major challenges that should be addressed before e-learning initiative can be introduced successfully: poor infrastructure, inadequate IT support, lack of e-learning policy, and lack of university management support*" (p. 4). In order for universities to move to electronic learning, proper strategies need to be put in place, particularly work around infrastructure and capacity building problems. For example, in a study conducted by van Zyl, Els, and Blignaut (2013) in North West University, South Africa, it was recommended that,

> *North West University (NWU) should increasingly implement, integrate, and make use of mobile learning, while continuing with already established f2f contact classes, using both print-based study material and various information and communication technology (ICT) to deliver quality open and distance learning (ODL) programs (p. 102).*

Similarly, recommendations were made for a study conducted in Botswana by Ntloedibe-Kuswani (2013) that "electronic mobile technologies may be an equaling agent in the future, however the first step is to equal the access and design instructional materials that benefit the flexible needs of a rural community" (p. 175). As a multiple context, mobile learning was recommended in North West University through which the university and academic teachers with students use personal electronic devices for social and content interactions. In another study conducted by Tshabalala, Ndeya, and Van der Merwe (2014) in a developing university in South Africa, it was found that the lecturers were not utilizing the blended learning introduced to them when the university acquired a Learning Management System such as Moodle. These studies were similar to Masalela's (2011) findings of academic staff not utilizing the e-learning technology for the effective transition from classroom to online learning. Generally, the universities fail to include the academic teaching staff in the initial stages of implementing technology innovation in teaching and learning, and academic teachers were not aware of the ICT policies made. Many feared using technologies for various reasons such as a lack of skills and knowledge, a lack of time, students not using technology, and a lack of infrastructure (Dintoe, 2018).

Briefly, the transition is a process over time, historically and contextually developed and diffused. Many universities in Africa intended to transition from f2f to online, following in the footsteps of the United Kingdom, North America, and Australia however; many have found the transition process to be anything but smooth.

Generally, researchers identified issues affecting the transition process from f2f to distance education to online learning such as the process of change that the individual faculties were going through, difficulties in coping with the fast pace at which technology changes, poor experiences, rapid role change, lack of time management, insufficient professional development, lack of support, and increased workload (Chiasson, Terras, & Smart, 2013; Masalela, 2011; Mpofu, 2005; Redmond, 2011; Thomas, 2008). On this basis, universities in Africa, specifically the University of Botswana lecturers face many challenges during these transition periods which impact on their intention to use online learning. Similarly, Pani, Srimannarayana and Premarajan (2015); Munezero, Irura, Kirongo, Etiegni and Suhoneng (2016) found that implementing e-learning in developing countries has not always been successful due to lack of infrastructure.

The literature concludes that the transition from f2f to blended distance education and then to fully online learning took time in the United Kingdom, North American, and Australian universities. In Africa, and Botswana specifically, the transition has not been smooth and, one could argue, that it is still in the beginning stages. The conclusion from literature review, more especially in African context, reference to University of Botswana, found that it is not always that the adoption and diffusion of technology is a linear process as noted by Rogers (2003), it depends on the individual adopters and the situation (environment) in which they all operate.

This paper based on Rogers (2003) theory focuses on Instrumentalist theorists to understand difficulties faculty had in applying their experiences of technology in the transition process teaching courses and programs offered in the university from face-to-face (f2f) to distance education using media such as print and online. According to Rogers' theory, the adoption and diffusion of an innovation is based on the characteristics of the adopters when interacting from both a micro to a macro level as members of the social system. Furthermore, who the adopters of a technology will be is based on the decisions they make, the attributes of the innovation, and the elements of the innovation because they each differently influence the adoption and diffusion process.

The literature and theory on the experiences of technology among early adopters in the transition process substantiated that e-learning, ICTs, and educational technology are important as they facilitate making university courses and programs offered accessible to the community at large. For instance, researchers claim that when lecturers are not supported in the implementation process of a technology they resist the technology by not adopting it in their pedagogy (Bates, 2000, 2005a, 2008; Beggs, 2000; Hardaker & Singh, 2011; Lane, Lyle III, 2011; Whitworth, 2011). The current paper focuses on exploring the difficulties in the application of experiences in teaching and use of technology among early adopters at the University of Botswana. An extensive literature review was conducted to find out what has been done in this area and to identify gaps. The theoretical perceptions with related literature, focusing on the adoption and diffusion of technology innovation in higher education in the African university context, including Sub-Saharan Africa, and references the University of Botswana as a case study were reviewed.

The review of the literature describes the status of technology in higher education systems in Africa, and the adoption and diffusion of innovation technology by early adopters. It has revealed the challenges faced by universities and individual adopters using ICT for teaching and learning. The paper explained that the status of technology in universities of Africa is generally low due to lack of proper communication on ICT policy structures, lack of infrastructure, and lack of accessibility of available technology for lecturers and students in universities. It was noted that having experiences with technology was important insofar as it enabled the lecturers to access the available technology, on the other hand, lack of technology experiences could lead to the decrease rate of adoption and diffusion process.

The other point noted was that African countries are not all the same in the diffusion process, and South Africa, North Africa, Mauritius, Ghana, and Botswana were identified to be more focused on the implementation of technology in their system as compared to other African countries. Although, these countries are better developed in terms of technology they are still faced with the issue of a digital divide, where urban areas have better technology infrastructure compared to rural areas. This defeats the aim and objectives of many of the ICT policies initiated by governments in Africa for the available higher education courses and programs offered to be accessible in all geographical areas; that is, rural and urban areas. Higher education in Africa was dominated by the print-based modes of distance education compared to the United Kingdom, North American, and Australian universities, which transitioned more fully to online learning (see summary on Table 1). The University of Botswana, which initiated changing the mode of teaching to online learning in 2001, has not been so successful. Although, research in Botswana and at the University of Botswana, has shown across the board problems with the implementation of online learning, little in-depth research has been conducted with early adopters themselves to establish what they are doing with technology. It is this gap that this research intends to fill based on micro level (Instrumentalist) Product Utilization Theories as stated above.

Table 1: *Summary of comparing and contrasting the adoption of information and communication technology in higher education between Western and African Universities (this applies to only universities described in the literature review of this article)*

ISSUES	WESTERN UNIVERSITIES	AFRICAN UNIVERSITIES
Similarities		
Challenges from f2f to online learning	Workload, support (organizational, professional development and training), time management, role changes, reluctant to adopt and diffuse technology, and process of change	
A global practice to deliver programs to individuals for career development.	The universities are in a paradigm shift; transitioning from f2f to online learning	
Flexible and or mixed mode of teaching and learning.	This is referred to as f2f/classroom aids/blended/distance/online	
Synchronous Learning	Universities generally finds it difficult to replicate without adjustments	
F2f to Online Learning	Universities generally finds it difficult to replicate without adjustments	
The adoption and diffusion of technology is a linear process as noted by Rogers (2003).	It depends on the individual adopters and the situation (environment) in which they all operate.	
Differences		
Distance Education	Online Learning	Blended: f2f, classroom aids, technology, and print based materials
Asynchronous Learning	Programs offered through online	Blended, distance, mixed and print based
Technology experiences and use of technology	Faculty are experienced	The faculty lack skills and knowledge
Mobile Learning	Used for teaching and learning	Creates more problems due to costs and lack of network connections in rural and at times in urban areas
Policies	Put in place as a strategy	Top-down approach
Accessibility and Infrastructure	Technology environment	Digital divide and students not using technology
Costs	Generally affordable due to more competitors in the market	High
Types of technology use	Old technologies replaced at a faster pace	Takes time to replace old versions of technology
Faculty adoption and diffusion of technology for pedagogies	They afford to own computers, accessible at all times	Lack of students not using, and lack of time to practice using technology
Teacher and student centered learning	Activity and technology based	Technology based
Technophobic	Working in a technology environment	Fear to use technology

METHODOLOGY

The qualitative case approach was used in this paper. The purpose was to understand participants on how they teach, use technology and artifacts based on their experiences. A case study is known to be a qualitative method that emphasizes the collection of in-depth information (Merriam, 2015; Savin-Baden & Major, 2013; Stake, 2010). A qualitative case study is bounded and provides in-depth meanings in context. This means that the study is restricted within the context of a case study, for instance, the University of Botswana. Because the researcher wants to find out difficulties the faculty at the University of Botswana finds in applying their experiences in pedagogies using technology and artifacts. This method helped the researcher concentrate on a specific group of people (faculty) and situation. The researchers also chose this method because it yielded in-depth information about that particular group. On this basis, the data was collected in line with the qualitative case study approach phenomenon using Interviews, observations, and artifacts.

Use of Interview Guide, Observation Tools, and Artifacts

The artifacts and secondary documents were used to develop the interview guide. The interview guide used was researcher-made. Part A from the interview guide, specific for this paper, was soliciting for demographic information. The majority of these questions were open-ended questions to allow for faculty to express themselves as much as they want. The researchers printed the interview guide and conduct the interviews, and after this process, observation tools were developed. Observation tools were used in observing them while teaching and during the face-to-face interviews.

Selection of Participants

Purposive sampling was used to choose the participants**.** Qualitative case studies typically work with a small sample size of people (Creswell, 2012; Maxwell, 2012; Merriam, 2002, 1998; Stake, 2005; Yin, 2014). I was not concerned about the number of participants but instead was focused on the amount of relevant information I could gather. The nine faculty members specifically selected taught courses through f2f and distance education mode for the Department of Adult Education (see Table 3). The researcher knew that the people being selected would give the information that was required because they were involved in f2f with an intention to teach online using technology. The purposeful sampling procedure I used above was in line with the research literature. I selected participants who were suitable for this study (Patton, 2005). Patton (2002) argues that the researcher must select participants one can learn more from, like those with rich information, as in my case study. I applied a criterion and convenient strategies by purposively selecting the participants (Lekoko, 2002).

Data Analysis

Data analysis, according to Bogdan and Biklen (1992), as cited in Lekoko (2002), is *"working with data, organizing it, breaking it into manageable units, synthesizing it, searching for patterns, discovering what is important and what is to be learned"* (p. 145). I analyzed my data before, during, and after collecting data. Bogdan and Biklen (2012) argue that data analysis begins when the researcher explores the literature before and during data collection. The simultaneous process of collecting and analyzing data is a qualitative approach as noted by Marshall and Rossman (2014) and Creswell (2009). I chose the constant comparative method for my data analysis (Lekoko, 2002; Ntseane, 1999; Sibande, 2011). The constant comparative method served the purpose because my data was in the form of text, transcribed verbatim in notes and observations. My main aim was to examine the artifacts, transcribed interviews, and observations, along with the additional notes, memos and materials collected.

FINDINGS

The data is important for gaining an understanding of how these faculty members as early adopters applied their teaching and use of technology experiences in teaching and learning in a university context. The focus is to explain how the faculty taught and what technologies and artifacts they used and why. This paper is organized into two sections to report the results with verbatim excerpts. The first section presents brief demographic information that describes the population studied on how and what they teach as shown in Table 2. Secondly, teaching and learning artifacts and how they used them in pedagogies are described as stated in Table 5. These are the teaching and learning materials used by lecturers in their f2f classrooms, in distance education, and in online learning. A discussion follows this section that links the literature review with demographic information profiles, teaching and learning artifacts and finally conclusions.

Demographic Information Profiles

The purpose of the demographic data is to provide a description of the participants studied on how and what they taught as noted in Table 2. The three main variables are described because they are in line with the problem, purpose, and literature reviewed that is, years of experience in teaching and technology used, courses taught and method of delivery used.

Years of Experience in Teaching and Technology Used

Table 2 shows that participant experiences were different in teaching and the use of technology. Some participants, both with and without PhD and master's degrees, had taught for a range of years (see Table 2). For example, Kutlo had served in the Department of Adult Education since 2000 and in 2007 at age 47 he completed his PhD. He had 14 years of experience in f2f teaching and nine years of experience in distance education. Oratile, on the other hand, was a lecturer from 1992 until 2002 when he completed his PhD. Lesego also had 22 years of f2f and distance education teaching experience and she completed her PhD in 1999. However, Serero completed her PhD in 1996 and joined the teaching service in the Department of Adult Education in 2010. She had fewer years of teaching experience before finishing her PhD degree and started accumulating teaching experience after joining the University of Botswana and began academic teaching in the Department of Adult Education. Keitumetse, Mmapula, and Lorato taught with master's degrees. They joined academic teaching positions with some teaching experience (see Table 2). Oratile said: *"… I started teaching the course until I went to school for my master's degree in 1993/94 …"* Lorato talked about her experience: *"I would say … I started off as a secondary school teacher, …, I taught at junior school … at senior school, … colleges of education before I came here, …".*

The participants' experience in teaching and use of technology varies (as in Table 2). Some of those with PhD degrees were experienced teachers before joining the academic field, while others were not, and those with master's degrees also had teaching experience before serving in the Department of Adult Education. This shows that, on average, participants were more experienced in f2f teaching and had less distance education teaching experience.

Although participants generally used some technology in teaching, the results of the study showed that participants mostly used technology for learning when pursuing their master's and PhD degrees. Although some technology was used in teaching, participant experiences with technology were generally lacking. For example, Lesego said: *"I have teaching experience and expertise on adult education and on distance education and face-to-face delivery methods but [have] limited experience with technology"*.

Table 2: *Participant Demographic Profiles*

Demographics	Categories	Kutlo	Itumeleng	Participants Mpho	Keitumetse	Oratile	Lesego	Serero	Mmapula	Lorato	Totals
Age	40 – 49	1	-	1	-	-	-	-	-	-	2
	50 -59	-	1	-	1	1	1	1	-	1	6
	60 – 69	-	-	-	-	-	-	-	1	-	1
	Totals	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**9**
Gender	Males	1	1	1	1	1	-	-	-	-	5
	Females	-	-	-	-	-	1	1	1	1	4
	Totals	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**9**
Education Level	Masters										
	1970 – 1990	-	-	-	-	-	-	-	1	-	1
	1990 – 2000	-	-	-	-	-	-	-	-	1	1
	2000 – 2010	-	-	-	1	-	-	-	-	-	1
	PhD										
	1990 – 2000	-	-	-	-	-	1	1	-	-	2
	2000 – 2010	1	1	1	-	1	-	-	-	-	4
	Totals	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**9**
Courses	**F2F – XYZ	713	707	622	603/705	941	712	804	717	612	-
	**Distance Education – XYZ	604	706	622	603	601	720	711	712	612	-
Teaching Experiences – F2F	Less than 5 Years	-	-	-	1	-	-	1	-	-	2
	5 to 10 Years	-	-	1	-	-	-	-	1	1	3
	10 to 15 Years	1	1	-	-	-	-	-	-	-	2
	15 to 20 Years or more Years	-	-	-	-	1	1	-	-	-	2

Demographics	Categories	Kutlo	Itumeleng	Participants Mpho	Keitumetse	Oratile	Lesego	Serero	Mmapula	Lorato	Totals
	Totals	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**9**
Teaching Experiences – Distance Education	Less than 5 Years	-	-	1	1	-	-	1	-	-	3
	5 to 15 Years	1	1	-	-	-	-	-	1	1	4
	15 to 20 Years	-	-	-	-	1	1	-	-	-	2
	Totals	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**9**
Technology Used	PowerPoint	1	1	1	1	1	1	1	1	1	9
	Blackboard	-	1	1	1	1	-	-	-	1	5
	Facebook	-	-	-	-	-	-	-	-	1	1
	Cellphone	-	1	-	-	1	1	1	-	1	4
	Internet	1	1	1	1	1	1	1	1	1	9
	Email	-	1	-	-	-	-	-	-	-	1
	YouTube	-	-	-	-	-	-	-	-	1	1
	Computers (Laptops)	1	1	1	1	1	1	1	1	1	9
	Smart-Boards	-	-	-	-	1	-	-	-	-	1
	WebCT	-	-	1	-	1	-	-	-	1	3
	Moodle	-	-	-	-	1	-	-	-	1	2
	Total Number of Technology Used	**3**	**7**	**4**	**4**	**9**	**4**	**4**	**2**	**8**	**49**

Demographics	Categories	Kutlo	Itumeleng	Participants Mpho	Keitumetse	Oratile	Lesego	Serero	Mmapula	Lorato	Totals
Other Types of Telecommunication Device Used	Telephone (land line)	-	1	-	-	1	1	1	-	1	5
	Totals Used	**-**	**1**	**-**	**-**	**1**	**1**	**1**	**-**	**1**	**5**
Position of Responsibility	Lecturer	-	-	-	1	-	-	-	1	1	3
	Senior Lecturer	1	1	1	-	-	-	1	-	-	4
	Professor	-	-	-	-	1	1	-	-	-	2
	*Head of Department	-	-	-	-	*1	-	-	-	-	*1
	Totals	**1**	**1**	**1**	**1**	***1**	**1**	**1**	**1**	**1**	**9**

Source: Demographic Information of Participants. ** Course Codes are (XYZ). The course codes and numbers have been changed to protect the participants' anonymity. *1 is both Head and Professo

Courses Taught

All nine participants taught through f2f and distance education as shown in Table 2 and Table 4. Three of the participants, Mpho, Keitumetse, and Lorato, taught the same course using f2f and distance education while six participants taught different courses using both delivery methods. In addition, Lesego and Mmapula taught the same XYZ 712 course but used different delivery methods; Lesego taught XYZ 712 via distance education and Mmapula via f2f. Although some participants taught different courses with both delivery methods, the course content was the same for f2f students and distance education learners. Participants preferred to teach the same course f2f and through distance education but was not always possible. Kutlo claims that: *"… the benefit is, you know, reduced workload, because I don't have to prepare two separate materials for the same two groups …"* Tables 2 and 4 show the courses and content taught to both f2f students and distance education learners.

The participants generally taught courses specializing in specific areas within the adult education discipline; for instance, Oratile taught XYZ 941, and Mmapula taught XYZ 717. These participants are experts in their subject areas as well as in adult education. Participants used a prescribed textbook for each course in the f2f classroom, a module for distance education learners, and technology used (see Table 4). These are described in later sections. However, one course is described as an example here.

Participants generally taught courses based on their areas of expertise. For example, Keitumetse taught a course in adult education (XYZ 705) that was delivered f2f and through distance education. This is a three-credit course that is optional for Bachelor of Education students and a core course for diploma students. The XYZ 705 course is offered in the second semester. Generally, for this course and also for all other courses offered in adult education, objectives are similarly stated as outlined in the course outline below in Table 3. Below is an example of a course outline for XYZ 705.

Table 3: Objectives of the XYZ 705 Course

Objectives for Course Taught - XYZ 705
1) Critically analyze the concept of a learning organization and transferable skills in a global economy
2) Analyze how the concept of employee development and other principles like self-directed learning, critical reflection and lifelong learning apply to the workplace
3) Describe the delivery methods
4) Identify sectors

Table 4: *List of Courses Taught Face-to-Face and for Sessional Teaching Distance Education*

Tutors	Course Codes – F2F	Course Codes – Distance Education
Kutlo	XYZ 713	XYZ 604/705
Itumeleng	XYZ 707	XYZ 706
Mpho	XYZ 622	XYZ 622
Keitumetse	XYZ 603/705	XYZ 603
Oratile	XYZ 941	XYZ 710
Lesego	XYZ 712	XYZ 720
Serero	XYZ 804	XYZ 711
Mmapula	XYZ 717	XYZ 712
Lorato	XYZ 612	XYZ 612

Method of Delivery Used

The University of Botswana's goal was to offer courses to the community at large including through f2f, distance education, and online learning. Participants were hired with the expectation that they would deliver the courses using all modes of delivery. Since the participants were experienced teachers, they often used technologies that were compatible to their teaching context and experiences. However, the teaching methods used by participants varied. Kutlo said:

> *I use the laptop for f2f classroom teaching, so at the end of the day to me the type of teaching method that the lecturer should adopt must be based on the ability of the learner to comprehend the issues. For example, to me it is not about technology all the time, even where people dictate, you know the dictation method sometimes is far better than the PowerPoint because when you dictate you more like explain the concept than having the student merely look at the board and record that in their notebooks.*

The point raised by Kutlo was that lecturers should use the teaching method based on the learner's ability in understanding the concepts. Furthermore, he meant that rather than students copying from the board when material is projected through PowerPoint slides, it is better to use a method where students will listen and write what they understand. Kutlo emphasized that although technology is good to use in teaching, he felt that it could encourage a teacher-centered method rather than a student-centered approach.

Lesego, on the other hand, indicated that she approached her teaching for distance education learners and f2f students in the same way. She said:

> *I use a similar f2f classroom delivery method used for f2f students for distance education learners when attending their residential sessions on campus and also in addition to the module to supplement it, I distribute same handouts used for f2f students.*

So Lesego's approach to teaching is that, *"the best way to learn is hands on".* Lesego's philosophy in teaching is that *"to get it you have to practice it",* meaning that teaching is 50% theory and 50% practice. Lesego expected her students to go and see what was out there in the real world, and discuss theoretical problems, not perceived problems. Whereas Lorato's philosophy of teaching was that students are not empty. She said teaching is like *"lighting a candle; although they might be struggling here and there, they are not empty vessels, which needed information poured into them".* She identified the 'problem' as the inability to grasp concepts and problems in English.

However, Mmapula said that she was of the 'old school'. She felt that teaching allowed more personal interaction.

Oratile described how he taught distance education courses:
… so I would introduce them to the first seven units in a module and you know basically you talk to them about the key concepts in each of the chapters or units in a module and then send them out to go and do their own independent reading and then they have to submit an assignment …

The section that follows focuses on describing the artifacts, teaching and learning materials, and online technologies used by lecturers teaching f2f to distance education as reported from interviews and observations.

Artifacts and Technologies Used

The nine participants were requested to provide the researcher with the teaching and learning materials they used for the courses taught. The artifacts collected (teaching and learning materials) are compiled in Table 5 and grouped under f2f, distance education, and technology (Learning Management Systems, Social Media, other technologies, and telecommunications media such as telephone) used. In addition, this section further reports findings as the results of what the researcher learned from lecturers' use of artifacts, secondary documents used for this study, interviews, and observations.

Table 5: *Artifacts Compiled*

Face-to-Face Classroom	Distance Education	Technology Used
Textbooks	Modules/Workbooks	***Online Learning Management Systems:***
		WebCT, Blackboard, Moodle
Tests/Exam Papers	Study Guides (from University of South Africa)	***Web 2.0 and Social Media:***
		Google Search, Email, YouTube, Facebook, Internet (reading list)
Assignments		***Other Technologies:***
		Personal Computers (Laptops), Smart-Boards, PowerPoint, Cellphones, Television
Course Outlines		***Telecommunications Media:***
		Landline Telephones
Time Tables		
Practice Questions		
Handouts: Lecture Notes		
Journal Articles		
Reports		
PowerPoint Slides (had copies)		
Worksheets		
Library Materials		

Table 2 indicates the technologies each of the nine participants used. For instance, the types of technologies used by Lesego and Serero were cellphones, internet, PowerPoint, and personal computers, and telecommunications media: landline telephone. The technology used by Kutlo and Itumeleng were PowerPoint, internet, and personal computers. Mpho and Keitumetse used Blackboard, a Learning Management System. Oratile and Lorato used the nine types of technology as noted on Table 2. Oratile used Blackboard, personal computers, telephone (telecommunications media), cellphones, internet, PowerPoint, WebCT, Moodle, and SMART Board, whereas Lorato did not use SMART Board but did use Facebook and YouTube. Thus, technology was used for teaching and learning.

Face-to-Face Classroom Materials

The participants in this study generally used lecturing as their method of teaching. Most used PowerPoint presentations with handouts to supplement the lectures, and students were also expected to buy textbooks. This section describes some of the commonly used f2f artifacts such as course outlines, assessment notes, textbooks, and class notes.

Course Outlines: All nine participants used a course outline, generally prepared by the lecturers, in their f2f classrooms as a planning and management tool to guide the students as they were required to do by the University of Botswana. These were distributed at the beginning of courses. Students were expected to have read assigned readings and to be prepared for classes based on the outline before coming to class.

Course outlines guide students on the specific content to be covered in the course and the mode of assessment. For most participants, as shown in Figure 4, course outlines contain a course introduction, rationale, objectives, and assessments. The course outline indicates a specific topic for each week with subtopics to be covered in a certain period of time. The course outline also generally contains the lecturer's contact information and classroom times and venues. The structure of the course outlines for all courses is the same as is suggested by the Department of Adult Education. Course outlines also contain some prescribed texts and recommended readings for students.

Course Outline
2013/14 Semester II

COURSE SYNOPSIS

This course is designed to help learners develop presentation skills using Microsoft PowerPoint; Introduction to spreadsheet concepts and principles; Use of basic spreadsheet application package facilities; Introduction to database concepts and principle.

AIM / RATIONALE:

This course offers a further introduction to the computer system environment and problem-solving with the help of the computer. The emphasis is on practical hands-on experience. The course helps students with understanding presentation skills. It will focus on equipping student basic spreadsheet and database skills. It will introduce further computing skills. The course will further equip students with basic ICT skills required for their academic work.

LEARNING OBJECTIVES

Upon successful completion of this course, students will be able to attain competency of each of the following, enough for them to teach themselves any more advanced related computer literacy material not covered in this course:

1. Presentation skills using Microsoft PowerPoint
2. Spreadsheet skills using Microsoft Excel
3. Introduction to Databases using Microsoft Access

1. Presentation Basics
1.1 Introduction
- Understand concepts and principles of multimedia information presentation
- Good practice in creating presentations
- Understanding different audience types (professionals, students, etc.)
- Creating presentations for different audience types

1.2 Basic operations
- open and close a presentation application
- open and close a presentation document
- use application help functions
- Understand layouts, templates, and themes

(Using MS ACCEESS)

3.4   Tables

- Create tables in design view, specify various data types for fields
- Specify primary keys
- Enter records using datasheet view
- Modify records

3.5   Relationships

- Different types of relationships
- Referential Integrity

3.6   Forms

- Create simple forms : (wizard and design view(
- Use forms to enter data into a table / query
- Create forms with sub-forms

3.7   Queries

- Create simple queries in design view
- Create advanced queries: update, delete, append, crosstab, and make-table

3.8   Reports

Create simple reports using the report wizard

Create advanced reports in design view

3.9   Macros

To automate the database

3.10   Import/Export of Data To/From Access Databases

3.11   Printing all objects

TESTS DATES

TEST 1: Thursday 6th March 2014

TEST 2: Thursday 17th April 2014

PRESCRIBED READING

1. Lecture and Practical lab manuals (availabe online through WebCT) **(To be revised)**
2. Any suitable Text books on PowerPoint, Spreadsheet and Databases application packages
3. Computer Based Tutorial and internet resources

Figure 4: *Example of a Course Outline for Face-to-Face Students*

INTRODUCTION

Week 1:   *January, 23*

Overview of the course; the meaning of adult education
- Key Reading:

Lindeman. E. (1926/1989). The Meaning of Adult Education: a classic North American statement on adult education (4th Ed.). Oklohoma city: Oklohoma Research Centre of continuing Professional and Higher Education.pp. 3-19 (http://www.infed.org/thinkers/et-lind.htming;

Task 1 : What did Lindeman (1926) think of both education and intelligence how does his views compare to us today? (Group member)

Merriam,S.B. & Brockett,R.G. (2007). *The profession and practice of adult education.* San Francisco: Jossey Bass. Chapter 1.

Also see www.infed.org/lifelonglearning/b_adedgn.htm AND

http://www.unesco.org/education/aladin/paldin/pdf/course01/unit_03.pdf

Oduaran, O (1991) Fundamentals of adult Education. Benin City: Nigerian Educational Research Association. (What is and the varieties of adult education) (Class member)

National Commission on Education. (1993). *Report of the national commission on education.* Chapter 8. Gaborone: Government Printer.
How is adult education viewed in Botswana?

TOPIC 1:   HISTORY AND ADULT EDUCATION

Week 2:   *January 30th*
The nature of history and the usefulness of historical method in adult education

- Key Readings:
Merriam,S. B. & Brockett, R.G. (2007). *The profession and practice of adult education.* San Francisco: Jossey Bass. Chapter 3.

Omolewa, M. (2000) Setting the tone of adult and continuing education in Africa. In S. Indabawa, A. Oduaran, T. Afrik, S.Walters (Eds). *The state of adult and continuing education in Africa.*(pp. 11-18) Windhoek: Department of Adult and Non formal Education. University of Namibia.
http://www.historians.org/pubs/free/WhyStudyHistory.htm
- Assignment set (see below)

Assessments Notes: Assessment notes are handouts given to students. They contain information about the course assessment. Common assessments are assignments/projects, tests, and examinations. Modes of assessments as shown in Figure 5 are included with other forms and total 100%. Assessments could be in the form of students having to review a book for instance (30%), written assignments (40%), open book tests (20%), and lifelong learning skills such as critical thinking, problem solving, and creativity, and class participation (10%), which all totaled 100%.

Modes of Assessment:

There will be one assignment (**due date- 25ᵗʰ Feb, 2014**), one test (**4 March, 2014**) and an end of semester **2 hours final examination.**

Final Grade:

The final grade for this course will be based on the following mark allocations:

    Coursework = one test and one assignment   **(50%)**

    Final Examination   **(50%)**

Prescribed Texts:

Giddens, A. (2000). Introduction to sociology. Cambridge: Polity

Edge, W.A. and Lekorwe, M. H. (1998). Botswana Politics and Society. Pretoria: J.L.
       Van Scahaik publishers.
Recommended reading
Freud, B. (1998). The making of contemporary Africa. Basingstke: Macmillan.

Hulme, D. and Turner, M. (1990). Sociology and Development. Hempstead: Harvester
       Wheatsheaf.

ACADEMIC DISHONESTY
- **harms the good reputation of our university**
- **affects your personal integrity**
- **is a barrier to the acquisition of the knowledge, skills and attitudes you would have acquired at the end of your study**
- **decreases your value in the eyes of employers**
- **has a heavy penalty including expulsion from UB.**

DO NOT CHEAT OR CONDONE CHEATING BY OTHERS
Office of the Deputy Vice Chancellor, Students Affairs

Figure 5: *Modes of Assessment*

Assignments: Face-to-face students are expected to complete at least one written assignment, as shown in Figure 6 for continuous assessment. One participant said: *"I give the students individual assignments, and allow them two to three weeks to research and then write the assignments"* (Keitumetse).

THE UNIVERISTY OF BOTSWANA

DISTANCE EDUCATION UNIT/CCE)

Semester two 2013/2014

Assignment (50 marks): Due 20th February, 2014

PART ONE: Write a research problem of your research proposal

Identify a research topic of interest to you. Then write the research problem section of the proposal. In writing your research problem, you are advised to follow, as much as possible the following format:

- Topic area   (1 marks)
- Statement of the Problem   (10 Marks)
- Purpose of the study   (2 marks)
- Research questions/objectives of the study   (6 marks)
- Importance/significance/justification of the study   (6 marks)
                                                               ----
                                                               25 marks

PART TWO: write a critical review of the literature for your proposed research study

Using the same research problem that you described in *Part One* above review the related literature. In writing this chapter, please use the following format

- A brief introduction   (5 marks)

- Review the literature by doing the following: (15 marks)
    - *Organize your literature review (i.e. summarize conclusions according to themes relevant to your study)*
    - *Critique the literature (i.e. interact with the literature by responding and commenting. Remember that relevant studies need to be critiqued not reported. Use your own words (i.e. only use quotes to support your conclusions and arguments)*
    - *Identify gaps in the literature, this is crucial for situating your own study in reaction to existing information or previous work)*

- Chapter summary   (5 marks)

                                                               25 marks

Note: That;
  i) You are expected to demonstrate sound knowledge of social scientific research principles and some evidence of reading on the subject matter to be investigated.
  ii) Quotations and citations should follow the "student style guide i.e. APA format of the Faculty of Education
  iii) The assignment will be marked out of *(50).* It will be assessed in terms of clarity, logic of the presentation and the ability to apply research principles.

Length: 3-5 pages typed

Due Date: This assignment is due on February 20th, 2014. Late submissions will be governed by the appropriate Faculty of Education regulation.

Department of Adult Education

Figure 6: *Example of an Assignment*

Tests and Examinations: Students are given a test during the course and an examination at the end of semester. The final grades are based on course work and a final examination, constituting 100% of the total marks as shown in Figure 7.

The tests usually cover material done at a specific time in the process of the course, whereas examinations are held at the end of the course and generally include work covered in assignments and tests. The nine participants usually distribute assignments, tests, and examinations to f2f students in class when the time comes to test them. Similarly, distance education learners also write the tests and examinations, similar to f2f students during the f2f classroom residential sessions.

QUESTION 3

a. List two uses of Microsoft Excel. [2]

b. Write down the steps to insert a column after column-D [2]

c. Refer the following worksheet and answer the questions from (i) to (v)

i. The commission rate given in cell B15 is in percentage. Write down the formula
   to calculate the commission amount for the month of July 2009. [3]
   (Note : When your formula is copied for other months, the same commission
   rate has to be used by the system)

ii. Write a function to find the total commission earned by the salesman [2]
    for all months
iii. Write down a function to calculate the average sales from [2]
     July to October 2009

Figure 7: *Examples of Tests and Examinations*

Textbooks: The participants indicated that they provide additional learning materials to f2f students to supplement their readings. These consist of practice questions, additional reading lists, lecture notes, reports, and journal articles. The students are expected to read materials in advance before coming to class to be able to participate in classroom discussions. Textbooks are prescribed for each course, with generally one textbook per course, and participants said they keep some books specifically for the course on hold as reserves in the library to supplement the readings. The students are expected to access these books from the library and read in preparation for the next class lessons. Mpho noted that: " … with the f2f one, we don't have a tailor-made textbook. We prescribe off the shelf textbook …" What Mpho meant here was that although f2f students do not

have tailor-made textbooks like the modules in distance education courses, they have a book prescribed for the course which they use. This means that both the f2f students and distance education learners, in addition to the module, use textbooks specifically prescribed for the course.

Class Notes: In addition to textbooks, the lecturers develop notes for the students to supplement their readings. The notes are based on the course material, prescribed textbooks, and reserved library materials. Students are expected to read these notes in addition to the prescribed textbook.

Distance Education Materials

Distance education artifacts are those materials developed by lecturers for distance education learners as listed in Table 5. Lecturers who teach f2f students are called 'tutors' for distance education learners. The title of 'tutor' is given to highlight the transition from lecturing f2f to distance education facilitation. Modules and materials are developed specifically for distance education learners. These modules are comprehensive course notes as noted in Table 5 and used as textbooks. The modules are independent study materials and represent the lecturer's presence when the distance education learners study on their own away from the University of Botswana.

In addition to individual independent study, distance education learners attend residential sessions at the University of Botswana in f2f classrooms with a lecturer who tutors them. These f2f classroom residential sessions are scheduled for one week inclusive of the weekend per semester. The lecturers are expected to tutor them, and at the end of the week give them an examination or test similar to the ones f2f students receive. The lecturing and testing of f2f and distance education learners was expected to have been completed in one week because it was expected that the distance education learners would independently complete all the work assigned to them. These sessions run when the university campus is closed for f2f students or when they are on break so that resources are shared and used by and for distance education learners only. These f2f sessions are meant to assist distance learners in clarifying what they did not understand from learning on their own. However, the tutors end up lecturing (giving them information) because learners often fail to complete the school work assigned to them for a number of reasons including, a lack of understanding and low levels of English. At these residential sessions, participants reported that they tend to use lecturing as the method of teaching and learning with distance education learners.

The modules are commonly referred to as workbooks and form a key component in the delivery of teaching and learning in distance education. Mpho said: *"The workbook is tailor-made specifically for this course we are teaching".* The modules provide information on all the units, and distance education learners can study the units at their own time, pace, and place. These modules are print-based, and distance education learners obtain them during the residential sessions or via mail.

The modules generally contain units similar to the f2f course outlines, except that they have more detailed comprehensive information, including course content. Typically, a module represents the presence of the lecturer, and includes the outline, objectives, assessments, weekly topics, content, and practice questions and assignments. Distance education lecturers do not need to produce supplementary teaching and learning materials because the modules are comprehensive. However, the participants said they were often under pressure from the University of Botswana administration to complete the syllabus by the end of the semester, so they provided distance education learners with additional materials. These materials were often the same as those used by f2f students. As one of the participants remarked*: "… when you read the module you find that everything has been simplified and even examples given, so that it actually simplifies everything for a distance education learner, unlike the f2f students …"* (Keitumetse).

At the University of Botswana, the Department of Distance Education Unit in the Center for Continuing Education is responsible for coordinating the planning, facilitating and producing of the

modules for distance education learners. This is a common practice in Southern Africa, where there is a unit specializing in adult education. The University of Botswana follows the model of the modules and study guides developed by the University of South Africa. The University of South Africa was a pioneer in print-based distance education materials. As such, the Department of Distance Education Unit brings together a distance education specialist with a subject expert to develop the modules. The distance education specialist from the Department of Distance Education Unit provides guidance and training to the subject expert on developing the modules according to adult education teaching and learning principles. The lecturer who teaches the f2f courses often develops the module but this is not always the case.

Once the modules are developed, the subject expert may move on to other courses and a new lecturer will be assigned to take over delivery of the distance education course. The new lecturer, then, will have had little input in developing the distance education course. Once a module is developed, little re-development takes place. According to the participants, the modules are updated but not re-developed. Some of the participants in this study, Lesego, Oratile, Kutlo, Lorato, and Itumeleng, developed their own distance education modules for the courses they taught, whereas Mpho, Keitumetse, Serero, and Mmapula taught courses using modules developed by others. Mpho reported: *"I have never been trained, nor attended a workshop, to be professionally developed on how to teach distance education learners, and develop their learning material in the form of a workbook, which is the module".*

Similar to Mpho and Keitumetse, Serero claimed that from the beginning of her involvement in teaching distance education courses she had not been trained to teach distance education nor had she developed a module. Mpho also used a module that had been developed by others, which he said was now outdated.

On the whole, distance education learners were taught through two ways: (1) modules, which were developed using adult education teaching and learning principles and were designed for independent study, which is generally student-centered; and (2) lectures similar to what f2f students received, which were conducted during residential sessions on campus. The Department of Distance Education Unit adopted a particular format for modules, which is used universally in distance education. The format is user-friendly and intended to aid in independent learning. An example of a module is provided in Figure 8 and the general structure of the module is as follows:

1.   Overview
2.   Objectives
3.   List of topics to be covered
4.   Examples
5.   Self-assessment activity to be done by the learners
6.   Questions
7.   List of references and further readings

UNIVERSITY OF BOTSWANA

DEPARTMENT OF ADULT EDUCATION

DISTANCE MODE MODULE

COURSE DAE

ABOUT THE MODULE

OVERVIEW

The communities in Africa and in Botswana in particular are submerged in poverty, hence the need to empower them economically. The recent years have witnessed the emergence of community enterprise and economic projects under the auspices of Non-Governmental Organisations (NGOs) and Community Based Organisations (CBOs) as well as those that are initiated and run by individuals within the communities. However in this module our interest is not in those projects and enterprises that are privately owned. It is in those community enterprises and economic projects that are geared towards community development. The strong conviction that influences the decision to invest time and energy discussing the community enterprises and projects is because they are seen as the pillars in the development of the communities. This observation is well supported by Hamilton (1992) who stated that, "Community development is usually thought about and discussed in purely economic and political terms" (p.29). The strong belief is that if economic empowerment is realized then political and social empowerment will follow easily. Therefore the economic empowerment process is highly essential if communities are to develop. The Bahai International community Office (2002/20/20) in support of the idea of economic advancement states that, "it is unrealistic to imagine that the vision of the next stage in the advancement of civilisation can be formulated without a searching re-examination of the attitudes and assumptions that currently underlie approaches to social and economic development (p.1). It becomes clear that economic development is important for communities to improve their socio-economic status. According to the World Bank as cited by Chambers (1983) "Rural development is a strategy designed to improve the economic and social life of a specific group of people – the rural poor" (p.147). In order for the rural populace to benefit from the fruits of development, the need for their economic empowerment becomes even more fundamental. It is in this light that I put forward to you this module. This I am highly optimistic that it will help you as an adult educator or change agent and also help you help others.

The topics that are covered in this module will help you to become more informed in the field of project and enterprise management. The presentation of the information is made with the aim of demystifying those concepts that you may have in the past considered as complicated.

The manner in which the module is written invites you to compare what is written here with you own experiences. The module is categorized in units that are closely related and I hope that you will find going through them interesting.

I wish you the best in studying the module.

Thank you!

General Objectives of the module

Upon successful completion of this Module you should be able to:

- Analyse the general principles and values behind community enterprises and economic projects, particularly in the African context

- Critically analyse factors that should be considered in choosing economic activities, including exploration of the gender perspective
- Effectively provide their services to communities in terms of business knowledge and skills as "business advisors"
- Show a critical awareness of the constraints and cultural contexts for community enterprise development and adult education in Botswana

UNIT 1

Some common issues related to community enterprise and economic projects

Overview

In this unit I shall help you to understand the importance of enterprises and community projects. The unit will examine the concept of community projects and enterprises and lay it into perspective. The unit will further look at the types of activities that are essential in a small business. The capital investments that are necessary will be discussed as well as the opportunities that must be harnessed if the enterprise is to be competitive and successful. The importance of resources in any business undertaking will form part of the crucial discussion in this unit.

In order for you to stay focussed and to benefit immensely from the unit I have formulated the objectives for it. The following are the objectives of the unit.

As having successfully completed this unit you should be able to:

- Define the concept of community project and enterprises
- Identify the types of activities for small businesses
- Identify the types of capital investments
- State the importance of resources in the running of community project or enterprise.
- State the importance of collaboration and participation in the global market

8. *Fire insurance*

This is the type of insurance that covers properties against the risk of fire.
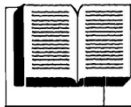
? ?

What type of insurance will you prefer for a community project or enterprise and why?
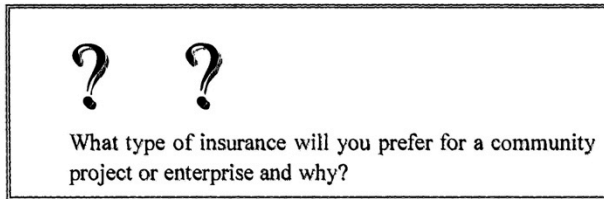
SELF-ASSESSMENT ACTIVITY

Define, the concept of insurance and justify its importance in the community projects and enterprises

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FURTHER READING

Birds, J. (1979) *Insurance.* London: Sweet and Maxwell.

Figure 8: Example of a Distance Education Module for Adult Education

In the module, icons are used to guide the distance education learners (see Figure 8). For example, a hand holding a pen indicates a self-assessment activity, and a picture of an open book indicates the learner is being referred to further readings. The module is written in accessible English so that distance learners can follow along easily. The purpose of the module is to represent the lecturer's presence in absentia. At the end of each module there is a summary of all the units covered with some practical exercises to do, and an assignment as a self-assessment for practice. The modules and any supplementary materials are distributed to distance education learners during the residential sessions on campus and those who fail to collect them receive them through the mail wherever they are located.

Online Learning Materials and Technologies Used

Online learning materials refer to electronic media used in teaching and learning for both f2f and distance education at the University of Botswana. Participants' responses on online learning materials showed that they used some technology for f2f and distance education modules. In addition, they were aware of and familiar with technologies used for online teaching and learning such as Learning Management Systems such as WebCT, Blackboard and Moodle, as well as social media, and other technologies (personal computers, smart-boards, and cellphones) (see Table 5). In addition, some participants indicated they used telephones (cell and landline) to contact students.

The Centre for Academic Development provided the nine participants with training on Learning Management Systems and other technologies such as personal computers and SMART boards. Participants' also used PowerPoint presentations, emails, Facebook, YouTube, cellphones for calling with text messaging, and telephones as telecommunications media. As shown in Table 2, Blackboard was used in f2f classroom teaching by four participants, one participant used Facebook for f2f students, three participants used cellphones for calling and text messaging in distance education, and four participants used landline telephones for distance education as telecommunication media. Participants used technologies like cellphones and telephones because these were accessible to distance education learners.

The lecturers said they used online technologies to post materials online for f2f students to facilitate asynchronous learning. However, participants noted that students often did not access the materials posted online even though they had access to University of Botswana computers for synchronous learning. For instance, Oratile used Blackboard, Moodle, and WebCT. This is what he said:

> *In the f2f program we do have courses uploaded on the Blackboard and Moodle and so on like in my case I use the Blackboard, so this is where I interact with the students. They can participate in discussions and I send them messages through the Blackboard and so on.*

Lorato said that she was the first one to use WebCT in the University of Botswana. She used to post materials for f2f students to read in advance before coming to class and also used it as a discussion forum, although she also commented that students often fail to access it. Lorato later began using Blackboard instead, which she said was introduced after WebCT.

The University of Botswana started using WebCT as a Learning Management System. This was later changed to Blackboard and then recently Moodle was introduced, which is not commonly used compared to Blackboard because participants are still struggling to learn and use Blackboard. Participants noted that new technologies were introduced before they even understood how to use the previous one. They claim that the University of Botswana does not allow them time to learn how to use and practice these new technologies. These Learning Management Systems have common tools with some slight differences as noted by Lorato and Oratile, the main users. The most commonly used Learning Management System was Blackboard, which has tools such as discussion forums, content delivery, and a chat area. The lecturers repeatedly mentioned that f2f students were not using the tools. They also stated that distance education learners were often not connected to the internet or did not have access to computers so they were less likely to access online materials. Participants in this study often tried to contact their distance education learners by using text messages via cellphone, and by calling and talking to them on landlines. Again, the lack of technology infrastructure in the remote rural areas hampered this process. Most distance education learners are located in remote rural areas.

Given the lack of technology infrastructure, the most commonly used technology among participants was PowerPoint presentations in both f2f and distance education. PowerPoint slides were posted online through Learning Management Systems like Blackboard before class; however, many of the lecturers noted that students never accessed them. When distance education learners attended residential sessions on campus PowerPoint slides were also commonly used. Participants said that PowerPoint is compatible with their teaching context because they project the slides on the classroom screen board and go over them to explain concepts. They also distributed PowerPoint slides as hard copy handouts to students. Mpho said: *"I can carry just a memory stick and use it in f2f or distance education residential session classroom by inserting the memory stick in the computer, then projecting the PowerPoint slides on the blackboard".*

Briefly, in examining the artifacts the following points were highlighted: (1) Faculty were all early adopters of technology. They used various types of technology for specific purposes. Participants' rates of technology adoption varied as some consistently used technology, like Lorato, Mpho, Kutlo, Oratile, and Keitumetse; while others used technology only sometimes such as Serero and Mmapula; and others like Lesego and Itumeleng used it sporadically. (2) Blackboard for online learning was the most commonly used Learning Management System and the specific tools used were content delivery, chat rooms, and discussion forums. (3) All participants noted that both f2f students and distance education learners did not access online materials, which negatively impacted their use of online and other technologies (see Table 5). (4) All participants used PowerPoint slides, as this was compatible to their teaching context experiences. (5) Some of the participants such as Lorato were creative and showed initiative by using Facebook and YouTube, and in addition other lecturers (Serero, Lesego, Kutlo) used telephones, and cellphone texting. (6) More online media and other technologies were used by lecturers in f2f classrooms rather than in distance education learning. Generally, participants did apply both the teacher and student centered approaches for f2f and distance learning, but teacher centered was predominantly used with compatible technology and some specific artifacts. It is this gap that the researcher explores to understand the experiences of faculty teaching, use of technology and artifacts a micro – bottom-up level of an Instrumentalist theories perspective in line with the diffusion of innovation theories.

DISCUSSION

The overall purpose of this paper is to explore and understand the faculty's difficulties in applying their experiences in teaching and use of technology with artifacts in pedagogies at the University of Botswana. Through the analysis of the data three themes emerged across the participant data in line with the research questions that serve to explicate the situation at this institution: the use of teacher-centered methods, the use of technology and artifacts in teaching and learning, and the use of technology and artifacts in distance education. Furthermore, the themes reveal understanding that could possibly inform other studies using diffusion of innovation focusing on the micro Instrumentalist theories to find out experiences of teaching, artifacts and technology use by faculty. The three themes will be discussed to answer the research questions that guided this study.

Teacher-Centered Methods

Although many participants incorporated some student-centered activities as observed in the profiles above, the predominant teaching method in f2f classrooms was lecturing using PowerPoint slides. Participants generally used PowerPoint presentations because it was compatible with their teaching experiences. The findings are in line with previous studies, which claim that when the attributes of technology innovation such as compatibility are high the adoption process is effective (Birch & Burnett, 2009; Keesee & Shepard, 2011). Faculties in the African university context as it is in this case, prefer to use technology that is compatible to their teaching experience. Similarly,

during the observations, faculties generally provided information to students distributing handouts and did mostly talking, dictating notes in f2f teachings. The faculty noted that the students were not willing to do school work as assigned, they want to be spoon-fed as was mentioned by Lorato and Itumeleng. It was the pressure they felt from the university administration and students not doing their school work, which compelled them to apply the traditional method: teacher centered in teaching. The teacher-centered method they used was based on their experiences in line with the compatible technology they used which enabled them to meet the university requirements without considering students' difficulties in understanding concepts. So, it shows that the pressure from the university administration's top-down approach was interested in meeting the goals without first understanding the faculty, students and consequences as users from a bottom-up approach. Reflecting on why participants continued to use teacher-centered learning despite understanding and wanting to teach student-centered classes, two issues were noted: (1) they experienced pressure from the system, and (2) they tried to incorporate innovative practices with teaching.

Pressure from the System: Participants identified that their teaching methods were focused primarily on examinations and provided handouts as supplements. In this regard, the University of Botswana expects lecturers to complete the syllabus by the end of every semester. Faculties tend to concentrate on the exams and use a teacher-centered approach because they are able to deliver material quickly to complete the syllabus as per the university mandates. In this case the individual early adopters as faculty felt pressure of being compelled by the university administration to implement innovations from a top-down approach for outcomes without considering the consequences. As was noted by Noble (1998) at York University when the faculty and students strike because they felt forced into developing courses through online and to study through cyber learning, respectively. It was on this basis that Masalela (2011) and Thomas (2008) argues that, the University of Botswana needs to go back to the drawing board and apply the initial top-down and bottom –up approaches for the purpose of effective online learning, which is expected to be a student-centered approach. On the other hand, student-centered approaches, faculty felt, took time they did not have. The results showed that the faculty members were not teaching the same courses f2f to distance, which means they prepared twice for courses, unlike others like Lorato and Mpho who used the same material for both f2f and distance. Consistent with this finding, Samarawickrema and Stacey (2007) posited that, some participants tried to move away from teacher-centered teaching into student-centered although it has more workload. Oratile, Lorato, Mpho, Lesego, and Mmapula used more of a student-centered approach compared to the other participants. They gave students activities that engaged them in learning for discovery or inquiry (for example, group presentations, class discussions, researching on a topic from the library/internet).

Participants attributed the use of teacher-centered approaches to pressure from the university administration. The results concur with literature as Surry (1997) argues that the system or organization from a macro determinist approach makes changes with technology by instructing the adopters, hence the top-down reformation. In contrast, Surry and Farquhar (1997) argue for an instrumental micro approach that the end user is the focus as changes are implemented and used by them from the bottom-up approach. Faculty as individual early adopters from a bottom-up level tended to concentrate on completing the syllabus rather than on students understanding the concepts or being able to learn through activities. Consequently, the faculty developed teaching methods and materials around examination questions and covering the syllabus. These materials were developed into handouts and used to guide the students towards the end of the course. As a result, students tended to rely on the faculty giving them information. Many participants mentioned the pressure from above but also the lack of participation by students.

Innovative Practices with Teaching: Participants, however, did try to incorporate many innovative practices. Some incorporated experiential learning, others provided demonstrations and many included group work. Many of the participants obviously enjoyed teaching and had considerable

education and experience in teaching. They all knew and understood the difference between teacher-centered and learner-centered approaches similarly as was noted by Stacey and Wiesenberg (2007) but in a Canadian and Australian context. The faculty could not apply their innovativeness due to the university administration pressure. It shows that the university was interested on the outcome without understanding the faculty as individual adopters from a bottom-up level who drives the change and not taking into consideration other factors. The results concur with the literature, (Melki, Nicolas, Khairallah, & Adra, 2017) posited that, *"… the idea that users' perceptions of technology usefulness and ease of use cannot be considered in isolation from the factors of innovation and creativity* (p. 139). It shows that the university administration was not interested in understanding the faculty and difficulties they are faced with in implementing the technology for teaching and learning.

Use of Technology and Artifacts

Despite the low levels of technology use, all nine participants were early adopters of technology in that they used various types of technology and they used what was available to them in novel ways (see Table 2). They engaged with Learning Management Systems where they could, and some used social media. Many used cellphones to connect to students and to distribute links to materials. Again here, participants experienced pressure from the administration in that they did not have enough time to learn how to use the technologies available and were just doing what they could, teaching with PowerPoint. When they did try to incorporate technology provided by the university into their teaching, they found little uptake on the part of students. Similarly, Asunka (2008) argues that students perceived online learning as complex, demanding and time consuming. In sum, there were many challenges in the technology diffusion process.

Various types of technologies were used for teaching and learning. Of all the technologies used, which are noted in Table 2 and Table 5, some participants used technology more than the others. For instance, Oratile and Lorato were the most frequent users. They engaged innovativeness by experimenting with online technologies where they posted materials (artifacts) through Blackboard and other Learning Management systems. Participants like Kutlo, Lesego, Serero, Oratile, and Itumeleng used landline telephone and cellphone to contact students, especially distance education learners, even though this was not standard practice. This concurs with the literature which states that novice and experienced teachers are different in demonstrating rapid change in conceptions (Claire, Anders and Linda (2017). The University of Botswana offered training on Learning Management Systems like Blackboard, Web 2.0, and social media such as Facebook, YouTube, and participants voluntarily attended the workshops. Workshops were offered whenever a new technology was introduced. However, participants felt that the time devoted to training was not enough and with the emphasis on exams, there was even less time to implement these technologies into teaching and learning.

Although they all used new technologies, more or less, for teaching and learning, participants tended to rely on the technologies that were most compatible to their day-to-day teaching experiences supplementing with artifacts (handouts and other learning materials). The technology most often used was PowerPoint, since it was easy to implement, it enabled them to meet the requirements of the university schedule and it suited the students. These views on compatibility resonate well with Rogers' (2003) idea that when a perceived attribute such as compatibility is high, the adoption and diffusion of technology rate is also high. However, even though compatibility with PowerPoint was high, this differed among participants, and as noted above some used this more than others. Jacobsen (1998) argued that, "because of their different levels of computer use and years of experience, each early adopter appeared to have a unique innovation-decision cycle" (p. 166). Faculty in an African university context differ from those in United Kingdom, North American, or Australian universities in that although they are supported through professional development or workshops, they often fear and have 'technophobia' about using technology for teaching and

learning (Totolo, 2007). Despite the low levels of online technology use, given the university's priority to migrate to online learning, a surprising finding from this data is how much online technology and artifacts were used in f2f classrooms.

Distance Education and Technology with Artifacts

It is clear from this data that very little, if any, technology was used for distance education. Distance education has remained print-based with residential f2f sessions (see Table 4). The residential sessions consisted of a week, early in the term, where students collected material (artifacts: handouts, study guides, modules) earlier before the week starts. Although students were supposed to learn independently during the term, this often did not happen. Distance learners, as participants indicated, were often students who had not completed high school and consequently experienced difficulties studying alone. Many also struggled with low levels of English proficiency. In addition, the lack of connectivity in rural areas, where most of the distance students came from, was an added reason why so little technology was used. Distance education learners are usually located in rural remote and poorer areas where there is lack of infrastructure.

Farrell and Isaac (2007) argued that there is a huge gap between urban and rural regions in Africa in terms of access to ICT infrastructure. The rural remote areas are mostly not connected and if connected there are often problems with electricity. For example, a study conducted by Sebusang, Masupe, and Chumai (2005) in Botswana revealed that broadband access was not within the reach of the population at large. They concluded that the overall accessibility of telecommunication was very low in Botswana. Where connectivity was available, dial-up methods were used at great expense. Since the majority of the distance learners were adults who worked part-time or were unemployed, it was impossible for them to access the technologies, even when they were available. These challenges do not create a technology culture. This concurs with the literature which states that lack of infrastructure in developing world universies has an impact on the implementation of e-learning in higher education (Moakofhi, et. al (2017); Munezero, et al. (2016). During the distance education learners' residential sessions, many come to the class without completing their assigned work. While in residence at the University of Botswana, participants found that they had to teach distance learners the whole syllabus in one week because they were not learning on their own. Also, even with the availability of technology at the university, distance learners did not use this technology during their residential periods. This is not surprising, since they would have had little experience using technology at all. Yet the University of Botswana administration expects faculty to transition to online learning without first understanding them from a bottom-up level and difficulties they might be faced with on effective implementation of ICT use in pedagogies.

CONCLUSIONS

This paper reports on the demographic information and communication technology (ICT) and artifacts used for teaching and learning. Participant profiles were developed and discussed in relation to a number of themes. All participants were experienced lecturers and early adopters of technology despite the low levels of technology use. A clear narrative that emerged from the participants was that University of Botswana administration was just interested on the outcome without considering the consequences and the fact that students do not use technology and this is what caused them to abandon the technologies, particularly, the Learning Management Systems. But there were also other pressures. For example, there was little time for technology training or for incorporating technology systematically into teaching and learning. With packed syllabi and little time to cover course materials adequately, participants resorted to what worked best – PowerPoint presentations and teacher-centered approach. Even though the university provided a range of

technologies and regular training on these technologies, participants felt they could not accommodate these new technologies into the daily teaching without substantial stress. Furthermore, online technologies for distance learners were non-existent because of a lack of infrastructure and the characteristics of distance learners. Participants felt that online learning was not possible given all these contextual issues. A surprising result from the data was, however, how much technology was being used in the f2f classroom considering the range of problems associated with technology, the diffusion and adoption of technology is not always a normal linear S-curve process as noted by Rogers (2003), it depends on the context and situation as it is in this case. The transition from face-to-face (f2f) to online learning at the university level is recognized globally as an effective educational promotion, and also in Botswana, the university is encouraged to promote and provide clear guidelines to understand the faculty from a bottom-up level as implementers of change taking into consideration the consequences.

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