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PRE-CONFERENCE PROCEEDINGS

RE-IMAGINING HIGHER EDUCATION POLICY IMPLEMENTATION:

CAN POLICY LEARN FROM PRACTICE?

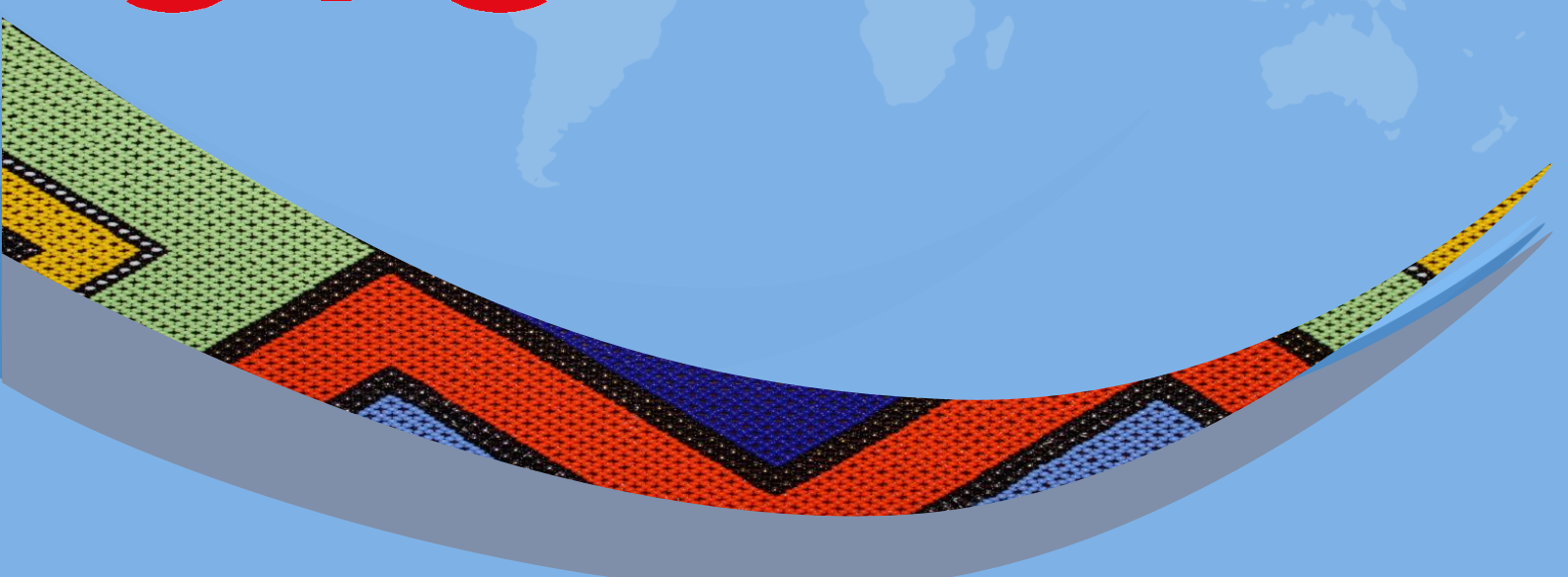## COMPLEXITIES, CHALLENGES AND POSSIBILITIES

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FACTORS AFFECTING THE POST-IMPLEMENTATION ADOPTION AND USAGE OF BLACKBOARD AMONGST ACADEMICS AT DUT

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Abstract

Universities around the world have invested heavily in technology which accommodates the digital-age students, and supports their learning experience. Durban University of Technology (DUT) followed the same trend, aligning their strategic planning to revive e-learning by improving pedagogical plans. This exploratory study examined the extent to which various factors influence academics' acceptance and use of the Blackboard system. The system has been deployed but there appears to be resistance on the part of the stakeholder (student or staff members) may result in underutilization. The institution adopted the system in the hope of reaping the rewards such as accessibility, flexibility and self-paced activity. However, such rewards are not always a fait accompli, technology not always being used as expected. Technology Acceptance Model (TAM) was used as a baseline to assess to what extent various factors influence adoption and usage on the proposed model and the model comprises three major factors (i.e., personal, technological, and organizational). A mixed-methods approach using a survey and interviews was employed and extended to all academics at DUT with a teaching responsibility. The results from both electronic survey (e-survey) and interviews revealed factors that seems to be affecting the adoption of the Blackboard system and these factors includes LMS experience, computer skills, and age, particularly in the 41-50 year age group, which indicated a significantly low usage of the system. Upgrading of the system to a more advanced version comprising more features; and increasing the response rate of the technical support staff were revealed by the results.

Keywords: Academic acceptance, adoption factors, higher education, learning management system, technology acceptance model

1. Introduction

The positive impact of Information and Communication Technology (ICT) on all spheres of society is well known, the field of education being no exception; ICT is an integral part of education nowadays. Higher-education institutions are faced with a number of challenges, including:

- Increased student access to higher-education institutions (Akoojee & Nkomo, 2007; Teichler, 2013);

- Poor success rate of students; and staffing resources in terms of student-lecturer ratio (Waghid, 2002); and

- Strained physical resources to accommodate ever-increasing class sizes of recent years (Jaffer, Ng'ambi, & Czerniewicz, 2007).

One way of addressing these challenges is to integrate ICT teaching with relevant learning tools. The rapid emergence of ICT or e-learning tools in the educational sector is a clear indication that e-learning is solving, to a certain extent, some challenges faced by higher education, or that these tools make a difference to e-learning.

The significant benefits of LMS in higher education have been widely studied in the field of education. According to Mahdizadeh, Biemans, and Mulder (2008), LMS is capable of motivating users (students and academics), increasing participation amongst the students in class. Furthermore, LMS offers what traditional learning does not, that is, accessibility, flexibility, self-paced learning, and interactivity. Baker, Bujak, and DeMillo (2012) suggested that the effectiveness of institutions rests on proactively exploring innovative technology, before embracing it. Even though it may seem that investing in LMS is a sure-fire way of moving ahead for universities, the use of this technology faces adoption resistance from both staff members and students.

2. Problem statement

According to Alharbi and Drew (2014), the successful implementation of LMS depends heavily on the academic staff buying-in. Minimizing the significant role played by the academic staff in the implementation of LMS may be seen as a major post-implementation factor in hindering the acceptance of LMS. Therefore the purpose of this study is to answer the following research question: What are the factors affecting adoption and usage of Blackboard at DUT?

The result of this study will shed more light on factors affecting academic staff in higher education in general, and DUT in particular. Apart from the investment (financial and time), it is equally important to invest in academics' training, to ensure that LMS may be utilized to full capacity, being integrated into the teaching and learning culture.

3. Literature review

Higher education institutions are now compelled to adopt relevant technological tools. In a study conducted by Blewett (2012), the result supported the need for a transferral from outdated 'industrial age' models to 'information age' models because outdated models can no longer support modern students' learning and communication experience. Watson and Watson (2007) are of the view that e-learning will play a critical role in meeting contemporary students' needs not met by current approaches to instruction.

The role of LMS in high education is important to support the shift from industrial-age pedagogy to information-age pedagogy that requires support from technology to satisfy modern students. For this reason, LMS plays a critical role to facilitates anytime and anywhere availability of the learning material process (Sejzi & Arisa, 2013). Furthermore, LMS can assist in offering learning resources and instructional activities to students (Yidana, Sarfo, Edwards, Boison, & Wilson, 2013). Findings of the study by Steiner, Götz, and Stieglitz (2013) have suggested that LMS communications' components positively influence students' attention and confidence. Furthermore, LMS has the capability of acting as a repository, tracking students' performance, and delivering learning materials.

Lately, LMS has been widely adopted by higher institutions, however, some institutions are still failing to identify factors impeding the adoption of such systems. TAM has been widely adopted to predict the acceptance and usage of Information System (IS). TAM suggests that the external factors of the system influence perceived usefulness (PU) and perceived ease of use (PEOU), and subsequently, this leads to the actual use of the system.

Despite external factors being attributed to a certain extent as influencing the acceptance and usage of IS, these factors are not applicable to all IS systems,

including LMS. Few researchers have modified TAM to investigate external factors influencing academics' acceptance and usage of the system in general, nor LMS in particular. These authors modified TAM, and proposed a revised TAM in order to understand this phenomenon. Alharbi and Drew (2014) suggested new external variables which included the lack of LMS availability, prior experience, and job relevance. Asiri, Mahmud, Bakar, and Ayub (2012) proposed internal variables (namely, attitude towards using LMS, beliefs towards e-learning, and competence in using LMS) and external variables (namely barriers faced by the faculty members and demographic factors) by adopting Theory of Reasoned Action (TRA) and TAM. Furthermore, Al-alak and Alnawas (2011) adopted TRA and TAM and the results of the study show that there is a correlation between intention to adopt the system and PU, PEOU, computer knowledge, and management support.

The broad engagement with contemporary literature review informed the author's choice of external factors perceived to be affecting the post-implementation adoption and usage of Blackboard amongst academics in higher education institutions. These factors comprises three major factors (i.e., personal factors, technological factors, and organizational factors) as seen in Figure 1. Personal factors include computer experience, LMS experience, and job relevance. Technological factors include system quality, service quality, and technology complexity. Support incorporates factors such as organizational factors, technical factors and training. This study has adopted and modified TAM as a baseline, proposing various suitable external variables (as shown in Figure 1) which predict LMS adoption and usage by academics in higher educational institutions.
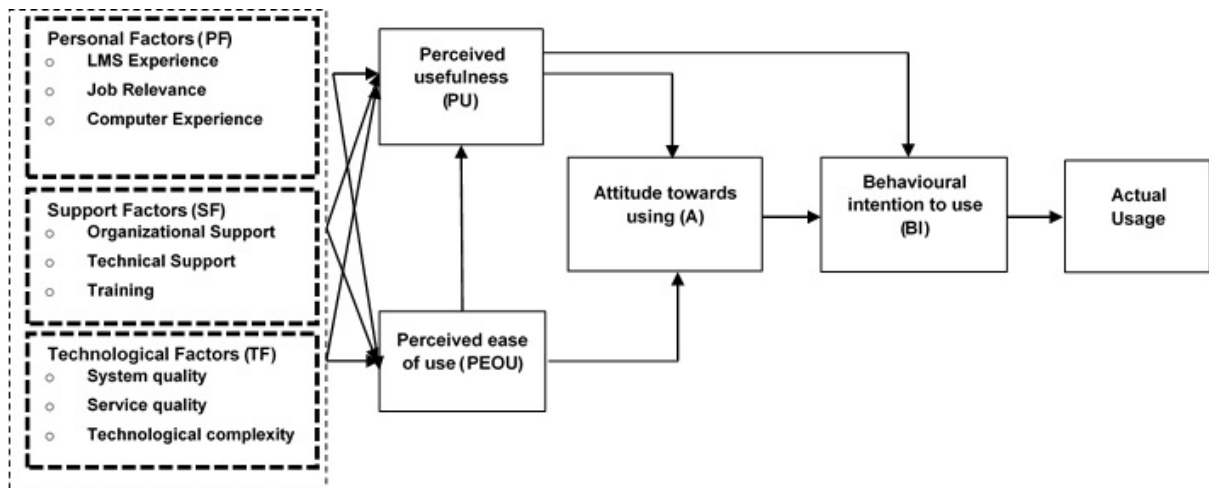
Figure 1: Proposed Academics' LMS Adoption Model

4. Methodology

This study reports on the mixed-methods approach (quantitative and qualitative) consisting of electronic survey (e-survey) and interviews. Convenience sampling was used for the quantitative approach (e-survey) and purposive sampling was used for the qualitative approach (interviews) because DUT staff are the targeted group and the only group that can provide the necessary information required in this study.

A pilot study was conducted to achieve an advance warning about any possible risks that could threaten or jeopardize the study; or to ensure that the proposed questionnaires or language or methods used were appropriate and not complicated. The pilot testing or preliminary survey was carried out on five academics in the faculty of Accounting and Informatics, prior to the actual survey. After the pilot study, the questionnaire went through changes to improve its quality and presentation.

4.1. Data collection methods

4.1.1. Questionnaire

During the first week of August 2014, electronic survey (e-survey) driven by a Google Forms was administered to all permanent academics of DUT with teaching responsibility. All the prospective subjects were invited per the email account of the institution. This was to allow the researcher to benefit from the following: reaching a substantial number of subjects, having a survey cheap and easy to administer, obtaining a speedy response, with subjects answering at their own convenience.

However, the challenges normally faced by this data collection method include access to a computer, and unwillingness or lack of time to participate. Fortunately, all the subjects had access to a computer. The subjects were sent two reminders after intervals of two weeks, however, despite the reminder, unwillingness or lack of time to participate were amongst the major inhibitory factors, as had been anticipated. A month after the questionnaire was administered, the daily response rate reached zero, prompting the researcher to change to a manual questionnaire. As a result, the response rate increased slightly, to above 50% (111 academics of DUT having a teaching responsibility) of the required sample. The researcher was hoping to achieve a response rate of over 90%. However, the issue of adequate response rate has created mixed reactions amongst researchers. According to these authors the acceptable rate is as follows: 50% (Babbie, 1990; Babbie & Mouton, 1998), 70% (Dillman, Christenson, Carpenter, & Brooks, 1974) and 60% (Kiess & Bloomquist, 1985). Therefore, the response rate was sufficient for this study.

4.1.2. Interviews

Interviews were conducted to gain sufficient depth, and provide new insight into the phenomenon being investigated. To participate in an interview, the subjects were asked to voluntarily fill in their details on the questionnaire. Only ten subjects showed an interest in participating in the follow-up interview. The other subjects opted not to participate owing to numerous reasons, ranging from time constraints to a lack of interest. Appointments were made and face-to face interviews of 20 minutes were conducted. A sufficient number of interviews is often an ambiguous question. Guest, Bunce, and Johnson (2006), attempted to answer this question. The finding revealed that data saturation arose on the first twelve interviews, while themes emerged within six interviews. Findik Coskuncay and Ozkan (2013) investigated the factors affecting academics' behavioral intention to use LMS (similar to the current study), they surveyed 224 academics; only 10 of them were interviewed.

4.2. Ethical issues

The ethical clearance was received from the University of KwaZulu-Natal (UKZN) Ethics Committee; and a gate-keeper's letter was obtained from the Office of the Registrar at DUT. Subjects were asked to fill in the informed consent and were also

informed of the study's objectives, and information expected of them prior to participating. Information collected from subjects will remain strictly confidential between the researcher and the subjects.

4.3.   Data analysis

The data collected through questionnaire was analysed using the 22nd version of the statistical software called SPSS and the following data-analysis tests were performed: Chi-Square Goodness-Of-Fit test, Wilcoxon Signed Ranks test, Regression analysis, Kruskal Walls test, and Mann Whitney U Test.

Moreover, data collected through the interviews was analysed by using narrative analysis and the interview questions were informed by the results of the questionnaire to gather quantitatively in-depth reasons for the responses. The interview questions were categorized into two sections:

- Group A (for those who do use Blackboard system, even to only a small extent). The aim was to ascertain the motivating factors for using the Blackboard.
- Group B (for those who do not use the Blackboard system at all). The aim was to ascertain the negative factors accounting for their not using the Blackboard.

5.   Data presentation and discussion

Table 1 that follows depicts the demographic information of participants involve in the study that was collected through e-survey.

Table 1 : Demographic summary

Demographics		Frequency	Percentage
Gender	Female	64	57.7
	Male	47	42.3
	Total	**111**	**100.0**
Age	>50 years old	33	29.7
	25-30 years old	13	11.7
	31-40 years old	36	32.4
	41-50 years old	29	26.1
	Total	**111**	**100.0**
Academic Rank	Associate Professor	3	2.7
	Lecturer	73	65.8
	Professor	2	1.8
	Senior Lecturer	24	21.6
	Specialist Instructor	9	8.1
	Total	**111**	**100.0**
Teaching Experience	<1 year	1	.9
	>20 years	35	31.5
	1-5 years	18	16.2
	11-15 years	23	20.7
	16-20 years	15	13.5
	6-10 years	19	17.1
	Total	**111**	**100.0**

The consolidated results from the questionnaire and interview will be used to answer the research question. This question was measured by Support Factors (SF) and Technological Factors (TF).

The results of Wilcoxon Signed Ranks test shows that academics were significantly in agreement with the majority of statements pertaining to the SF and TF constructs. These results suggest that support factors and technological factors play a critical role in adoption and usage of the system. The Technological Factors dimension included system quality, service quality, and technology complexity. The correlation between Technological Factors (system quality, service quality, and technology complexity), and dependent variables (PEOU and PU) showed significantly positive; however, PEOU showed a high strength of $r = .667$, while PU showed a low strength of $r = .270$. These results were similar to the findings of the study by Almarashdeh, Sahari, Zin,

and Alsmadi (2010) which revealed that system quality, service quality, information quality, usefulness, and ease of use, influenced the user's satisfaction and intention to use LMS. Findik Coskuncay and Ozkan (2013) also found that technical complexity significantly affects PEOU.

The Support Factors' dimension included the Organizational Factor, Technical Factor, and Training. Findings revealed that on the organizational construct, participants were in agreement that management was supportive. On the training construct, participants also agreed that training provided by Centre for Excellence in Learning and Teaching (CELT) staff improved their ability to use the system, and that it was sufficient. Centre for Excellence in Learning and Teaching (CELT) is a service-provider department of the Blackboard system in DUT. However, when asked whether the technical staff provided prompt support should the Internet be down, using as alternatives various communication means such as email, telephone, chat, etc., participants were in disagreement. This has had a negative effect on the system's adoption. Abbad (2011) concluded that technical support affects the LMS adoption. The researcher also found that technical support directly influenced PEOU and PU. Amongst other factors, a poor response rate from technical support might possibly explain the disconnection between Actual Use and Intention to Use (r =.149, p =.118) with a low strength. The correlation between Support Factors and dependent variables (PU and PEOU both with a medium strength) also showed significantly positive.

To test whether any of the response options had been significantly selected, the Chi-Square Goodness-Of-Fit test was performed. Results showed that 31% of the academics have used LMS for 1 – 2 years, while only 3% have indicated that they have not used it, nor do they intend using it in the future. This is positive, seeing that the Blackboard system is still in its initial stages. Furthermore, results are compatible with the findings of Alharbi and Drew (2014) that 28.1% have used LMS for 1-3 years; almost half this number (16.95%) have used it for under a year; those with up to 5 years' LMS usage contributed 3.39%; and very few had used LMS for more than 5 years (1.69%). Technology experience is a critical element in positively increasing teachers' confidence in adopting and using LMS (Bandura, 1994). The result of the studies determining influential factors in the use of e-learning by university academics showed that e-learning experience has a significant correlation with actual use

(Mahdizadeh et al., 2008); and user experience is influential in the use of technology Al-Busaidi & Al-Shihi, 2012; Gautreau, 2011; Mahmud & Ismail, 2010; Venkatesh & Davis, 2000). In contrast, Ball and Levy (2008) found that intention to use LMS is not influenced by technological experience. PEOU ($r =.232$, $p =.014$) and PU ($r =.328$, $p<.0005$) are both statistically significant in LMS experience.

However, the usage between 41 – 50 age groups was significantly low. This result implies that this age group is reluctant to use the Blackboard system. Possible reasons for general low usage emerging from the interview includes persistent downtime of the infrastructures, poor response of technical support staff, limited version of the system, lack of incentives for system's users, and minimal academics' involvement in the Blackboard planning, acquiring, and implementation. Furthermore, these factors impeding adoption and usage of the system might be strategically used to promote usage and adoption. The results of the interview indicated that incentivizing the user of the system, improving response rate of technical support, and upgrading the system, might assist in closing the gap between intention to use and actual usage. The technical support was the only common item measured by both interview and questionnaire, offering conflicting results. The interview result indicated that one of the participants was satisfied with the technical support staff while the questionnaire result indicated that the participants were significantly in disagreement with the statement that technical support staff provides prompt support if the Internet is down. Nevertheless, based on the fact that only one interview participant was satisfied with the technical support compared with the quantitative results, it may be concluded that technical support could be a contributing factor affecting usage and adoption of the system.

The findings of the correlation between a dependent variable (PU) and independent variables (PEOU, LMS Experience, Blackboard Usage, Computer skills, Support Factors, and Technologically Factors) showed that Support Factors strongly influence PU; while variables such as PEOU, LMS Experience, Blackboard Usage, Computer skills, and Technological Factors were weak statistically, and may be considered to have no impact whatsoever. At the same time, the results of the correlation between a dependent variable (PEOU) and independent variables (LMS Experience, Blackboard Usage, Computer skills, Support Factors and Technological Factors)

indicate that PEOU is strongly influenced by LMS Experience, Blackboard Usage, Computer skills and Technological Factors; while only Support Factors was statistically weak and may be considered to have no impact.

Figure 2 depicts the summary of results of the correlation coefficients of the research model. The result shows that all constructs of the model are significantly correlated, with the exception of Actual Use and Intention To Use. A single asterisk (*) in the research model's correlation coefficients' path (below) indicates a 0.05 significance level, while a double asterisk (**) indicates 0.01 significance level.
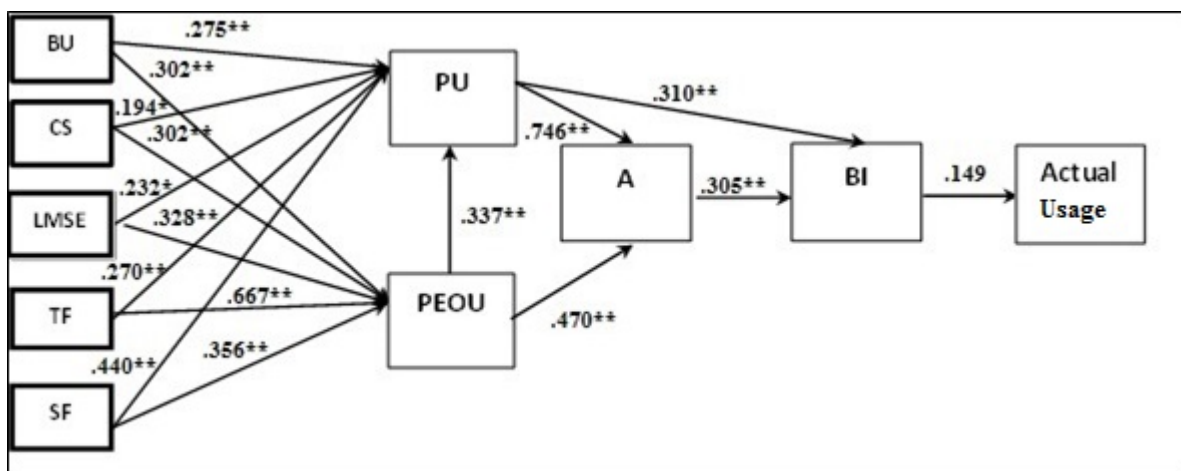
Figure 2: Path of research model coefficients

This section only highlight the important path on the model, based on the higher coefficients' values. The result shows that there was a fair, positive correlation between SF => PU (r=.440, p<.0005), indicating that the more support provided to academics by the management, technical support staff, and training, the more academics perceive the system to be useful. The results also indicate a strong, positive correlation between TF => PEOU (r=.667, p<.0005), indicating that the more support is provided to academics to ensure reliability, or availability, and an error-free system, the more academics perceive the system to be easy to use. Furthermore, PEOU (r=.470, p<.0005) and PU (r=.746, p<.0005) are both predictors of A, showing strong and medium strength, respectively, and correlating positively with A. Meanwhile, the Actual Use is not significantly correlated with Intention to Use (r=.149, p=.118), the strength being low. This result indicates a gap between Actual Use and

Intention to Use. This may be because of a lack of incentive or persistent downtime of the infrastructures, and poor response of technical support staff.

6. Conclusion and recommendation

Underutilization of LMS at DUT could lead to undesirable consequences considering the money and time invested by the management of this institution.Even though the system has already been deployed but it appears that there are academics who have resisted adopting and using the system. The factors that seem to be affecting the adoption of the Blackboard system includes LMS experience, computer skills, and age, therefore a more robust training to up skill academics on adequate use of the system is imperative, particularly in the 41-50 year age group, which indicated a significantly low usage of the system. An increase in adoption and usage of the system rests heavily on the upgrading of the system to a more advanced version comprising more features; also providing incentives of using the system, and increasing the response rate of the technical support staff.

Limitations of this study have afforded some valuable future research for scholars to consider. The first future research would be a study to further test the proposed model for similar results in a different context (country or institution or population). Secondly, other factors which could affect the adoption and usage of Blackboard could be explored, not limited to the proposed model.

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PERCEPTIONS OF MALE STUDENTS ABOUT EARLY CHILDHOOD EDUCATION
In the B. Ed. PROGRAM IN THREE SOUTH AFRICAN UNIVERSITIES

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Abstract

Societies perceive women as kind, motherly and the kind of people who can nurture young children whereas men are perceived as having the opposite traits. In South Africa there is a domination of women teaching in the Early Childhood Education (ECE) Program. Such dominance has resulted in men showing less interest in programs associated with teaching in the Early Childhood Education. This dominance of women has caused an existence of a relative resistance among male students to be enrolled in Early Childhood Education B.Ed. Program as they think it is for it for women, (Peterson and Parker 2011). This paper is drawing from theories advancing post-structural and teacher agencies. The paper presents findings on perceptions of male students about the Early Childhood Education B.Ed. Program offered in three South African Universities. The findings of this paper reveal that students need to think beyond the gender based kinds of employments and emancipate themselves in order to embrace democracy in the South African multicultural societies. This paper uses a wider study of ten Early Childhood Education B.Ed. male students who are enrolled in this program. This is a qualitative multiple case which is informed by the interpretivist approach. Purposive and convenience sampling were used in selecting the most accessible students. Unstructured group interviews and group conversations were used to generate data and then analysed and categorised. The findings reveal that there is a lesser number of male students who are willing to take this program and those who have taken the initiative are either ridiculed or perceived as academically weak. The findings of this paper reveal that any profession in the 21st century should recognise all genders and that men as part of our societies, have roles to play in all the education spheres.

Keywords: Early Childhood Education B.Ed. program, male students, teaching, South African Universities

1. Introduction

The Bachelor of Education in Early Childhood Education program is dominated by female students, and as a result male students who enroll for this program feel as if they do not belong. The South African primary schools have few male teachers to serve as role models for children. The reasons given for women dominating this program is that they are constructed using gendered frames (they are characterized as being "naturally" caring, nurturing and more loving than men). This construction exclude males who can also play significant roles in young children in Primary schools. In most cultures there is a strong belief that naturally women can be charged with the responsibility of raising children and men cannot handle that responsibility, (Neugebauer 1999; Sanders 2002; Cunningham & Dorsey 2004 & Wardle 2004). This social construction of women has closed many doors for men in the education fraternity because men are sometimes not seen as people who can nurture, guide, love and raise children. However this belief is challenged in terms of the kinds of some other people's and societal beliefs about men. As a result in the Early Childhood Education program one does not expect to find many male students. In this 21st century, times changing, male students registered in B.Ed. program have become strong competitors (Mashiya 2014).

Now there is the shift in people's perceptions where there are men who want to take part in their children early education and who happen to be nurturing and loving not as women but in a holistic way. As male students took the initiative of being included in the ECE program, they are perceived as weak, unfit and perverts (King, 2005 & Martino 2008). Clower, Ratele & Shefer (2015) argue that in some instances where there is an absence of biological fathers to the children in the Foundation Phase, the male teachers play a significant role in mentoring the learners. This is some kind of a different perspective on how the Foundation Phase teachers' males are sometimes viewed in some communities. Men are perceived as people who will bring play, entertainment and active movements and these are requirements in the Early Childhood Education fraternity where children are expected to learn through play. Also men in Primary schools are associated with leadership positions and when they choose teaching in the Early Childhood Education then the people's perceptions change as these males are academically weak (Mulford 2003). In the ECE it is

significant that children become active agents to improve the process of their own development as they shape their environment through their participation.

In the South Africa context research around this topic is very limited. This is because of the myths associated with males working in the ECE that such men are perverts who are in the classrooms to abuse children (Petersen 2014). Mashiya (2014) alludes to being a male in the Foundation Phase and Petersen (2014) argues on the views of male teachers in the Foundation Phase. Though these two scholars are not focusing on the male students' perceptions but they look at how competitive the males could be in the ECE and how they can bring in positive kinds of ways as they become teachers in the Foundation Phase. Societal attitudes towards ECE male teachers are at best described as hostile and very unbecoming which now blankets all the good deeds by men in this growing generation. Most research is done abroad as they see the male teachers in the ECE as fathers and mentors to the young children (McBride, Rane & Bae 2001). Male teachers in the Foundation Phase are also seen as fulfilling the roles of the absent father in children's lives (Mukuna & Mutsotso 2011). This signifies that the males can be role models to the children they teach, as they teach, children behave, they become good example, and they can also bring success to young children. As times change, the kind of men in our societies also change. There are the kinds of men who take their daughters to school and find that they are interested in what the young daughter or son does at school. That is the kind of society South Africa has where there are caring, nurturing and loving not that they have a feminine side but it is the kind of society that loves education.

It is unfortunate that the thinking of men who have taken an initiative of being involved in the ECE Foundation Phase are viewed as people who are not compassionate as what is expected from women who teach in the Early Childhood Education. According to Goelman & Guo (1998) in the South African context, the Early Childhood Education has been dominated by older or unqualified women. For progress in education, such trends needs to change, from my understanding this has been most gendered kind of a profession and it is one of the trends that takes South African education backwards in terms of empowering the young men. Mukuna (2008) states that it is the mothers not the fathers that work in the Early Childhood Education programs. These are such claims that take the education fraternity backwards. Nyoni & Nyoni (2012) support this

argument as they argue that young children are viewed as delicate and they are still growing as a result they need female teachers to handle their education. This argument is different from how these researchers view men. Men are perceived as rough and tough as a result they cannot do the work done by women. Men in the 21st century are part of our societies and they need to know better and disengage themselves from such claims. The male students in the three South African universities come from different societies, those that believe that men cannot teach in the Early Childhood Education as they are expected to be hard and not nurturing. These are some of the critics that are aligned with enrolling in this B.Ed. ECE/ Foundation Phase. These critics bring hostility amongst the students themselves as they find it difficult to go against societal beliefs. However these students come from different backgrounds, they have been socialised differently.

This paper will address the teachers imbalances found in the Foundation Phase who are found teaching in the Early Childhood Education. Nyoni & Nyoni (2012) refer to the issue as the negative attitudes of the societies towards males being employed in the ECE. These claims by societies view males as people who cannot be involved in employments perceived as for women. This paper will further draw from the issues of teacher agency, especially in the Early Childhood Education where there is a shortage of teachers especially in the Foundation Phase. The shortages signify that there is even less men in the ECE as male teachers are ridiculed when they choose teaching in the ECE. Furthermore this paper will look into the methodology employed for the research addressing the findings on the perceptions of so called a male "taking a role of a woman" and how the societies need to be educated as we move forward towards different kinds of professions in the 21st century.

2. Gender imbalances of teacher representation in the ECE

The gender imbalances of teachers in the Foundation phase is not only for South African education. According to Mukuna & Mutsotso (2011) in Kenya and Janairo, Holm, Jordan, & Wright (2010) attest that there are gender teacher imbalances in the Early Childhood Education. Male teachers seems to be very few in the Early Childhood Education phase, male ECE teachers were seen by communities as sexual abusers (Barnard, Havingh Nezwek & Proy-Bayard 2000). Bigler, Hayes & Hamilton (2013) argue that there are teacher imbalances as there are more females than men in the

Foundation Phase and learners are socialised into female roles rather than men. This increases the female learners performing better than boys. Olarenwaju (2005) asserts that it is the education sector that will be able to correct any imbalance in any society. In the South African schools diversity can be good for young boys and girls. In order that diversity improves in schools there should be a balance between the teachers to cater for these young children. Research done by Rowe & Rowe (2002) indicate that girls are performing much better than boys in Primary schools and this could be because the young girls are being motivated by female teacher mentors to do well as opposed to the young boys. It looks as if there is a female teacher suppression in the primary schools that is challenging the young girls who also need motivation from the males that can be part of teaching in and learning in the Foundation Phase. In most African countries there is limited research that alludes to male teachers in the ECE, in such a way that a number of studies is referring to women as teachers in the ECE. This socialisation of children turn to become stronger in the primary schools.to less male role models in the ECE, this profession is dominated by old female teachers as stated in this research that the female ECE teachers are perceived as the only people who can nurture, guide and mentor young children in the ECE (Chabaya, Rembe & Wadesango 2009; and Mukuna & Mutsotso 2011). The teacher shortages in South Africa either being males or females signifies that the male teachers who would like to work in the Foundation Phase will not only benefit the young boys who needs mentoring but the South African education fraternity. Johannesson (2004) argues that young boys in Foundation Phase are disadvantaged of being mentored in schools due to a number of issues, one of them being the pandemic HIV/AIDS, some left through retirements, some left for greener pastures and some teachers changed professions, (Tye & O'brien 2002).

The shortage thus lead to teacher-shortages in schools and this became worse in Primary schools. South African researchers like, Mashiya (2014) and Petersen refer to this cohort as the initial one which brought different changes to this ECE program first one that were taken in one of these South African Universities to strengthen the "Foundation Phase Teacher Education". This cohort was started in 2011 and the male students were now teaching in the Foundation Phase (Grade-R-3). The White Paper on Early Childhood Education (2001) states clearly in its purpose that it is there to protect the children's rights in order for them to develop to their full cognitive,

emotional, social and physical potential. It is generally known that our communities have been riddled by the HIV/ AIDS pandemic, some children come from child-headed homes and there is no father figure in that home (Gachuhi 1999). Clowes, Ratele & Shefer (2013) argue that South Africa needs to be socialised to different kinds of fathers, those that are able to nurture the young generation. Some children come from single parenting homes and worse some have been brought up by grandmothers. The gender imbalances in the primary schools where there are more females teachers then males put these men teachers under the microscope where they feel pressured and labelled as child molesters (Clare 2010).   According to Cushman (2005) there are limited numbers of men in the teacher training colleges because they do not like teaching but they like the management positions in the schools. The male teachers who are part of teaching in the Foundation Phase love working with the young children.

There are positives that are seen in men who are teaching in the Foundation Phase. They allow children to learn in an interactive ways and more playful ways (Mukuna & Mutsotso 2011). In the South African context, this has been the direct opposite, as men were seen as hard, law-making kind of people who cannot nurture young fragile children. Children in the primary schools are also diverse that is a fact but not all of them are fragile. Teaching and learning in schools require mentoring especially those young boys who are brought up by single parents. Communities are dominated by single parents and child headed homes where the children in those homes have no father figure, as a result there is an urgent need of the males to teach in the Foundation Phase. Also the fathers for the children who are in Primary schools are more or less the same as age as these males in these Universities. These concerns often relate to our society where many children are being raised in one parent families and where that parent is generally female. The need for male role models in the early years of a child's education and development has regularly been articulated as a reason to address the male/female imbalance in primary teaching. Cosser (2009) argues that there were very few children in the Secondary schools who aspired to be teachers and if this situation persists then there will be a shortage of teachers in this fraternity. This is not a challenge only in South Africa but also the neighbouring countries like Zimbabwe and Kenya (Chabaya, Rembe & Wadesango 2009 and Mukuna & Mutsotso 2011). Schools have experienced teacher shortages especially in the Early Childhood Education as this profession due to the social and contextual issues like HIV/AIDS and

teachers changing profession. Also the issue of hidden curriculum which is raising questions on what children learn in schools and the more the children are socialised into being taught by females, these issues will be what communities are differentiated by. It is the responsibility of the communities that all young boys and girls be afforded an opportunity in life and allow parents to encourage both girls and boys their own identities and avoid t traditional gender stereotypes.

The South African Curriculum Assessment Policy Statement (CAPS 2011) for Foundation Phase is designed to cater for Grade R to 3. As the policy states that the Department of Basic Education is responsible for the 5 to 9 year old age cohort therefore allowing male teachers to be part of the teaching fraternity. The B.Ed./Foundation Phase in the South African universities is preparing teachers to teach these grades. With that being said, these male students registered for this program me are trained to teach young children in these grades. This paper is responding to the perceptions of the male students who are part of this program me. There are a couple of reasons why these male students find themselves in this program me. Some are drawn to the program me because of the funding available for teaching in the Foundation Phase as there are teacher shortages and some are drawn to this program me for the love of children. The students who are enrolled in the intermediate and senior phase are judging these male students because of their lack of information about these B.Ed. ECE male students. There is more to teaching in the Foundation Phase than what meets the eye of their counterparts. This paper will allow these counterparts to understand that teaching and learning in the 21st century need also to recognise that there are men who want to teach young children. These male students are also part of our societies and it is also the society 'responsibility to see men as having valuable input in teaching young children. For decades women has dominated these early years so much so that when men are wanting to take the initiative, they are called names like, they are weak, they are child molesters and womanish. The paradigm shift from the fathers who have been known to be hard on children to more understanding, nurturing and loving Foundation Phase male teachers. Also changing norms around how men construct their gender identity in South Africa therefore has the potential to substantially decrease levels of violence in schools, hence men males are better than women when dealing with discipline (Sak, Sahin & Sahin 2012).

3. Theoretical Issues

The gender imbalance in the South African universities is due to culture, stereotypes and perceptions of communities. This paper emphasizes the significance of multiculturalism and calling for more dynamics for young children in Primary schools. Williams (2005) argues that in poststructuralist theories there are no restrictions to the understanding of knowledge therefore plays an unavoidable role. The same idea is supported by Kellner, (2003) that the poststructuralist theories encourages knowledge that is open to change. The paper using the critical theory that is orientated to changing societies and emancipate those that are oppressed. The male students who happen to be perceived as child-molesters and not nurturing to young children are fathers to these children (Jones 2012). This was confirmed by one of the other participant who stated that he used to take his daughter to school and that is how he felt the love of teaching in the early years. Surprisingly as this is a profession perceived as for women but this young man made a decision to change how people viewed as the foundation of knowledge and wanted to be part of the profession that was generally known as for women.

As stated earlier that the issue of HIV/AIDS has changed how people viewed families as there are now challenges of child-headed homes (Stein, Harris & Hartell 2011). Though this situation cannot change but these men be the father role models to these young children. According to Skelton and Hall (2001) young boys in the lower grades happen to have disciplinary problems when they are always surrounded by women. The involvement of these male students in this B.Ed. program can also assist in maintaining discipline to the young boys in the Foundation Phase. How the students from the other B.Ed. Disciplines other than the ECE perceived as they interacted with the ECE counterparts had a great impact on their way they felt about themselves. The thinking that male student teachers who want to teach in the Early Childhood Education are perverts, are just claims that are untruthful in fact these young male teachers deserve to be given a chance to teach in the ECE like their women counterparts. Drawing from post-structural theories, to understand that the young male teachers who are in this B.Ed. ECE program are as good as their counterparts in the other B.Ed. program other than Early Childhood Education.

4. Ethics for this study

Anonymity and confidentiality was granted to the B.Ed. Early Childhood Education participants as this is the sensitive issue to some of these male students. Maree, (2009, p.41) stresses that "the protection of research participants is important". I also understood that it was my primary obligation to protect the participants against any harm or risk during the research. Cohen & Manion (2000) argue that ethics need to be adhered to in all the stages of research therefore it was significant to allow these male students information that they could be able to pull out at any stage if they felt uncomfortable. For that I made sure that their participation in the study was going to be treated with confidentiality.

5. Methodology

The research was to understand male students' perceptions who are in the Early Childhood Education program in three South African universities. Qualitative approach was used in order to best understand and dig deep into the male students'' understandings and perceptions. Maree (2009, p.78-79) argues that "qualitative research is based on a naturalistic approach that seeks to understand phenomena in real-life situation". This research aimed to achieve an in-depth understanding of the perceptions of the male B.Ed. ECE students so this approach allowed me to have deep conversations with them in order to understand their feelings. I also went further to have face to face semi-structured interviews. Denzin & Lincoln (2000) refers to semi structured interviews as where the researchers is able to engage with the participants with the designed questions that does not limit the probing (107). This was intended to dig deeper for the meaning. I further on had group conversations with these male students in ECE as from the semi- structured interviews their responses differ due to their different experiences and backgrounds as a result there were multiple realities.

The group conversations started in a very unsettling discussions as it is understandable that this was a sensitive topic for them. As we continued with the conversations these male students were leading in the discussions explaining how they felt small as they started the program due to the ridicule and everything that was said about being a weak male if you happen to be enrolled in this program. Both these data generation methods were to allow the participants to have discussions with the interviewer in a natural and safe way. The conversations and group interviews

provided more data on how the male students perceived this B.Ed. Early Childhood Education program. The group conversations provided a platform for the participants to say more on the issues that they were unable to talk about in the semi-structured interviews. The face to face interactions with participants, talking to them and seeing them behaving in their real context (Creswell 2011, p.45). From the face to face interviews and group conversations data was categorised into themes for further understanding of these male students' perception on the B.Ed. ECE program. Maree (2007) states that the reality is not fixed, it is multiple, personally and perceptually constructed by human beings. However how these male students perceived themselves, the best way was to have conversations with them where they felt comfortable and be able to open up about their feelings. The generation of data was by asking open ended questions and engaging in conversations that led to probing of questions.

6. The themes from the data generation

Most of the Foundation Phase women teachers do not associate themselves with the school management positions as a result the men who happen to be in the Primary schools are eligible for these higher positions (Peterson & Runyan 1999). Historically the Primary schools have been led by the women as the schools are dominated by women teachers. The literature points out that women teachers preferred to be in classrooms rather than in the leadership positions. Data points out that the male students were aspiring to be in these leadership positions as they knew that they maybe be promoted. This was confirmed by one of the participants who stated that:

> *"I knew that as a male teacher in the Primary school I will be standing a chance of being the principal and that was my main interest, teaching young children was not what I wanted to do".*

It is a myth that men cannot ne nurturing, caring and loving as women, the kind of development that men will provide for young children is different in the sense that it could be playful and that is different from what women provide no reliable research indicates men are any less capable of nurturing children than women are. Historically men would be seen as people to provide physical independence to young learners and that is different to what is provided by women in the classrooms. The male

teachers who wants to be involved in children early education would take leadership positions rather than to be in the classrooms.

There are so many reasons of involving male-figures in childrens' lives. For some of the male students teaching in the Primary school brought out their personalities, that is the love of children. These were some of the reasons for some male students who decided to be part of this program me. Some of the mockery made no difference to these students as they knew what they wanted to do and had reasons to teach in this phase. This was confirmed by some students who shared their understanding of teaching in the ECE phase as:

> "Being a male within foundation phase discipline was at first a problem because around campus people found it strange for a man to be in early childhood development. Nonetheless I ended up understanding the field better each day, especially with the theoretical understanding of childhood which was provided through the module called understanding childhood development. Also engaging in critical discussions in all my foundation phase classes' prior first teaching practice which was TP220 and was scheduled to take place in the second year.

It is quite true that some of these male students are ridiculed and called names for choosing the program as people look at the program as an easy one. Mukuna (2008) attest that the ECE program has been what the women are good at and the men were not part of this program if men had any doing in the program, which is when they happen to be ridiculed and be called names. How the society perceive women and men profession divides them according to their gender whereas the gendered division and it is the societies men and women in our society. This means that male teachers in ECE are perceived to be women because culturally child care is the domain of women. Women are expected to do lower cadre jobs as a social construct. Men in ECE are therefore taking the women's positions. There were changes in the way the male students were thinking as the data also revealed that the B.Ed. students who were not in the ECE thought of the program as for only women and when the male students took the program they were ridiculed as if they will be doing women employment. This was confirmed by one of the male student who stated:

"Surviving all the, ridicule, critiques and different ideas around males teaching in ECE was through a self-confrontation or rather self-study to say, who am I? What do I believe in? Such questions they then assisted me to build my confidence around the university i.e. understanding who I am."

Based on feedback from teachers of other schools and what I have observed in my own school I have inferred that women generally are incapable of successfully influencing young males on their own. At first glance this might appear to be a sexist or even chauvinist statement but the primary authority figure for young boys that become unruly in predominantly female teachers and/or single mothers, aunties or grandmothers. This could indicate that even with the best efforts and intentions, young boys are not responding positively to the influence of these dominant women in their lives.

According to Clark (2009) the rate for male Foundation phase teacher seems to be dropping and reasons tend to be number of women who are known to be having a nurturing mothers therefore suitable for this kind of profession. The shortages of male teachers in the Foundation Phase was marginalising the male role-models in the primary schools. MacDonald, Saunders, & Benefield (1999) argue that for some children in the Primary schools the only father-figure they can relate to is from their male teachers. Research in Africa indicates that most of the children in Primary schools are from child-headed homes. There are so many reason as to this effect, the HIV/AIDS pandemic, poverty and unemployment just to mention a few. Skelton (2002) argues that the male teachers in the primary schools happen to be the "the replacement father" who is available for the absent fathers who are not available at home. Both young girls and boys find the male teachers as their father mentors in schools.

Nelson & Shikwambi (2010) argue that there seems to be a real mentorship that at some point assist in the reduction of drops outs in the Foundation Phase as the men work with the young boys and girls. Sak, Sahin & Sahin (2012) refer to this support that the males demonstrate as the more democratic fair and kind as compared to the women teachers. The male teachers absence in primary school classrooms is

promoting that there will be learners who grow up without different kinds of role models. Skelton (2001) concluded that the women leadership in Primary Schools tend to favour the young girls in their classrooms and that situation made the young boys to be disruptive at times Both young girls and boys require skills to be responsible adults in the communities and if the girls are able to receive this support from the female teachers so as the young boys, the need from the male teachers in the school. The trends of the power structures of being the males who decide on taking teaching positions in the Foundation Phase. It is believed that there are places for men in the Foundation Phase as men take over positions of being teachers in the classrooms, this was confirmed by one of the male ECE student who stated that:

> *"I used to take my daughter to school and I fell in love with how they learnt and from there I knew I will teach young kids".*

To some male students, it was their strong will that pushed them to take this program and other male students happened to be fathers as a result they were involved with their children's education and that brought the love of teaching in the ECE. Some female teachers would struggle teaching sports in the Foundation phase hence the involvement of male students in the program could enhance the love of sports to some children.

> *"If I was not strong willed, knowing what I wanted, I would have left the program , my peers were just laughing at me, saying how will I handle crying babies, I realised that I have to this also because of the sponsorship and I am loving it right now".*

As I said earlier that it became a necessity for some Provinces to intervene as the teacher shortages in were crippling the South African education. Some of these students were sponsored to be part of the project that had to strengthen the Foundation Phase. As a result these male students were chosen to take part in the project, therefore had this to say:

> *"At first it was weird because I got into the program knowing what I wanted to do, I am an elder brother to three siblings who are in the Foundation Phase and*

I assist them with their homework, which brought me so much love for Foundation Phase".

Some of the young males in the Early Childhood Education Program were to be admitted because of their financial challenges. The implications of poverty in South Africa saw men taking positions that were formally known as for women.

"I got to the program through sponsorship….I don't want to lie I didn't like the fact that there were only three males in a class full of females, that for me was not sitting well, until I understood how teaching and learning was taking place…..but it was tough".

7. Discussions of the findings

In 2014 the research done by the Centre for Development and Enterprise in South African signifies that there is teachers' shortages and the schools are surviving with the temporary posts. The Department of Education cannot deal with more scarcity of teachers. It is a well-known fact that there is a shortage of teachers in South Africa as leaners in High Schools do not aspire to train as teachers. How else can this scarcity be solved? Teachers have to be trained, males of females. There are so many reasons why these male students want to be part of the education fraternity in the Foundation Phase.

"I did not mind the ridicule from my friends but I was worries about Teaching Practice…I thought of how it will be difficult to teach Grade-1's but when that time came I was placed in Grade-2, as a soccer fanatic, I will teach children using examples from the soccer field and it will be so much fun…I am loving it".

8. Conclusion and recommendations

This study found that the male students who are registered in the Early Childhood Education program me are ridiculed by their counterparts in the South African universities but that does not change how they feel about the program as these male students believe that the understanding of their counterparts has to change in order to inform open decisions making in the 21st century. The poststructuralist theory encourages that knowledge and understanding are open to change to how people

perceive history before. These male students will increase the numbers of the males in the Foundation Phase as well as the teacher shortages in South Africa. The Department of Basic Education has embarked on strategies of increasing the teacher shortages by allocating bursaries for students who aspire to be teachers. The Limpopo Province took a leap in such an agency to enroll a cohort of male students in the Foundation Phase when seeing the necessity of education fraternity and a large percentage of this cohort were males who were wanting to teach in the Foundation Phase.

Schools experience the shortage of teachers due to different contextual factors like, HIV/ AIDS, teacher relocations and change of professions due to better and improved professions. Primary Schools need more male teachers who can also mentor the young boys and girls who grow up in child-headed homes. There is still a shortage of male Foundation Phase teachers in the Primary Schools. This happens as people are still amazed when they are encountered with the male teachers teaching in the early years. The male students who are aspiring to be teachers in the Foundation Phase need to be given a chance.   It is possible that there are those who are seeking to be in the leadership position as this happens to be what males want to do in the Foundation Phase. The young boys and girls in Primary schools still need the role-models/ father figures in schools as the males bring in the sense of stability in the primary schools. The literature still refers to women as motherly, nurturing and loving to be Primary school teachers but that is not only what the education fraternity needs. The schools cater for young boys and girls who also need to be nurtured in sporting activities hence the male teachers can offer in Primary schools. The young boys who grow up without fathers at home also can be mentored by these male teachers who have found their passion in teaching in the Foundation Phase.

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USING METAPHOR DRAWINGS TO BETTER UNDERSTAND MY PRACTICE IN ORDER TO DEVELOP RESPONSIVE AND INNOVATIVE PEDAGOGIES

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Abstract

In this paper I focus on how I used a metaphor drawing to better understand my teaching practice in order to develop responsive and innovative pedagogies as a teacher educator in the discipline of accounting. I demonstrate how I involved my students for five weeks in the use of the discussion board tool in the institution's learning management system namely Blackboard. I chose self-study as the methodological approach for my research because I wanted to understand how I was teaching and why I was teaching this way. Students had to record their weekly reflections about the activity in an online reflective journal. Over a period of five weeks I also recorded my reflections about the online activity in a reflective journal. These became the main sources of data in this study. From my reflections and students' reflections I identified a nodal moment and drew a metaphor to represent this nodal moment. I believe that metaphors provide me with a rich and powerful mechanism for gaining a better understanding of my practice. I analysed the metaphor drawing and certain common themes emerged about me in relation to my practice. These common themes highlighted the fact that in this changing and dynamic education landscape, my teaching strategies in Accounting Education needed to be revitalized to incorporate new contexts and perspectives that will respond to the call for more responsive and innovative pedagogies. This will capacitate my students to not only see the world differently but to engage and act differently in it. Therefore I want to reshape the Accounting Education curriculum to include strategies that develop students as life-long learners.

Keywords: Accounting pedagogy, discussion forum, learning management system, metaphor drawings, teacher education

1. Introduction

I am a teacher educator at a University of Technology in South Africa. I lecture Accounting Education to students completing an undergraduate four year Bachelor of Education degree. All students enrolled for this qualification have to register for a compulsory module called Skills and Life Orientation where they are taught basic computer skills and they are also taught in-depth how to operate the Blackboard learning management system (LMS). Blackboard is a virtual learning environment and course management system. Its main purpose is to add online elements to courses traditionally delivered face-to-face. It allows lecturers to post announcements, course content, assessments and other information about a course. It has features that allow lecturers and students to create discussion threads and send e-mails to each other.

As part of my doctoral studies, I am exploring my role modelling as a teacher educator of Accounting Pedagogy. I use Blackboard extensively for teaching and learning with the Accounting Pedagogy students. In this study I demonstrate how I involved the students over a period of five weeks in various online discussions about Accounting Pedagogy using the Blackboard discussion tool. This study was conducted with 65 second year and 92 third year Accounting Education students.

2. Rationale for the study

The ultimate goal of this study is to better improve and refine my instructional practice to enable me to develop innovative and responsive pedagogies in the teaching of Accounting Education. I want to develop new insights into teaching Accounting Education and better respond to my students' needs and in the process assist them in becoming innovative and responsive teachers themselves. Therefore I chose self-study as the methodological approach for my research.

3. Self-study as a methodological approach

With self-study I am afforded the unique opportunity to use myself as an instrument of the research and to become aware of explicit and tacit assumptions about my practice (Mason, 2001). My research and the analysis helps me explain my role in the research process and the impact it will have on my professional development and the learning of my students. Self-study research methods are gaining popularity mostly because the self-study genre has encouraged classroom teachers and teacher researchers to

closely examine and better understand individual teaching practices (Pinnegar & Hamilton, 2009). "What was once a rhetorical question-'how might I become a better teacher'- is now seen as an evaluative question with a multitude of answers" (Spatt, Honigsfeld & Cohan, p. 52. 2012).

Pinnegar & Hamilton (2009) believe that when we want to understand our own practice more deeply we use the voice of others. Likewise in order to interrogate my practice more deeply and more importantly to understand my practice, I gathered and analysed my students' reflections together with my own reflections about the online discussion activity. Certain themes emerged from my analysis and I drew a metaphor to represent these themes. This was done for me to gain a better understanding of what I am teaching and how I am teaching. I believe that being aware of what I am teaching and how I am teaching will assist me in developing as a teacher educator who can explore more innovative and responsive pedagogies to teach Accounting Education and thereby enhance my professional practice.

4. Metaphor and metaphor drawings

Metaphors can be described as a figure of speech applied to an object or an action to which it is not literally applicable whereas a metaphor drawing is an illustration of something regarded as representative or symbolic of something else (Rogets, 2013). Using metaphors is a powerful way of thinking because it permits new knowledge to be developed on theories and ideas that are in existence (Kurtz, Gentner & Gunn, 1999).

I am fully in agreement with Aubusson & Webb (1992) when they offer that metaphors assist us to understand the manner in which we as teachers teach, how we teach and why we do not want to change the way we teach. Metaphors have played a very important role as analytical tools in exploring teaching and teacher ideas about teaching. Practitioners have used metaphors as reflective tools (Tobin, 1990).

Also metaphors have been used to explore and enhance teacher development (Ritchie, 1994). I found this to be so true when I drew a metaphor to represent the nodal moment because once I had the metaphor in front of me I could talk at length about the emotions and feelings it evoked whereas when I looked at the concrete

representation I just could only explain exactly what happened at that moment as if I was relating an incident not describing a nodal moment.

Hence I came to realise the value that the metaphoric representation had for me. It also served as a catalyst for finding meaning within the drawing and allowed me to engage in a recursive reflective process which was invaluable in better understanding my practice. Clearly this helped me in better understanding my teaching activities in such a way that it promoted me to develop new insights into Accounting Education teaching.

This happened because the metaphor drawing created opportunities for self-critique while simultaneously prompting me to evaluate the reflections of my students. Thus the elements of reflection was multifaceted which acted as an impetus for self-study. It allowed me to take a step out of my context and reflect on what I was teaching, how I was teaching, what I should continue doing and what I should change and improve on.

5. Blackboard discussion board

The Blackboard discussion board is a tool for sharing thoughts and ideas about class materials. The discussion board is made up of forums. Forums are a way of organizing a discussion around a topic or a group of related topics called threads. Individual discussion board forums can be linked to any content area anywhere in the online course but are also centrally located in the discussion board tool on Blackboard. Students were instructed to use the centrally located discussion board tool because other online discussion forums were created and linked to content of certain online modules and these online discussions were graded. I did not want to interfere with the grades of the students completing these modules.

Discussion forums are usually conducted asynchronously. Asynchronous communication is the relay of information with a time lag. It is very helpful to communicate in this way, because students have plenty of time to formulate thoughts and comment later. The word synchronous means working together at the same time in online learning environments. Chat rooms and online conferences are examples of synchronous communication. In a chat room people's comments to each other are

relayed   immediately   enabling   a   real-time   discourse.
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The two topics on which the discussion was based were the Curriculum and Assessment Policy for Accounting Grades 10-12 (CAPS) and the Distinctive Nature of Accounting. I had previously uploaded this content into the online classroom and students had to read this information. We had already gone through the content of these two sections in class but we never had a rigorous discussion on it. Therefore students firstly had to read the content on these topics that was already uploaded into the online Accounting classroom and then comment on and hold discussions on these two topics and debate issues.

All students were registered as users in this online discussion board because when they register for the Accounting Education module they are automatically registered into the Accounting online classroom. I am the instructor in the online classroom and I get the option of assuming any role in the classroom by default. Apart from the instructor role I also took on the role of moderator of the discussion. It was my responsibility as moderator to ensure that the discussion kept to the rules and I monitored student participation.

6. Framework for the online discussion

In order for the online discussion to be successful and contribute to their learning, the students needed to be supported through a structured developmental process using a five step model adapted from Salmon (2002). It appears below in the form of instructions that were given to students.

6.1.   Step 1: Getting online

This is the first step in the process. You are required to access the Blackboard classroom and click on the discussion tool. Step 1 should be completed within a week and at the end of the week you must write your reflections in your online journals.

6.2.   Step 2: Online socialization

During this step you have to log in the online classroom and establish your identify with either your student number or name. The discussion board tool will not allow you to enter the discussion unless you first post a comment about the topic. At the end of

the week you are required to record your reflections about the week's activities in your online reflective journals.

6.3.   Step 3: Online interaction

In this step there is to be mutual exchange of ideas and information. You should be doing some research in your own time and read the content uploaded in the classroom and engage in deliberate discussions and debates. At the end of the week you must record you reflections in your online journals.

6.4.   Step 4: Knowledge construction

By the time you reach this step all technical problems for example logging in problems and access should have been resolved and you should be engaged in course related group discussion. At the end of the week you must record your reflections in the online journals.

6.5.   Step 5: Development

At this stage the online interaction between students and between groups should not be so robust as conclusions should be drawn, agreement must be reached on new ideas and new knowledge created. At the end of the week you will make the last entry into your reflective journals by answering the question on what you would do differently after participating in this online discussion.

7. Data analysis and findings

The data sources used in this self-study project is my reflective notes that I had recorded over the five weeks in my journal to document a personal thought process related to the online activity as well as my students' reflections on the online activity. While reading my daily reflections and the reflections of my students I became aware of an incident that I believe was significant for me and had meaning for my development. I carefully reflected on this happening and I remember it this way. This online discussion was to take place after lecture time which meant I had to carry on with face-to-face lectures.

The incident that stands out for me occurred when students interrupted my lecture to ask me why this online activity was not being graded. One student asked this question

and before I could answer the other students joined in complaining that this activity was a waste of time if it was not for marks. At that moment I experienced feelings of fear and insecurity. I had planned this activity with the confident thought that all students would enthusiastically participate. At that moment I felt extremely alone more especially as I could not provide them with a good enough reason for not grading the activity.

Nevertheless I had to gain my composure and was determined to bring the situation under control. Although the situation calmed down I was thrown off-balance when a student asked me if I was using them for my own research. I had explained this to them when I sought their permission to use their reflections as part of my data. I once again explained that my research will help me develop as a more productive teacher educator which will in turn benefit them as my students.

When I read the students' reflections I found similar comments about the activity. Some of the comments are as follows:

"This activity is going to take a long time, if it was for marks I will do it but just do it for the sake of doing it, I am wasting time."
"Why should we waste our time doing this activity when it is not for marks, we need a DP mark and we can do other assessments where we can get marks."
"I live in a rural area near Greytown. There is only one high school in my area where there is still no electricity. They drink water out the tank. How am I going to benefit from this activity when the learners have never worked on a computer?"

Tidwell & Fitzgerald (2006) termed this nodal moments. They state that examining the actions and reactions within an instructional moment helps to better make sense of the meaning behind practice. Recreating nodal moments in teaching developed out of the work of Richardson (1998) when she found that using drawing to represent one's own perception of reality intrigued her. More importantly using the actual drawing as data especially where you analyse and deconstruct the content of the drawing leads to more insight into your practice (Tidwell, 2002; Tidwell & Fitzgerald, 2006). As Knupfer (1994) suggests "realism can be enhanced by providing a graphic component"

(p.228), I drew a metaphor to represent my nodal moment. The metaphor I drew is that of a tightrope walker clutching his briefcase.

Figure 1: Metaphor of Nodal Moment

Examining what I included in the drawing proved to be very helpful in thinking realistically about my practice. In addition, Tidwell & Fitzgerald (2006) claim that planning the drawing of the moment provides a frame for making sense of the moment. I found this to be so true when I asked myself certain pertinent questions about the metaphor drawing for example what I would actually draw, how was it related to the nodal moment, what would I include in the drawing so that it would realistically represent what happened at that moment. So my reflection began even before I drew the metaphor.

When I looked at the tightrope walker in the drawing I could see myself, all confident and sure of myself striding along and even holding a briefcase. This is how I felt before the online activity. I was certain that all students would participate willingly even if the activity was not for marks because I was convinced in my practice I was the expert and anything I did students would go along with it. However this was not the case because students felt differently as suggested by the comments they made in their reflections and during the nodal moment.

The tightrope walker is holding a briefcase. I interpreted this in two different ways. He was trying something new walking on the tightrope therefore he was safeguarding himself because he felt insecure therefore he used the briefcase for balance. However if he fell even the briefcase would not have helped him as he was alone. I too was trying something new with the online activity. However unlike the tightrope walker I had no briefcase to help me balance myself if I slipped. I identified this as a gap in my practice in that I did not have any plan to back me up. It felt like I was just giving this activity for the sake of giving a technology mediated activity. Therefore when my students questioned me about the task I panicked and became insecure. Maybe this could have been avoided if I had actively involved my students in the planning and development of the activity

The other reason the tightrope walker could be holding the briefcase is that he has something valuable inside and no matter what he was not letting go. He was determined to hold onto the briefcase even if it meant falling. This displays courage, determination and composure. The drawing alerted me to the fact that I have more strength, courage and resilience that I thought. This became apparent during the nodal moment when I panicked but I did not let students see I was panicked. I managed to regain my composure and bring calm to the lesson and I carried on with the activity. An earlier comment from a student further emphasized this when she said," Mam, you always believe in us even if we cannot do something, you say we must try. Because you believe in us we get confidence in ourselves and we do not give up"

8. Discussion

The metaphor drawing and my analysis of the drawing has uncovered significant potential for challenging and rethinking my pedagogical approaches. I believe that if I want to achieve new pedagogical outcomes for my students then I must design innovative and responsive pedagogical approaches to support this outcome. Three main themes have emerged after analysis of my metaphor drawing and these themes are life-long learners, technologically advanced students, student-centred learning.

8.1. Life-long learners

I believe that if I can help my students develop in their thinking they will at least be able to respond to change and react to current global trends. My challenge is to

redesign the Accounting Education curriculum to include teaching and learning strategies that will force my students to think creatively and reflectively and develop 'informed foresight' (Slaughter, 2008) about the future. Tilbury 2011a; Tilbury & Wortman 2004 suggest this can be achieved by designing teaching and learning approaches that are linked to the future by including strategies for understanding different perspectives and hopes about the future, finding alternate ways of solving problems, challenging social customs that restrict hopes about the future and engaging the students to work towards a positive future. This approach will involve a step away from my traditional curriculum and will lay the foundation for refocusing my student's learning towards engagement and hopes for the future as life-long learners.

8.2. Technologically advanced students

Closely related to developing students as life-long learners is developing students that are technologically advanced so students would not be so negative about completing technology mediated activities only for marks. Hopefully they will be more positive towards activities that develop them as future teachers rather than activities that are just for marks. I intend including technology mediated learning by creating virtual environments much more extensively in the Accounting Education curriculum in order to broaden their classroom experience.

Presently I am only using Blackboard to supplement my teaching and their learning. However I am aware that although students are reported to be in favour of technology, face-to–face teaching and learning is highly valued (Bradley, Noonan, Nugent & Scales, 2008). This has resulted in many educators adopting a blended learning approach (Steventon, Panesar & Wood, 2012). Hence I want to combine computer-mediated instruction (Graham, 2006), with face-to-face teaching (Prinsloo & van Rooyen, 2007, a term commonly called blended learning (Jones, 2006). I intend doing this by including social media platforms like Facebook, Instagram, Whatsapp and Pinterest more for teaching than solely for social networking.

8.3. Student-centred learning

The analysis of my metaphor drawing and the comments from my students made me take cognizance of the fact that I need to involve my students more actively in the learning process. This does not mean engaging them in class only but it involves

getting students to be co-creators of the knowledge that is designed for them. This will involve deconstructing my pedagogical stance that I have adopted as a teacher educator over the decades by wanting to be the expert in the classroom. I wish that my students will connect with me as peers rather than as students in the development of the Accounting Education curriculum. They are aware of the challenges and obstacles and the everyday realities that students face and will bear this in mind when contributing to the curriculum thus making the curriculum more meaningful and relevant.

In becoming producers of knowledge rather than mere consumers of knowledge, students' cognitive abilities will be stimulated and their higher order thinking skills will be promoted. They will thus become empowered to respond to change, uncertainty and complexities in their lives both personally and professionally.

9. Conclusion

The metaphor drawing has important implications for my pedagogy. The process of using metaphor drawings has highlighted that in this changing and dynamic education landscape, my teaching strategies in Accounting Education have to incorporate new contexts and perspectives to enable my students not only to see the world differently but to engage and act differently in it. They need to be exposed to transformative learning approaches like critical reflection, the ability to contextualize and adapt knowledge and skills to changing situations and discourses.

Hence I am going to develop innovative and responsive pedagogies by including progressive and transformative education practices in the Accounting Education curriculum. I have focused on three main strategies which are to create life-long learners in my students, incorporate more technology mediated learning in Accounting Education and adopt a student-centred approach by involving my students in shaping the Accounting Education Curriculum.

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USING BLACKBOARD COLLABORATE AS A REFLECTION TOOL IN A SERVICE-LEARNING MODULE

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Abstract

In 2005, the Faculty of Engineering, Built Environment and Information Technology (EBIT) at the University of Pretoria implemented a compulsory module, Community-based Project (JCP), for all undergraduate students in the Faculty. Since service-learning was not included in the curricula of the Faculty's existing modules, it was necessary to implement a new, separate module to centralise and coordinate community service initiatives. Module assessment includes a project presentation in which students reflect on the outcomes of their service-learning engagement, the skills acquired in the execution of the project and lessons learnt during and upon completion of their projects. Due to the high number of students enrolled in the module (one lecturer to 1 795 students in 2015), students have been given the option of using Blackboard Collaborate for their final presentations. In order to evaluate the students' perspectives on service-learning reflection through Blackboard Collaborate, data was collected through an online survey. The survey enabled students to reflect on their experiences and preferences with regard to the format of the presentation. Blackboard Collaborate gives students and the lecturer more flexibility in terms of time to upload and watch the reflective presentations. The presentations are also recorded and can be archived for later use. Most of the students who responded to the survey indicated that they found the Blackboard Collaborate option convenient for a presentation, but that they still preferred a face-to-face presentation. The students found that it is an easy and convenient tool, but indicated that they preferred face-to-face reflective sessions. The students thought that Blackboard Collaborate could best be used to record lectures, answer questions before a test and for online tutoring.

Keywords: Blackboard collaborate, service learning

1. Introduction

One of the goals of higher education institutions in South Africa is to encourage social responsibility among students, which leads to their becoming more involved in the socio-economic and cultural structure of South African communities (DHET, 1997). The aim is ultimately for these students to assist and develop their communities, and to continue to do so after graduation. The importance of community engagement, and thus service-learning, has been emphasised in the National White Paper for Post-School Education and Training in South Africa. This shows that service-learning has become an important part of universities' work in South Africa. According to the Department of Higher Education and Training, community engagement should be linked directly to academic programmes. It has to form part of the teaching and research function of all higher education institutions and thus of the professional development of all students (DHET, 2013).

Service-learning can be described as a form of experiential learning where community service is fully integrated into the academic curriculum (Osman and Castle, 2006). Students must participate in an organised service activity, which addresses the needs of the community. After the service activity, students must reflect on their experiences. The aim is to enhance students' sense of civic responsibility, but they should also understand the course content of the discipline (Bringle and Hatcher, 1999).

It is recommended that students identify a project in a section of society that differs from their own social background and develop a student's sense of social responsibility. In the process, important life skills, personal growth and a higher degree of citizenship are gained (Bringle and Hatcher, 1996). One of the most important aspects of students' final assessment in a service-learning module is reflecting on their service-learning experience. Experience becomes educative if critical reflective thought creates new meaning to the experience (Hatcher and Bringle, 1997).

Students must have a deep understanding of their service-learning experience. They should thoughtfully reflect on the impact of their service-learning experiences on themselves and the community. They also develop an understanding of social issues, as well as an awareness of personal, social and cultural values during their involvement in the community (Jordaan, 2012). These skills and awareness of their

role in the community should enable them to make a positive contribution to the quality of individuals' lives (Dukhan, Schumack and Daniels, 2008). Only then could a service-learning module achieve its objective.

2. Online synchronous software

The internet has become an integral part of higher educational instruction. Of the many applications enabled by new technologies, the most commonly used application in higher education is the learning management system (LMS). The goal of LMSs are to provide a set of tools that support an inquiry- and discovery-based approach to online learning. Various LMSs are used by Higher Education Institutions such as Moodle and Blackboard. In this study one of the tools within an LMS that can be used for synchronous and asynchronous online training is discussed. Blackboard is used as it is used by the University where the study has been executed. The tool, Blackboard Collaborate, support online synchronous collaboration. The Blackboard Collaborate platform enables lecturers to implement instructor-led synchronous and asynchronous online training into their teaching and learning methodologies. Blackboard Collaborate allows students or lecturers to launch a synchronous or an asynchronous session directly from Blackboard Learn (Blackboard).

3. Research background

In 2005, the Faculty of Engineering, Built Environment and Information Technology (EBIT) at the University of Pretoria implemented a compulsory service-learning module, Community-based Project (JCP), for all undergraduate students in the Faculty. Since service-learning was not included in the curricula of the Faculty's existing modules, it was necessary to implement a new, separate module to centralise and coordinate community service initiatives.

The service-learning project must benefit a chosen section of society and expose EBIT students to real-life issues. The project's learning outcomes depend on the type of project. Students should be able to work effectively in a multidisciplinary environment, perform critical functions and communicate effectively with the community with which they will work.

The module was launched as a pilot in 2005. In 2009, the module became compulsory for all undergraduate students. The increase in the number of students in the module correlates with the increase in the number of students enrolled in the Faculty. The number of students enrolled in the module has continued to grow since 2005, as shown in Figure 1 (Jordaan, 2014).
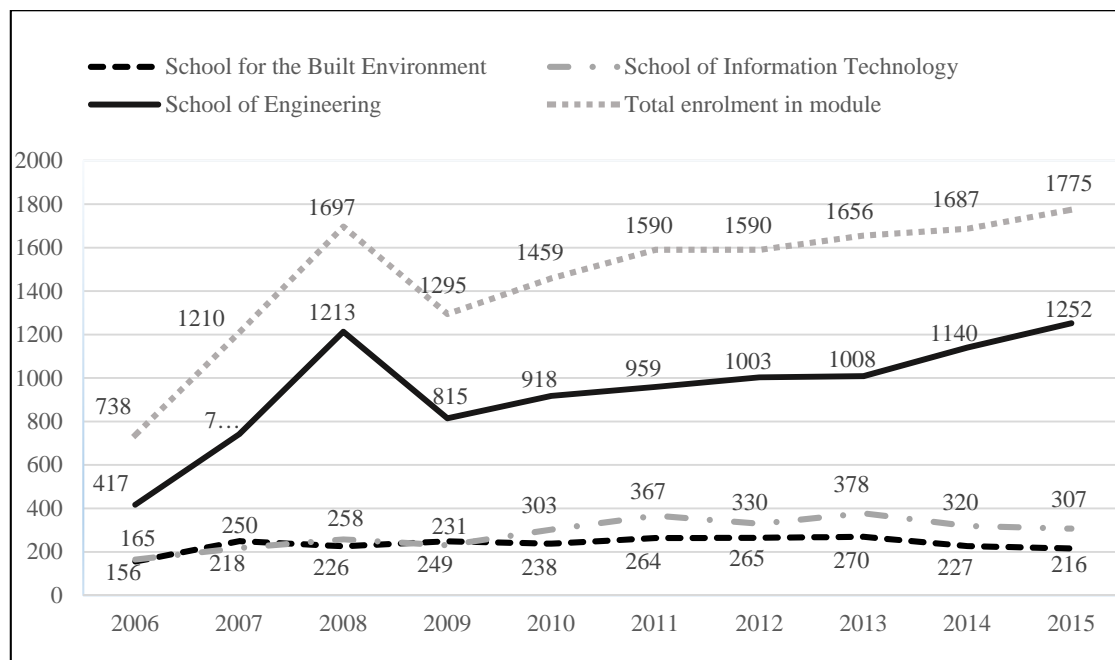

Figure 1: Number of students enrolled in the module

4. Theory underlying a service-learning module

The JCP module's educational approach integrates project- and enquiry-based learning. The students' learning experiences are aligned with Kolb's theory of experiential learning (Jordaan, 2012). Service-learning and the reflection of service-learning endeavours are embedded in the theory of Kolb's experiential learning cycle. He describes a process of moving from experience to thought and back again as learners construct and organise knowledge. His experiential learning cycle describes the interaction of the concrete experience, observation and reflection about the experience, the formation of abstract concepts through synthesis of the experience, as well as testing these concepts in new situations.

Assessment must drive the learning experience, and Kahn and O'Rourke (2005, p.9) viewed assessment as a further means of supporting learning. In a service-learning

module, it is important that students reflect on their experience. Bringle and Hatcher (1999) indicated various types of reflection activities, like portfolio's, storytelling, presentations or journals that can be included in a service-learning module. It is important that the assessment technique in a blended course leads to learning. The main purpose of assessment is to monitor student learning to improve academic programmes, as well as enhance teaching and learning (Gayton and McEwan, 2007).

5. Course description and assessment in the module

The JCP module is presented as a blended learning module where students interact with the lecturer in face-to-face sessions, as well as asynchronous online sessions. Model assessment includes the evaluation and approval of the project proposal, self-assessment, peer assessment, as well as an assessment by a supervisor from the community and the lecturer. As part of their assessment students have been required to produce a wiki report on Blackboard, as well as a visual blog that is uploaded on YouTube. Students also deliver a project presentation to the lecturer. During these presentations, they reflect on the outcomes of their service-learning engagement, the skills acquired in the execution of the project and lessons learnt during and upon completion of their projects.

Students may work individually (where logistical issues, such as transport and the community partner's location, requires them to do so) or in groups of up to five members. Not all the registered groups (2013: 587 groups; 2014: 550 groups) completed the module. Students deregistered for the module, discontinued the course and joined other groups during the year. At the end of 2013, 482 groups completed the module, and 504 groups in 2014.

Due to the large number of students enrolled in the module and the limited time in which to assess all presentations face-to-face, students could do their presentations via the online synchronistic software, Blackboard Collaborate. An asynchronous format was followed. Students could upload their presentations and the lecturer could assess it at a later stage. The students received a rubric for the asynchronous session from the lecturer and she assessed the presentation, the wiki report and the YouTube video. Where the lecturer needed more information on the project's outcomes, the

students were requested to book a face-to-face reflective discussion with her (Jordaan, 2013).

6. Methodology

In order to evaluate the students' perspectives of a service-learning reflection via an asynchronous session on Blackboard Collaborate, data was collected through an online survey. The survey was submitted for ethical clearance to EBIT at the University of Pretoria. The online survey enabled the students who completed their presentations via Blackboard Collaborate to reflect on their experiences and preferences with regard to the format of the presentation.

6.1. Research topic and questions

This study aims to explore the possibility of using online synchronous software asynchronously as one of the reflection tools for a service-learning module.

The following research questions were asked in order to pursue this objective:
1. What was the perceived complexity of Blackboard Collaborate as a tool for the students to reflect on the service-learning endeavour?
2. How did the students reflect on the JCP module?
3. What was the presentation preference of the students who had used Blackboard Collaborate?
4. What other possible uses of Blackboard Collaborate did the students have for undergraduate courses?
5. Is the integration of Blackboard Collaborate as a reflection tool for students unique in the broader context of its use at the University of Pretoria?

6.2. Online questionnaire

The online questionnaire consisted of 10 questions, including an open-ended question. Table 1 provides a summary of the survey instrument and indicates the link between each question and the associated research question of the study.

Table 1: Link between online survey questions and research questions

Research question	Question type	Survey question number and summary
Research Question 1: What was the perceived complexity of Blackboard Collaborate as a tool for the students to reflect on the service-learning endeavour?	Likert scale	2. Evaluation of instructions provided to do the presentation with the Blackboard Collaborate online synchronous software
	Likert scale	3. The level of difficulty of using various aspects of the Blackboard Collaborate online synchronous software
	Likert scale	4a Experience of using the Blackboard Collaborate online synchronous software
Research Question 2: How did the students reflect on the JCP module?	Likert scale	4b Reflection on the JCP project
Research Question 3: What was the presentation preference of the students who had used Blackboard Collaborate?	Yes/No	5. Preference of presentation format
	Multiple response	6. Reasons for preferring a face-to-face session
Research Question 4: What other possible uses of Blackboard Collaborate did the students have for undergraduate courses?	Yes/No	7. Indicate use of Blackboard Collaborate online synchronous software in undergraduate course
	Multiple response	8. Options for using Blackboard Collaborate online synchronous software in undergraduate courses
Research Question 5: Is the integration of Blackboard Collaborate as a reflection tool for students unique in the broader context of its use at the University of Pretoria?	Yes/No	9. Possible uses of Blackboard Collaborate online synchronous software for academic purposes by students
	Multiple response	10. Possibilities to use Blackboard Collaborate online synchronous software integrated into the LMS for academic purposes by students

The first question focused on providing informed consent for the study. The students were asked to acknowledge that they understood the nature and objective of the survey and that the results would be published.

6.3. Findings from the questionnaire data

During 2013, 34 groups (54 students) chose to do their project presentation via Blackboard Collaborate and in 2014, 18 groups (43 students). Of the groups that opted

for the Blackboard Collaborative sessions, 17 for 2013 (31.48%) and 17 for 2014 (39.53%) completed the survey.

Research Question 1: What was the perceived complexity of Blackboard Collaborate as a tool for the students to reflect on the service-learning endeavour?

Detailed step-by-step instructions with screen captures indicating how to access and present their session were provided to the students. The students were requested to indicate if the instructions provided were clear and easy to follow. Their responses to this question are reflected in Figure 2.
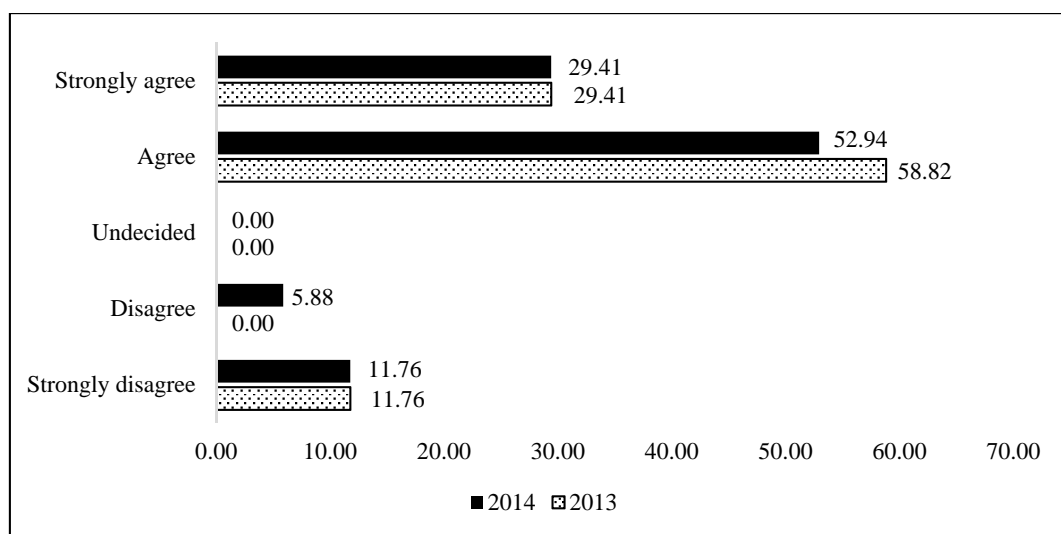
Figure 2: Instructions to use Blackboard Collaborate session

Most of the students indicated that they agree to strongly agree (2013: 88.23%; 2014: 82.35%) that the instructions on how to use the Blackboard Collaborate session were clear and easy to follow.

The students were requested to indicate the rate of difficulty in accessing the Blackboard Collaborate session, configuring their computers, uploading and presenting their presentations and completing the online presentation in the allocated time. Table 2 shows the feedback from the students.

Table 2: Indication of the level of difficulty to upload and complete the online presentation session

	Very easy		Easy		Difficult		Very difficult	
	2013	2014	2013	2014	2013	2014	2013	2014
Accessing the online session	23.53	52.94	64.71	41.18	11.76	5.88	0	0
Setting up your computer to be able to present	11.76	58.82	47.06	35.29	35.29	5.88	5.88	0
Uploading your PowerPoint presentation	52.94	52.94	35.29	35.29	5.88	11.76	5.88	0
Presenting your online presentation	23.53	35.29	52.94	47.06	17.65	11.76	5.88	5.88
Completing your presentation in the allocated time	47.06	52.94	52.94	41.18	0	5.88	0	0

The students found it:

- very easy to easy to access the online session (2013: 88.24%; 2014: 94.12%);
- very easy to easy to set up the computer to do the presentation (2013: 70.58%; 2014: 83.35%);
- very easy to easy to upload the PowerPoint presentation and to do the online session (2013 and 2014: 88.23%);
- very easy to easy to present their online presentations (2013: 78.47%; 2014: 83.35%); and
- very easy to easy to complete the presentation in the allocated time of an hour (2013: 100%, 2014: 94.12%).

The additional support documentation provided and the usability of the Blackboard Collaborate software enabled the students to successfully complete their online presentations.

Research Question 2: How did the students reflect on the JCP module?
The face-to-face presentations allowed the lecturer to determine the students' perception of the value of the module during their reflection. It was therefore important to receive the same information from the group of students who had used Blackboard

Collaborate for their presentations. The students were requested to reflect on the module, as well as the Blackboard Collaborate session. Their reflections on their experience with Blackboard Collaborated is indicated in Figure 3.
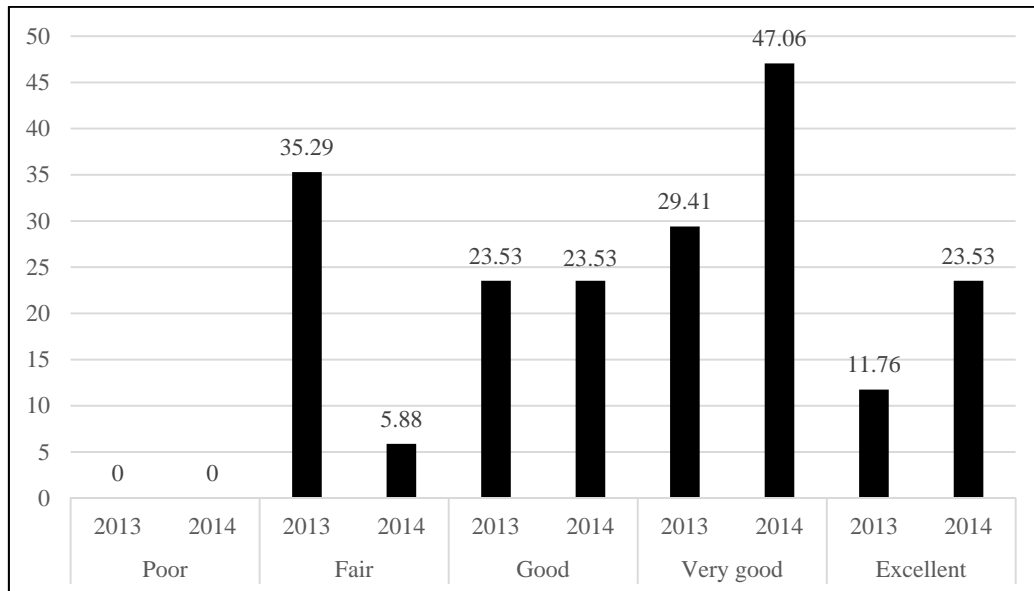

Figure 3: Overall experience of presentation on Blackboard Collaborate

Overall, the students reflected very positively with regard to their overall experience of the module. They indicated that the completion of their community project was good to excellent (2013: 88.23%; 2014: 94.11%). This question was asked to determine whether there was any correlation between their experiences of the module and that of their final presentation on Blackboard Collaborate. The students indicated that their experience of doing the final presentation on Blackboard Collaborate was "good" to "excellent" (2013: 64.7%; 2014: 94.12%). The students who were enrolled in 2013 were not as positive with regard to the final presentation on Blackboard Collaborate (64.7%) compared to those of 2014 (94.12%), but both year groups indicated that they mostly had a good experience of the JCP module.

Research Question 3: What was the presentation preference of the students who had used Blackboard Collaborate?
To determine the students' preference in terms of a face-to-face session or a Blackboard Collaborate presentation session, they were requested to indicate their preference. Figure 4 shows their feedback.
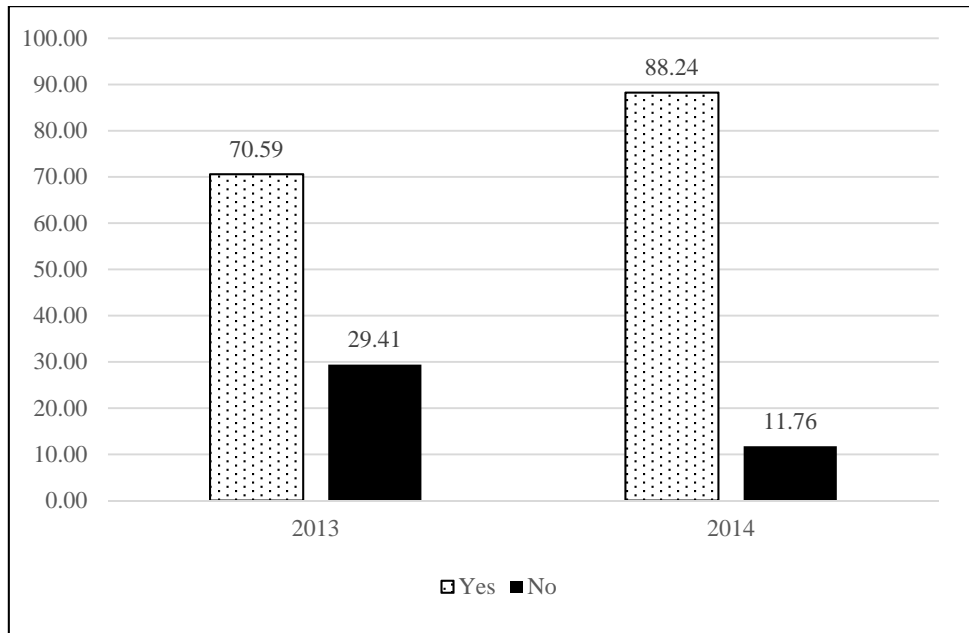
Figure 4: Indication of whether students prefer a face-to-face presentation rather than a presentation via Blackboard Collaborate

Students indicated that they preferred a face-to-face presentation (2013: 70.59%; 2014: 88.24%) to a presentation via Blackboard Collaborate. Students indicated that it was more convenient to do a presentation via Blackboard Collaborate, but not being able to interact with the lecturer and the use of new electronic media added additional stress to the delivery of the presentation.

The use of technology might cause some users to feel disenfranchised or marginalised. A service-learning module also requires a deeper reflection on the service rendered, an online session does not give the students the opportunity to discuss and share their experiences in depth with the lecturer.

Research Question 4: What other possible uses of Blackboard Collaborate did the students have for undergraduate courses?
The students were requested to give their opinions with regard to the use of Blackboard Collaborate for other undergraduate modules. Figure 5 shows their views on this question.
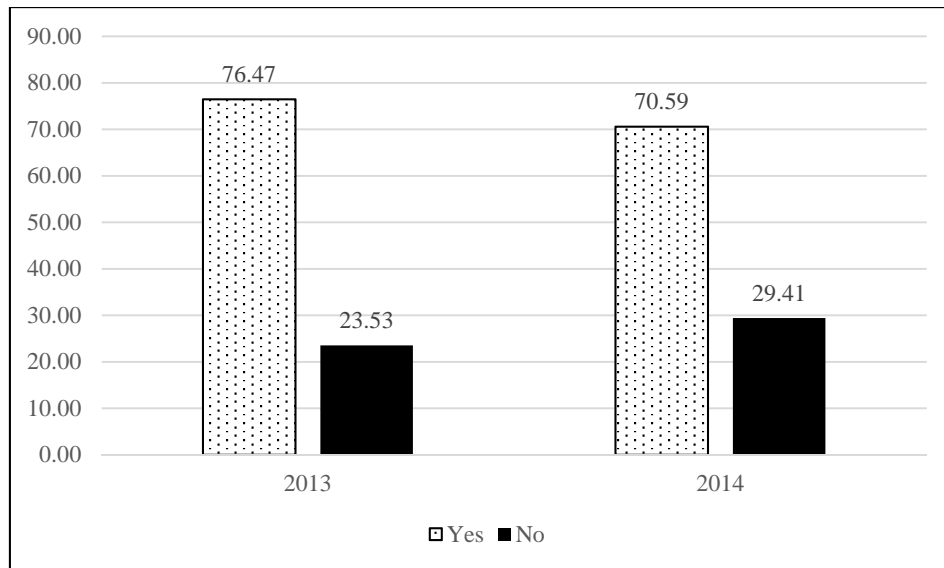
Figure 5: Indication that students would prefer that other modules also use
Blackboard Collaborate

More than half of the students (2013: 76.47%; 2014: 70.59%) thought that Blackboard Collaborate could be used in other modules.

Data received from the Blackboard Collaborate system administrator indicated that it has predominantly been used as an instructor-led tool since its implementation. Up until the publication of this paper, lecturers have not been using the tool for asynchronous student presentations. This was the first time University of Pretoria students had the opportunity to use this tool for assessment purposes. Various lecturers at the University use Blackboard Collaborate predominantly for postgraduate course for synchronous online instructor-led teaching.

The students were requested to indicate how they thought Blackboard Collaborate could be used in other undergraduate modules. Their feedback is reflected in Figure 6.
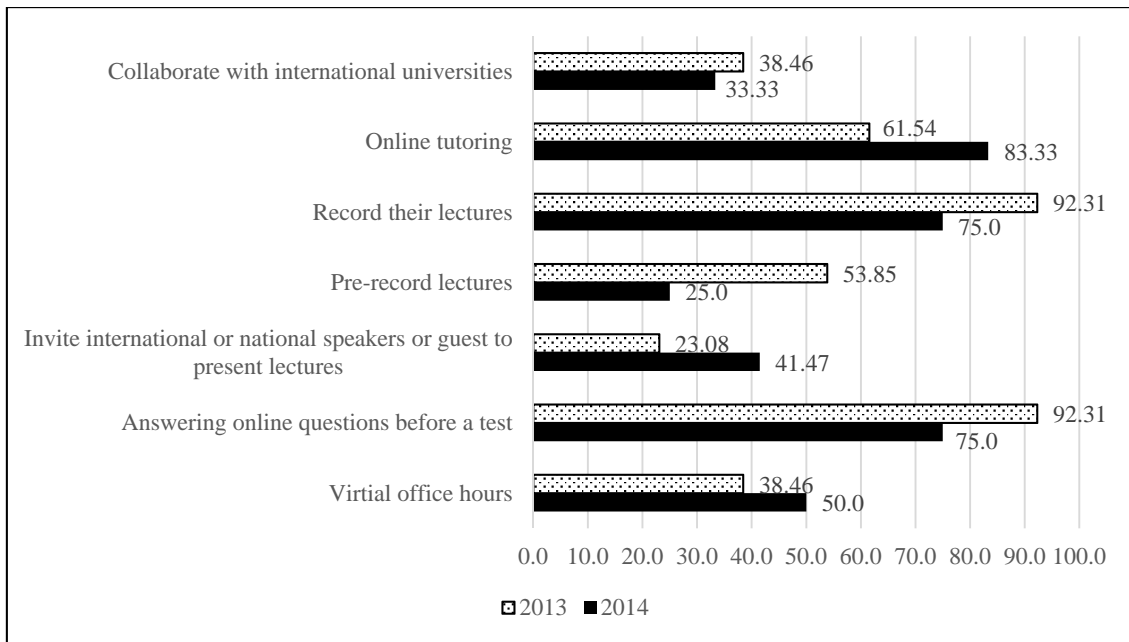
Figure 6: Indication of how Blackboard Collaborate could be used in other modules

Students were of the opinion that Blackboard Collaborate could be used to record lectures (2013: 92.31%; 2014: 75.0%), answer online questions before a test (2013: 92.31%; 2014: 75.0%) and facilitate online tutoring (2013: 61.54%; 2014: 83.33%) in other modules.

At this stage, Blackboard Collaborate is available for lecturers' use in other modules. However, lecturers need to create a session on Blackboard Collaborate so that the students can access the session. No other lecturer at the University of Pretoria uses asynchronous Blackboard Collaborate sessions for summative group assessment purposes.

Research Question 5: Is the integration of Blackboard Collaborate as a reflection tool for students unique in the broader context of its use at a University?
To probe the possible academic use of Blackboard Collaborate, the students were requested to indicate how they would use Blackboard Collaborate if it was available on the LMS for student use. Students were asked if they would use the tools (Figure 7) and how (Figure 8) they would use them.
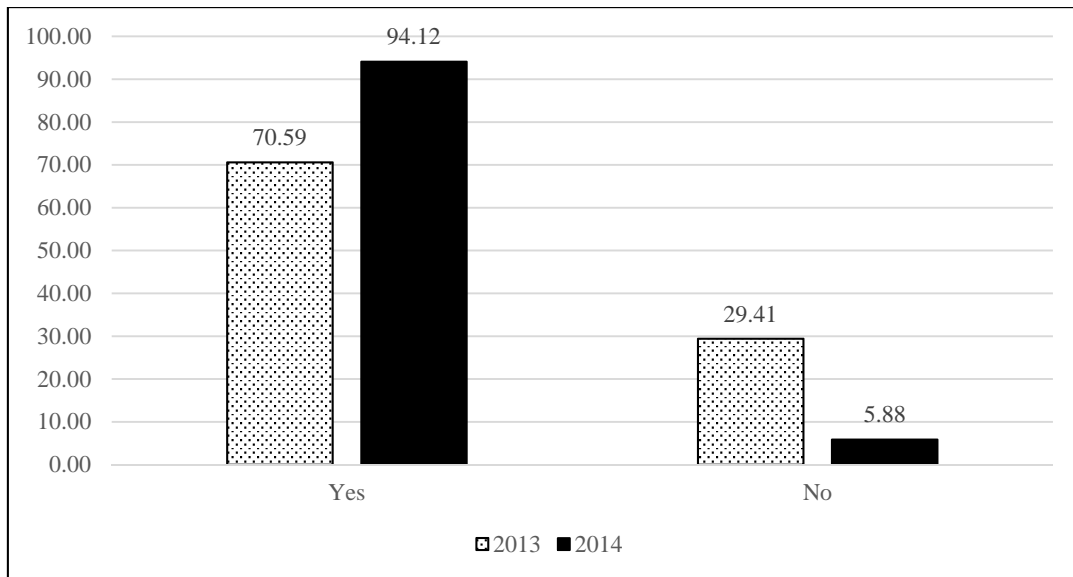
Figure 7: Indication of whether students would use Blackboard Collaborate if it was available to students on the LMS

Most students indicated that they would use Blackboard Collaborate if they could (2013: 70.59%; 2014: 94.12%). Data received from the Blackboard Collaborate system administrator indicated that Blackboard Collaborate is not available to University of Pretoria students, as instructors need to enable students to access open student-led sessions. Students were also asked how they would use Blackboard Collaborate. Their responses can be viewed in Figure 8.
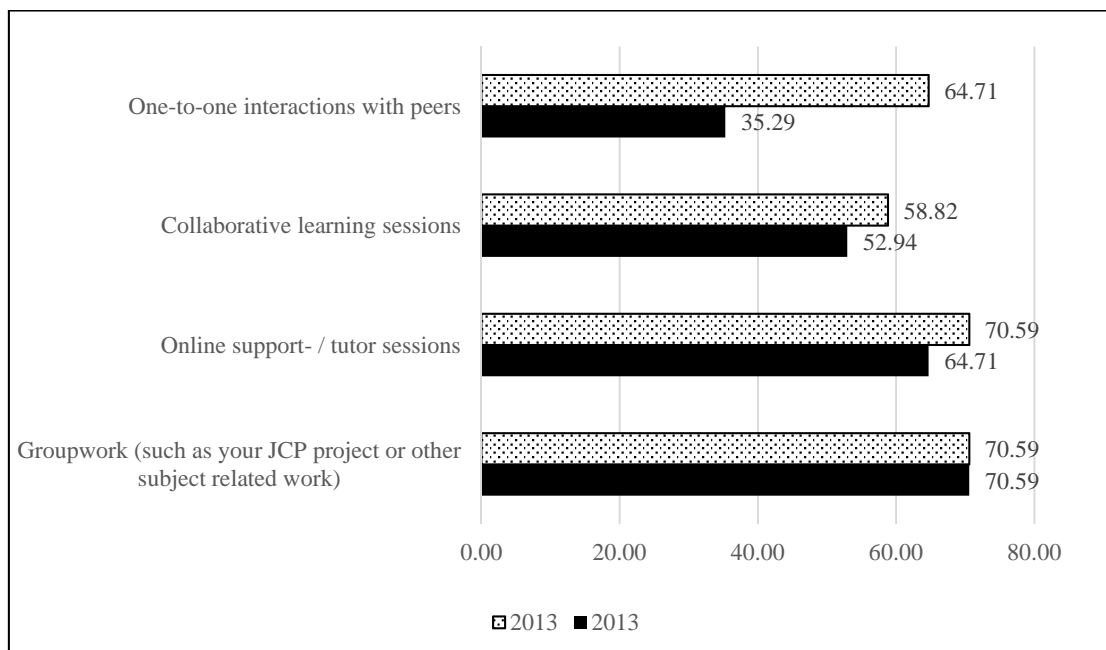

Figure 8: Indication of students' envisaged use of Blackboard Collaborate

Most students indicated that they would use Blackboard Collaborate for group work (2013 and 2014: 70.59%), online support and tutor sessions (2013:70.59%; 2014:64.71%) if it was available to them. Although students mention that they would use Blackboard Collaborate for tutoring, tutor sessions are facilitated by instructors.

7. Conclusion

The study was conducted on a limited number of students, as only a few groups opted to do their presentation sessions via Blackboard Collaborate. However, the study indicated that the students generally did not find the tool difficult to use and indicated that they would use it for various other options.

The asynchronous use of Blackboard Collaborate allows students to complete their reflective service-learning assignment in a flexible environment, at their own pace and at a time of their choice. The majority of the sessions were completed after hours or during weekends. When they completed the assignment, the students were not restricted to time and place. Blackboard Collaborate also allowed the lecturer to assess all the students in the module within the allocated time.

In terms of the reflective presentation session for the service-learning module, the students still preferred a face-to-face session to a session on Blackboard Collaborate. However, this was the students' first experience of Blackboard Collaborate and they might find it easier after a few attempts. From a student's perspective, the main concern was that they would have preferred to interact with the lecturer. The students also indicated that they were unsure of the lecturer's expectations, even though they received a rubric for the assessment.

The students indicated that the online session was more convenient and that they could easily fit this presentation session into their busy schedules. With more opportunities to use Blackboard Collaborate, students might be more at ease with the tool. The Blackboard Collaborate sessions also gave the lecturer more flexibility to assess the presentations.

Based on the students' feedback, it is evident that Blackboard Collaborate can be utilised for reflection assignments in a service-learning module. However, the lecturer

must still make sure that the students experience a sense of belonging through other reflection assignments.

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UNDERGRADUATE MATHEMATICS PRE-SERVICE TEACHERS' UNDERSTANDING OF MATRIX OPERATIONS

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Abstract

Linear algebra forms a core part of the first year mathematics curriculum of pre-service teachers in many countries and is applicable to many other areas besides pure mathematics. The research that is reported in this paper, focused on the understanding of matrix operations as a concept in linear algebra. The purpose of the study was to explore the understanding of matrix operations concepts of a sample of 70 mathematics undergraduate pre-service teachers. The aim of the study was to explore their mental constructions of matrix operations and how these coincide with a preliminary genetic decomposition. The research question underpinning this study is: How can pre-service mathematics teachers' understanding of matrix algebra concepts be described using APOS theory? The Action Process Object Schema (APOS) theoretical framework describes the growth in understanding of mathematics concepts through the hierarchical development of mental constructions called action, process, objects and then as schema. The theory centres on the models of what might be taking place in the mind of a student as she or he engages with mathematical concepts like matrix algebra. The results showed that most pre-service teachers had interiorised actions on scalar multiplication and addition of matrices into processes. For the 14 pre-service teachers who struggled with the scalar multiplication and addition, the reason for their struggles was operations on integers, a topic that is taught at Grade 9 level in schools. There were 25 participants who were unable to find the product of two square matrices. Although many participants showed evidence of process level engagement with the computation of matrices, there were some who had not attained even an action level understanding of the concepts. It is also recommended that students, who are selected to be pre-service teachers, should be given further opportunities of engaging with school level topics using interactive methods.

Keywords: APOS theory, genetic decomposition, linear algebra, matrix computation, pre-service teachers

1. Introduction

Globally, many mathematics education researchers have been concerned with students' difficulties related to the undergraduate linear algebra course. There is agreement that teaching this course is a frustrating experience for both teachers and students, and despite all the efforts to improve the curriculum the learning of linear algebra remains challenging for many students (Dorier & Sierpinska, 2001). Students may cope with the procedural aspects of the course, solving linear systems and manipulating matrices but struggle to understand the crucial conceptual ideas underpinning them. The concepts are usually presented through a definition in natural language, which may be linked to a symbolic representation. These definitions are considered to be fundamental as a starting point for concept formation and deductive reasoning in advanced mathematics (Zaslavsky & Shir, 2005). Sometimes at the end of the linear algebra course many students do reasonably well in their final examinations, since most questions require knowledge of certain procedures, rather than understanding the concept (Siyepu, 2013).

The APOS (Action-Process-Object-Schema) theory development in mathematics and mathematics education suggests an approach different from the definition-theorem-proof that often characterises university courses. The framework describes the growth in understanding of mathematics concepts through the hierarchical development of mental constructions called action, process, objects and then as schema (Dubinsky & Wilson, 2013; Arnon, Cottrill, Dubinsky, Oktac, Fuentes, Trigueros & Weller, 2014). The theory centres on the models of what might be taking place in the mind of a student as she or he engages with mathematical concepts like matrix algebra. The research question that is explored in this study is: How can pre-service mathematics teachers' understanding of matrix algebra concepts be described using APOS theory?

2. Literature review

Matrix algebra is one of the fundamental topics of linear algebra which needs to be understood (Bogomolny, 2007). Understanding matrix algebra concepts is more than performing calculations. It is being aware of how procedures work, developing an intuitive expectation of the result without actually performing all the calculations, being able to work with variations of algorithms, being able to notice connections and to organise experiences (Bogomolny, 2007).

Studies on mental constructions of linear algebra show that many students have difficulties in developing conceptual understanding of linear algebra concepts (Ozdag & Aygor, 2012; Plaxco & Wawro, 2015). The study on pre-service teachers' mental constructions on matrix algebra by Ndlovu and Brijlall (2015) revealed that most pre-service teachers were confident applying algorithms but had difficulties in answering the questions requiring them to give reasons. They knew rules and could carry out procedures. Ndlovu and Brijlall (2015) pointed out that most pre-service teachers have a procedural understanding of matrix concepts. In addition their findings concur with Siyepu (2013) who asserted that students' responses in mathematics display procedural understanding instead of conceptual understanding. Furthermore, Ndlovu and Brijlall (2015) revealed that from the responses of pre-service teachers there was evidence that the lack of background knowledge of basic algebra schema impacted negatively on the construction of necessary matrix algebra mental constructions. They observed that some students failed to manipulate numbers correctly when computing matrices.

In addition, Bansilal (2013) pointed out that many students struggle to make the transition from addition and subtraction to multiplication and division, which hampers further progress in mathematics. This might imply that lack of adequate schema for integers can work against the development of fluency in carrying out the appropriate operations on matrices. Uncertainty in addition and subtraction of integers might result in incorrect entries of matrices since most students struggle to reach the kind of fluency that could make their calculations less burdensome.

3. Theoretical framework

The APOS framework describes the growth in understanding of mathematics concepts through the hierarchical development of mental constructions called action, process, objects and then as schema. APOS theory was built on the work of Piaget and constructivist ideas, (Arnon et al, 2014). The theory centres on the models of what might be taking place in the mind of a student as s/he engages with mathematical concepts like matrix algebra.

One of the major tools used in APOS based research is the genetic decomposition. A genetic decomposition is a hypothetical model of mental constructions that a student

may need to make in order to learn a mathematical concept (Arnon et al (2014). Until it is tested experimentally, a genetic decomposition is a hypothesis and is referred to as preliminary (Arnon et al (2014).

3.1.   Preliminary Genetic decomposition for matrix operations

The preliminary genetic decomposition was constructed using the researcher's experience of teaching and learning of matrix operations at tertiary level and even high school. In addition the researcher's knowledge of APOS theory plays a vital role in the construction of this genetic decomposition. The specific constructions related to concepts of scalar matrix multiplication, addition of matrices and matrix multiplications are detailed below.

3.1.1 Scalar Matrix multiplication

Action: The individual multiplies out each element at a time by k, limited to an action conception. An individual cannot think beyond the single multiplication being carried out.

Process: An individual reflects on the rule and thinks about the effect of the scalar k on all the elements of the row or column or matrix A to form kA, by imagining that each element has been multiplied by the scalar k. The individual has interiorised the scalar multiplication carry out operation without doing step by step procedure. S/he is able to symbolically express the result of the scalar multiple using algebraic notation.

Object: The individual can see the effect of the scalar multiplication as a totality. The individual will be able to apply processes or further transformations on a scalar multiple of a matrix or scalar multiple of a row or column.

3.1.2 Addition of matrices

Action: The individual performs single additions (resulting in a new entry of the required matrix or row or column) at a time, without thinking beyond the addition of the numbers being added.

Process: The individual can imagine what the sums of the corresponding elements will be without carrying out step by step procedures. Addition of scalar multiples of matrices can be done in one step, without having to first work out the matrices after

the scalar multiplication. At this level, the individual is able to predict whether it is possible to add given sets of matrices. S/he will be able to symbolically express the result of the scalar multiple using algebraic notation.

Object: The individual can see the effect of the scalar multiplication as a totality on any given matrix n by n. S/he is able to make observations about the relationship between two scalar multiples of a matrix or to compare the effect of the scalar multiplication on different matrices. The individual will be able to apply processes or further transformations on a scalar multiple of a matrix or scalar multiple of a row or column.

3.1.3 Matrix multiplication

Action: In working out the product AB=C of two matrices, the individual is able to multiply out one row by one column at a time, by multiplying each element in a row from the first matrix by the corresponding element of a column from B and then adding them up, in the same way as a vector dot product is computed. The individual is able to identify the ith row of matrix A that must be multiplied by the jth column of matrix B that results in the ij^{th}, element c_{ij} of the product C.

Process: The individual is able to imagine the effect of finding the dot product of the ith row of the first matrix with the jth column of the second matrix to generate a new specific element c_{ij}. S/he does not necessarily have to go through the pair wise multiplication of each element of the row with each element of the corresponding column but is able to recognise the corresponding elements of the rows and columns that are paired. An individual is able to recognise whether multiplication of two given matrices is possible.

Object: The individual is able to carry out further operations or transformation on a product of matrices. S/he is able to see the result AB as an object separate from the process that produced it. An individual is able to generalise about properties of products of particular matrices.

4. Methodology

An interpretive study recognises that individuals with their own varied backgrounds and experiences contribute to the on-going construction of reality. Thus an interpretative study was carried out with mathematics pre-service teachers and comprised a qualitative analysis of the written responses of 70 pre-service teachers to an assessment task comprising three questions. The questions required them to carry out multiplication, transposition and addition operations on given square matrices of order 3. The three items formed part of an assessment which included items on other concepts as well

The study was carried at a Southern Africa university. At this university one of the content modules offered to pre-service teachers include matrix algebra as one of the topics to be taught with matrix operations as an aspect to be considered when teaching.

The data was collected from the assessment task written individually and marked by one of the authors after teaching the concepts for three weeks. The participants' written responses were analysed and themes relating to the ways in which they carried out the matrix operations were then identified. Inductive and deductive analyses were used through coding the written responses of pre-service teachers. After coding, the responses were grouped according to identified categories. These categories aided in identifying different components of the theoretical framework in various types of correct and not correct responses. Then merging patterns were identified and discussed. The preliminary genetic decomposition served as an analytical tool. Here it helped in describing the mental constructions made by pre-service teachers. After analysing the assignment tasks meaning was assigned to pre-service teachers' responses and the level of which they were operating was described in terms of APOS theory.

5. Results

When describing the responses, the reference to the participant contains a number 1 to 70, so P2 for example, refers to the second participant. The scripts were not arranged in any order and a higher or lower number does not indicate any difference in ability or performance.

5.1. Results for Question 1

We first analyse the responses to Question 1. The question required participants to multiply two square matrices of order three, as shown below.

Let $A = \begin{bmatrix} 1 & 0 & -2 \\ 0 & -1 & 3 \\ 3 & 2 & 4 \end{bmatrix}$ $B = \begin{bmatrix} -1 & -2 & 5 \\ 1 & 0 & -1 \\ 2 & -3 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} -2 & 9 & 6 \\ -3 & 3 & 4 \\ 2 & -2 & 1 \end{bmatrix}$

1. Find AC

Solution

$$AC = \begin{bmatrix} 1 & 0 & -2 \\ 0 & -1 & 3 \\ 3 & 2 & 4 \end{bmatrix} \begin{bmatrix} -2 & 9 & 6 \\ -3 & 3 & 4 \\ 2 & -2 & 1 \end{bmatrix} = \begin{bmatrix} -6 & 13 & 4 \\ 9 & -9 & -1 \\ -4 & 25 & 30 \end{bmatrix}$$

The analysis showed that 45 out of the 70 participants were able to multiply the two square matrices providing evidence that they were able to work at an action level with matrix multiplication. From the 45 participants, 31 multiplied each row by column and come up with the answer. The other 14 just wrote correct answer. These participants managed to get the correct answer for question as $\begin{bmatrix} -6 & 13 & 4 \\ 9 & -9 & -1 \\ -4 & 25 & 30 \end{bmatrix}$.

There were 25 participants who failed to get the correct answer for the product of matrices A and C. We consider these participants as having a pre–action conception because there is no evidence of any knowledge of the procedure. From the twenty five participants, four did not multiply the rows of first matrix with the column of second matrix. For example P34 multiplied the two entries which were in the same position of each matrix, as is done when adding or subtracting matrices. P34's response in Figure 2 shows that each element b_{ij} of the new matrix was generated by multiplying element a_{ij} of A with element c_{ij} of C, that is $b_{ij} = a_{ij} \times c_{ij}$. This seems to have been influence by the process of matrix addition where a new element b_{ij} is generated as $b_{ij} = a_{ij} + c_{ij}$.

Figure 1: Response by P34 to question 1

Three of the 21 participants multiplied the appropriate rows and columns but confused the position of the answer. They multiplied the first row in the first matrix by each column in the second matrix to get the entries of the first column of the solution matrix. Hence the result they obtained was effectively the transpose of the expected solution matrix. The response of one student (P16) is shown below in Figure 2.

Figure 2: Response of P16 to Question 1

Eighteen participants had problems with addition and subtraction of the three numbers for each entry of the matrix AC. For example P5 evaluated $[(1 \times 9) + (0 \times 3) + (-2 \times -2)]$ as 5, which was the first entry in the second column of AC instead of 13. Many participants

arrived at incorrect answers because of inaccurate addition, subtraction and multiplication of entries.The response of P5 is represented in Figure 3.

Figure 3: Response of P5 who struggled with operations with integers

5.2. Results for Question 2

Question 2 is shown below.

$$\text{Let } A = \begin{bmatrix} 1 & 0 & -2 \\ 0 & -1 & 3 \\ 3 & 2 & 4 \end{bmatrix} B = \begin{bmatrix} -1 & -2 & 5 \\ 1 & 0 & -1 \\ 2 & -3 & 1 \end{bmatrix} \text{ and } C = \begin{bmatrix} -2 & 9 & 6 \\ -3 & 3 & 4 \\ 2 & -2 & 1 \end{bmatrix}$$

2. Find -2A + 3B. (3)

Solution

$$\text{-2A + 3B} = -2 \begin{bmatrix} 1 & 0 & -2 \\ 0 & -1 & 3 \\ 3 & 2 & 4 \end{bmatrix} + 3 \begin{bmatrix} -1 & -2 & 5 \\ 1 & 0 & -1 \\ 2 & -3 & 1 \end{bmatrix} = \begin{bmatrix} -5 & -6 & 19 \\ 3 & 2 & -9 \\ 0 & -13 & -5 \end{bmatrix}$$

Now considering the responses to Question 2, there were 56 participants who managed to multiply each square matrix of order three by a given scalar to find -2A + 3B as $\begin{bmatrix} -5 & -6 & 19 \\ 3 & 2 & -9 \\ 0 & -13 & -5 \end{bmatrix}$. Of these 56 participants, six multiplied term by term of each matrix to first find the entries for 2A and 3B entries and again added term by term of -2A + 3B. Since the participants carried out step by step calculations this suggests that they had not yet interiorised the concept and were operating on an action level. Fifty participants multiplied each matrix by the given scalar, and in the same step they found the sum. This shows that they did not need to work out each operation separately

indicating that these 50 participants may have moved beyond an action to a process conception of scalar multiplication and addition of matrices.

Fourteen did not arrive at the correct answer. Most of the participants stumbled at the multiplication of -2 with each entry of matrix A, revealing that they had challenges with operations on integers. This again shows that uncertainty in addition and subtraction of integers resulted in incorrect entries of matrices since most students struggle to reach the kind of fluency that could make their calculations less burdensome. Of the 14 who were unable to work out the sum, three participants made a slip with the addition of negative numbers for one entry in the final matrix. Eleven participants displayed more serious problems with multiplication of certain entries of the matrix by the number -2. The responses of two participants are illustrated in Figure 4 and Figure 5.

Figure 4: Response of P28 who failed to multiply matrices by a negative scalar

Figure 5: Response of P24 who failed to multiply matrices by a negative scalar

5.3. Results for Question 3

Question 3 is shown below.

$$\text{Let } A = \begin{bmatrix} 1 & 0 & -2 \\ 0 & -1 & 3 \\ 3 & 2 & 4 \end{bmatrix} B = \begin{bmatrix} -1 & -2 & 5 \\ 1 & 0 & -1 \\ 2 & -3 & 1 \end{bmatrix} \text{ and } C = \begin{bmatrix} -2 & 9 & 6 \\ -3 & 3 & 4 \\ 2 & -2 & 1 \end{bmatrix}$$

3. Show that $(AB)^T = B^T A^T$. (4)

Solution

$$AB = \begin{pmatrix} -5 & 4 & 3 \\ 5 & -9 & 4 \\ 7 & -18 & 17 \end{pmatrix} \quad (AB)^T = \begin{pmatrix} -5 & 5 & 7 \\ 4 & -9 & -18 \\ 3 & 4 & 17 \end{pmatrix}$$

$$A^T = \begin{pmatrix} 1 & 0 & 3 \\ 0 & -1 & 2 \\ -2 & 3 & 4 \end{pmatrix} B^T = \begin{pmatrix} -1 & 1 & 2 \\ -2 & 0 & -3 \\ 5 & -1 & 1 \end{pmatrix}$$

$$B^T A^T = \begin{pmatrix} -5 & 5 & 7 \\ 4 & -9 & -18 \\ 3 & 4 & 17 \end{pmatrix} \quad Thus (AB)^T = B^T A^T$$

When given a further question requiring manipulation of a product of matrices, 68 pre-service teachers were able to find the transpose of the given matrices and only two failed. Forty two of the 70 pre-service teachers produced correct responses, indicating a process level of understanding of matrix multiplication. The 42 pre-service teachers

were able to show correctly that $(AB)^T = B^TA^T$. Twenty eight participants were unable to show the equivalence of the two expressions. One participant, P24 worked out A^TB^T instead of B^TA^T and four had problems with computing the multiplication of the respective matrices. The response of P24 is shown on Figure 6.

Figure 6: Response of P24 who struggled to multiply matrices

Twenty three participants had problems with operation on integers when multiplying matrices. The responses of two participants are illustrated in Figure 7 and Figure 8.

1.1.3 Show that $(AB)^T = B^T A^T$

$$AB = \begin{bmatrix} (-1\ 0\ 4)\ (1\ 0\ 6)\ (5\ 0\ -2) \\ (0\ -1\ 6)\ (0\ 0\ 9)\ (0\ 1\ 3) \\ (-3\ 2\ 8)\ (-6\ 0\ 12)\ (15\ -2\ 4) \end{bmatrix}$$

$$AB = \begin{bmatrix} 5 & 5 & 3 \\ 5 & 9 & 4 \\ 7 & -16 & 17 \end{bmatrix} \qquad (AB)^T = \begin{bmatrix} 5 & 5 & 7 \\ 5 & 9 & -16 \\ 3 & 4 & 17 \end{bmatrix} =$$

$$B^T = \begin{bmatrix} -1 & 1 & 2 \\ -2 & 0 & -3 \\ 5 & -1 & 1 \end{bmatrix} = A^T \begin{bmatrix} 1 & 0 & 3 \\ 0 & -1 & 2 \\ -2 & 3 & 4 \end{bmatrix}$$

Figure 7: Response of P1 who failed to multiply matrices

1.1.3 from the definition of symmetric matrix

$$A^T = A \tag{4}$$

$$B^T = \begin{bmatrix} -1 & -2 & 5 \\ 1 & 0 & -1 \\ 2 & 3 & 1 \end{bmatrix} \qquad A^T = \begin{bmatrix} -1 & 0 & -2 \\ 0 & -1 & 3 \\ 3 & 2 & 4 \end{bmatrix}$$

$$=$$

$$B^T A^T = \begin{array}{ccc} +1+0+15 & 0+2+10 & 2+6+20 \\ -1+0-6 & 0-1+6 & -3+2+8 \\ +0+9 & 0\sim+6 & 4\sim12 \\ & 5\sim2 & 15-2+4 \\ 5+0-2 \end{array} \qquad \begin{array}{c} +15 \\ -3 \\ +3 \\ \\ -6+20 \\ 0-4 \\ -9+4 \end{array}$$

$$B^T A^T = \begin{bmatrix} -5 & 5 & 7 \\ 4 & -9 & -18 \\ 3 & 4 & 17 \end{bmatrix}$$

$$\therefore (AB)^T = B^T A^T$$

Figure 8: Response of P7 who failed to multiply matrices

Twenty five participants managed to get the correct solution for all three questions and six participants produced incorrect solutions to all three questions. The rest of the group got one or two correct solutions.

6. Discussion

It is likely that 64% of the pre-service teachers are operating at an action level or beyond, because they were able to multiply matrix A and matrix C correctly. When given a further question 3 requiring a manipulation of the product of matrices, 60 % of the participants produced correct responses. This indicates that many of participants, who had been successful with the action level question, had actually developed a process conception of understanding of matrix multiplication. This was so because participants knew rules and could carry out procedures as revealed by Ndlovu and Brijlall (2015).

The 36% who were unable to correctly compute the product of matrix A and matrix C in question 1, have a very limited understanding of the concept of matrix multiplication and we categorised them as operating on the pre-action level. Some of the reasons for the low levels of engagement were because of difficulties with addition, subtraction and multiplication of integers. For instance, some participants got -4 as the product of -2 and -2 instead of 4. It was found that some displayed consistent incorrect methods of doing the multiplication emanating from misconceptions that seemed to be quite entrenched. For example the method used by P16 produced the transpose of the matrix AC. The consistent application of the incorrect rule implies that the rule has been incorporated into the student's overall schema for matrix multiplication. It is important to note that this incorrect multiplication method could only be carried out in the case of multiplying two square matrices of the same order. Research suggests that students fail to manipulate numbers correctly when computing matrices. Instructors should therefore take care to present such situations which can be used to develop the correct conceptions. In fact questions on matrix multiplication should also include situations where matrix multiplication is not possible, thus forcing students to question whether the rules were applicable in the situation.

The results from question 2 indicated that 71% of the pre-service teachers had developed a process conception of scalar multiplication and addition of matrices since

they were able to interiorise actions of scalar multiplication and addition of matrices. Six students' responses suggested that they were still operating on an action level while 14 of the participants could not provide evidence of even an action level engagement. The main reason for their limited levels of engagement was their problems with integer addition, subtraction and multiplication, as shown for example by P28 and P24. This show that some students struggle to reach the kind of fluency that could make their calculations less burdensome.

The majority of the participants were able to find the transpose of given matrices for question 3, indicating that they had developed a process conception of the concept of the transpose of a matrix. Only two participants were unable to carry out the task of finding the transpose of the given matrices. In terms of the multiplication of matrices that was required to verify the given property for transpose of matrices using the given examples, 60% of the pre-service teachers got correct answers, suggesting a process level of understanding of matrix multiplication, because finding the transpose of the product of two matrices constitutes a further action on the matrix multiplication process. Some have developed an action level in the understanding of matrix multiplication since they multiplied each entry in the row by each entry in the column (term by term) and struggled with addition, subtraction and multiplication of integers such P24. Others have not even developed an action level understanding, such as P16.

In summary, 30% of the pre-service teachers managed to get the correct solutions for the three questions. They have demonstrated a process conception of scalar multiplication, matrix multiplication and transpose of a matrix. In order to make a judgement whether these participants have developed object conceptions, it would be necessary to pose questions which require them to perform further processes on products of matrices, and the lack of such questions constitutes a limitation of this study.

7. Conclusion

This paper studied 70 pre-service teachers' responses to a question set involving operations on matrices, in order to explore their mental constructions of the understanding of scalar multiplication, matrix multiplication and transpose of a matrix

using APOS theory. The findings reveal that most pre-service teachers did not get all the responses for scalar multiplication, matrix multiplication and transpose of a matrix correct. Therefore, their schemas for most matrix operations are not yet well developed. Further research is required to enable us to identify participants who have developed object level conceptions of these topics. In order to distinguish between individuals who are working on higher levels suitable tasks set at object levels will be required in order to elicit the necessary data. Interviews conducted with students while they work on the items could also have provided useful evidence in that regard. Further research will be conducted and these limitations will be addressed in the design of the follow up studies. The study revealed that many of the participants displayed problems with addition, subtraction and multiplication of integers, a topic taught at Grade 9. This is cause for concern as the participants are pre-service teachers who will be teaching mathematics at the Senior and FET phase in school.

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AN EXPLORATION OF HONOURS STUDENTS' CRITIQUE OF A PROPOSAL USING THE DISCUSSION FORUM

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Abstract

This article presents an exploration of honours students' critique of a proposal using the discussion forum. These students are expected, as part of their course, to do independent research which involves developing a proposal. Purposive sampling was used in selecting eighteen university students undertaking their honours degree in Curriculum Studies. Document Analysis and participant observation were used for data generation and Guided Analysis was used to present the findings. Blooms taxonomy was used as a frame of inquiry. The Findings suggest that the DF is a powerful resource of student engagement as all students actively participated in the activity and after the students received critique while some improved in their overall proposal others did not. It emerged that students engaged at the lower & middle levels of Blooms taxonomy rather than at the higher level, which speaks directly to the student's learning outcomes and is expected of them as honours students. For online resources, hard-ware and soft-ware were used consciously whilst ideological-ware seemed to have been used coincidentally or not at all. This article recommends emphasis on Technology of Education (T.O.E) represented by ideological-ware over Technology in Education (T.I.E) represented by hard-ware and soft-ware tempered with teaching presence.

Keywords: Critique, discussion forum, online resources, technology in education, technology of education

1. Introduction

MOODLE is among the diverse interventions that have been undertaken by higher education institutions to enhance the quality of teaching and learning, accommodate a greater student population on and off campus and give students more autonomy. MOODLE is a Learning Management systems (LMS) that enables synchronous interaction (chats) and asynchronous interaction (discussion forums). Wiburg (2003) contends that the integration of LMS in teaching and learning facilitates several learning opportunities, such as enhancing students' critical thinking and problem solving, however, students learning profiles differ which means their uptake and use of the L.M.S and its accompanying learning opportunities may vary. It is from this premise that this study seeks to explore honours students' use of the discussion Forum hence forth DF in MOODLE to get a deeper insight into the actual practice. The next section presents the literature around online resources with emphasis on the DF.

2. Literature review
2.1. Critique

Burns and Grove (2005, p.26) define critique as "systematic, unbiased, careful, examination of all aspects of a study to judge the merits, limitations, meanings and significance based on previous research experience and knowledge of the topic". In this paper, critique will be used as evaluation. Evaluation is the fifth level of Bloom's cognitive domain and falls among the higher order thinking process. Honours students are at level four of their undergraduate degree and are expected to operate within the higher order thinking processes within the taxonomy. The following elements essential to an educational transaction: cognitive, social and teaching presence, will guide the observation of posts (Garrison, 2007). Teaching presence is by way of lecture guide /notes posted on the DF and other teaching resources found on the L.M.S as well as the direct instructions given by the lecturer before and during the assignment. The investigation of critique, will look for discussion threads which reflect the presence of either/or all of these three elements. Garrison (2007) defines teaching presence (TP) as organizing cognitive and social processes to enable the realization of worthwhile educational learning outcomes. Social presence (SP) as the social and emotional interaction of learner's and cognitive presence (CP) as the way meaning construction occurs among learners. Teaching presence entails designing the educational experience and learning activities, facilitation and assessments. SP supports CP

indirectly facilitating the process of critical thinking while TP supports and enhances SP and CP to realise learning outcomes.

2.2. Online resources

Online resources comprise tangible aspects of teaching and learning (Hard-ware [HW] and Soft-ware [SW]) as well as intangible aspects (Ideological-ware [IW]). HW constitutes teaching tools/machines (e.g. computers) whereas SW comprises materials used in conjunction with the teaching tools (e.g. computer CD/ DVD). IW consists of teaching/learning strategies and experiences (Khoza, 2013). Percival and Ellington (1988) categorize HW and SW, as Technology in Education (TIE) and IW, as Technology of Education (TOE). The use of the DF falls within HW & SW whereas the critique falls within the IW. This study seeks to understand how the participants use the aforementioned online resources.

2.3. Discussion forum

Hew, Cheung and Ng (2010, p.572) define a discussion forum as "a text based computer mediated communication environment that allows individuals to interact with one another without the constraint of time and place." Communication within a DF is asynchronous and data stored within it is saved on the virtual space and can be revisited several times enabling adequate time for reflection on the content before a response can be made. A DF allows a wide readership and lecturers/peers can address students concerns at any place/time. Shy students who are overpowered by the more active students in the f-2-f environment can get a voice (Khoza, 2012). A DF primarily enables students to exchange ideas, share multiple perspectives and clarify understanding drawing on a learner- centered approach to learning. The section that follows will address research on DFs.

2.4. Related studies

Most studies on DFs have been done in Asia and Europe with Singapore, Taiwan and U.S.A leading (Loncar, Barrett & Liu, 2014). There has been a paucity of research on the same from the African continent. Hou (2011) examined 32 learner's behavior and content in actual discussions using situated learning. In one case, learners were assigned roles, and in the other no roles were assigned. Data was generated quantitatively and qualitatively using Blooms revised cognitive domain as an analytical

tool. Findings suggest that students cognition levels lacked depth and mainly used level two (understanding) and level four (analysis). They recommend the use of role play in situated learning as it elicited more focused and better quality discussion. Most of their data was generated and discussed quantitatively however, their sample size of 32 participants was too small to facilitate generalization and 34% of their sample were peripheral participants meaning only 10 participants actively participated in the study.

Hew, Cheung and Ng (2010) used 50 empirical studies to identify factors that limit student contribution in DFs. Use of grades, number of postings and instructor facilitation were outlined as potential guideline dilemmas. Case studies with students acting as facilitators were carried out. Results indicate students took control of their learning through facilitation and they recommend it as a way to address the instructor facilitation dilemma. The participants in this study however, were students drawn from a technological field and as such were tech savvy whereas majority of students aren't necessarily in a technology field and may not be confident using the DF. Their recommendation was limited to only one of the three potential dilemmas' identified.

Mokoena (2013) examined factors that encouraged postgraduate certificate in education student engagement and participation in an online DF. His sample were students pursuing teacher education via open and distance learning. A Qualitative case study was the main approach though percentages were drawn using quantitative methods. Data sets consisted of students forum posts. Results indicate that participation does not lead to effective use and enhanced student learning. He recommends social presence by the lecturer through technical support, constructive feedback and setting clear goals and organization of the task. The research design used in this study made it difficult to authenticate the findings of this study as in identifying the themes, the researcher refers to substantive posts that imply serious thought process, but does not state what these are leaving it to the imagination of the reader. Quantitative methods are used to present the findings of a qualitative study. The sample size, number of posts viewed (data set) and the forum task the students were posting/commenting on isn't identified. Research shows that authentic tasks enhance student engagement and participation (Amory, 2014).

Thomas (2002) argues that the non-linear branching structure of the online DF may be insufficient in the realization of truly conversational modes of learning. He further states that students viewed the online discussion forum as being disjointed, stilted, less spontaneous, less immediate, time consuming and difficult to use, promoting individualistic rather than interactive learning. The conversational element of a discussion is lost as writing is transactional whereas speaking is interactional. This suggests that online DFs and LMSs continue to generate debate and further research on the topic needs to be done to address strategies that will promote active, meaningful student engagement and knowledge creation in this learning space.

3. Research Purpose/Research Questions

This article is an exploration of honours students' critique of their proposals using the DF, the researchers' specific focus is on the manner in which online resources were used by the students during the critique. This article may help the students and lecturer enhance the educational experience and to better achieve the learning outcomes of the module. The data generation is aligned along the following research questions:

- How do students use the DF to critique their proposals?
- What levels of critique do students engage in on the DF?

3.1. Research design and methodology

This article is an interpretive case study of eighteen honours students undertaking curriculum studies at a South African university. The study explored the honours students' use of the DF to critique proposals with the aim of gaining rich insights into the phenomenon. The case study method while not allowing for statistical generalization, can allow for analytical generalisation (Yin, 2009). An interpretive case study is suitable for this study as it enables a detailed exploration of the phenomenon, is open-ended and occurs in the participants natural settings (Jwan & Ong'ondo, 2011).

3.2. Sampling

Purposive sampling was used to select the participants. Cohen, Manion and Morrison (2014, p.156) define it as; 'a feature of qualitative research, [where] researchers hand – pick the cases to be included in the sample on the basis of their judgment of their typicality or possession of the particular characteristics being sought." This was ideal for this study as the selected sample met the researchers' specific needs, (honour's

students at the proposal development stage; full time in-service teachers working with the Department of Basic Education). Document analysis of a specific task given and virtual observation of the interaction of the same, on the learning space by the participants enabled the researcher address the research question. The proposals were coded D1, to D18 to ensure anonymity and confidentiality. All necessary ethical considerations were observed.

3.3.   *Data generation and analysis*

Participant observation and document analysis were used to generate data. Virtual observation of the learning management site occurred daily for six weeks (duration of the specified task). Activities the researchers engaged in included: reading, posting, commenting and scrolling through previous posts in order to get a first-hand experience of the phenomenon. Observation was used to identify common patterns in the students' critiques. Document analysis entailed a review of the learning guide, lecture notes, links to You-tube on research proposal writing and other relevant materials to guide the students in the task. The 18 critiqued proposals (note here that despite the fact that there were two critiques per proposal, the unit of analysis was the individual proposal not number of critiques) constituted the main source of data. This kind of review is advantageous as it is unobtrusive and the data can be subject to re-analysis.

Authenticity and trustworthiness of data collected was ensured through credibility, transferability, dependability, and confirmability (a step by step description of the data generation process to eliminate personal bias) (Yin, 2009). Eisenhart (2006, p.573) refers to it as "having been there". Eisenhart further suggests that the use of concepts from the literature, excerpts and direct quotes from the data sources can increase credibility of a study. Jwan and Ong'ondo (2011, p.136) concur saying credibility can be assured by establishing 'a chain of evidence'.

Guided Analysis was used to analyse the data. Samuel (2009, p.12) describes it "as involving categories apriori (categories determined in advance of data generation and analysis proceeds in relation to the prescribed categories) and Grounded approach (where categories emerge from the data)". Four themes: Remembering,

Understanding, Applying, and Creating were generated. Findings are presented by means of discussion, direct quotations and explanation using relevant literature.

4. Results/Findings

All students actively participated in the DF because the task given was directly related to their studies and was part of their assessment, the students had had several f-2-f interactions and therefore knew each other and had developed some sort of connection. All the participants had a proposal posted on the DF these were labelled D.1 to D.18. All the proposals were in the field of Education– the profession of the participants – (F/T teachers, taking curriculum studies). This resonates with the view that a problem is generated from everyday environments/natural settings in keeping with an interpretive qualitative case study.

Creating	Evaluating	Analysing
Applying		
Understanding		
Remembering		

Figure 1: Blooms Cognitive domain depicting the top three levels as equal
Source: Adapted from Anderson & Krathwohl's 2001 revised Blooms taxonomy

4.1.   The task

The task involved each student developing and posting a proposal on the DF, thereafter critiquing a minimum of two proposals–(not their own)–and re-posting them back on the DF. All the students were at the proposal development phase of their studies which will culminate in their independent research project a prerequisite to the award of honours degree. The task, assessment criteria and rules of submission were posted on the DF. Students who were not clear on the instruction further voiced their concerns and got feedback from the lecturer or their peers. See excerpt below.

Q: "*Hi guys please help, is it important to write the number of your participants in the research proposal? I am lost!*"

R: *"Even though I don't get your question but I think it is vital to indicate how many participants you will use in your study as well as the type of sampling you are using including the reason of using that sample."*

The data will now be presented using Blooms revised taxonomy as a frame of inquiry, some excerpts from the critiques will be highlighted, these will be discussed in relation to the task given.

Anderson and Krathwohl (2001) revised Blooms taxonomy to remembering, understanding, applying, analysing, evaluating & creating to fit outcome-based education objective; long established research has confirmed these levels as a hierarchy and mastery of one level enables acquisition of the next level. The first three levels in the taxonomies stick to this order, however the top three levels of the taxonomy (also referred to as higher order thinking) have been viewed by some educators as equal in complexity (Huitt, 2011). Huitt likens these levels to creative and critical thinking which if omitted during a problem solving process, compromises effectiveness as they are of equal value and superiority (See Figure 1).

The posts will be observed for indicators of social and cognitive presence. The cognitive domain was selected as a lens to view students' critique as cognitive presence is a vital component in gauging the efficacy of MOODLE as a teaching and learning intervention. The following excerpts are drawn from the students' critiques.

D.1. *Congratulation for completing ass 2 ….Under rationale next page first line, I think it should be one sentence.*

D.2. *Hi, please find the attached reviewed proposal of yours. Attend to technical errors all those underlined with red.*

D.6. *kindly receive my comments on your assignment. Please pay attention to line spacing as well as spelling errors over and above your assignment look very good to me congratulations!!!*

D.10. *Pls put percentage behind the number on the table of average percentage acknowledge the Doe for giving you the statistics of the results. Take care*

Social presence is exhibited through endearments (such as Congratulation; please; take care) while cognitive presence was through the actual critic. All posts dealt with levels one & two. Most participants were aware of technical errors and raised it in their critique, for some that was the only aspects raised. Participants seemed to shy away from the ideological-ware though the assessment criteria had been clearly stated. Most participants restricted themselves to comments such as this "*visit the library for help with the referencing*", or "pay *attention to technical errors*". Though this isn't wrong it did not exhibit higher order thinking expected of university honours students. It can however, be argued that an awareness of the basic details is vital as this could impede the overall outcome of the proposal.

The excerpts that follow were the only ones closely aligned to the assessment criteria:

D.4*. Kindly receive my comments regarding your assignment. [sic] I will like you to pay attention to the following. [sic] Dependability, Conformability, Transferability and credibility. I suggest that pick one that is related to your study for example generalisation does not work if a researcher is collecting data using a case study in one school.*
D.8 *[sic] I think it is vital to indicate how many participant you will use in your study as well as the type of sampling using including the reason of using that sampling*
D. 14*. Check your objectives and questions and correct all the technical errors (Commas, full stops, brackets and spaces between paragraphs and words).*

These excerpts address content related issues and display evidence of higher order thinking processes: applying, analysing and creating that enabled the recipient to critically evaluate and synthesis their writing.

4.2. Level One – Remembering
Remembering entails exhibiting memory of learned materials by recalling facts, basic concepts and answers and retrieving previous learned information. All participants seemed to have a good grasp of this level evidenced by the presentation of their proposals using the stipulated template and correct format. The participants' ability to properly align the aforementioned is crucial in completing the task.

4.3.   Level Two: Understanding

This entailed participants engaging in critique that involved explaining, describing, and reasoning. All participants were able to identify technical errors occurring in the proposal such as spelling mistakes, punctuation, poor referencing, this had to do with the form of the proposal rather than the content. Dealing with technical errors is important and enabled those participants who took heed to these aspects improve the content of their proposals scoring a high final mark (Hou, 2011).

4.4.   Level Three: Applying

This entailed participants using their content knowledge, constructing, solving and selecting relevant aspects of the proposal to critique. Viewed against the stipulated assessment criteria, critique should have focused on how individual proposals presented arguments. Some participants identified poor referencing but did not expound on it. However, some participants aligned their critique to the assessment criteria and their understanding of the task. (See previous excerpts for *D.4, D.8, and D.14*).

4.5.   Level four: Creating

Analysing, evaluating and creating are higher order thinking processes within Bloom's taxonomy. Whereas these three were initially depicted as hierarchical, some researchers argue that they are in fact of equal import (Huitt, 2011). In this study the researcher uses them as such under the theme "creating". Creating required participants to list components; compare and contrast; differentiate between; evaluate; give arguments for and criticize. However, none of the participants posted comments that indicated they were engaging with this level. Similarly, Hou's (2011) study found that cognitive aspects of application, evaluation and innovation were lacking. This suggests that participants' failure to engage adequately with evaluation could emanate from the use of the DF (Thomas, 2002) or their level of knowledge thus requiring greater teaching presence (Mokoena, 2013). The participants were more concerned with correct form and good writing skills which if not addressed, could hamper the grasping of the content.

The participants did not equitably combine the online resources. Hard-ware and soft-ware represented by the effective use of the DF occurred smoothly but ideological-

ware represented by critic was poorly addressed. Ideological-ware draws on level four and required participants to employ teaching/learning strategies, theories and knowledge in their critique. Nevertheless, the levels they engaged in are equally important as they are the foundation on which good writing /research skills are built by dealing with technical errors. Social presence emerged as critical (Hew et al 2010). Participants who heeded the critic they received benefitted from the interaction and improved in their final grades some did not. This suggests that ideological-ware should guide their engagement. This finding concurs with Amory's (2014) perspective of "learning with" as opposed to "learning from" technology. Learner needs, rather than technology, should always drive the learning process, the instructor's role (teaching presence) influences interaction (Mokoena,2013) assessment spurred interaction (Thomas, 2002) and authentic tasks motivate the students (Amory, 2014).

5. Conclusion

Lecturers through teaching presence should facilitate cognitive and social presence by appropriating technology judiciously and foregrounding ideological-ware as paramount in the learning process. Switching from F-2-F to L.M.S should be gradual as there is still a high dependence on teachers by students. Teachers should gauge each students' level and help them take more control of their learning by designing online discussion activities to stimulate engagement and knowledge creation that draws on the higher level thinking processes.

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EVALUATING LEARNER SUPPORT IN OPEN DISTANCE LEARNING AT UNISA KWAZULU-NATAL

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Abstract

Post 1994 transformation in South Africa created educational landscapes with institutional focus on distance education. The paper emanates from a doctoral study on higher education, with reference to distance education and open distance learning at the University of South Africa (Unisa). This study took place within the higher education field as part of the Public Administration domain. The research problem focused on the impact of learner support in the enhancement of learning, development of skills and throughput rates, whilst exploring levels of preparedness of students for the world of learning. The purpose was to evaluate learner support services in an Open Distance Learning (ODL) environment and gauge experiences of students using them. An extensive review of the literature was done with an empirical study including surveys and interviews with staff and tutors. Location was the regional hub in Durban and learning centres in KwaZulu-Natal. Learner support initiatives at Unisa were evaluated to determine influences on students' experiences and their learning progress. A key question was put forward: Is the quality of the learner support initiatives effective to enhance learning amongst students in Unisa KwaZulu-Natal? Findings included: access to the system and that best reflective practices needs to be well-managed and co-ordinated to enhance teaching and learning. To conclude, ODL is increasingly seen as a cost-effective educational mode of delivery without forfeiting quality. Both sufficiency and effectiveness of ODL is crucial to enhance teaching and learning in this first regional study conducted within Unisa. Through a focus on current learner support initiatives and necessity for stronger academic support, it is hoped that learner support structures would influence positive learning experiences in students.

Keywords: Influence on students' experiences, learner support initiatives, open distance learning

1. Introduction

The higher education landscape and specifically distance education in South Africa changed significantly since 1994. Conventional distance education institutions were categorically affected resulting in new advantages and opportunities. The Ministry of Education committed itself to distance education and its methods to be adopted by institutions. With the White Paper on Education and Training of 1995 an open learning (OL) approach was adopted, enhancing a student-centered approach, flexibility of learning, elimination of obstacles to access learning and delivery of learner support (Nonyongo & Ngengebule, 1998, p.104).

Open distance learning aims to merge learner support, curriculum development, flexible learning and the removal of barriers to access to meet the needs of learners in the education system, asserts Msweli, (2012, p. 97). The author further affirms that ODL is a learner-centred method to learning and that all institutional resources should be used to guarantee that the various needs of learners are being addressed. Governments globally have created the necessary legal foundations, regulatory as well as policy frameworks to ensure that ODL systems can be implemented successfully revealed (Zuhairy, Julaeha, Eduard and Sinar, 2013, p.1197).

Throughput rates in distance education institutions has been very poor, particularly for second language learners. (Glennie in Tait & Mills, 1996, p. 25) is of the opinion that a large number of learners in distance education programmes have a negative experience of education because of the lack of educators and where schools are not performing well in providing and establishing important learning skills. Evidently many learners still experience higher education challenges with under-preparedness for the world of learning, with specific reference to Unisa (KwaZulu-Natal). The question can then be asked whether the learner support initiatives and services provided to learners is sufficient and effective in improving throughput rates and the learning experience of students. These initiatives include face-to-face tutoring, e-tutoring, teaching assistant support, peer collaborative learning, academic literacy and counselling. These learner support initiatives were investigated in this study to determine their sufficiency and effectiveness in Unisa.

2. Literature review: Characteristics and key principles of Open Distance learning

Open Distance Learning (ODL) is seen an approach rather than a system or technique and is based on needs of individual learners and not on interests of lecturers or institutions. It should aim to give students control over the when, what, where and how during their learning processes. The Commonwealth of Learning, (1999, p.1-3), lists features of ODL as separation of teacher and learner, institutional accreditation, use of mixed-media courseware, two-way communication, face-to-face meetings and use of industrialised processes. ODL increases self-determination and self-sufficiency in learning processes because students take charge of learning and manage their involvement. They empower themselves in their learning journey. Marland, (1997, p.70) mentioned the principles of ODL to include: learner-centeredness, lifelong learning, flexibility in learning and removing barriers obstructing learners' accessibility. From the afore-going, it is evident that ODL does not impede on choices of learners, but highlights advanced learning options. A brief historical discussion of ODL in the South African context follows in this paper.

The ODL policy of Unisa, (2008, p. 2), summarises ODL as a concept targeting to bridge time, geographical, economic, social and communication distance between students, institutions, academics, courseware and their peers. ODL focuses on removing barriers to access learning, flexibility of learning provision, student-centeredness, supporting and constructing learning programmes with the expectation that students can succeed. This definition demonstrates and highlights a combination of characteristics of distance education, as a method of education provision and the approach of open learning into open distance learning. The focus thus moves away from study material as the best product to the learner as the customer. ODL also describes learning situations where students can choose from a number of options with regards to the time, place, instructional methods, means of access and other factors linked to their learning processes. The "openness" describes the range of choices to students by providing them with the prospect to study and learn in ways that are self-determining of time and place, proclaims (Caliskan, 2012, p. 2516).

2.1. Learner support systems and its primary functions

Integrated and well-functioning learner support systems are integral factors in open distance learning. (Sim, Atan and Idrus cited in Simpson, 2002, p. 7) summarised that a learner support system includes the creation and delivery of course material supporting learners in the advancement of studies. These can take the form of additional reading materials, human contact, advice and proper support. The author further explains that there are two areas in a learner support system: academic and non-academic. Academic support deals with support in cognitive, intellectual and knowledge components of courses. This includes learning skills, understanding and knowledge and literacy. In a learner support system, different media can be used to transfer these skills and knowledge to advance the teaching and learning journey of students. Non-academic support strengthens the facilitation of communication between students, academic staff and the administrative needs of students including registration and orientation. These two systems were a focal point in this research study that was conducted at Unisa.

Tait (2000, p. 289) suggest that there are three primary functions of learner support:

- Cognitive – supporting and developing learning through the mediation of the standard and uniform elements of course materials and learning resources for individual students. Cognitive and this learning outcomes in learner support are reached where the teaching is facilitated through courseware. Therefor the support should be embodied during the design and development of the content of the course.
- Affective – providing and environment which supports students, creates commitment and enhances self-esteem; and
- Systemic – establishing administrative processes and information management systems which are effective, transparent and overall student-friendly.

The functions mentioned above are essential and interdependent, as is the case at Unisa. It seems that learner support is mainly seen as focusing on administrative processes but the above three functions are significant in locating ODL at Unisa.

3. Theoretical and conceptual framework

The right to education in South Africa is included in various documents of government and is seen within the paradigm of basic, adult and higher education systems. These documents include the *Constitution of the Republic of South Africa*, The *White Paper on Education and Training* (1995), *Higher Education Act 101 of 1997,* The *National Plan for Higher Education* (NPHE) (2001), The *White Paper for Post School Education and Training* of 2013 and the strategic focus of higher education as per the *National Development Plan* (NDP) 2030. All these policy documents address the following critical issues: reconstructing the Higher Education landscape in South Africa and addressing the imbalances of the past; access to education; Open Distance Learning and student / learner support.

Unisa, is a higher education institution that operates under the Higher Education Act of South Africa. All the policy documents of Unisa clearly indicate and disseminate the concept of Open Distance Learning as a tool to bridge time, economic, social, educational and communication, distance between the student and the institution and the student and academics. Restructuring of the higher education system brings into existence the 'new Unisa' in 2004, unique in that it is the only dedicated distance education institution in South Africa. The Strategic plan of 2015, Institutional Operational Plan, Draft Student Policy, Open Distance Learning Policy and Open Distance and e-Learning Business Model form part of the Unisa regulatory framework with regard to ODL and learner support.

3.1. Public Administration, Public Governance and the Developmental State Perspectives

Focus is on the following:

- System of structures and processes with ODL structures of Unisa aim to provide a positive learning experience to students.

- Operates within a particular society as environment with the specific society as an environment will be the composition of the students and the staff of Unisa as a higher education institution.

- Facilitate the formulation of appropriate, legal and legitimate governmental policies where the purpose of public policies is to guide public officials to achieve specific goals (Thornhill & Hanekom, 1995, p. 102). The Higher Education Act of South Africa, a public policy, guided Unisa to formulate ODL related policies within the framework of the institution.

- Effective, efficient and productive execution of formulated policies with the aim is to enhance teaching and learning.

In support thereof, (Nagy & Robb in Barac & Marx, 2012, p. 352) elucidate that this is where higher education institutions (HEIs) in South Africa have to play and important role to ensure advancement, development and application of knowledge. Society is increasingly demanding, funding available from government for tertiary education is decreasing and the greater complications in higher education demands flexible teaching and learning.

3.2. National Development Plan, 2030

Education, training and innovation are crucial to the long-term growth of South Africa. These components are important to eradicate poverty and reduce inequality, as the fundamentals of an equal society. Through Chapter 9 of the National Development Plan (NDP) 2030, Government aims to have a post-school system that provides quality-learning opportunities to young people and adults who want to change careers or upgrade skills. It should also contribute towards quality teaching and learning and raise education and training levels to produce highly skilled professionals.

3.3. The Bates Model

The Actions Model (Bates, 1995) is based on methodology to assess learning technologies. The author suggests that decision-making in educational institutions should be based on an analysis of questions by an institution and grouped in the model. This model also highlights significant actions that should be taken into account when consideration is given to the use of technology in the ODL system, and whether students are ready for this mode of education. Learner support and service delivery in the environment of Unisa ought to add value to the development and progress of its students as clients. This model highlights the important role access, cost-effectiveness and teaching and learning methods should play in the attainment of knowledge and developing skills for students.

4. Methodology

The study was conducted using a mixed methods mode with both qualitative as well as a quantitative approaches using distinct designs that involved rational assumptions and theoretical frameworks, as emphasized by Cresswell, (2014, p. 4). Staff who were involved in learner support initiatives were interviewed to gauge a comprehensive picture of the learner support functions in the region. Open--ended questions were used for these interviews. Questionnaires were distributed to students who attended tutorial classes in Durban, Newcastle, Pietermaritzburg, Richards Bay and the Wild Coast areas. Durban is the Hub of the region while the other offices are regional agencies of Unisa in KwaZulu-Natal. Observational data collection was used in the study of students and tutors during tutorial classes. Data collection methods were used to support the reliability of findings in the study.

4.1. Sampling

The population of this study was the distance education students of Unisa, KwaZulu-Natal enrolled for the tutorial programme. Reasons for choosing this population is that they are the most significant people to reveal essential information with regards to distance learning and open distance learning, as well as their experiences as students in this environment. A simple random sample method was used where every person or element in the population has the same chance of being included in the sample (Weiers, 2011, p.120). Sample size was selected from the tutorial classes in the offices of Unisa in KwaZulu-Natal. Tutorial classes are offered according to certain modules in all six colleges of Unisa. Not all modules are offered in each college as the classes are offered where there is a demand. High risk modules were also considered. In modules offered, students were selected randomly to participate. Staff were also randomly selected and interviewed with regards to learner support initiatives in the region, for example, Tutorial services, Student Counselling, Library services and Academic Literacies.

4.2. Ethical Issues

Permission was sought through the Research Office at the University and confidentiality and voluntary participation of respondents was upheld.

5. Data Analysis

The Questionnaire were the primary tool used to collect data in the first phase, and was distributed to students who attended tutorial classes at Unisa at the various regional offices in KwaZulu-Natal during the second semester in 2014. In total, 369 questionnaires were dispatched and 313 were returned which represented a credible 84.8% response rate.

The data collected from the responses were analysed using the Statistical Package for Social Scientists (SPSS) version 22.0. The results were presented using descriptive statistics in the form of graphs, cross tabulations and other figures for the qualitative data that was collected. Inferential techniques included the use of correlations and Chi-Square Test values; which are interpreted using the p-values. Kaiser-Meyer-Olkin measure and Bartlett's test was used to examine the

appropriateness of factor analysis and the measure of students' attitudes towards the ODL policy (Didacticiel – Études de cas, 2013, np).

In the second phase, interviews with staff involved in learner support activities and tutors were approached to obtain the data in the qualitative phase. Data revealed the phenomenon under investigation and also established significant relationships between and amongst key variables.

6. Findings and discussion

6.1. Biographical data

Encapsulates the biographical characteristics of the respondents who completed the questionnaires. A number of dimensions informed this question such as: age, gender, geography, income, ethnic and racial identity, employment and unemployment, housing, access to communications and technology. The findings reveal the ratio of females to males is approximately 3:7 (27.8%: 72.2%). In a study in the Caribbean by Dana Peebles, (2014, p. 3), key issues associated with ODL: are financial and low literacy levels for some groups. This tendency influences participation of young men and they are more affected than young women. In all countries at all levels, participation rate for females in education exceeds that of men which includes use of ICTs either as a means of study, or both. Within ages 18 to 20 years, is 14.1% (44 students) and the age categories of 21 to 25 years reveals 33.9% (106 students), with the total number between 18 to 25 years to 48% as 150 students within the sample.
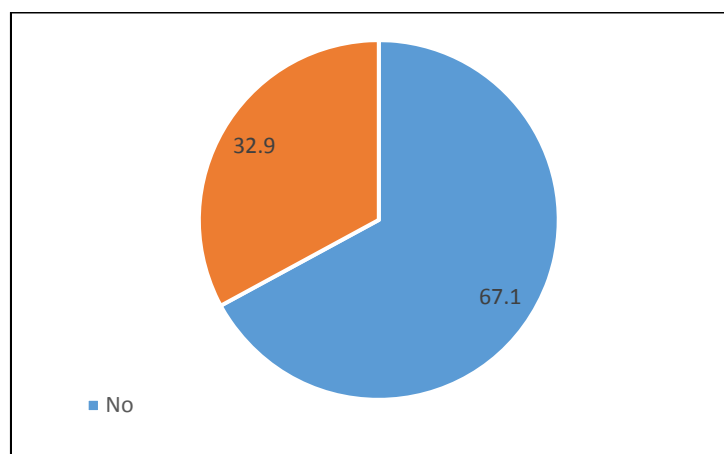

Figure 1: Employment status of respondents

Figure 1 indicates the number of unemployed students is 67.1%. Reasons attributing to this status is the high number of young students between age groups of 18-25. Students with more work experience are more successful, is the view held by Erdogan, Bayaram and Deniz, (2008, p. 40), and could be attributed to why dropout rates are higher amongst first years.

Table 1: Accommodation during studies

	Frequency	Percent
Yes	168	57.3
No	96	32.8
Sometimes	29	9.9
Total	293	100.0

More than half of respondents (57.3%) indicated that they had accommodation. A percentage (32.8 %) of students don't have accommodation whilst studying at Unisa and 9.9% were able to find accommodation. Studies revealed that this could impact on throughput rates. In an article in Career Junction by the Department of Higher Education, the importance of suitable accommodation for students was highlighted. The paper discussed shortages of accommodation for students in general in South Africa as one major causes of poor student performance and high dropout rates at some universities, having a negative influence on throughput rates of universities (Career Junction, 2012, p. 2).

6.2.   Expectations of students at Unisa as an ODL University

In the first three options in *Table 3* below, an average of 62.6% of the respondents expected more face-to-face contact. Tutorial classes are in huge demand as evidenced in the following comments: "*Attend classes in order to pass"; it is important to have a lecturer - face to face or tutors every day; and expect residential provision".*

Table 2: Expectations of students

	Disagree	Unsure	Agree
Attend classes every day	47.1	5.3	47.6
More face-to-face tutorial classes	17.0	4.9	78.0
Lecturer is at the regional centre	23.0	14.9	62.2
Only online learning	63.5	12.8	23.6
None of the above	60.2	23.9	15.9

Table 3: Usage of Learner Support Services

	Count	Percent
Tutorial classes (face-to-face by tutor in the region)	254	80.9
MyUnisa (online services)	236	75.2
Library services	151	48.1
Discussion classes (classes by the lecturer)	150	47.8
MyLife (own student e-mail address)	137	43.6
Registration support while registering	94	29.9
Computer Laboratories	92	29.3
E-tutoring (online tutoring)	89	28.3
Student Counselling services	76	24.2
Teaching assistant support (TA support)	70	22.3
Financial support	63	20.1
Video conferencing	52	16.6
None of the above	13	4.1

From Table 3, multiple responses emerged. Table 4 provides an idea as to what learner support services the students use. A large percentage (80.9%) of the students are using tutorial services and MyUnisa (online services) reflecting 75.2%. A clear indication that these learner support services are a popular choice with the students, however, more tutorials are needed as students often experience difficulties with some of their study materials.

Face-to-face tutoring is described as a more supportive approach with added opportunities for dialogue than other mediums, asserts Simpson, (2002, p. 78). In a study by Kember (2007, p. 146) the majority of the students expressed their preference for face-to-face tutorials, because they would rather study in a group than on their own and alone. This gives them the opportunity to share with other students. Although this is a costly mode of delivery, there's a need for this type of support to provide a value added learning experience, especially for first year students, as indicated.

Students experienced a number of difficulties and uncertainties during their learning journey at the university. If one compares some of the difficulties experienced by students with the contents of the policy on student centeredness and support, it is clear that definite gaps exists with implementation of the policy due to a number of factors. Few difficulties are highlighted as:

Tutorial and support from lecturers:
"*More tutorials are needed as the course is very challenging.*"
"*It is difficult to get hold of lecturers when assistance is required.*"
"*Do not have the opportunity to get help immediately if problems are experienced from lecturers.*"
Peer support elicited the following responses:
"*Difficult to find students doing the same module and challenging to study alone.*"
Some challenges with the integrated courseware approach included:
In-text support with well-designed and integrated courseware. "*Some words in the study guide are difficult to understand and sketchy.*"
"*Overload of work and difficulty to understand subjects that were never done before.*"
Administrative support:
"*Could find more information if feedback on assignments were given timeously.*"
"*Assignments and feedback are given after the examinations - difficult to prepare for exams and study material arrives after examinations have been written which contributes to low exam mark.*"
These are gaps and lack of effective and sufficient learner support was identified from data obtained through the questionnaires.

6.3.   Quality of learner support services

As Unisa is in the process of transforming its ODL, learner support should be effective and efficient to ensure that the students have successful learning experiences.
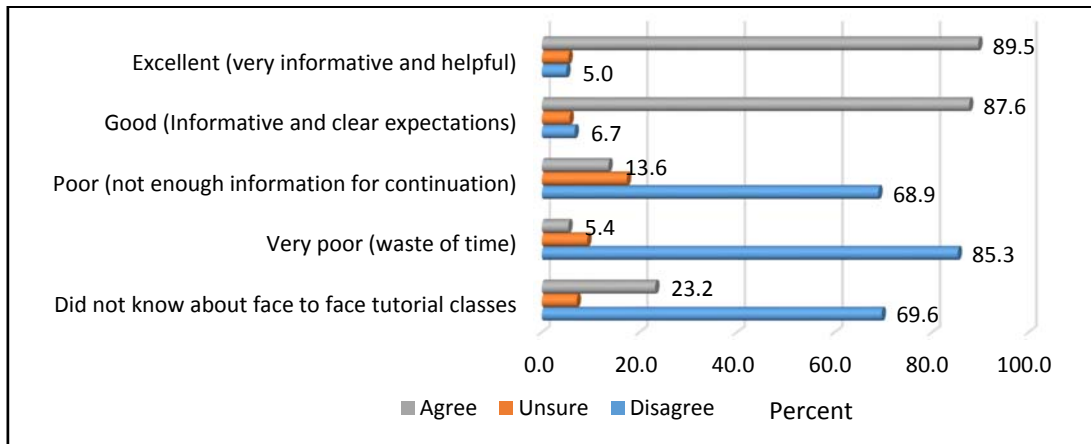

Figure 2: Face-to-face tutorial experience by students

Students expressed their need for more tutorial classes. This may be reflective of the lack of lap tops, computers and the Internet as expensive, as well as the personal contact with staff from the university and other students.

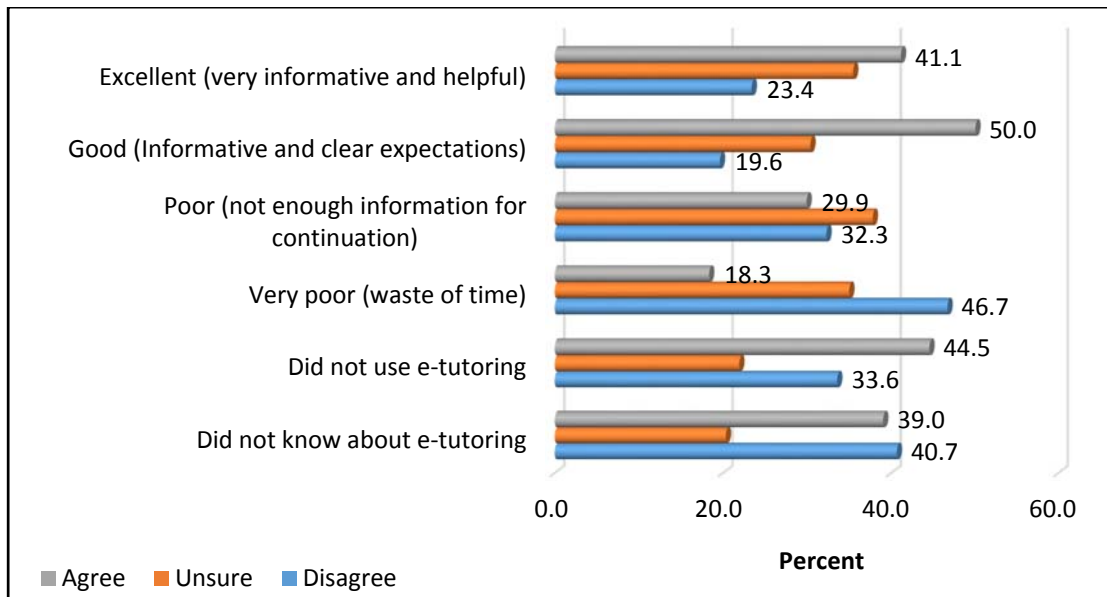 *"Face to face tutorial is beneficial - more session time requested."*

Figure 3: Experience of E-tutoring by students

An interesting phenomenon is displayed in the figure above. Only an average of 45.55% of the respondents indicated their satisfaction with e-tutoring, while 44.5% did not make use of it and 39% did not know about e-tutoring. Many factors can influence this occurrence as seen in the comments made by the students below.

"No access to computers and internet."

"Very poor as students have little knowledge about computers and there is no assistance."

"E-Tutoring was not a gradual process therefore there are infrastructural challenges."

"No online tutoring and e-tutoring does not provide feedback timeously."

From the above, it is clear that the e-tutoring is currently a concern to students and they find it difficult to use this facility, which impacts on the ODL system.
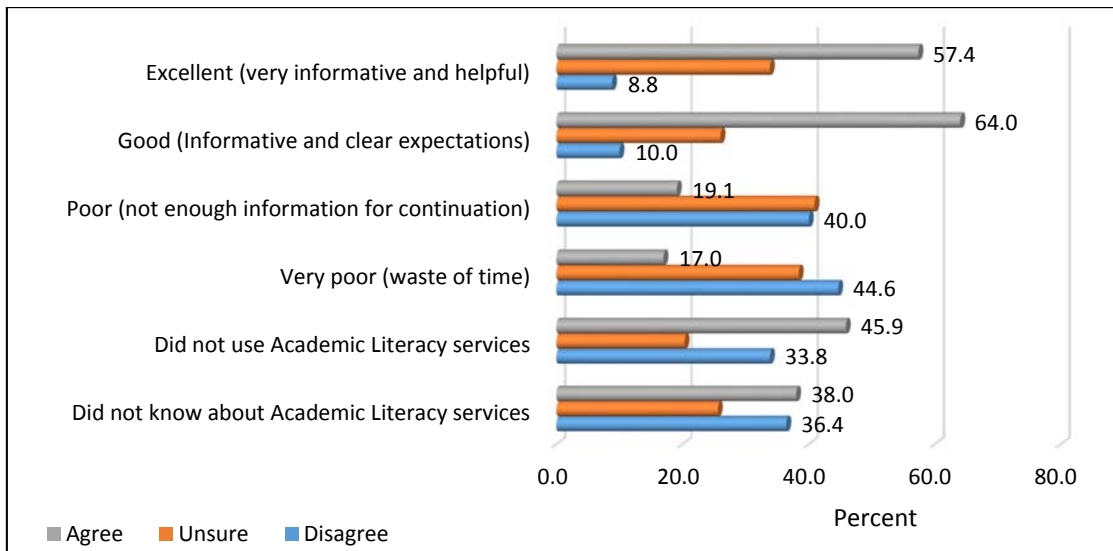
Figure 4: Experience of Academic Literacy services

An above average of 60.7% satisfaction with the service, but 45.9% of the respondents indicated that they have not used the Academic Literacy services. This service is also only available at the Durban hub. It would appear that students also are not clear about what these services entail. This is an important service, because most of the students experience language barriers, as evidenced in interviews with staff and tutors.

Figure 5: Services at the computer laboratories at Unisa KZN

Students are allowed to book a computer for two hours and it can be assumed that a large number of students also use the Unisa internet facility, as well as the WiFi facility

on the campuses where it is available. An average of 39.9% of the respondents indicated that they did not use the computer laboratories. This may be attributed to more students starting to use their own computers. This is an important servic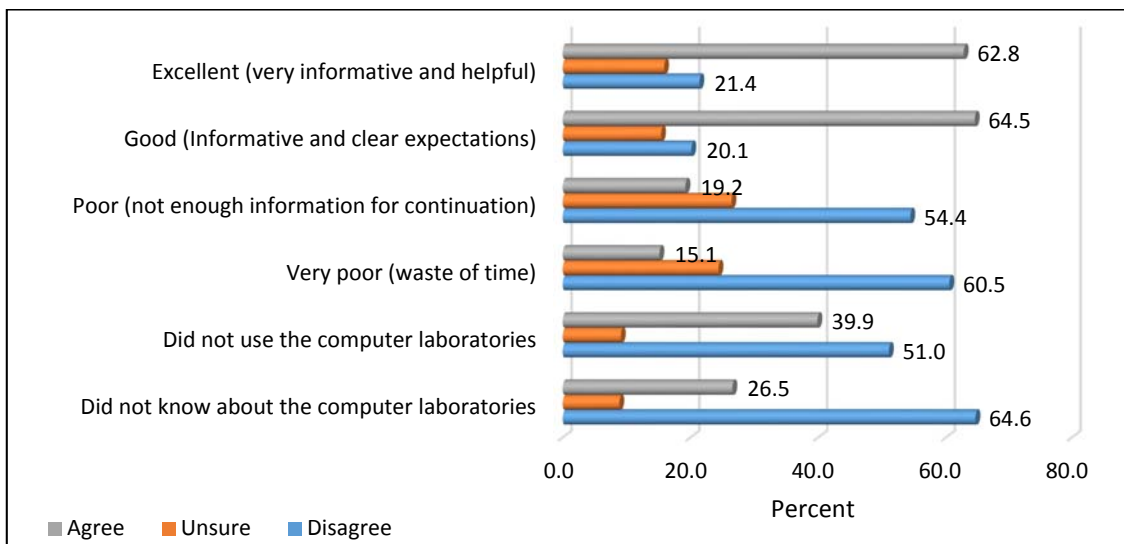e, because Unisa is moving towards an ODL university. Students raised concerns with the size of the facility and poor service delivery in computer laboratories.

6.4. Quality of learner support services and perspectives of staff

Simpson (2002) argues that unless the quality of student support services is of a good standard, there is no point in providing these services. The provision of learner support is increasingly recognized as an important part of any open distance learning system. The learners are the most important participants in any educational system and therefore quality services should be delivered by providers, maintains Sim, Atan & Idrus, (2005). The following aspects was highlighted during the interviews with staff and tutors: resources are in a poor condition; access to system are difficult; staff uninformed on e-learning; best reflective practices (BRP) are challenging; availability of lecturers; necessity for course development to stimulate learning.

From the preceding selected empirical analysis and discussion in the study, the efficacy of the learner support services and students' learning experiences via ODL cannot be overemphasized. The cognitive, affective and systemic functions are significant perspectives of the efficiency of teaching and learning in distance education.

7. Conclusion

In an ODL university, learner support is compulsory and of vital importance and this is where the role of regions cannot be over emphasised. Although ODL is seen as a cost-effective mode of education delivery, initial costs to implement is considerably high. It can be said that the profile and caliber of students dictates the way learning is effectively achieved. From the research undertaken, it is clear that staff in the region are doing their utmost best with the resources available to them, however challenges and gaps have emerged and needs urgent attention. Furthermore, the whole learner support drive should be based on the "*Batho Pele Principle – People First / Students First.*" In a study by Oosthuizen, Loedolff & Hamman (2010, p. 201) on students' perceptions of quality learner support in ODL at Unisa, students' perceptions showed

low levels of satisfaction: discussion classes, tutorial classes, administrative support and helpfulness after registration were some of the emerging issues. These are important aspects for due consideration by Unisa given the context of its current focus as a distance education institution. Although students are more familiar with new technologies in ODL, it is evident that students' perceptions on support from the University did not really change significantly, and more attention must be given to addressing their teaching and learning needs.

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TEACHING PRACTICE CHALLENGES THROUGH DISTANCE EDUCATION

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Abstract

The South African Higher Education system for training of teachers is at a crucial stage whereby there are shortages of teachers particularly in Mathematics and Science subjects. Poor reading and mathematical foundations has become the norm of today's South African public schools. Student teachers through distance learning are greatly challenged because they learn on their own and practise their teaching skills in schools which are not equipped for the 21st Century teacher. Since learning technologies are evolving at a phenomenal pace, the challenge is on universities to implement innovative pedagogies, such as integration of social media sites in teaching and learning. The theory of connectivity underpins the innovative approaches using learning technologies and blended learning together with presently employed educators forming communities of practice. This in turn creates digital natives amongst student teachers, who will penetrate global education into remote communities. Students' teachers are aided and guided by school leaders using Facebook that will track their performance in a very relaxed environment. Data was collected from five students registered in different distance universities. This study intends to aid other student teachers registered under distance universities to overcome challenges they face. The role of ICT leadership is seen under the umbrella of the communities of practice. Lectures are seen as technology conveners.

Keywords: Communities of practise, digital natives, student teachers

1. Introduction

Carroll viewed at the new millennium as characterised by the drastic changes in technology. It is true; "we now live in an increasingly diverse globalized and complex media saturated society" (Carroll, 2008, p.1). Student teachers may be committed to their profession only to find that they come to school with very different sets of experiences and expectations than their being the tech savvy and multi- tasking digitals in their everyday life. Prensky (2001.p.2) described digital natives as people who "are used in receiving information fast, thriving for frequent rewards and prefer games rather than serious work".

Since Learning technologies are evolving at a phenomenal pace, the challenge is on universities and schools to implement innovative pedagogies using teaching related technology, active learning, self-guided instruction and group work. There is disconnection between the way students' live, learn and practise teaching. Thus, student engagement is hampered. Teachers who are presently employed within the educational system of employment are used to traditional methodologies of teaching which does not cater for technology integration in their teaching. "Today's youth are much more media-centric than the previous generation" (Jusoh and Jusoff, 2009.p.1).

This technology gap and digital division becomes a challenge to student teachers at Umkhanyakude schools. Student teachers find it challenging to inculcate their vibrant ideas to less interested learners, demotivated educators and with no technology policy which support the usage of any emerging technologies. Student teacher's expectation during practise teaching is challenged because at the school level connectivity is dragging. As the 21st Century student there is intense demand as to sharpen their skills too in order to become effective in education. Thus they need to know how to step into a digital learning environment so as to strengthen teaching practice (Leke-ateh, Assan and Debeila, 2013).

Todays I kids start using technology at an early stage, they speak digitally since they are the digital generation (Cashman, Gunter and Gunter, Shelly, 2007). Students across the socio-economic spectrum need and deserve motivating, supportive instructional environments, engaging content and the opportunity to learn in settings that support collaboration with their lecturers, peers, teachers and the larger community. Partnerships between schools and universities need to be improved (du Plessis, 2013). Student teachers are guided by cooperating teachers, as well as by the tutors and are practically exposed to action-oriented experiential training practical in schools observing the mentor (Leke-ateh, *et al*. 2013).

The Born Free generation watch on television Mickey mouse and kewpie dolls thus not mixing what they watch with their studies. They receive poor quality education and child support grants. Children up to age of eighteen, getting child support grant could diminish the skills to born frees of becoming the entrepreneurs (Timeslive, 2015; Maswili, 2014). A massive transition is needed and the agenda should be created for the generation that will bring about this transition of using technology (Kangai and Bukaliya, 2011). Martin argued that "much of what needed to be done is not happening where's today's computer models show that we are not adapting quickly enough because we are not thinking ahead" (Martin, 2007.p.1). The lecturers as instructional designers have a role to translate communication tools and collaborative methodologies to language of learning networks. The 21st Century student teachers need to implement technology skills to his/her learners (Siemens, 2008).

2. Literature review

The South African education teaching practice is in crisis (du Plessis, 2013; Leke-ateh et al, 2013). The dramatically failing of Mathematics, Science and English draws everyone concerned about discussing fundamental aspects of the crisis, which is debilitating anti-educational inheritance of demotivated, underqualified, unselfconfident, dependent and textbook-bound (Alexander, 2014). There is lack of professionalism amongst teachers, which one can draw back to how student teacher are mentored by these educators (Leke-ateh *et al*, 2013).

Alexander viewed this as "the problem linked to effects of the colonial-capitalist, Eurocentric and racist frame works which most of South African educators have been schooled" (Alexander 2014.p.197). Siemens alluded that "Student teacher should become a curator, an expert with advanced knowledge and how to foster and encourage learner exploration" (Siemens, 2008, p.17).

Schools are unequally resourced in an unsafe environment thus causing teachers to suffer post-traumatic stress disorder (Alexander, 2014). This is challenging to student teachers since teaching practice demanded the great need of moving rapidly towards an apprenticeship system of teacher education and professional development. This is anticipated to give appropriate attention to the theoretical and philosophical underpinnings of the process of teaching and learning, with much emphasis on role models and mentorship by lead teachers (Alexander 2014, Jakovlijevic, Buckley and Bushney, 2013).

Beyond this characterisation and stereotyping of the critical agents of educational continuity and transformation, one has to pose with the more serious questions: "how student teachers can help to close the digital divide"? (Alexander 2014) This draws to the main challenge of student teacher when describing the 'teaching practice' which is the time in which student teachers' training happens when they are exposed to school life under the mentorship guidance (du Plessis, 2013). Mentors are not sufficiently involved in teaching practice; they just lack knowledge on how and what to mentor (Leke-ateh *et al*, 2013). Thus the informal self-organized group of individuals interested in education which must be formed is called the Communities of Practice (CoP) (Jakovljevic *et al*, 2013). CoP's are formed by practitioners who commit to engaging and working together to increase the impact of education and add towards systematic change. This is done in a collaborative view (Siemens, 2008; Berg, 2000). Student teachers are given the chance to learn from the expert developers of education (Abdulla, 2013).

The White Paper for Post-School Education and Training asserts that "if the provision of education and training is to be better coordinated with the needs of society and the economy, central information about skills needs is required" (Department of Higher Education and Training(DHET),2013.p.58). Therefore "identifying current and future skills demand as accurately as possible is extremely important if the goals of the National Development Plan, the New Growth Path and the Industrial Policy Action Plan are to be achieved" (Human Resource Development Council of South Africa, (HSRC),2014. p.7). There is a great need of increasing levels of intelligence in schools to meet the demands of the information age. Schools will become the thinking communities if they emphasise thinking critically and creatively, to analyse and reflect, to generate new ideas, to exercise good judgement, to learn independently and to think for oneself (Green, 2014.p.3). The teachers are the main central people in this transformation process (Siemens, 2008).

Schools are open communication centres with the capacity for ongoing, creative problem solving and willingness to receive feedback so as to change (Green, 2014). The challenge faced by student teachers is on improving themselves and meeting the responsible educator who have the focus of getting developmental initiatives within schools which are sustainable. School development is a long term intervention. Many developing countries have invested a lot in primary education (Shalhoub and Al Qasim, 2010). The lecturers, educators, parents and student teachers need to work together with the significant investment of time and resource incorporating mutual respect, and common vision (Green, 2014). There should be collaboration across networks and leading by influence (Carroll 2008). African countries, like Ghana have championed the application of ICT in education with the improved educational outcomes (Natia and Al-hussan, 2015). The Work-integrated learning (WIL) as a model has been proposed in South Africa with intention to enable the students teachers to assist the community with their social challenges while still augmenting student learning (Abdulla, 2013).

3. Theoretical framework

Education is characterised by making meaning on what people know, learn and distribute knowledge across a network and patterns created by the creation of images, videos and cartoons (Downes, 2012). The theory of connectivity is used in this study to explore where learning will consists and the ability to construct those networks in three domains which is knowledge, learning and community (Downes, 2012). The blending of formal and informal, structured and unstructured is the vital task of the student teacher (Siemens, 2008). The theory of connectivity is used in this research to explore how the lecturer, student teacher and learners connections are created or adjusted. Student- teacher collaboration with the mentor educator is based on similarity, contiguity, feedback, and harmony (Downes, 2012). Student teachers as digital natives and lecturers as digital immigrants, (Prensky, 2001) have to share knowledge which will inform learning. What is learnt informs community and the community in turn creates knowledge that is related to 21st Century needs. WIL emanates from integration of workplace experience and university knowledge (Abdulla, 2013). WIL stresses that learning is situated in the work practice of learner, thus forming a community of practice which aims at teaching student teachers correct way to perceive education (Green, 2014; Lundh-Snis, Svensson and Ostlund, 2003).

4. Methodology

Purposive sampling was used with intention to get student teachers who do the practise teaching at Umkhanyakude district. They became the informants who are typical members of a broader selected society of Umkhanyakude and registered in different institutions of higher education through distance education. I conducted face to face interview with each student teacher. I also wanted those who used Facebook as the means of social media communication. I met them as the group after they have done practise teaching. Different research data collection methods were used for triangulation. I analysed their two weeks reflection on daily preparation to track their consistency in the integration of technology as resources they used. I asked them to disclose their communication to me after the teaching practise how their communication was with their lectures and mentors prior going to schools and during the practise teaching session.

5. Ethical issues

I recruited five educators from different South African institutions and asked them to sign consensus forms after agreeing to assist me in data collection. Their anonymity was emphasized and their dignity was highly valued. They were given prior information that the research is purely for academic purpose and they were free to withdraw anytime should they felt uncomfortable.

6. Data analysis

Interviewing five educators enrolled in different distance universities gave me opportunity to explore their challenges of teaching practice. Two were at primary and three were at secondary phase. They were all not doing practise teaching for the first time this year. I had two interviews per person. The first one was to introduce myself and to ask their one week lesson preparation after they have gone to their classes. I used audio tape to assists me with voice recording while we were discussing to get all their probing. The documentation was their lesson plans where I read their reflection as the teachers. I gave them the questionnaire to fill in prior our interview meeting. I got the feedback from three student teachers who managed to form Facebook groups of which amongst them only one lecturer was active in the chatting. I used triangulation to address the validity of the data. The theory of connectivity was used as the means of guiding what was really happening in the classroom and a tool to analyse and understand all research questions. Face to face interviews, with probing were advantageous because detailed questions were asked. Response rate was much higher than the self-administered questionnaires. I used the documentation as the 'thick description' which could give the substantial description in my exploration. They gave me the clearer description of the intervention on the challenges faced by student teachers. I could analyse the commonalities found and main data with integrity. I used coding when analysing this data.

7. Findings

There are limitless opportunities and possibilities that are offered by 21st century curricular since new knowledge is anchored by combination of new technologies. Notwithstanding the challenges faced by student teachers which are the lack of internet connectivity in schools other measures of connectivity needed to be in place. Facebook can widen and expands room from better delivery of information which is self- guided instruction, active learning and working in groups to share new information. Student educators were challenged in getting the support from teachers on choosing technology related resources.

The usage of the Bringing Your Own Device to school (BOYD) was a strategy that embraced ethnicity, economically diverse and socio economic status. In this context the Centre for Development and Enterprise (CDE) (2011) highlighted that the shortage of good teachers is a key reason why the education system is underperforming, particularly in scarce but vital subjects such as mathematics and science.

Educators were excited about the usage of technological related resources which reminded them of programmes like OLSET and READ which were previously piloted in their schools and found them to be good. They began to recruit one another to use the technology method. The problem was the absence of a technology policy in schools which would have clarified cyber security, limits and maximum capabilities of technology integration in learning.

The CoP was seen to be having great impact since many existing teachers in scarce subjects are not teaching well, poorly managed and might be because many of them were badly trained. The student teacher needed to refer every time so that they do not get astray. CoP's are the more relaxed methods of communication at all time. The rate at which the student's teacher innovative idea was adopted or accepted within the school system was influenced by how other educators perceived the performance and innovation towards learners.

On the basis of promoting ICT the Ministry of Education launched the South African National Broad band policy of 2013 which is still not beneficial to these schools that student teachers were practising on them. The criterion underpinning composition of the CoP's at universities is not explicit; hence there is formation of the Academics' Community of Practice Network (ACPN) by higher education institutions (HEIs) in South Africa (Jakovljevice *et al*, 2013).

8. Discussion

Distance education is defined differently in various data sources (Green, 2002). The exploratory study yielded crucial features that underpin the greatest challenge of today's student teacher is to cover gaps in both absolute and relative scarcity of 21st Century skills. The minimum targets for all students are to be set, so as to meet skills suitable for the 21st Century and to meet the employment criteria. Skill is defined as "the necessary competencies that can be expertly applied in a particular context for a defined purpose" (HSRC, 2014.p.9). The reflexive competence is noted when the 21st century student teacher is able to integrate or connect his performance with an understanding of the performance of others, so that he /she can learn from her/his actions and be able to adapt changes and unforeseen circumstances (HSRC, 2014). Student teachers have responsibility of managing time since they are studying in their own pace (Hainline, Gaines, Feather, Padilla and Terry, 2010). This culture that the university has inculcated in student teachers will be used also in work environment capacitating learners and other educators too (Waghid, 2002). Universities provided conceptual scaffolding in discipline to enable students to think critically and discover new forms of knowledge on their own (Hainline *et al*, 2010). These technological practises which are more technologically based are the pillars of the 21st Century student skills (Berg, 2002).

Scholars suggested different characteristics of the 21st Century students which are the descriptors of strategies to conquer challenges when they are confronted with complex situations and schools (Green, 2014; Carroll, 2008; Kangai and Bukaliya, 2011).

These characteristics are as follows:-

8.1. Persisting

The student teachers need to stick to their task until they complete it because of their resilience. They utilize a range of alternative strategies as means of problem solving following all research methods systematically.

8.2. Managing impulsivity

Student teachers need to be reflective individuals so as to consider alternatives and consequences prior taking action. This will decrease need for trial and error method since they will be gathering information.

8.3. Listening to others with understanding and empathy

A good listener tries to understand what the other person is saying. A student teacher is expected to develop deeper silence within him / her.

8.4. Thinking flexibly

The student teachers need to have capacity to change their minds as they receive additional data, engage in multiple and simultaneous outcomes and activities.

8.5. Have the ability to think about their thinking- Metacognition)

Student teacher must be able to know and tell when not knowing, becoming aware of ones actions and the effect of those actions on others.

8.6. Striving for accuracy and precision

Student teachers should have value in checking their product review and criteria they have utilised.

8.7. Questioning and posing problems

The student teacher should be the inquirer of causal connection and pose a hypothetical problem.

8.8. Applying past knowledge to new situations

The student teachers should be in the position to abstract meaning from one experience and give it a new meaning.

8.9. Thinking and communicating with clarity and precision

Student teachers need to be effective in oral and written communication, by taking care of using the precise language, strive to avoid generalisation, instead support their statement with quantification and evidence.

8.10. Gathering data through all the senses

The student teachers ought to allow higher thinking order skills always.

8.11. Creating, imagining and innovating

Creative individuals try to conceive problem solutions differently examining alternative possibilities from many angles.

8.12. Responding with wonderment and awe

Student teachers must become efficacious, enjoy working things out for themselves and continue to learn through the presently available digital technologies.

8.13. Taking responsible risks

Flexible people have an almost uncontrollable urge to go beyond established limits.

9. Conclusion

This paper comprised of a literature study and research on the challenges faced by the student teacher during teaching practise at Umkhanyakude district. Formation of WIL will be effective if students, mentors and lecturers truly achieved these educational practices which are critical reasoning; creativity; communication and collaboration. Discussion of the challenges faced by student teachers has generated research interest into understanding what distance education is? Also student teachers are enriched in knowing the characteristics of 21st Century student skills to capacitate depleting student teachers, presently employed educators. Lecturers are conveners of technology. Technologically based educational activities will minimize the constraints of time, place, and pace, thus refresh the mode of teaching delivery to be effective. Understanding the challenges of the student teacher in distance education becomes the necessity for both initial and continuing professional development. Deeper student engagement and learning rest on professional development toward attainment of the 21st Century skills.

The findings of this research are not transferable since research was specific to a small number of particular environment and individuals, it is impossible to demonstrate that the findings and the conclusions are applicable to other populations. However it gave the picture that there is still a role to be played by the CoP's and promotion of connectivity for effective education. The usage of social media will facilitate connectivity, effective mentorship and communication among student teachers. Student teacher's mode of learning and researching which is more technologically based is in great demand among schools at Umkhanyakude district to promote effective education.

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FACTORS (DIS) ENABLING INTERNATIONAL POSTGRADUATE STUDENTS' LEARNING EXPERIENCES IN A SOUTH AFRICAN UNIVERSITY

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Abstract

The voices of international postgraduate students are more often than not missing from the conversation about their learning experiences at the host university. This article draws on an on-going M.Ed. study on international postgraduate students' constructions of their learning experiences in a South African university. It addresses the question: What factors enable and constrain international postgraduate students' learning experiences in a South African university in the 21st century? The study adopted a qualitative approach, drawing on an interpretive paradigm and on participatory visual arts-based methodology, in particular, photovoice, to answer this question. The participants' who are eight international postgraduate students in the M.Ed. and Ph.D. programme the School of Education were purposively selected. The findings suggest a strong sense of enabling learning environments such as: interpersonal relationships among international students, lecturers' support, and learning in an open-resource setting. Another theme which emerged from this study indicate factors constraining international students' learning experiences, namely, poor international-local students' relations, lack of support from the university operation management and other contextual factors international students face over time. The article concludes that international postgraduate students' are highly motivated about their learning experiences and can access various resources from their host environment towards their learning. However, they also point out their dissatisfactions, mainly macro-level forces which have a negative effect on their learning. Furthermore, the article concludes that, the use of photovoice as a participatory visual method may both enable dialogues among students and bring into

visual focus international postgraduate students ideas about their learning experiences.

1. Introduction

Internationalisation in South Africa universities has grown naturally without any national policy framework (Malaza, 2011; Sehoole, 2006). Internationalisation in post-colonial South African context has been fragmented, driven by self-interest and pursued to achieve different goals (Sehoole, 2006). Recent studies have shown evidence of a rapid increase in the growing number of international students in their universities (McGregor, 2007; DHET, 2013). The South African Department of Higher Education and Training (DHET, 2013) asserts that in 2011, 70,061 foreign students were studying in South African public universities, a number which was equivalent to 7 per cent of the total student body. During this period the average increase in international student participation has been 13% per annum (Malaza, 2011). This indicates that the growing number of international students in South African universities is a reality.

The research presented here, focuses on exploring the various factors enabling and constraining the international post graduate students' experiences of learning in the school of education, in a South African university. We further argue that their voices have often been missing from the conversation of their learning.

2. Literature review

Internationalisation is a vital policy issue in the growth of higher education worldwide and most importantly in the growth of South Africa universities. Lee (2008) argues that internationalisation is a remarkable trend in higher education. Knights (2008, p.22) defines internationalisation "as the process of integrating an international /intercultural dimension into the teaching, research and service elements of an institution". Different scholars has indicated that Internationalisation is intensified by globalisation worldwide (Knight, 2008; Neale-Shutte & Fourie, 2006). Meanwhile, Zolfaghari et al., (2009) assert that every higher education institution has its specific rationale for involving in

internationalisation activities. The study by Adamu (2011) notes that the major rationale for internationalisation in institutions both globally and in Africa is to strengthen their research and knowledge production by internationalising their curriculum. Kotecha (2012) in contrast argues that the rationale for the internationalisation of higher education in South African universities in the post-apartheid period is first to prepare students to live in a world that is more connected in both cultural and economic terms, and secondly the need for increased economic development and competitiveness.

Several studies has been conducted internationally and locally on international students' experiences in higher education institutions generally. These does not include international postgraduate students' experiences of learning in South African schools of Education. Generally, international students are regarded as 'foreign students' who left the shores of their home countries in order to gain international knowledge and qualification. International students study abroad to gain knowledge and develop their skills to become critical thinkers and engage in intercultural learning. Thus the goal of internationalisation with regards to international students' is development of their cognitive skills for critical, comparative and complex thinking; cultivation of their capacities for cross cultural communication, and enhancement of their ability to recognize differences and deepen their understanding of themselves, their society and learning styles (Zeleza, 2012).

Despite these objectives, literatures has also shown that international students experience hardship, challenges, victimization and violence in their host countries (Vandeyar, 2010; Tarry, 2011; Graycar, 2010; Mda, 2010; Zar 2009; Sawir et al., 2008; Nyland et al., 2009) and have been seen as 'victims' (Montgomery, 2010) rather than active agents (Gu et al., 2010). Specific challenges faced by them include language difficulties, cross cultural differences, inadequate learning support, difficulty in making friends with domestic students, lack of sense of belonging, discrimination, victimization, academic difficulties, financial constraints and difficulty in accessing academic online resources affecting their learning (Georgiou & Sawidou, 2014; Carson, 2008, Ryan & Viete, 2009; Wadsworth et al., 2008; Johnson, 2008; Montgomery, 2010; Lillyman & Bennet, 2014; Urban & Palmer, 2014).

Additionally, in South Africa international students have been shown to experience challenges such as the exposure to new pedagogies, harassment, xenophobia, low self-esteem, isolation, loneliness, lack of collaborative classroom environment, assessment methods and high medical cost affecting those studying in South Africa universities (Neale-Shutte & Fourier, 2006; Aloyo & Wentzel, 2011; Paola & Lemmer, 2013; Rajpal, 2013;   Mudhovozi, 2011; Ayliff & Wang, 2006; McGregor, 2014). Despite these challenges, both international and local studies has revealed positive learning experiences for example improved knowledge of self-awareness, skills and attitudes (Gu et al., 2010); increased confidence, respect for diversity of cultures, support for one another academically, socially and emotionally (Zar, 2009); enhanced communication skills, development of language skills, enhanced academic motivation, engagement, and achievement (Barnes, 2010); enhanced educational quality (MacGregor, 2014); independence learning (Warring, 2010), increase in employability level in world labour and becoming change agents (Kelly, 2010) and lastly enhanced critical thinking skills (Furham, 2004; McGregor, 2010). Brown and Holloway (2008) also argue that meeting with diverse people helped the international students to enjoy a sense of belonging.

Little in the literature reviewed above, much has addressed the factors enabling and constraining international postgraduate students' experiences of learning in schools of Education. Further there has been little use of photovoice which is a participatory visual method within qualitative research (Mitchell, 2011) as the research method to generate data. Thus, this study seeks to explore and understand international postgraduate students' learning experiences in a South African university, in particular in the Schools of Education by responding to the following question: What factors enable and constrain international postgraduate students' learning experiences in a South African?

3. Theoretical framework

This paper employed the bio-ecosystemic theory of Bronfenbrenner (1994) known as the theory of human development to explore and understand the factors enabling and constraining the international postgraduate students' learning experiences in a South African university. Bronfenbrenner's (1994) explanation of how learning is developed informed the way in which the international students' learning experiences were

explored and the way data were analysed. The bio-ecosystemic framework recognizes the students' as active human beings, who are able to identify critical aspects while explaining and sharing their learning experiences. Bronfenbrenner's (1994) bio-ecosystemic theory provides a framework for identifying and conceptualizing the multi-system factors that influence development.

Bronfenbrenner (1994) argues strongly that individuals do not develop in isolation or a social vacuum but within the systems of relationship (larger social structures of community, economics and politics).The bio-ecosystemic theory further indicates that the world of individuals consists of five systems of interactions which are the following: The microsystem known as the first system of interaction which is where the individuals are directly active and learn about the world. The second system of interaction is the mesosystem which describes how the different parts of an individual microsystem work together for the sake of the individual (Bronfenbrenner, 1994). The exosystem is the third system of interaction which includes the other people and places that the individual may not interact with but have a large effect on the individual (Dersken, 2010).

The macrosystem is the fourth system of interaction that refers to the cultural fabric of the individual's society such as the degree of freedom permitted by the government (Boon et al., 2012). Lastly is the chronosystem which develops as a result of the individuals experiences in his/her life, this includes environmental events, cross-national migration, timing of migration, duration in the host society, and other major life changes overtime; (Bronfenbrenner & Morrison, 2006). This study employed the bio-ecosystemic framework in order to understand the international postgraduate students' experiences of learning and also to indicate how the various bio-ecosystems influence, interacts, interdepend and interconnect having the students located at the centre. Therefore, this framework suggest that all the systems can influence the international postgraduate students' learning and development positively or negatively.

4. Methodology

This research adopted a qualitative approach and drew from the interpretive paradigm using case study research design to gain an in-depth understanding and description

of the factors enabling and constraining international postgraduate students' learning experiences in a South African university. The study used a participatory visual art methodology. The participatory visual art methodology invites people to participate in co-creation of knowledge about themselves (Coles & Knowles, 2008). Khanare, (2012) indicates that variety of techniques are being used in participatory visual methods, for example, pictures, symbols, signs and drawings for people to express their views and disseminate their information. However, this study specifically adopted photovoice which is a "powerful photographic technique that promotes critical dialogue and produces knowledge" (Wang & Redwood-Jones, 2001, p.560). In other words, adopting photovoice in this study might make my participants to become critical thinkers (Wang, 2009; Wang & Red wood-Jones, 2001), enhance their visual skills while actively producing their artefacts (Wang, 2009) and stimulate discussion among my participants (Mitchell, 2011).

A purposive and convenience sampling was used in selecting the location of the study and participants used in conducting the study (Babbie & Mouton, 2009; Creswell, 2009). This study was conducted at the School of Education in a university in Durban. The participants for the study were eight international postgraduate students' doing their M.Ed. and PhD programs; staying at the university residences and also studying for more than two years in the particular university.

4.1. The photovoice process

Data generation for this paper took the following forms: A one day three hours training session was conducted with the participants' in a convenient place chosen by them in the university premises. The training was divided into three sessions for one hour each. The first session is the photovoice workshop and is a brief training on the photovoice process drawing from the guidelines of Mitchell (2008, 2011), De Lange et al. (2006), and Sides et al., (2005). The second session was on photo shooting, in this session cameras were giving to each of the participants' to take eight photographs of their choice that represented their negative and positive experiences of learning. We decided on eight photographs each from the participants making it sixty four photographs in total in order to get a more accurate and rich descriptive data from the interpretations of the photographs using the participants ideas and views on their experiences of learning.

The last session was the photo narration/interpretation session, where the participants interpreted their photographs individually. This was an important session in the process because it elicited the participants' meanings and intentions behind each photograph, while being guided by the following prompts; what do you see here, what's really happening to you here as international postgraduate students and how do you feel about being an international postgraduate students here? This indicated the use of SHOWeD mnemonics (Wang &Burris 1997). However the study suggests that using photovoice to generate data for this study moved the participants' from just talking to action and giving them a voice (see, Khanare, 2012) and stimulated and triggered dialogue/discussion among the participants' concerning their learning experiences. This discussion was audio recoded with the participants' permission.

5. Ethical consideration

In the process of conducting the study, permission was granted from the university in which the research study was conducted. Informed consent was obtained from the participants. Confidentiality and anonymity was ensured, pseudonyms were used as the participants' names and pictures were blurred where there is need. Participants were told to feel free to withdraw from the study at any given time. The guiding ethics in photovoice were adhered to which was against taking photographs of identifiable things (signs, symbols, posters) or people while engaging in the photovoice process (Wang and Redwood- Jones, 2001).

6. Data analysis

The data generated was analysed and interpreted using the thematic approach and the bio-ecosystemic framework of Bronfenbrenner (1994). The data analysis followed Tesch (1990) process to analyse the factors enabling and constraining the international postgraduate students learning experiences. We closely looked at all data (photographs and text) and deduced meaning from the photo interpretation for the emerging themes.

7. Findings and discussion

Using photovoice and focus group discussion as methods of generating data made the students' (participants) engage in a reflective dialogue about their learning

experiences. The section presents the emergent themes on the factors enabling and constraining international postgraduate students learning experiences in a South African university. Six selected photographs and accompanying interpretations were chosen using the thematic analysis to illustrate some key findings in response to the research question guiding this study. Pseudonyms was used to give each international postgraduate student coded numbers (Participant A to H, e.g. PA, PB.) in order to ensure confidentiality and anonymity. However, two themes emerged from the findings of this study. We discuss each of the themes and subthemes in the discussion below:

7.1. Learning- enabling factors in the university environment

The following are results from the visual and textual data indicating a strong enabling learning environment experienced by the participants as discussed below:

The participating international students had a realistic view that the support they get from other people, particularly international students from other countries is a significant aspect of their learning experiences in the host university. All the participants' felt comfortable while sharing their experiences with their fellow international students. In explaining her photo, PA said:

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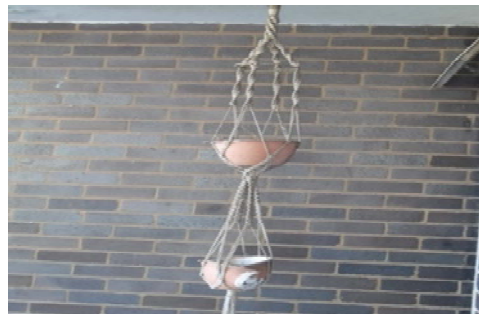
Figure 1: A rope carrying two clay molded pots showing the interpersonal
relationship shared among the international students

"The above picture represents diversity of students and culture from all parts of world. Studying with different international students from diverse cultures and background has widened my perspective and understanding about people/cultures and has strengthened my relationship with people of different cultures and backgrounds".

Some participating international students point out that studying together with diverse culture was helpful to share ideas. For some participants, like participant (PC), he asserts that being with fellow international students provided a sense of belonging for him:

> *"The opportunity to relate with diverse students, the opportunity to relate and communicate with diverse students, to learn from these diverse students, relate with different people and share ideas with them has been quite helpful in developing me and giving me a sense of belonging".*

The data revealed a process whereby individual international students connect with fellow students as they anticipate and cope with their day to day life in the university. As noted in the extracts above, their experiences spans from sharing ideas to interacting with as fellow international students. Thus, creating an opportunity for students to learn each other's culture and experience's in the classroom and beyond. The participants' responses clearly show that they view their fellow international students' as key element in providing sense of belonging. This resonates with the findings of Barnes (2010) and Brown and Holloway (2008) which argue that regular social gatherings and having an exciting opportunity to meet with diverse people help the international students to enjoy a sense of belonging.

An interaction with peers and fellow international students is closely related to the Bronfenbrenner's concept of the microsystem (Donald, Lazarus & Lolwana, 2006). It is in the microsystem that the agent (in this case, it is the international students) is in the friendship circle with other students. The international students were able to share ideas, learn from diverse cultures when interacting with fellow students thereby escaping their sense of loneliness to that of belonging.

The responses from the participants' also implied that interaction did not only take place among international students only according to some of the participants, the university lecturers were identified as significant factor to the international students learning experiences. The everyday presence of the lecturers and their discreet characteristics created supportive environment for some of the international students as indicated by PG.
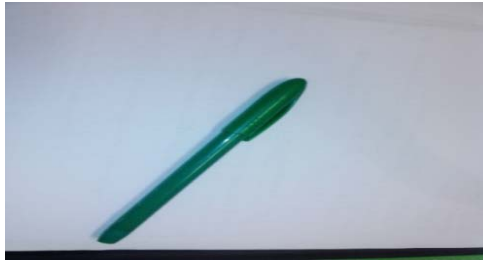
Figure 2: A pen showing lecturer support

"*The above picture depicts the type of support I receive from my supervisors. My supervisor supports me positively in my studies and provides speedy feedback whenever I send my work across to her*".

 Another participant said:

"My supervisor in particular is very helpful and useful to me as they put me through some of the things that I don't know in research. My supervisors also encourages me when I am emotionally down. Their support has brought me this far in my studies". (PF)

The participants clearly saw the lecturers especially their supervisors as a resource to enable learning and they facilitate the international students coping strategies. As a part of creating enabling environment, the international students acknowledged the capacity of supervisors to provide emotional support and encourage students to thrive. The supervisors   who work 'with' and are 'human' are regarded as creating enabling learning experiences for the international students, as indicated by PD who notes that:.

"….*another positive aspect I found here is the way of working with supervisors. I found out that they are human beings like us they try to help me so that I can do what I am supposed to do here*".

In these responses, it is apparent that learning experiences encompass a range of services and university lecturer's responses and ethos are important in creating enabling learning environment that might improve students learning while in the university. The ecosystemic theory (Bronfenbrenner, 1994) indicates that the way significant people interact with the students will have an effect and impact on how the students develops in that environment. For instance, improved learning was created

by lecturers and supervisors with qualities like supportive, motivating, sensitive to international students' needs, and who provided constructive feedback; such an environment provides the students with greater opportunity to improve their learning. The participants' also identified other non-human resources that add to enabling environment in the context of learning in the university. This was indicated by one of PB below:

Figure 3: The students' research commons

"*The above picture represents the research commons and the facilities for example computers, board rooms, internet facilities, and the conducive learning environment which has been very helpful to my studies*".

Another participant said:

"…the availability of computers with internet facilities in the research commons and everywhere in the school premises helps me to search online for numerous books, articles, newspapers, and other resources which has enhanced my academic performance at my own convenience". (PE)

These comments demonstrate that international students may locate assets other than fellow students and lecturers or supervisors to improve their learning. Central to microsystem (Bronfenbrenner, 1994) is the notion of complex interactions –since "human development takes place through processes of progressively more complex reciprocal interaction between active, evolving bio-psychological human organism, objects and symbols in its immediate environment" (Bronfenbrenner, 1994, p.38). Enabling learning experiences, as revealed thus far, were created by access to research commons, computers and internet which directly influences their learning

(Pillay, 2012). The significant thing about the micro system is the notion that the way interactions take place is beyond person to person and involve interacting with the world of symbols and objects; such an environment is said to be significant to international students' learning experiences in the university.

So far, the discussion has illustrated how the use of photovoice through the lens of bio-ecosystemic theory enabled the international students to express their views about the enabling learning environment within the university. The findings indicate the complex degree of reciprocal interaction, interdependence and interrelationships (Bronfenbrenner, 1994) within the students' immediate environment which enables the students to understand their circumstances in relation to their learning. The next section highlights international students' abilities to identify constraining factors within the university setting and its impact to the international students learning experiences.

7.2. Learning- constraining factors in the university environment

As much as positive learning aspects was reported through photovoice, however the participants' were also able to identify various factors they found that were unconducive to their learning. Although in the first theme the students identified a good interpersonal relationship with their fellow students. However in this aspect, some of the students identified poor interaction with local students. In this aspect, the international postgraduate students' identified poor relation with local students as a challenge to their learning experiences in the university. Most of the participants expressed the view that the local students were not friendly to them and that they also made use of derogatory terms (the use of unfamiliar language) to exclude them in the classroom. According to one of the participants' in her photo, she narrated thus:

Figure 4: A classroom sitting arrangement showing poor relationship with local students

"*The picture depicts a classroom sitting arrangement which makes learning difficult while doing group works because the students are mostly South African and they speak the same language. During Lectures students pair or sit in groups according to their culture and language. It is very difficult for me to communicate with these group of students due to language barrier and I always feel so isolated and lonely in the classroom being the only international students in their midst*".(PD)

The international students' indicated that the local language posed a serious challenge to their learning in the university. Most of the participants complained about the use of local language by the local students as a medium of communication which made them to feel alienated in and outside the classroom.

According to one participant he indicated that:

"….here the language issue is very problematic, this is because when you do not speak IsiZulu ehh, it is difficult to be integrated in the community. Ehmm! So there is that kind of hostility against foreigners here". (PH)

Another of the participants also commented that:

"Language is a challenge here because ehmmm most of the people we had in our classrooms where people that are from black South Africans which their medium or mode of communication is their local language which is IsiZulu, so it was difficult to break into their cycle". (PF)

The data revealed that despite the participants' experiencing a good relationship with their fellow international peers, relationship with the local students was fraught which is because of the issue of language. The participants' responses revealed that their learning experiences was affected as they felt excluded and alienated within their host environment due to language issue and the study also revealed that the local students were unfriendly to them. The responses from the students clearly shows that they view the poor relationship with the local students as negatively influencing their learning. This resonates with the findings of Mudhovozi, (2012), Vandeyar, (2010) with Brown and Holloway (2008) which revealed that language issues experienced by the

international South African schools caused alienation, loneliness and lack of sense of belonging.

To reiterate, Bronfenbrenner (1994) has shown that in the microsystem, the relationship existing between international students and their local peers (agents) is determined on the way they are being treated by the agents. In this aspect, in the microsystem when the agent and environment is hostile, the international students reciprocates with hostility because they active beings and not passive beings. Therefore, due to an unconducive learning environment caused by the agents (Local students) who are unfriendly due to the use exclusionary practices affected the international students learning negatively. In addition, the data revealed also that the constant absence of the international students' officers and their lack of administrative support to the international students also created an unconducive learning environment for the students.

Most of the participants identified that the lack of support from the university operation managements in particular the international student's office/officer whenever their support was needed also contributed negatively to their learning. One of the participants' (PB) in her pictures explained thus:

Figure 5: The international students' locked office door.

"This picture depicts the international students' office which is always locked. As an international student, no one from the office is always available to assist or support us if we are having challenges here on this campus and this has impacted negatively on my learning".

Another participant's response is as follows:

> *"The international office is just a monument, we don't receive any information from them, no help from the international office"* (PH)

More so, another participant responded:
> *"I don't understand the duties of the international students' office, they are not there to help us international students when we have issues or problem."*(PE)

The comments from the participants' showed that other than the hostility of the local peers, internationals students' experiences some other factors in their university environment which negatively affected their learning. The constraining learning experience as revealed here showed the international students' office locked door and the lack of assistance offered by them to the international office when they have issues or assistance which negatively impacted on their learning. The bio-ecosystemic theory indicates that the international students' development takes place within a complex reciprocal interaction in their immediate environment but when this agency (university managements) refuses to support them, the international students learning becomes negatively affected (Krishna, 2010). This support the findings of Amaechi et al., (2013) who indicated that the university management's role is to support and provide a positive learning environment for their international students and this is by including them in social activities and introduction to peers and academic staff. More importantly Bronfenbrenner (1994) indicates that the mesosystem (the university system) helps to connect and interact with other systems for the individual sake and when it fails to function properly the individuals learning (international students') and human development becomes negatively affected.

The study also revealed that all the international students' identified the new immigration policies, and the delay /non-issuance of their students' visa and permits as a contextual factor beyond the university environment that has negatively affected their learning too. As one of the participants narrated in his photographs below:
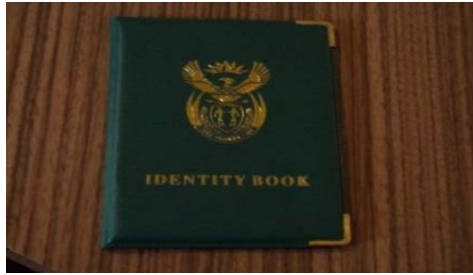
Figure 6: An Identity book back cover showing contextual factors affecting international students learning.

"*This Picture depicts the immigration policy of my host country. Their policy is not friendly to foreigners most especially to people like me who are African international postgraduates' students. Due to the new South African immigration policy, my students' visa/permit which I had applied for renewal has been delayed for more than six months now. This issue has restricted my movements and has affected my learning negatively here at this university. Without the study permit, I am not able to continue my studies here".* (PB)

Another of the participants' also indicated:

"This countries policy generally is affecting those of us that are foreigners and through these policies, institutional xenophobia is promoted". (PA)

More so, one of the participants also noted:

"*The immigration laws are anti-foreign and as a student that is very disturbing because if you think about not having a valid document as a student you cannot be productive. So it is very problematic and it really disturbs our mind".* (PC)

The above comments showed that due to the new immigration policies of the host country, the international students experienced delay in their study visa/permits; their movement became restricted and are psychologically affected by this challenges. In this aspect, the study revealed that the participants' learning were affected negatively which made them to become unproductive. Central to the macrosystem, the systems (new government policies) imposed in an individual's location can act as a powerful influence (Positively or negatively) on the individuals' lives (Boon et al., 2012). In this case, due to the new immigration policy that was imposed on the international students, their learning and lives have been negatively influenced. The findings from

this study concurs with Majyambere (2012) study and Rajpal's (2013) study which identified that the difficulty in getting study visa/permit affected the international students' studies in South Africa universities.

Therefore, this section has clearly identified through the use of photovoice and the bio-ecosystemic theory, the various factors in which the international students revealed as unconducive in their environment and which affected their learning negatively in the university. The findings showed firstly; poor relationship with local students; secondly, lack of support from the school operations management and lastly contextual factors such as students permits and immigration policies that affected the students' learning negatively.

8. Conclusion

The findings from the study showed that using photovoice enabled the international postgraduate students to voice out their views and perceptions concerning their learning experiences in their environment. The result of the study revealed a strong enabling learning environment for the students to develop and construct their own learning. The international post graduate students 'were highly inspired by the facilities and support they got form their lecturers and supervisors and were able to access a range of resources placed in the university environment that enhanced and impacted positively on their learning. On the other hand the study also revealed several negative factors which influenced the international post graduate students' learning experiences as they expressed their dissatisfactions about them. This was most especially on the contextual factors (immigration policy) which has negatively impacted on their learning. Therefore this suggest that incorporating photovoice which is a participatory visual method provided an opportunity for the international postgraduate students' to actively engage in a reflective discussion concerning their learning experiences, This gave them the opportunity to bring into visual focus access to their learning experiences.

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ASSISTING STUDENTS WITH DISCIPLINE-SPECIFIC LITERACIES IN SCIENCE: A RESPONSIVE TEACHING AND LEARNING APPROACH

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Abstract

Students entering university become members of the university community as they become part of a Community of Practice regarding teaching and learning. They need to acquire and use distinctive language and appropriate discourse conventions and practices peculiar to disciplines, gain competence, develop identities and become members of discourse communities. This presents challenges for many students studying science in higher education where the Language of Learning and Teaching (LoLT) is English, and for whom English is a second or additional language. Such students have to immerse themselves in two social practices, i.e. learning a new language; and science which has its unique set of rules and language. Language of science and its study in Higher Education (HE) involves reading, writing, conversing, computing and practising science. Explicit use of visual representation, academic language and scientific writing is used to engage students in scientific discourses and gain scientific knowledge. The paper draws on a PhD study at University of KwaZulu-Natal (UKZN). A key question in the study was how disciplinary specialists assist the BSc4 (Foundation) students to acquire discipline-specific literacies for science discourse. Data was yielded through interviews, observation and documentary

evidence. Findings showed how disciplinary specialists shift towards critical understandings of teaching discipline-specific literacies. Academic literacies play an important role in students' conceptual development, moving towards integrated approaches to teaching which are crafted in practice.

Keywords: Discipline-specific literacies, discourse communities, language of Science

1. Introduction

Teaching pedagogies are evolving phenomena in HE, giving credence to learning in current socio-economic and cultural contexts. Designing and implementing curricular based on HE learning approaches is fundamental to ensuring enhanced learning across disciplines. Outcomes of modules taught in HE should be reflected in teaching methodologies. The purpose of higher education institutions is therefore to provide a platform for understanding and critically engaging in various discourses. In this paper, the authors submit that the language used in science discourses, focusing on the linguistic style and repertoire of how it is communicated, can have major implications for the quality of the learning outcomes for students if it is not understood clearly. It follows then that a rethinking and re-imagining of the language of science should involve a reconsideration of the pedagogical styles in teaching science so as to maximize the learning potential of those whose first language is not English (Brand, 2003).

1.1. Study background

Communication in Science (SCOM) offered in the foundation programme promotes literacies *in* and *for* science. Its content from journals and textbooks may be rewritten and adapted to suit students' needs[1]. Reading and comprehension of science are taught through "scaffolding" (Vygotsky, 1978a and 1978b). Rose, Lui-Chivizhe, McKnight and Smith (2003, p. 41) define 'scaffolding' as support that teachers give learners so they can work at much higher levels than is possible independently. Scaffolding enables learners to successfully practise complex skills. SCOM teaches

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[1] In the study, student distribution by home language in FP was: isiZulu: 86.04%; Xhosa: 5.81%; Swati: 2.32%; English: 1.93%; Sotho: 1.93%; Tsonga: 0.77%: Other Black Language: 0.77%; Ndebele: 0.38%).

scientific genres i.e. report writing, academic essays, and oral presentations. The issue of discipline-specific literacies 'outside' SCOM, in foundation science modules in the FP was explored.

1.2. Rationale for study

Students in the FP in science need to acquire the discourses of reading, writing, doing and speaking science. In essence, disciplinary specialists (DSs)[2] serve as agents who convey such discourses. Scientific literacy enables individuals to develop sound understanding of scientific facts and scientific inquiry process, and an awareness of the relationships among science, technology, and society (Bauer, 1992). It is important to ascertain the DSs' efforts in paying attention to discipline-specific literacies; and how they assist FP students to become scientifically literate. It is within this understanding that this study explored how DSs assist FP students in the acquisition of discipline-specific literacies for science discourse.

2. Conceptual and Theoretical Framework

In the conceptual framework, the authors highlight the approach and methodology used by disciplinary specialists when teaching the language of science. Their intention is to contribute to retention of information, increase self-esteem and stimulate cognitive achievement whilst clarifying material and helping students to appropriate knowledge transmitted to encourage teaching and learning (Hlatshwayo, 2013).

New Literacy Studies (NLS) (Street, 1984 and Gee, 1990) views literacy as social practices rather than the acquisition of skills (Street, 1984). "NLS takes a socio-cultural view of literacy, emphasizing the description of literacy practices of everyday life, and challenging approaches which emphasize decontextualised basic skills" (Stephens, 2000, p.10). NLS argues that literacy is not a socially-neutral technique, but a socially-embedded practice (Street, 1984; Collins, 1995). NLS is relevant in this study since it views literacy as a practice; is embedded in social practices; and contextualises ways in which teachers and students interact (Street, 2003).

Street's (1995) ideological view of literacy which falls under NLS is the basis for the theoretical framework of this study. This view of literacy emphasizes the contextual

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[2] DSs are disciplinary specialists who teach foundation modules in science.

nature of literacy practices. This is relevant as research was undertaken in specific contexts of science modules. Acquisition of literacies in science helps students gain scientific knowledge in reading and writing; creating spaces to acquire practice in science meaning and discourse.   In this paper, some key concepts relating to the language of science and discipline-specific literacies are unpacked.

3. Literature Review
3.1.   *Discipline-specific literacy and science discourse*

Students entering the HE environment need to become familiar with academic reading and writing which contribute effectively to higher learning but do not imply having achieved literacy. The traditional view of literacy as being able to read and write has been challenged since "what one reads and writes, and how much ability in reading and writing is required to be considered literate, are unanswered" (Roberts, 1995, p.143); and it does not "honor the role of listening, speaking, and experiencing in the comprehension and understanding of texts" (Draper, 2002, p. 359). New understandings of literacy (Draper, 2002; Street, 2003 and Lee, 2004) have extended its meaning to encompass more than the ability to read and write. Concepts of literacy have thus evolved from being viewed as single and monolithic to multi-faceted practices shaped by context, culture, participants and technology.

Green's (1988, p. 160) three dimensional view of literacy i.e. operational, cultural, and critical bring together language, meaning and context. The operational dimension is being able to read and write in a range of contexts; the cultural aspect is understanding texts in relation to contexts, and the critical dimension deals with socially constructed nature of all human practices and meaning systems. Integrated views of literacy in practice and in pedagogy address these dimensions simultaneously. This study seeks to understand the acquisition of discipline-specific literacies in science in a university foundation programme.

For science, students require disciplinary literacy which involves "reading, reasoning, investigating, speaking, and writing to form complex content knowledge appropriate to particular disciplines" (McConachie and Petrosky, 2010, p.16). Rainey and Moje (2012) state that students need disciplinary literacy for thinking, knowing and communicating disciplines; and teachers should reveal underlying practices, values and assumptions of disciplines to allow for student engagement, enabling them to become disciplinary insiders.

Students in HE need to acquire discourses. For Gee (1990, p. 143), discourse does not only include ways of speaking, reading and writing, within particular contexts, but also ways of behaving, interacting, valuing, thinking and believing that are acceptable within specific groups of people in particular contexts. This definition is relevant in this study as students need to acquire appropriate discourse in science; to acquire an identity in science; and become members of the discourse community of science. They need to acquire, develop and learn academic discourse, which Duff (2010, p. 175) refers to as genres, registers, graphics, linguistic structures and interactional patterns usually linked to specific disciplines.

3.2. Language in and of Science

Science at HE involves reading, writing, conversing, computing and practising using visual representations (e.g. figures, diagrams, symbols, formulae, tables and pictures); being exposed to academic language and writing. Science is a source of objective knowledge (Wellington and Osborne, 2001, p. 65), without narrative, personal, subjective, emotional and figurative writing. Science uses specific vocabulary and grammar to describe complex ideas and abstract concepts (Zwiers, 2008, p. 20). It is dense with technical and non-technical words. The latter has meanings in everyday language with precise and different meanings in science (Cassels and Johnstone, 1985).

Research in foundation mathematics by Pillay (2009) illustrated understanding mathematical register and discourse for communication and interpretation, highlighting collaborative learning to facilitate and improve mathematical skills and knowledge. Bohlmann and Pretorius (2002) explored mathematical competency and reading proficiency; while others (Feltham and Downs, 2002; Downs, 2005) explored

answering short questions and essays in biology; students' difficulties with problem-solving (Drummond and Selvaratnam, 2008); and misinterpretation of questions in science (Dempster and Reddy, 2007).

4. Methodology

This study was conducted using interpretivism, where people define the world according to their subjective experiences; and behaviour depends on context. It was conducted in the specific context of the BSc4 (Foundation) programme in science; the research site being UKZN. Interpretivism provided the opportunity for voices, concerns, perceptions, attitudes and practices obtained through interviews and observation. The qualitative approach in a single study was used. Documentary evidence and observation corroborated data from interviews. Triangulating data increased accuracy of data collection, providing a holistic understanding of phenomena. The study provided descriptive, detailed data; enabling the situation to be seen through participants' eyes. The purposively sampled population was the disciplinary specialists teaching foundation modules in science.

4.1. Case study (UKZN)

A PhD study in the BSc4 Foundation Programme (FP) in science at UKZN showed samples comprising disciplinary specialists as research participants. Disciplinary specialists (referred as DSs) taught foundation modules in science i.e. biology, chemistry, mathematics and physics. The study demonstrated how students are apprenticed into science; using the qualitative approach with multiple sources of data from interviews, course manuals, laboratory workbooks, reports, tests, lectures and tutorials.

4.2. Ethical considerations

Permission was obtained from line managers to undertake the research. The purpose and nature of the study was communicated to participants, requesting voluntary participation with signed consent forms. Interviews, observations and transcriptions informed the study including access to documentary evidence. Participant confidentiality was ensured.

4.3. Disciplinary specialists' interventions

Engagement with disciplinary specialists evidenced attention to promote discipline-specific literacies in science in FP using different methods and approaches. These were in response to challenges experienced by the FP students. These were comprehension of scientific texts, scientific vocabulary, interpreting questions, quantitative literacy, summarising, report writing and scientific grammar. Disciplinary specialists devised mechanisms to address these challenges and promote the acquisition of discipline-specific literacies in science. Henceforth, follows a discussion of such mechanisms.

5. Findings and Discussion

Data in respect of discipline-specific literacies for science indicated reference to lexical and grammatical features of reading and writing. To assist students, data illustrated how some DSs emphasized spelling and vocabulary acquisition, as conveyed by DS1[3]: *' if a language issue comes up – a word they don't understand or can't spell, we discuss it".* In this study, 70% of DSs considered assisting FP students to develop control over vocabulary as important because of technical/non-technical words.

In a foundation biology practical, specific attention was paid to technical words (e.g. 'kelp'; 'corals'; 'anemones') that were context-specific to marine organisms; and technical words (e.g. 'detritivore'; 'chromatophores') that were discipline-specific. Students acquired relevant scientific technical vocabulary to access science content in the practical involving interaction amongst peers, DS and demonstrators. This methodology maximised the objective of acquiring discourse practices of "knowing", "doing" and "talking" science (Lee and Fradd, 1998).

Most of the specialized technical words DS2 focused on were in the foundation biology manual. The glossary in biology was "*an easily accessible mechanism to extend, acquire and reinforce scientific technical vocabulary specific to biology"* (DS3); intended to *"correct the misconceptions brought from school"* (DS4); and encouraged students to *"add new, unfamiliar words"* (DS2). The foundation mathematics glossary

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[3] The responses of DSs have been italicised.

helped students grasp key words (e.g. 'respectively') frequently used in mathematics. It was explained thoroughly in the beginning of the semester and was to be used as a reference guide. Students were initially provided with few concepts and symbols; they extended the glossary as they engaged with more concepts e.g. prove, show and verify.

Kirkwood (2007) states that it is not always technical words that cause problems in reading texts but also general academic and ordinary everyday words. Research (Cassels and Johnstone, 1985) shows everyday words can have precise and different meanings in scientific contexts. DS4 recounted the approach used to link an everyday word to the context of science. "*I wanted to find out if students knew the meaning of 'efficiency'. I showed them the different forms of the word and I discussed its meaning*". 'Efficiency' is a common, everyday word, and DS4 needed to clarify its meaning in science to facilitate understanding of the catalytic efficiency of enzymes and its role in chemical reactions. DS4 explained 'efficiency' in terms of its phonology, morphology and semantics.

5.1. Encouraging student participation

Lemke (1990, p.1) advocates "learning to talk the language of science" which helps to communicate scientific knowledge. DS5 outlined oral discourse in foundation mathematics: *"I like peer teaching and learning. To get students talking, I give them turns to explain on the board. I then understand how they are thinking – is application correct? I clarify, reteach. Sometimes peers correct them".*

DS5's pedagogic practice allows students to show understanding through engagement, encouraging oral communication. Since mathematics is cognitively demanding, students require Cognitive Academic Language Proficiency (CALP)[4] (Cummins, 1979). Demonstrating conceptual understanding, strategic competence and adaptive reasoning is paramount (Kilpatrick, Swafford and Findell, 2001, p.116).

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[4] "CALP is context-reduced communication relying primarily on linguistic cues to meaning" (Cummins, 1984b: 136). There are fewer non-verbal cues; language is more abstract.

The situation in DS5's class reflects students' progress through Vygotsky's (1978b) Zone of Proximal Development (ZPD)[5]. DS5 used peer teaching and learning as a pedagogic practice - focusing on teaching; and students learning from each other.

5.2. Overcoming reading challenges

The data revealed that 25% of DSs used teaching time to enforce reading while 31% focused occasionally on reading, especially when paying attention to specific concepts; locating or clarifying information in texts. Forty four percent of DSs did not focus on reading due to time constraints, voluminous content and expectation that students read independently.

Foundation biology has extensive reading texts that students needed to read and comprehend for laboratory practicals, which incorporate theoretical knowledge. DS3 explained using some time in the practical for reading literacies: *"Sometimes students complain they don't know where to get answers. I read with them, we highlight together; showing them how to get answers".*

DS3's approach is characteristic of "learning to read and reading to learn" (Rose, 2005). There is explicit modelling of two significant literacies: reading and reading for comprehension. This focus goes beyond fluency and articulating written words; based instead on ability to comprehend. The method helps students to jointly distinguish between essential and peripheral information, and organize information into specific categories. DS5 helps to guide and apprentice students into the discourse of science and shows student progress through ZPD. The students in the situation are at Stage I of ZPD (Vygotsky, 1978a) with limited understanding of locating answers in the text. DS3 - the more competent other - guides them through learning processes of reading, comprehending and extracting answers from texts to help complete tasks. DS5 models learning, enabling the students to reach Stage II: without assistance. It is between these two stages that the ZPD (Vygotsky, 1978a) occurs and DS5 is hopeful with time*, "they will learn to find answers on their own",* and completing the task will be internalized; a learnt process. Devoting time to reading and showing students how

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[5] Zone of Proximal Development (ZPD) is the theoretical underpinnings of scaffolding as a teaching and learning strategy. ZPD is "the distance between actual developmental level as determined by independent problem solving and level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978b: 86).

to locate answers in more difficult texts, DS3 helped students progress from "other-assistance to self-assistance" (Gallimore and Tharp, 1990, p.183).

DS7 created an interactive learning atmosphere urging students to read aloud and rephrase foundation chemistry content. This approach forced students to engage with texts, develop confidence in reading and speaking, highlighting reading proficiencies and comprehension abilities.   DS7 thus addressed confusion, misinterpretations and inaccuracies. This helped students acquire disciplinary discourse, become members of the discourse community; and talk science (Lemke, 199, p.1).

5.3.   Assisting with Writing

To *curb "memorising of equations and formulae"* (DS8), and to eliminate the perception that physics is about learning fixed rules and equations that can be applied to a question, the following question testing students' conceptual understanding was given:

> A scheming business man buys gold by weight at a higher altitude (height above sea level) and sells it at a lower altitude at the same price per weight.
>
> Write a brief explanation to the public protector on how the business man is making a profit.
>
> (Foundation Physics: August Test, 2011, p. 2)

DS8 justified including a question instructing students to provide an explanation for their answer: *"In foundation physics students bring concepts of mathematics into physics. They like you to write the equation on the board. With some questions, you have to explain your answer. They need to understand why they are doing calculations".*

Justifying answers was a way of demonstrating conceptual knowledge and reasoning, showing evidence of understanding. This is Comprehension Level II of Bloom's Taxonomy (Bloom, Englehart, Furst, Hill and Krathwohl, 1956). Van Heuvelen, (1991) states that students could learn to think like physicists when given opportunities to reason qualitatively, making use of translations from verbal and pictorial representations.   This points to helping students become members of discourse communities through written explanations, and a way to encourage writing in physics.

One way FP students have been apprenticed into scientific report writing conventions is through scaffolding. In foundation biology, scaffolding is used as an instructional strategy teaching students how to compose and produce scientific reports, a "goal-oriented activity" (Martin, 1984, p. 25). The scientific report involves theoretical and practical work, using procedural language to explicitly and objectively describe scientific phenomena.

Some DSs have been implementing practices to foster learning in science. Since the scientific report is a key genre, foundation biology used explicit modelling as a form of scaffolding to teach it. Micro level scaffolding (Wells, 1995) to teach students to understand this genre included giving students *"examples of good and bad scientific reports"* (DS2), as seen below.

Examples of both badly written and well written reports are given in the following pages. The well written report will give you a good example to model your own report writing on. In tutorial groups you will have to identify all the mistakes in the badly written report.
(Foundation Biology, 2011)

In foundation biology there is evidence of explicit attention to necessary literacies to compose scientific reports. This included explicit definitions of specific scientific terminology (e.g. 'hypotheses', 'variables') with appropriate short tasks to test understanding of terminologies (Appendix 1).

Explicit modelling guides, supports and apprentices students into the academic discourse community. It mediates learning. The strategy in foundation biology to reinforce the report genre satisfies transfer of learning and the need to make discursive practices visible and meaningful.

5.4. Concept mapping benefits

Language of science is perceived as difficult to teach and learn because it consists of a myriad of unfamiliar concepts relating to complex relations (Schmid and Telaro, 1990, p. 78). Concept mapping can help students organize concepts into meaningful discussion as opposed to loosely connected entities. A concept map depicts hierarchy and relationships amongst concepts and requires one to switch back and forth

between different levels of abstraction (Ault, 1985, p. 38). Unlike rote learning methods, concept mapping permits variation in the right answers.

Maps permit comparison of students' understanding with expert knowledge. They improve understanding by searching personal meanings for misconceptions or incorrect relationships among concepts, and illuminate insights into elementary concepts. They enhance opportunities for meaningful learning (Ault, 1985).

The study highlights using concept mapping strategy. DS9 explained that in foundation physics, concept mapping was a form of visualisation that helps students create a summary of key concepts. In a 'Mass and Other Balances' lesson, DS9 used the concept mapping task (Appendix 2) to link relevant concepts learnt. Lesson progression exemplified that of Vygotsky (1978a): the DS worked with students to mediate their understanding of concepts and construction of knowledge, then allowed for interaction with other students, and finally encouraged independent work. This assisted students to understand key concepts. The concept mapping task was a summary of learnt concepts.

Concept mapping is a tool to engage students and mediate learning. It is essential when subject matter is abstract and there are numerous concepts to be acquired, understood and learnt. It allows tutors to see what kind of conceptual categories and links the student is generating, and helps him ascertain the actual level of development so he can work within ZDP to push that development (Angélil-Carter, 1994, p. 132).

5.5. Creating Communities of Practice

Communities of Practice (COP) emanates from knowledge management discourse. COP is used in diverse contexts. Notions of learning and knowledge building are located within reservoirs of skills and competencies, producing outcomes translated to benefits for all. Need for building physical and intellectual spaces for the enhancement of students' learning, is a significant aspect of COP. Garrison and Anderson in Nagy and Burch (2009, p. 233) suggest that the value-add in a knowledge-based space will be a learning environment that develops and encourages continuous learning independently and collaboratively. Thus, building COP is a medium to promote higher order thinking and knowledge building.

The study included nuanced aspects of teaching and learning *vis-à-vis* COP which includes expanding learning boundaries, preparing students for the real world, teaching content and literacy; and collaboration amongst discipline specialists.

6. Conclusion and Recommendations

Literacy should not be seen in isolation. Students need socializing into discourses of disciplines by learning ways of speaking, reading and writing within particular contexts. Ideally, discipline-specific literacies should be taught with content so students can understand relationships. As evidenced in data, DSs can take responsibility to make learning discourses and literacy practices explicit. DSs focused on discipline-specific literacies acquisition in science through concept mapping, scaffolding, learning by imitation, and modelling. These satisfy NLS by creating the space and understanding of contextual nature of literacy practices; apprenticing students in science discourse.

Greater engagement and collaboration among DSs teaching foundation modules and with academic literacy facilitators are vital to produce graduates with scientific knowledge and grounding in scientific communication. DSs need to continually take cognisance of readability and comprehensibility of texts and notes for foundation students and take responsibility to make their own discourses and literacy practices explicit. Students also need to write more intensively in science.

Whilst this paper focuses on the language of science, the approach can be replicated across other disciplinary fields where content is often challenging e.g. Economics, Finance, Accounting and Taxation. Through such contexts, the purpose of academic literacies can be explored in ways enabling students to engage with disciplinary content. Similar studies can be replicated in mainstream HE environments among native speakers of English students.   What matters is the willingness of educators and learners to explore new teaching approaches to maximise learning outcomes in HE modules. Creating a dialogue and interchange between DSs and students using approaches that simplify yet stimulate learning the language of science is an important *caveat* towards enhancing studying and learning discipline-specific literacies and creating discourse communities. The authors are of the view that discipline-specific

literacy acquisition needs to be explored from the perspective of students, especially those for whom the LoLT is not a native language.

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Note:

ETHICS AND LEADERSHIP: DEVELOPING A UNIVERSAL CODE FOR AN EVOLVING AFRICA

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Abstract

Africa is currently challenged with an eroding ethical leadership base across the continent. The foundation of past ethical thought and exploring authoritative sources has led to a general understanding and consensus of what ethics should subscribe to. Africa, and South Africa in particular, is at a junction where the quest for a renewed spirit and united front for re-establishing an ethical foundation is eminent. Higher education and evolving curriculum in typical leadership programmes is important in sewing a 'golden thread' throughout every curriculum thus portraying the critical importance of a renewed thrust in strategic community development globally. To solve the current dilemma that is fragmenting the continent regarding the degeneration of ethical conduct amongst current leadership in Africa, the paper undertakes to concentrate on possible models and the essence thereof for innovative ethical solutions to emerge. Developing higher education global systems and critically evaluating policy, practice and its evolving implementation that incorporates a paradigm of thinking that not only takes into account the past (in-the-box thinking), the current evolving 'outside-of-the-box' thinking but explores a shift that encourages

teaching, learning and innovation with a renewed higher education basket of tools. The ultimate journey is a new focus on a shift toward 'without-the-box' thinking for further development in higher education using a learner-centred approach in a flipped classroom environment thus encouraging a renewed ethos embedded in an innovative future professional that should emerge. The outcome is a renewed approach to revitalise higher education in a fast and vibrant technological global environment, encouraging a new generation of dynamic, strategic African leaders that can address the on-going evolving sustainable development leadership challenges which are currently fragmenting and destabilising the continent.

1. Introduction

Scholars' interrogations of Africa's predicaments reveal that its embattled development is constrained by lack of positive, ethical and public leadership. This has deterred the citizens' interest and trust in the state. Agyeman, an African scholar, emphasises the following: "If we were to be very honest with ourselves, we surely would not find it too difficult to be convinced of the fact that Africans have been irresponsible and harmful to Africa in terms of self-governance" (Agyeman, 2003, p. 276).

The idea of unresponsive governance is demonstrated in the leaders' impassive, indifferent and languid attitude towards the concept of citizenry as the real basis for governance. Africa's common experience has been that of leadership who do not recognise the difference between the public funds and their private funds (Agbude & Etete, 2013, p. 484).

In Africa, there are a myriad of examples in which problems arising from poor leadership are recorded. These problems result in the underdevelopment of most African nations and hardship in the lives of its people. Consequently, one sees among many countries seeming disillusionment and the desire for a better life by plotting to overthrow the government. As such, and especially more recently, there have been some revolutionary movements against the governments of various nations in Africa, as witnessed in Libya, Tunisia and Egypt (Okoye, 2013, p. 21).

Strategic leadership models focusing on an ethical foundation can contribute to the development of new developing sectors and assist leaders globally with their future challenges. A triple-bottom line approach can realise the fact that not for profit, does not necessarily mean not for gain. This means that reporting should take into account all economic, social and environmental issues (Institute of Directors in Southern Africa, 2009). The King III Report acknowledges the importance of stakeholders and sustainability reporting. According to the King III report, "reporting should be integrated across all areas of performance". The inclusion of three parameters: economic, social and environmental, is consistent with the triple-bottom line reporting requirement that companies and organisations need to display a corporate conscience in respect of social and environmental sustainability. Business ethics and corporate governance issues must take into account future generations. An inclusive, stakeholder-centred approach towards corporate governance in South Africa is contained in the corporate governance guidelines which is indicative of a fair representation of corporate governance on the African continent as a whole. Ethics and Leadership thinking 'without the box' (Rippon, Indermun, Asmal, Mutobola, Matsongoni, Moodley & Khan, 2014) is now the order of the day and evolving Higher Education models need to take into account the graduate attributes to be developed so that we can remain in harmony with developmental changes, not only locally but globally as well.

The management of educational institutions is often performed by participants in public or private organisations from within their communities. Unethical behaviour can often result in low levels of participation and performance by participants nominated to manage and efficiently implement professional activities, projects and programmes, provide benefits and service their community citizens successfully.

2. Background to the problem

Ethical and leadership models need to be developed to support new trends for change locally, across the continent and globally. The current dilemma that is fragmenting the continent has resulted in the degeneration of ethical conduct amongst current leadership in Africa.

According to Choudaha (2014), transparency through data reporting and information sharing is an important policy. Higher education institutions lack transparency in their policies. In many instances, this results in low levels of participation, commitment and performance within these educational institutions. The rigidity of these structures in an immovable state results in an indeterminate position. This leads to an inability to adapt to change. Regulatory bodies in higher education must manage these institutions more closely as many critical issues of concern are currently dealt with by these institutions.

In counties across the globe, civil society supported by governments, plays a critical role in transformation processes that affect a variety of existing and newly developing educational systems. The ultimate community challenge is to ensure sustainable development to efficiently manage a variety of educational resources. This can only be completed if a common value system is agreed upon. The desired sustainable community development objectives are not being achieved. Figure 1 illustrates strategic management principles and processes in community development at grass roots level which are key for African ethical leadership. Integrity is an integral characteristic of leadership principles. Thoughts on leadership, management and how they pertain to innovation and enterprise survival with regards to African leaders seeking a bottom-up approach centred around ethics and integrity-testing.

Figure 1: Ethics and leadership: Evolving Curriculum for Africa highlight attributes of a good leader. Source: Adapted from Leadership and Innovation (Abolrous, 2010, p. 1).

3. Aim and objectives

Many communities across the globe are not applying best management higher educational practices for sourcing and allocating available resources. To achieve the desired results more efficiently, this paper will concentrate on selected educational best practices and innovations. Community leaders can utilise these practices as a roadmap with tools for facilitating future Strategic Community Development throughout the world.

To achieve these objectives globally, educational institutions may rely on innovative models to develop future teaching and learning practices in order to achieve a common value system.

This paper further aims to provide community leaders with a clearer understanding of how developing leadership and ethics, can vastly assist communities in South Africa, Africa and provide for innovative trends globally for that matter.

New strategies and educational models can develop leadership practice in ethics whilst efficiently managing community resources. The evolving nature thereof is an incremental learning process, if applied well, can assist with achieving sustainable development in communities globally for generations to come. Community leaders need to be sensitive towards developing the community in a responsible manner for the next generation.

The following objectives have been identified for the study:

- *To develop an understanding of the extent of the ethical and leadership dilemma on the continent of Africa based on past and present data.*
- *To design and develop innovative educational models to address the challenges related to ethical leadership and higher education in Africa.*

4. Literature review

Literature in support of the paper includes references from local, regional and international sources which include books, journal articles, reports and literature from newspaper articles related to ethics and leadership. Personal observations found by

each of the authors that reflect on the past findings, current research and future trends envisaged have been taken into account.

According to the Department of Social Development (Codes of Good Practice for South African Non-profit Organisations, 2001, p. 5), community life in the South African democracy is defined by three distinct groups of organisations which have important impacts. These are the State or Government, private enterprise or the business sector, and Non-profit Organisation sector made up of a few or a number of individuals in the community who agree to act together for common purpose.
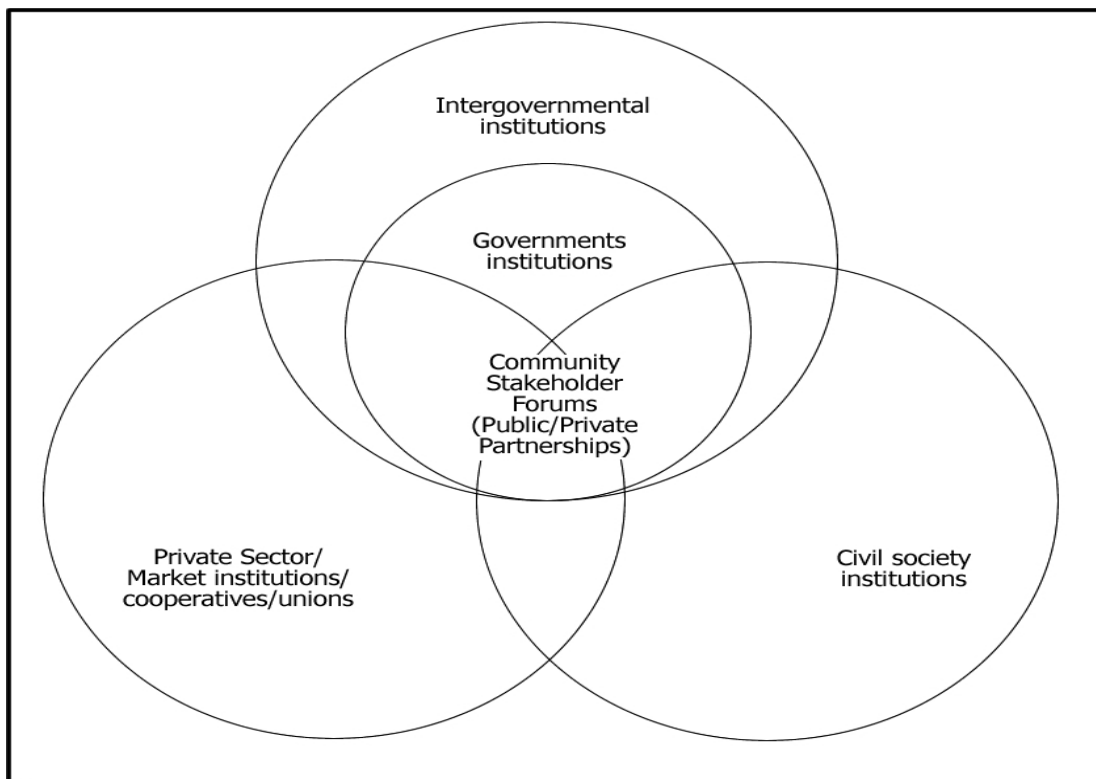

Figure 2: Sustainable Development Triad. Source: Adapted from (Dalal, Clayton & Bass, 2002, p. 186).

In Figure 2 change and transformation processes affecting an integrated number of existing and newly developed community environments must be supported by civil society and local government in South Africa. Civil society includes the activities of individuals and organisations in communities. These activities include developmental, religious, cultural, social, economic, environmental, and political.

A global paradigm shift must be set in motion in order to encourage community uplifting processes. The emerging bottom-up fulfilling a top-down design set out in the National Development Plan (NDP) by specialists displays a formulated strategy. This strategy entrenches the legacy and principles of Nelson Mandela thus making every day a Mandela Day and not just on 18th of July.
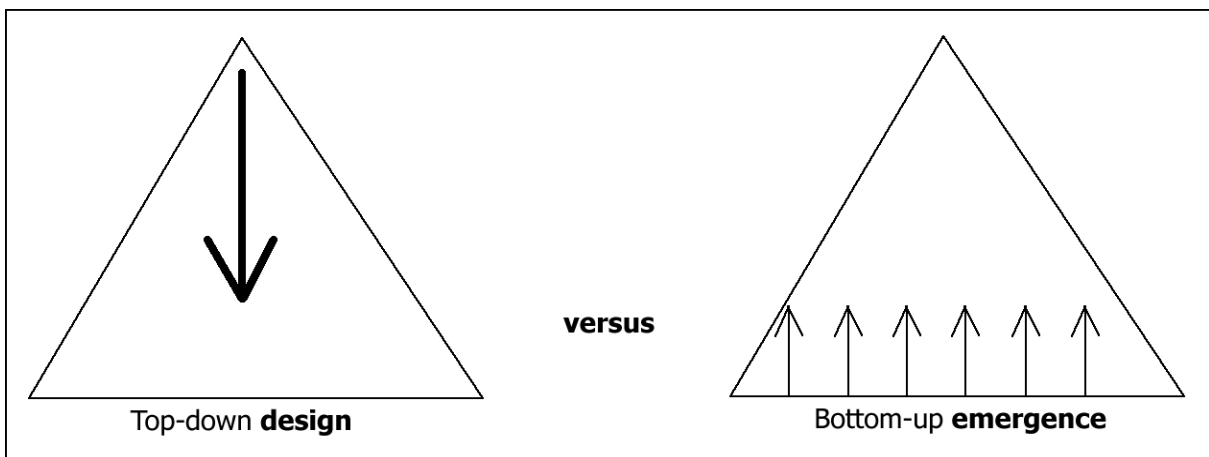

Figure 3: Bottom-up emergence versus a top down design. Source: (Cumming & Wilson, 2003, p. 2).

Philanthropy and hybrid ventures include a combination of social networking, creativity and innovation which develops social cohesion and ethical value. New business models can assist with higher education interventions for strategic community development challenges in the fast changing 'global village'. This can result in contributions toward a future desired state for a community's victory. Community leadership needs to be sensitive towards teaching and learning practice in a responsible manner. According to Learning Forward: The Professional Learning Association (2015), professional learning within communities require continuous improvement, promotes collective responsibility, and supports alignment of individual, team, school, and school system goals.

Leadership encompasses responsibility to one's peers, family, community and society in general.

Figure 4 illustrates the circles of influence that intertwine and forms part of the holistic systems approach.

OUR RESPONSIBILITY IS TO….
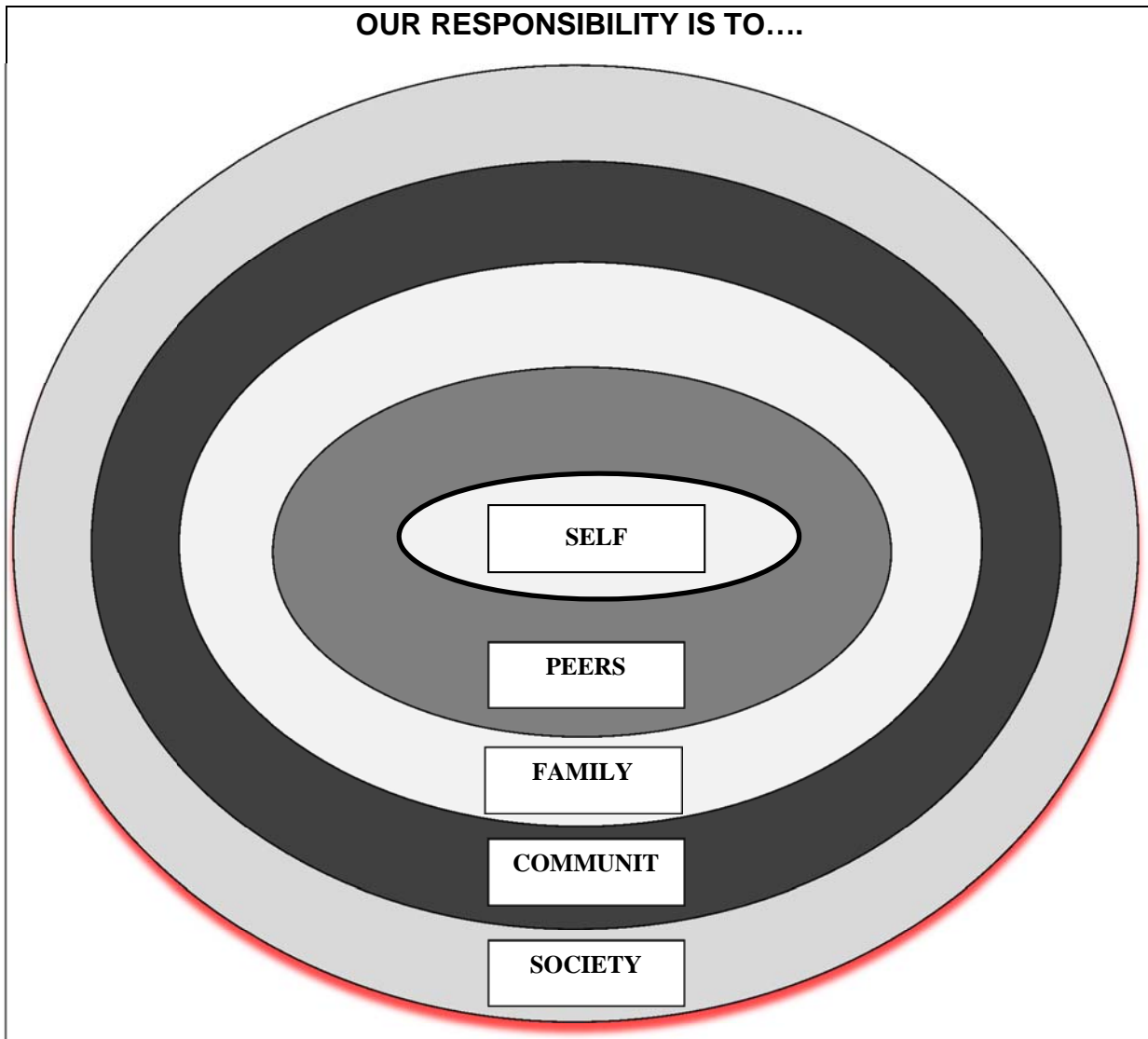
SELF

PEERS

FAMILY

COMMUNIT

SOCIETY

Figure 4: Responsibility to self and others in a typical community environment. Source: Adapted from ("An effective leadership model for Africa's development", 2004).

In the context of 'global business not as usual' it is recommended that a learning process approach (Rippon et. al, 2014) be adopted incrementally. In this way, further development collectively and globally, results in one continent, one country, one community and one neighbourhood. This exercise at grass roots incorporates a bottom-up emergence versus top-down design strategy. This strategy can unite governments, business and society with evolving educational models to incorporate ethics and leadership, social networking and collaboration in a variety of global communities. Figure 5 highlights the various business schools that have benchmarked notable practices in teaching ethics.

Figure 5: Some notable practices in teaching ethics. Source: (Christensen & Peirce, 2006).

Table 1 highlights ethics being taught as a subject in a variety of global business schools. A selected group of international business schools were analysed and ranked from one to fifty and it is quite evident that there is a need for ethical leadership training and development.

Table 1: Schools that require classes in one or more topical areas.

FT Ranking	School	Ethics	CSR	Sustainability	Ethics & CSR	Leadership (& Ethics)	Ethics, CSR, & Sustainability	Ethics & Other Topic
1	Wharton	✓						
2	Harvard					✓		
3	Stanford					✓		
4	Columbia						✓	
5	London Business School						✓	
6	University of Chicago					✓		
7	NYU: Stern	✓						
8	INSEAD	✓						
10	MIT: Sloan					✓		
13	IESE					✓		
14	IMD						✓	
15	University of Michigan: Ross	✓						
16	UC Berkeley: Haas	✓						
17	Northwestern: Kellogg	✓						
18	York University: Schulich						✓	
21	CEIBS - China	✓					✓	
22	HEC Paris						✓	
24	RSM Erasmus University						✓	
25	University of Toronto: Rotman	✓						
26	University of Virginia: Darden	✓						
27	ESADE - Spain		✓	✓				
28	Duke University: Fuqua					✓		
29	University of North Carolina: Kenan-Flagler	✓						
30	Lancaster Management School - UK						✓	
31	University of Western Ontario: Ivey						✓	
32	Michigan State: Broad				✓			
34	SDA Bocconi - Italy							✓
35	University of Cambridge: Judge						✓	
36	Georgetown University: McDonough				✓			
38	University of Maryland: Smith	✓						
39	University of Illinois- Urbana Champaign				✓		✓	
41	Carnegie Mellon: Tepper							✓
42	Penn State: Smeal				✓			
44	McGill University				✓			
45	BYU: Marriott						✓	
47	City University: Cass - UK		✓					
50	Boston University							✓

Source: (Christensen & Peirce, 2006).

4.1. Ethics and Leadership Teaching and Learning Trends

Past higher education teaching and learning trends in leadership and ethics

It is important to take a look back and see where professionalism and teaching and learning ethical methodologies have emerged from. Refer to Dr Patrick Dixon speaking at an international conference on the Future of Education: educational trends, syllabus, learning, exams, teachers - Futurist keynote speaker (Dixon, 2008).

Historically ethics was taught to address the issues at that time. However, to develop and adapt teaching of ethics current teaching and learning strategies should be aligned to current developments.

Current higher education teaching and learning trends in leadership and ethics

With emerging economies and technological trends moving at such a fast pace, teaching and learning strategies are continually evolving. With this in mind, as the world is changing, what trends are effective that meet current challenges?

Innovative higher education teaching and learning activities in leadership and ethics

A paradigm shift in thinking includes introducing integrity testing as a tool to objectively analyse the level of ethics and leadership in an organisation. A flipped classroom approach involves changing the instructional strategy into a blended learning approach. Reversing "traditional education arrangement involves delivering instructional content, often online, outside of the classroom and moves activities, including those that may have traditionally been considered homework, into the classroom." (Lakmal & Dawson, 2015, p. 4).

Technological developments and virtual gaming

Innovative techniques are being employed to enhance distant learning modes by introducing virtual gaming methods in order to exercise and further develop cognitive and critical thinking skills e.g. strategy games, character simulations, and community development games such as Sim City.

Business simulators and Incubators developing leadership and ethics for entrepreneurs

Work Integrated Learning (WIL) objectives need to be continually assessed and incorporated into the current changing curriculum that meets the required changes

expected when analysing graduate attributes. These are required in changing environments when searching for new ways of developing ethical leaders and professionals. Business simulations and incubators provide a simulated parallel experience for an individual entering the workplace.

Professional apprenticeships, internships and 'job shadowing' in the workplace
Practical skill with knowledge and experience is important in order to master opportunities that exist in current changing environments. Theoretical knowledge coupled with practical experience assist in resolving issues and challenges where gaps are evident in teaching, learning and the workplace. Work Integrated Learning (WIL) activities in collaboration with industry or in the workplace are important to bring the real world into the classroom.

Volunteering and excursions to inculcate empathy and a focus for ethical leadership
Volunteer work during vacations can bring empathy and understanding and encourage environmental consciousness and a sense of social responsibility in a future ethical leader.

'Live' case studies for ethical decision-making practices in a business context
According to Neill (2015), the question whether ethical leadership can be taught by observations in the outdoors and in the field is investigated. Outdoor education reveals itself as having a minefield of potential. For example, in relation to waste management, the most commonly discussed ethical issues involve weighing up the relative human and ecological benefits. The garbage that is strewn up and down in many African communities in not morally justified. Students are not taken into environmentally sensitive areas for their benefit as they may cause damage to that particular environment.

Case studies have generally been the norm as a tool to encourage a certain level of working integrated learning experiences. 'Live' case studies are being used to encourage learners to develop a holistic view in a practical manner. Combining a real outdoor experience or excursion with case analysis enhances the overall work integrated learning experience. Examples thereof include, visits to Robben Island (Cape Town, South Africa) with a parliamentary tour together with interactive case study discussions.

Alternatively, a visit to Ushaka Marine World (Durban, South Africa) with a debate around business experiences in an amusement park would be valuable. Others include, introducing conferences in game parks or environmental excursions discussed in the form of a case study after researching further information before participative discussions, presentations or debates.

Educating utilising various forms of entertainment to teach value-centred principles

The combination of entertainment with education *('edutainment')* is being utilised to reach various audiences. In the environmental industry the relevancy of this is evident. Simulated games minimise the risk of depleting scarce resources or affecting the "green" environment.

4.2.   What constitutes ethical and responsible behaviour?

According to the Department of Social Development (Codes of Good Practice for South African Non-profit Organisations, 2001) when dealing with others, non-profit organisations are expected to conduct their operations ethically and should behave responsibly. While the application of the following standards and principles might vary from one organisation to the next, they remain a good place to start:

Fairness: Just and equal treatment of individuals being tolerant and accepting diversity and privacy.

Transparency: Being open and honest in a reasonable manner.

Honesty: Includes truthfulness and sincerity.

Fidelity: Friendship and loyalty in adversity, support, and devotion to duty.

Responsible citizenship: Involves lawfulness, participation, social consciousness, and public service.

Caring for others: Compassion, giving, kindness, and serving.

Respect for others: Being courteous and decent by showing respect for human dignity.

Pursuit of excellence: Embodying being diligent, reliable, industrious and committed.

Accountability: Accepting responsibility for decisions, and consequences.

Integrity: Involves being principled and honourable.

Promise keeping: Fulfilling promises and commitments.

Safeguard public trust: To safeguard and advance the integrity and reputation of all organisations.

5. Research Methodology

Literature was adopted in order to investigate the value of teaching and learning trends in community ethics and leadership. A literature search was conducted across a variety of journal databases. The search was filtered to include publications in English, which were written and published in the last two decades. All databases were searched using the following keywords: Leadership, Ethics, Integrity Testing, Corruption, Amnesty, and Sustainability.

Analysis of the data included a literature review by way of a desktop study. Research outcomes included books, journal articles and internet sources from various local, regional and international databases. These databases provided the foundations for ethical thought and authoritative sources related to ethics, leadership and sustainable development trends globally. Chen (2012), cogently argues that morality, virtuousness, and character serve as building blocks for sustainability leadership amongst others which supports the authors' philosophies related to the antecedents and outcomes of sustainability and sustainability leadership.

6. Research Themes

With reference to the literature reviewed it is evident that ethics throughout Africa is at a crossroad. In crossing the rubicon, we have to review interventions that will impact on future sustainability on the African continent.

The desktop study findings highlighted the fact that to ensure trust between nations, it is important that a common 'golden thread' needs to be observed by all leaders throughout the African continent. Leaders of nations not meeting codes of good practice should be addressed by the relevant authorities accordingly. Leadership best management practices must emerge in order to be aligned to international standards and international law.

In many of the countries across the world ethics has been watered down to a point that in many cases it is acceptable that 'anything goes'. Africa needs to decide on a standard set of common values, moral code of best practices and overall attributes that graduates need to emerge with from higher educational institutions for the common good of all societies going forward.

The foundation of ethical thought and sources of authority in this area may need to be revisited. Internet, social media and virtual interaction poses a great threat to the upbringing of our children even at a very young age. The extent of a growing threat with regards to influences either through film, television or from the internet is becoming more problematic. Cybercrimes and distortion of information is becoming a growing problem and the trustworthiness of various websites is now questionable.

7. Recommendations

'In-the-box' thinking

According to Chen (2012), in light of the current environment where the Cartesian view and cynicism still dominates, it is incumbent on scholars in organisational studies to extend their reach into areas that represent a flourishing of higher human attainment. Mismanaging community resources will directly impact poverty which is expected to rise during the 21st century. The irony is that Africa is rich in natural resources, yet is still lacking in ethics and leadership which can result in and impoverishment. Bannatyne (2005).

Historically ethics was taught to address the issues at that time. However, to develop and adapt teaching of ethics, current teaching and learning strategies should be aligned to current evolving curriculum developments.

'Outside-of-the-box' thinking

Ethical leadership starts at the top and bottom, be it African heads' of state or in the home environment (parents and the community at large). There is a need for moral and political education in Africa in order to ensure the advent of sustainable development. Sustainable development can only be engendered by ethical political leadership. This idea of holistic moral education is a necessity given that leaders emerge from the people. It is important that Africans form a stakeholder's forum to ensure that crime, fraud corruption that lead to corrupt outcomes be continually monitored. Searching for a common balance is required. As far back as 1997, major interventions in the leadership crisis and nation building ethics and spirituality, rooted in the African spirit of Ubuntu which values the community, humanness and wellbeing of every person must be revisited along ethical values for understanding inherent African codes of good practice. (Bhindi & Duignan, 1997). Spirituality rooted in respect and love for the other, alongside trust, authenticity, humility and peace among others will liberate the country. This

ensures for sound ethical foundations with ethical standards and professionalism that is comparative to any world partner.

According to Rossouw (2005, p. 5), the Kenyan, Mauritian and South African codes take the lead in venturing deeper into what the governing of ethical performance entails with regards to strategic African leadership focusing of ethics going beyond developing a code of good ethics and practice. An anti-corruption project within the private sector that targeted the supply side of corruption was launched in Ghana by the African Capital Markets Forum (ACMF). It highlighted the role the private sector plays in sustaining corruption by offering bribes to officials.

As far back as 2003, the launch of the New Partnership for Africa's Development (NEPAD) should have "a positive bearing on enhancing corporate governance in general and business ethics as an integral part thereof. The aim of the NEPAD initiative is to eradicate poverty and foster socio-economic growth through democracy and good governance" (Armstrong, 2003).
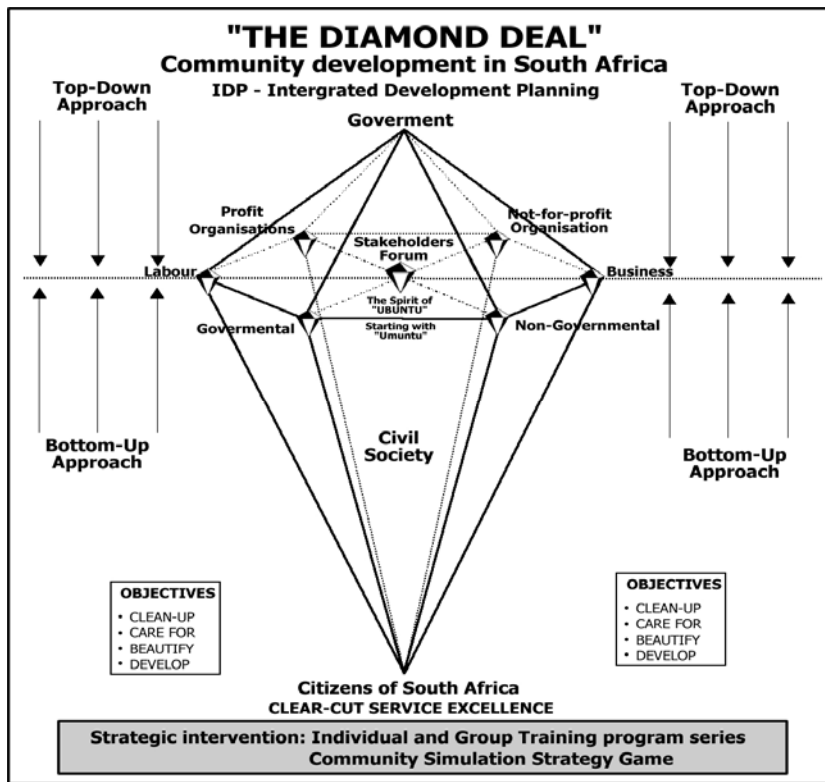
'Without-the-box' thinking

Figure 6: The 'Diamond Deal' for community development in South Africa.

Source: (Rippon, et al. 2014, p. 5).

In order to implement new ideas and change paradigms this involves the 'cutting of a diamond' approach for fine tuning niche management strategies for community development, business, governments and societies which need to be integrated. This strategic approach results in an integrated strategic management model developed to assist community leaders to facilitate community development in South Africa.

A number of South African community leaders are not applying best practices to managing, resources efficiently in their environments. Evidence of poor results achieved by local, district and metropolitan municipalities throughout South Africa has been noted.

At the core of each stakeholder's forum represented in "The Diamond Deal" is a focus on ethical leadership from the various organisational structures. Ethical leadership allows for a trusted team of community stakeholders at grassroots and nationally that display integrity and professional ethics whilst serving their communities bottom-up and top-down.

While some argue that bribery and corruption is embedded in the business culture of Africa, the tide is fast turning where ethics and legislation combine to combat such criminal activity with unlimited fines and prison sentences for those who do not comply. At the centre ethical leadership change is certainly cracking down internationally on bribery and corruption, not only in one particular country, but in organisations doing business with a specific country. Education in Africa must concentrate on the emergence of leaders who are not just intellectuals but are also people of sound moral integrity.

8. Conclusion

The commitment of African leaders to the welfare of the people they govern will definitely affect the peoples' commitment to their fellow citizens and to the State at large. Integrity testing that is standardised across the continent can assist with highlighting issues needing attention in the various governments, businesses and civil society organisations currently threatened with a 'virus' of corrupt activities. Interventions have to be instilled similar to an amnesty for corrupt offenders or 'truth commissions' that hopefully bring perpetrators of such acts back into wanting to be honourable citizens.

Many African countries on the continent are dealing with roots that are evolving due to value systems accepting forms of corruption and bribery. According to Marshal (2015), despite anti-corruption and bribery legislation being in place, the problem seems to be growing in Africa. Marshal mentioned that according to a recent survey by the anti-corruption organisation, Transparency International, in four out of six countries people paid bribes to speed up service delivery, while in South Africa more bribes were paid to avoid problems with the authorities.

Often unethical behaviour will result in loosing trust of others or those that look up to us. It is important to set an example as leader for fellow Africans and curriculum development needs to include ethics and professional teaching, learning and innovation that cut across all programmes going forward.

If Africans are rooted in good foundational values which are principled-centered with regards to leadership ethics common to all countries on the continent based on intrinsic values that regenerates a moral foundation that is integrity driven. Ethics and leadership which instills a universal code for an evolving Africa and contributes to developing a future desired state for community victory for the next generations going forward will result in a renewed ethos embedded in an innovative future ethical leader.

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INVESTIGATING PERCEPTIONS OF FOOD INSECURITY COMPLEXITIES IN SOUTH AFRICAN HIGHER LEARNING INSTITUTIONS: A REVIEW

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Abstract

Household food insecurity is a complex phenomenon challenging most sub-Saharan countries as 220 million people are still projected to be malnourished between 2014 and 2016. Despite the South African economic advancement of 4.6% in 2011 in the public sector; and decreased poverty levels from 30% in 2002 to 13% in 2011, an average of 20% households are still vulnerable to food insecurity. In recent years, South Africa has also recorded high dropout rates of students in higher education linked to poverty. This challenge threatens the country's economic advancement and transformation as students' academic performance; degree completion and entry into the labour market are compromised. Studies on food security in South African Higher learning institutions (HLIs) have been conducted in recent years, but there is a knowledge gap with regards to perceptions of food insecurity complexities at these institutions. This review evaluates the perceptions about food insecurity in South African HLIs with particular reference to the University of KwaZulu-Natal (UKZN). A critical appraisal of these perceptions were viewed from 1) Maslow's theory of self-actualisation- to explore food as a basic human right; 2) inadequate nutrition and health- premise that food and nutrition insecurity are part of the environmental factors that affect psychosocial functioning; 3) the concept of food poverty and stigmatisation- a psychosocial factor that discriminates the poor. The study shows that food insecurity and poor academic performance of students in South Africa are a big challenge, complex and paradoxical to the key stakeholders. It requires a paradigm shift, because food security is vital in human capital development and ultimately economic development.

Keywords: Academic performance, food insecurity complexities, perceptions, South African Higher Learning Institutions

1. Introduction

Food insecurity in South Africa is no exception to the rest of the sub-Saharan African countries as 20% of its households are food insecure (Statistics South Africa, 2012). Most recent studies indicate that household food insecurity and socio-economic burdens affect students in South African HLIs, especially those who come from low income households (Hughes, Donaldson, Serebryanikovo & Leveritt, 2011). The UKZN in South Africa counts among the most affected by food insecurity complexities, given that 53% of its students come from economically disadvantaged backgrounds (Veldman & Kassier, 2013). A study by Munro *et al.* (2013) conducted between 2007 and 2010 confirms that UKZN resource-poor students who are on financial aid are vulnerable to food insecurity. While the University in 2012 implemented a food security programme to address student food insecurity, the knowledge gap as to how it is perceived by HLIs is elusive.

2. Food insecurity in South African higher learning institutions

The South African government plays a vital role in addressing the challenges of food insecurity as it poses a threat to health, active life and well-being of the citizens. This commitment is articulated in the Medium Term Strategic Framework for 2009-2014 (*Minister in the Presidency*, 2009), the Bill of Rights and Section 26 and 27 of the National Constitution (1996), which stipulates access to sufficient food as a basic human right. The realisation of food as a basic human right has been translated into actions like the School Feeding Scheme (SFC) through the Integrated Food Security Strategy, which was introduced in 2002 (DoBE, 2009: p.1). The targeted beneficiaries of the SFC are children attending public schools coming from economically disadvantaged backgrounds. The SFC has yielded positive results as provisions of free nutritious meals at school has increased the school attendance and enhanced the concentration of learners (DoBE, 2009).

Unfortunately, the SFC is limited to school going children and HLIs are not prioritised. It could be argued that food insecurity and financial burdens of HLIs students are addressed by government through a student loan and bursary scheme called National Student Financial Aid Scheme (NSFAS). However, the reality is that NSFAS is primarily directed to students who are in need of money to pay for their tertiary education rather than food security. According to Jones, Coetzee, Bailey & Wickham,

(2008, p.29), NSFAS is supposed to provide financial support to cover mainly tuition fees, accommodation and in some instances a stipend, depending on the institution. However, NSFAS is usually inadequate to cover all these aspects, especially stipend for food. This leaves students with the difficulty of finding options to close the financial gap, for example many students opt for part-time jobs (Lesteka & Maile, 2008). These financial gaps are among the critical factors that determine whether the student succeeds academically or drops out from university (Jones *at el.* 2008).

Additionally, the government is rigorously creating opportunities, such as increasing students' access to HLIs, which are the universities, Technical Vocational Education and Training (TVET) colleges, and Universities of Technology. These institutions are viewed as primary sites for "advancing the public good by sustaining an informed and active citizenry, reducing economic marginalisation, advancing science and innovation, and ensuring quality progress in human capital development" (*Republic of South Africa*, 2010). Thus, the HLIs are integral partners in the successful execution of the 2015 Millennium Development Goals which include *Eradication of extreme poverty and hunger; Achieving universal primary education* and *Enhancing economic growth from a sustainable livelihood (Summit of the United Nations*, 2000).

Unfortunately, the HLIs are burdened with the problem of students taking long to complete their degrees, high dropout and failure rates. A report by Lesteka & Maile (2008, p.2) indicates that only 15% of students complete their degrees on time in South Africa. Nicole Murdoch, executive director for teaching, learning and quality at the Monash University South Africa concurs with the assertion that the graduation rate among undergraduate students in 23 public universities in South Africa is one of the lowest in the world (Mtshali, 2013). Various statistics from across the country's HLIs also indicate that an average of 35% of students fail to complete their degrees, with 52% dropping out of universities of technology, while 17% of the students do not complete courses at TVETs (Letseka, 2009).

Research has revealed that poverty significantly impacts on the students' academic performance leading to low graduation rates and high failure and drop-out rates (Lesteka, 2009), which jeopardizes the country's economic development. The major problems that contribute to low student graduation rates include food insecurity as

some go for days without having had a meal due to financial constraints (Mtshali, 2013). Jones (*et al.* 2008) and Munro *et al. (2013)* concur that students on financial aid are the most vulnerable to food insecurity. Furthermore, a study at the UKZN revealed that 55% of students viewed themselves as coming from low income household backgrounds with little or no financial support from their homes throughout the year (Gwacela *et al.* 2013). These students used their bursary to support their families at home. The study also revealed that 57% of undergraduates were not on financial aid to pay their tuition fees (Gwacela *et al.* 2013). Additionally, most students' guardians live on social security grants in South Africa (Neves, Samson, Niekerk, Hlatshwayo & Du Toit, 2009).The social grants are usually distributed among old aged family members while a portion is given to children attending school. Given the high rate of students who cannot afford to pay for their tuition fees, it could be argued that the grant is usually inadequate to meet the family needs such as paying university fees and purchasing adequate food.

3. The paradox of food insecurity perceptions and perspectives

In accordance with the definition given by the Food and Agricultural Organisation of the United Nations, food security "exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (*World Food Summit*, 1996). The absence of food security is referred to as food insecurity. Therefore, the availability of adequate nutritious food at all times and one's access to it is critical as it is an important socio-economic factor when analysing the subject of food insecurity. Improper utilization of food and poor diet can lead to illness, which can negatively affect students' academic performance, and other academic commitments (Hughes *et al.* 2011).The complexity of household food insecurity has continued to attract various proponents, researchers and scientists to present their views and various means of addressing the subject.

3.1. *Inadequate nutrition and health*

Food insecurity has also been identified as a driver of health problems. This view is supported by Booth & Smith (2001), who contend that food insecure people are prone to malnutrition, hunger and starvation. In this view, food insecurity has been identified as an outcome of lack of access to food and poor dietary quality which can contribute

to body over-mass and under-mass. While analyzing the subject, some authors such as Donald *et al.* (2010) have come to a conclusion that there is a relationship between adequate food and nutrition, and physical health. The authors found an association between food consumption and health outcomes using Body Mass Index (BMI) amongst women of reproductive age. Food insecurity was found strong correlated to higher BMIs, indicative of overweight and obesity.

Similar studies conducted on food insecurity among American women concluded that food insecure households had more overweight individuals compared to food secure households (Adams, Grummer, & Chavez, 2003). Over- weight and obesity are becoming a public health problem linked to food insecurity; most households experiencing the risk of food insufficiency are vulnerable to this problem as they tend to buy energy-dense foods which are cheaper and accessible to poorer households (Hughes *et al.* 2011). Furthermore, a study by Jyoti, Frongillo & Jones (2005) revealed that school aged children from low-income households, who were at risk of hunger, were linked to compromised psychosocial functioning. Therefore, food and nutrition insecurity negatively affects one's social skills, academic performance and physical health (Innes-Hughes *et al.* 2010) and this can have adverse effects on students' potential for economic and social development.

3.2. *Food poverty*

Food poverty could be understood as the occurrences of food insecurity or the extent to which an individual lives without basic recourses (such as money to purchase food, goods and services, and mental ability to make proper decisions) to live and maintain a standard living (Booth & Smith 2001). A study by Dixon *et al.* (2001) on household food security confirms that adults from food insecure households are vulnerable to compromised diets threatening their health compared to adults from food secure families. From the same study, it emerged that anxiety about availability of food may affect a person's social or mental well-being by creating feelings of aggravation and depression.

This view is supported the findings of national survey conducted of Sorsdahl *et al.* (2011) on food insufficiency and mental health in South Africa, which indicated an association between Diagnostic and Statistical Manual of mental disorders (DSM-IV)

diagnosis and food insufficiency for the 12 month DSM-IV outcome. In the study, it was observed that respondents who reported to be food insecure were more likely to have a 12 month DSM-IV disorder (anxiety disorder) compared to those who were food secure and those who reported to have had enough to eat in 12 months and a lifetime absence of sufficient food. Furthermore, the effects of poverty on food security is presented by Herek (1999) who argues that poverty is directly linked to social behaviours, such as marginalization and stigma. Herek (1999) presents a concept of marginalized stigma, which can help us to understand how individuals can interpret such views. In the context of food security, individuals who are in most need of help from communities' support systems ironically disintegrate due to stigma, while discrimination encourages community members to marginalise those who need help. Marginalised stigma has also been documented in HLIs where food insecure students do not discuss openly about their status due to the negative connotations attached to the phenomenon (Fekisi & Jaffer, 2013).

In United States of America, *The Atlantic* reported an increasing number of students in universities that frequently attended class on empty stomachs but would not perceive their lack of food as a problem (Shreeves, 2010). It was noted that even after the campus 'Food Closet' project was launched to address student food insecurity at the University of California, students seemed to be embarrassed to receive food aid. Similar views were shared by interviewed staff members from the UKZN Student Counselling Centre who noted that one of the major challenges was that students did not admit that they were food insecure, which made it harder for the counselling staff to assist them accordingly (Khanyile, 2011, cited in Gwacela *et al.* 2013, p. 86).

The University of the Free State in South Africa, an institution confronted with food insecurity complexities, documented that some interviewed 'Hungry students' on campus were so ashamed of exposing the impoverished lifestyle that when their peers offered to buy them lunch, they felt that they were burdening their friends as they did not have anything to give back to them (Fekisi & Jaffer, 2013). It was also reported that some students were reluctant to apply for the food security aid on campus ('No Student Hungry Programme'), which they thought would expose their poor economic status on campus and trigger stigmatisation. The students feared that they could be labelled as hungry students who cannot afford to feed themselves.

On the contrary, a study on the subject disclosed that community food support had a positive impact on the psychosocial status of the food aid recipients. Likewise, an impact study by the *WorkinghamTrussell Trust Food Bank* (2014) on the clients' perception about the community food bank in the United Kingdom revealed that 81% of the respondents reported that accessing food from the community food bank made a significant positive impact particularly on their mental and psychological status. The respondents indicated that food handouts helped them reduce stress related problems, such as anxiety about where their next meals would come from. While the above study did not particularly investigate the impact of food security on academic performance in HLIs, it is relevant to the present study as it significantly contributes to some perspectives of analysing food insecurity interventions and their positive impact. Therefore, there is need for further research on the relationship between food security, stigma and academic performance in HLIs such as the UKZN.

3.3.   *Self-actualisation and well-being*

Although there is no dispute about the relationship between nutrition and cognitive development, (Hamenlin *et al*. 1999), there is minimal evidence of the effect of food insecurity on academic performance. Food insecurity is often underestimated as a psychological and or emotional stressor that could trigger or affect certain behaviours (Jyoti *et al*. 2005). A study by Hamenlin *et al*. (1999) in Canada affirmed that low economic status leads to depression, which affects the cognitive stability and functionality (limits the learning and brain memory structures), thus affecting one's behaviour. Behavioural scientists, such as Abraham Maslow observed that human beings have specific needs such a food, water and security that should be fulfilled if they are to be high achievers or self-actualisers in their life time. Through his theory of motivation, Maslow (1954) presented a five-stage model containing a hierarchy of needs, which he sub-divided into basic needs- namely biological and physiological needs (McLeod, 2007). The hierarchy is premised on the notion that individuals must satisfy their lower level basic needs such as food and water before progressing onto the higher needs. As stated by Maslow, if the basic needs are not gratified they compromise higher ranking needs such as self-esteem and self-actualization (McLeod, 2007). In other words, given the potential correlation between food insecurity and academic performance, it could be argued that if students' primary need of food

security is not fulfilled, other factors related to academic performance could be jeopardized.

Closely related to the concept of relating food security and academic performance are recent studies conducted by Kassier & Veldman (2013) on food insecurity at the UKZN, which revealed that tertiary students who are food insecure tend to experience poor nutrition due to unbalanced diet, which is of poor quality and low dietary diversity and hence underperform academically. Although the above study points to a correlation between food security and students' academic performance, they are general and only consider the challenge of food insecurity from the causal point of view. While analyzing the subject, Sorsdahl *et al.* (2011) observed that research on household food insecurity seems to have received attention in developed countries such as Canada, Australia and the USA but there is insufficient reported research on the subject in sub-Saharan African countries, including South Africa. Hughes *et al.* (2011) also stated that food security and its impact on academic performance of school children.

4. Institutionalisation of food security interventions

Unlike at basic school level, where government addresses food insecurity and nutritional problems through the feeding scheme, students in HLIs are known to have survived on insufficient and less nutritious food as most of them come from poor socio-economic backgrounds (Shreeves, 2010). This could be attributed to the fact there is an absence of policy to guide HLIs to address the challenge food insecurity despite its acknowledged negative impact on health and the national economy. Nonetheless the complexities of household food insecurity have prompted some HLIs such as UKZN to come up with an initiative of providing food assistance to students in need.

The food security programme was implemented at the UKZN in 2012 in response to increased cases of food insecurity among students. Its primary goal is to provide both counselling and food support in the form of food hampers or meal vouchers to students who are referred by academic staff members of the Student Representative Council (SRC), other concerned staff, and students who may identify students that are in need of food assistance. The food security programme also aims to create awareness about the challenges of food insecurity and the threat it poses on students' academic

performance, degree completion, entry into labour market and socio-economic advancement and transformation (UKZN, 2012).

The University of the Free State, whose student food insecurity prevalence stand at 59. 35% has also implemented a "No Student Hungry Programme" to address the increasing cases of student hunger in its community (Fekisi & Jaffer, 2013). The research findings also reveal that owing to the socio-economic disparities created by the apartheid legacy, the previously disadvantaged populations such as Coloureds and Black Africans mostly undergraduates are most at risk of being food insecure. Other institutions such as the University of Zululand and Durban University of Technology (DUT) have institutionalised meal plans in some of the students' residences and dining halls where the NSFAS-funded students staying in university residences receive meal vouchers of a certain amount per day, which is used for swiping or purchasing meals from the dining halls (Gwacela *et al.* 2013, p.91). At the DUT, it was observed that although the dining hall system was effective in terms of addressing the students hunger needs, particularly those who came from impoverished homes that could not afford groceries per month, there was a general tendency by the students who qualified for the vouchers to swipe for their friends who were excluded from the system.

5. Summary and conclusion

Studies conducted at UKZN between 2007 and 2013 indicate that food insecurity is a threat to student academic performance. However, much attention has been given to household food insecurity measurement. Students at HLIs are semi-detached from their households, thus individual households should be of concern. This is imperative in institutions that have more than 50% of students coming from low income households. It is generally known that inadequate nutrition affects cognitive power. However, this theory seems to be given little attention in relation to the food insecurity of students at HLIs. The government has paid attention to the food security at basic school level. This study recommends that, the South African food and nutrition policy implementation actions be extended to HLIs.

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GRADUATE OUTPUT IN SOUTH AFRICAN HIGHER EDUCATION: THE DILEMMA OF POLICY INTERVENTION

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Abstract

Higher education policy documents in South Africa are replete with the challenges of graduate output and possible policy interventions. An important recent policy document by the Council on Higher Education (CHE): *A proposal for undergraduate curriculum reform in South Africa*, suggests that providing additional undergraduate curriculum space to enable the majority of the student body to succeed in mastering their core curricula could improve graduate output. Furthermore, the curriculum space should allow those that are able to do so to complete a programme in less than the formal time. The document notes that since there is no prospect of the schooling sector producing the well-prepared matriculants required by the higher education sector in the foreseeable future, this sector ought to act on the systemic problems within its control. This paper argues that these proposed policy interventions are unlikely to improve graduate output as they are not based on an in-depth analysis of the unequal social fabric of South Africa and that flexible curriculum space will perpetuate these inequalities. Furthermore, curriculum reform cannot be solved by the higher education sector acting alone. The paper utilises the notion of capital advanced by Bourdieu to argue that meaningful policy interventions and/or research should engage with the forms of cultural and social capital experienced by the majority of the student body. It is posited that these forms of capital contribute significantly to academic attainment and can thus not be ignored or mentioned tangentially in any meaningful policy study or intervention, especially in post-apartheid South Africa.

Keywords: Academic achievement, cultural and social capital, higher education, policy, unequal society

1. Introduction

The challenges of graduate output in South African Higher Education have been discussed at length. In 2001, the National Plan for Higher Education observed that at 15%, South Africa's graduation rate was the lowest in the world (Letseka & Maile, 2008). *A proposal for undergraduate curriculum reform in South Africa: The case for a flexible curriculum structure* drawn up by a task team of the Council on Higher Education (CHE) documents the glaring challenges of graduate output. In line with the National Plan for Higher Education (2001), the proposal notes that the average graduation rate of White students is more than that of other race groups, especially Black Africans.

In order to better understand and address the challenge of low graduate output, the CHE mandated a task team to investigate this issue in 2013. The task team noted that there is no prospect that the schooling sector will produce the well-prepared matriculants required by the higher education sector in the foreseeable future and thus argued that this sector should act on the systemic problems within its control (CHE, 2013). The team recommended the creation of an extra curriculum space in the undergraduate curriculum to enable the majority of the student body to succeed in mastering their core curricula and to allow those that are able to do so to complete a programme in less than the formal time (CHE, 2013).

This paper sets out three interrelated arguments to show that these proposals are unlikely to improve graduate output. First, the proposal generally lacks an in-depth analysis of the unequal social fabric of South Africa that contributes significantly to the nature of participation in higher education. Second, given the apartheid past, a flexible curriculum structure will perpetuate racial inequalities and prejudices with more White than Black students graduating earlier. Third, since the challenges of graduate output are rooted in the apartheid system, higher education interventions alone will not be able to fully solve the problem.

The paper utilises the notion of capital advanced by Bourdieu to argue that meaningful policy interventions and/or research should engage with the forms of cultural and social capital experienced by the majority of the student body. The assumption is that forms of capital contribute significantly to academic attainment and can thus not be

ignored or mentioned tangentially in any meaningful policy study or intervention, especially in post-apartheid South Africa.

2. Theoretical Framework: Bourdieu and Capitals (Cultural and Social)

Bourdieu's concepts of capital (cultural and social) provide illuminating lenses through which to understand academic attainment and achievement and to explain the reproduction of social inequality (see Bourdieu, 1973; Bourdieu & Passeron, 1990). To understand his use of the notion of *capital*, it is important to first consider his notion of *field* since for Bourdieu, the logic of capital works within a particular field (Mahar, Harker &Wilkes, 1990).

Bourdieu and Wacquant (1992, p. 97) conceive of a field as "a network or a configuration, of objective relations between positions. These positions are objectively defined in their existence and in the determinations they impose upon their occupants, agents or institutions…as well as by their objective relations to other positions". In other words, a field can be said to be "a structured space of positions in which the positions and their interrelations are determined by the distribution of different kinds of resources or capitals" (Thompson, 1991 in Ihlen, 2005, p. 493). A field should thus be understood as a social space in which people compete for resources. The idea of competition is well captured by Mahar et al (1990) who posit that a field should be seen as a *field of forces,* meaning that a field presents a struggle within itself, which is necessitated by the logic of capital. A good example would be to see the higher education sector in South Africa as a field or a *field of forces* in which people (White, Black, etc.) compete for positions and some excel while others do not.

Bourdieu explains capital in general terms as an accumulation or investment that demands a return (Reay, 2004). For Bourdieu, *cultural capital* thus means the accumulation or acquisition of knowledge, skills, and information through formal and informal education, which may exist in embodied, objectified, or institutionalised states (Bourdieu, 1986). In the embodied state, a person accumulates cultural capital in the form of long lasting dispositions of mind and body (e.g., through jargon, music, etc.). This accumulation and transmission begins during early childhood and demands the sensitisation of the child to cultural distinctions (Reay, 2004). The objectified state takes the form of cultural goods such as books, machines, pictures and others while

the institutionalised form is mainly exemplified by educational qualifications (Bourdieu, 1986).

Bourdieu defines *social capital* as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalised relationships of mutual acquaintance and recognition" (Bourdieu, 1986, p. 248). Simply put, social capital refers to the resources present within social networks (Carpiano, 2006). Bourdieu posits that an agent's volume of social capital depends on the size of the network of connections they can effectively mobilise and on the volume and type of capital (economic, cultural or symbolic) possessed by other agents to whom an agent is related (Bourdieu, 1986).

As noted, since both cultural and social capitals such as economic capital are accumulated, they can be used to perpetuate social inequalities between those who have accumulated more and those who have not. It can be argued that a superior amount of cultural capital facilitates improved social capital within a field. Since social capital represents a network (of similar or like positions) it can be used to exclude those that have not accumulated a similar level (Carpiano, 2006).

Another important concept in relation to the notions of field and capital is the *habitus.* In *Outline of a theory and practice*, Bourdieu defines a habitus as "a set of assumptions, habits, taken-for-granted ideas and ways of being that are vehicles through which agents engage with, understand and move on through the world" (Bourdieu, 1977 in Bebbington, 2007, pp. 155-156). In *Distinction*, he conceives of a habitus as "a structuring structure, which organises practices and the perception of practice" (Bourdieu, 1984, p. 170). Simply put, according to Bourdieu, a habitus explains our thought system, beliefs, tastes, and interests that influence our understanding of the world. The habitus is formed through primary socialisation into the world through family, culture and the milieu of education (Bourdieu, 1984).

It is important to note that while habitus is influenced by the *being* of the agent, it is mainly lived within the structures of social difference experienced by the agent, e.g., class, gender, ethnicity, which are themselves characterised by distinct distributions of capitals: social, cultural, symbolic, economic and so on (Bebbington, 2007). The

difference between cultural capital and habitus is that while both are transmitted within the home, cultural capital is the accumulation of legitimate knowledge while habitus is the accumulation of a set of attitudes and values (Sullivan, 2002). In terms of educational attainment, the dominant habitus reveals the attitudes and values of the dominant class whose major characteristic is the development of positive attitudes towards education generally (Sullivan, 2002).

2.1. Cultural and Social Capitals, Habitus and Educational Attainment

As noted, capital is an accumulation of types such as economic, cultural, social and so on. For Bourdieu, school success is a function of the "amount and type of cultural capital inherited from the family milieu rather than by measures of individual talent or achievement" (Reay, 2004. p. 74). Sullivan (2002: 144) holds that according to Bourdieu,

> …success in the education system is facilitated by the possession of cultural capital and of higher-class habitus. Lower-class pupils do not in general possess these traits, so the failure of the majority of these pupils is inevitable. This explains class inequalities in educational attainment. However success and failure in the education system is seen as being due to individual gifts (or the lack of them). Therefore, for Bourdieu, educational credentials help to reproduce and legitimate social inequalities, as higher-class individuals are seen to deserve their place in the social structure.

Furthermore, Sullivan (2002) observes that the cultural capital inculcated in higher-class homes, enables higher-class students to achieve better educational credentials than lower-class students, resulting in inequalities as the dominant class maintains its class position in society. Thus, according to Bourdieu, a combination of cultural capital, social capital (its network) and individual habitus plays a very important role in educational achievement.

3. A proposal for undergraduate curriculum reform

Following its release by the CHE, the proposal for undergraduate curriculum reform was widely discussed by 22 public universities and other organisations in 2013. The

responses formed the CHE summary report released in June 2014. Guided by the responses, the CHE released an advice document to the Minister of Higher Education and Training in December 2014.

3.1. The shortcomings unearthed by the task team

The proposal states that "graduate output in South Africa has major shortcomings in terms of overall numbers, equity and the proportion of the student body that succeeds" (CHE, 2013, p.15). It reports that "despite there being a small intake that has good academic potential, performance in higher education is marked by high levels of failure and dropout" (CHE, 2013, p.15). The proposal notes that the structural problems within the higher education sector include 1) discontinuity between secondary and higher education, 2) many curricula contain key transitions for which students are differentially prepared and 3) the need for undergraduate curricula to be enhanced in order to meet contemporary local and global conditions. To solve these problems, the proposal suggests the following:

- *Duration - that the formal time for all current three-year degrees and diplomas, as well as current four-year professional Bachelor's degrees at level 8 of the Higher Education Qualifications Sub-Framework (HEQSF) should be increased by one year.*
- *Flexibility - that the new curriculum should be flexible to allow students who can complete a programme in less than the formal time to be permitted to do so.*
- *Standards - that the new curriculum structure should improve upon existing exit standards through utilising the additional curriculum space (CHE, 2013, p. 20).*

3.2. Responses to the task team

The CHE noted that the responses from the 22 public universities were participatory involving faculties, student bodies, committees, executive groups and teaching and learning specialists (CHE, 2014). The report explains that while universities generally acknowledged the problem of poor throughput rates, four differed from the rest by citing the following grounds: poor throughput rate was not the case at one university,

that radical curriculum reform is not necessary, that the problem is better located and dealt with at school level and that the particular model advocated is not the most effective means of addressing the problem (CHE, 2014).

The report further explains that while the majority of public universities agreed that there is an articulation gap between schools and higher education and that this structural factor contributes to poor throughput rates, some institutions are not convinced that the problem has been correctly analysed. Furthermore, while the majority of public universities agreed on the nature of the problem, some held that not all the factors that could be contributing to the problem had been dealt with by the proposal (CHE, 2014).

3.3.   Advice to the Minister

In its advice to the Minister of Higher Education and Training, the CHE outlines several recommendations that suggest that the Department of Higher Education and Training (DHET) should adopt the proposal for a flexible and extended curriculum suggested by the task team. The document notes that higher education is failing in its basic mission to produce the graduates required for the reconstruction and development of South African society and calls on stakeholders to assist in achieving the non-racial, non-sexist and democratic values enshrined in the South African constitution.

4.   The undergraduate reform proposal viewed through Bourdieu's lens

Using Bourdieu's lenses of capital, the proposal is found wanting in four different ways: 1) the proposal is ahistorical and fails to acknowledge that the apartheid legacy shaped the cultural and social capital that impact on graduate output where White students perform better that other students generally, specifically Black African students; 2) it subscribes to the fallacy of meritocracy in higher education achievement in South Africa; 3) the proposal fails to comprehend that the flexible mode will reproduce social inequalities, given that White students (with their accumulated capitals) will constitute the cohorts that complete their degrees in less than the formal time while Black students will take longer; and 4) it subscribes to an ahistorical assumption that the higher education sector can solve the graduate output challenge on its own by acting on systemic problems.

4.1. Apartheid and Cultural and Social Capitals

Cultural and social capitals in relation to achievement in the higher education sector in South Africa have been affected by the apartheid legacy. Indeed, apartheid is the major contributor to social inequalities in South Africa generally (see Franchi, 2003b; Mhlauli, Salani, & Mokotedi, 2015). It is thus naive for the task team to only touch tangentially on issues relating to cultural and social capital, habitus and higher education.

Formalised in 1948 when the Nationalist Party came to power and replaced by a democratic system in 1994, apartheid facilitated racial segregation that entrenched White domination over other race groups generally and the Black Africa majority specifically (Chisholm, 2012; Mhlauli, et al, 2015). Racial segregation was formalised with the promulgation of the Population Regulation Act of 1950, which categorised South Africans based on race, namely, White, Bantu (Black), Coloured (mixed descent) and later Asian (see Franchi, 2003a).

Simms (2000, p. 169) observes that the apartheid system "regulated every aspect of social life, prohibiting marriage between Whites and non-Whites, sanctioning White-only jobs, segregating residential areas, establishing separate educational standards, and denying non-White participation in the national development." It can be argued that racial segregation thus provided White and Black people with different cultural and social capitals that disadvantaged Black people and advantaged their White counterparts. Black South Africans were oppressed (Franchi, 2003a), while White South Africans were subjected to a systemic construction that they were superior to Black people.

These characteristics of capitals were also reflected in the schooling system where "the aims of education were explicitly to maintain White superiority and dominance in the economy and state" (Chisholm, 2012, p. 85). Reay (2004) contends that the ideological functions of education policy under apartheid were designed to fit with the apartheid social arrangement of society, which distributed educational resources unequally on the basis of race. Thus, White people enjoyed access to well-resourced institutions (Mudzielwana & Maphosa, 2013). In limiting the cultural and social capitals of Black South Africans educationally, White institutions were well provided for to

support smooth learning while Black institutions were "mainly located in under-developed, impoverished rural areas with little economic infrastructure for supporting local development and university expansion" (Jansen, 2003 in Suransky & van der Merwe, 2014, p. 2).

The apartheid legacy continues to impact on South Africa's social fabric. For example, Moguerane's (2007) study of the post-apartheid politics of integration at a residential student community in South Africa found that Black South Africans adopted a Black township lifestyle as a way of resisting White domination. In other words, the township lifestyle constitutes both cultural and social capitals of these Black people. Using Critical Race Theory, Mhlauli et al (2015, p. 57) argue that "even though the new government has devised ways to provide educational and employment opportunities for the previously disadvantaged groups, a large segment of Black people are still uneducated, live in poor rural communities and have lower paying jobs."

4.2. The problem of meritocracy

Without acknowledging the challenges using the lenses of cultural and social capitals, the proposal implicitly favours the thesis that proposes that achievement in higher education is facilitated by intellectual ability and is thus meritocratic. This is problematic when viewed through Bourdieu's lens. The intellectual thesis posits that the majority of White students excel because of their intellectual capability and hard work. However, as noted in this paper, such thinking amounts to a fallacy of meritocracy as it reproduces and legitimates social inequalities, where White students with a higher-class habitus are seen to be intelligent. Sullivan cautions that "since some lower-class individuals will succeed in the education system, their success will be used in support of the 'fallacy' of meritocracy" (Sullivan, 2002, p. 145-146).

4.3. Additional space, curriculum flexibility and inequality

Due to the fact that its analysis is largely ahistorical, the task team failed to deeply understand the impact of the proposal from the historical perspective outlined in this paper. Some universities observed that with a flexible curriculum "cohorts would be divided into a three-year White performing and privileged [group] and a slower non-performing [Black] cohort that will perpetuate existing inequalities in the system and in individual universities" (CHE, 2014, p. 9). A further concern was that the different

cohorts would enable "unfair discrimination on the part of employers based on whether students had taken the longer or the shorter route" (CHE, 2014. p. 9). Given these issues, an additional curriculum space framed within an ahistorical lens seems unlikely to address the graduate output problem. It should be noted that while these issues were raised, they are not part of the final advice document to the Minister of Higher Education and Training, which demonstrates how tangentially they were held by the task team.

4.4.   *The Higher Education and systemic problems*

Given that the problem of graduate output is deeply entangled in the apartheid legacy that continues to shape the South African social fabric, it is unlikely that addressing systemic problems in the higher education sector will solve the graduate output problem. The proposal harbours an ahistorical assumption that the higher education sector can solve the throughput challenge on its own by acting on systemic problems. It is difficult to imagine that the structural problems raised in the proposal (discontinuity between secondary and higher education, curricula requiring key transitions for which students are differentially prepared and the need for undergraduate curricula to be enhanced in order to meet contemporary local and global conditions) could be solved without the involvement of the entire education system.

In his critique of the proposal Pinar (2014, p. 9) posits that "any systemic review of the nation's needs must also include a systematic review of government, business, the courts, and the church". This paper emphasises that policy intervention should be long term and focus on ways to assist the majority of students to accumulate the necessary capitals to benefit from university education. Such an intervention requires a systemic review of the whole social fabric in South Africa as higher education as a field or a *field of forces* exists among several other fields (economic, legal, religious, etc.) that impact on it.

5. Conclusion

This paper used the theoretical lenses of cultural and social capitals and habitus advanced by Bourdieu to engage with the CHE's proposal for undergraduate curriculum reform in South Africa. It argued that the suggestions made by the task team to increase undergraduate curriculum space and to allow students who are able

to complete a programme in less than the formal time to do so are unlikely to improve graduate output. The proposal is mainly ahistorical in that it fails to recognise the impact of the apartheid legacy on cultural and social capital in relation to higher education achievement. The paper further argued that the proposal represents an ahistorical assumption that the higher education sector can improve graduate output on its own by acting on systemic problems within its control.

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USING CLICKERS IN LECTURES: A STUDY OF FIRST EXPERIENCES

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Abstract

Students have certain expectations of tertiary education, which may include how they will be taught and how they will learn. Most of the current generation of students are technologically savvy and use technology for academic work and social interaction, and as such may expect technology to play an important role in teaching and learning. However, universities are renowned for their traditional teaching approaches. Many lecturers do not use any form of technology in their courses, while a smaller group of lecturers use technology extensively. The use of technology in and out of the classroom can improve learning outcomes, and lead to student satisfaction and success. In an attempt to improve participation and engagement in diverse large classes, the Commerce, Law and Management (CLM) Faculty at the University of the Witwatersrand (Wits) purchased clickers, or Student Response Systems, for all first-year students. The first priority was to use these clickers for active student engagement with immediate feedback in lectures. While it is recognised that this is not the most up-to-date technology, clickers were chosen over other options for various reasons, not least of which is that all students have equal access to the devices. At the beginning of 2015, clickers were introduced in three first-year courses in the CLM Faculty. This study employed a mixed-methods research design, using qualitative and quantitative data collection methods to investigate the approaches, uses, benefits and challenges of using clickers in CLM. It was found that clickers were extremely beneficial in engaging the class and allowing anonymous participation. Immediate feedback was found to be very useful and most students and lecturers enjoyed the experience, although technical and software challenges were experienced. Lecturers wanting to adopt clickers should attend appropriate training and slowly phase in the use of clickers until they are comfortable using them.

Keywords: Clickers, engagement, lecturers, students, UTAUT

1. Introduction

Higher education has experienced substantial change in recent years, including a new era of mass education, with an increasingly diverse group of students. As a result, universities are being forced into thinking about the quality and equity of their teaching and learning (Maringe & Sing, 2014). Students entering higher education have certain expectations of tertiary education, and, as they are often technologically savvy, may expect technology to play an important role in teaching and learning (Satheesh, Saylor-Boyles, Rapley, Liu & Gadbury-Amyot, 2013). The extent to which lecturers use technology varies, but it has been found that using technology (and using clickers) can improve engagement, and lead to student satisfaction and success (Satheesh et al., 2013; Stagg & Lane, 2010; Gachago, Morris & Simon, 2011). The Council on Higher Education (Council on Higher Education, 2013) has suggested that technology can improve collaboration and provide opportunities for enhancing the curriculum.

As such, the Faculty of Commerce, Law and Management (CLM) at the University of the Witwatersrand (Wits) embarked on a project to purchase clickers and introduce them to first year students in the faculty, in an attempt to increase student participation and engagement and provide immediate feedback in lectures. Consequently this paper will report on the uses, benefits and challenges of using clickers, and will suggest solutions which could enlighten potential adopters of clickers.

2. Literature review

A clicker, also known as a Student-, Personal- or Audience Response System *inter alia* (Or-Bach, 2014), is a handheld device (similar to a remote control) that uses infrared or radio frequency to communicate with a receiver (Stagg & Lane, 2010). Clickers enable lecturers to pose questions using software such as Powerpoint, and students can respond by entering their answer(s) on the keypad of the device (Lantz, 2010; Stagg & Lane, 2010). Various types of questions can be asked including multiple-choice, short text or numeric answers (Brenner & Shalem, 2010). The responses to the questions are collected and summarised and the results can then be displayed using charts to show the distribution of answers (Kay & LeSage, 2009; Lantz, 2010; Stagg & Lane, 2010). The lecturer can use this feedback to initiate further discussion about the content and allow for another round of answers or can provide the correct answer immediately (Kay & LeSage, 2009; Fies & Marshall, 2006; Brenner

& Shalem, 2010; Oosthuizen, 2014). Furthermore, clickers allow students to provide their answers anonymously, but the software associated with the clickers can track and save individual students' answers if each device is linked with a particular student (using the student number for example) (Kay & LeSage, 2009; Lantz, 2010; Stagg & Lane, 2010). Clickers have been used in many disciplines, in various class sizes and at various levels of education (Fies & Marshall, 2006; Lantz, 2010; Kay & LeSage, 2009; Satheesh et al., 2013).

When first introduced in the 1960s, clickers were too expensive for common use, were not user friendly and did not work efficiently (Kay & LeSage, 2009; Satheesh et al., 2013). In time, technological developments led to improved clickers in the late 1990s and widespread use of clickers started in 2003 which saw many schools, colleges and universities adopting them in classes (Kay & LeSage, 2009). However, according to Gachago et al. (2011), usage and research on clickers in South Africa is still in its infancy.

Previous studies (Or-Bach, 2014; Satheesh et al., 2013; Stagg & Lane, 2010; Kay & LeSage, 2009) have found that the use of clickers in lectures is mostly positive. These studies have been carried out across many disciplines in various class sizes, but despite the varied application, the primary reason for using clickers has mostly been the same: to increase student engagement, to provide anonymous answering of questions and to provide immediate feedback (Or-Bach, 2014; Brenner & Shalem, 2010; Stagg & Lane, 2010; Lantz, 2010; Kay & LeSage, 2009).

However, clickers have also provided challenges, such as the time needed to adapt content, produce questions and integrate their use in the class (Satheesh et al., 2013; Kay & LeSage, 2009), the negative perceptions when used for attendance (Stagg & Lane, 2010; Kay & LeSage, 2009), technical difficulties (Kay & LeSage, 2009) and time taken in class (Kay & LeSage, 2009).

The CLM Faculty at Wits has a large number of first year students from diverse backgrounds, which pose many challenges for lecturers, particularly those who want more class participation and engagement. In 2013 applications for Teaching Development Grant funding were made and received for two projects: the Road to

Success Programme (RSP) and to purchase clickers for all first year students in the faculty as a means of engaging the modern student. Although the initial aim of the RSP was to support students deemed to be "at risk", the RSP team enlisted as many first year students as possible and has provided them with extra holistic support as a prevention strategy. Correspondingly, most students registered for first-year courses at the start of the 2015 academic year were given a clicker. They did not have to pay for the device, but had to sign a contract in which they agreed to return it at the end of the year, failing which they would be liable for the cost of replacement. All students with clickers were invited to training on the use of the device before lectures started. Similarly, all lecturers of first-year CLM courses were offered the opportunity to attend training on the use of clickers and would be given the necessary hardware and software to incorporate the clickers in their lectures. In total, 1395 students collected clickers, while 13 of the 37 lecturers attended the few hours of training provided by the vendor on the use of the device.

Some academics questioned the use of clickers, as opposed to using other devices like cell phones, as polling systems. However, it was decided to roll out the clickers for a number of reasons: a large number of students at Wits do not have, nor can afford mobile and/or smart phones; if phones were donated, they could place students at risk of theft or may be sold by desperate students for food; clickers have no value beyond their use in the classroom as each clicker is allocated to a specific student; the clicker software is able to interface with Wits' learning management system; clickers are more robust than mobile devices; and clickers are not dependent on Wi-Fi or internet access.

To carry out this research, the Unified Theory of Acceptance and Use of Technology (UTAUT) model (Venkatesh, Morris, Davis & Davis, 2003) was used, as this model explains an individual's acceptance and/or actual usage of technology, by integrating constructs from several acceptance models. Venkatesh et al's (2003) constructs are outlined as follows:

- Performance Expectancy: the degree to which an individual believes that using a system will help achieve gains in performance. The current study

sought to investigate how the use of clickers is perceived by lecturers to benefit them and their students.

- Effort Expectancy: the degree of ease of use of the system. The current study investigated the effort required to use clickers.
- Social Influence: the degree to which an individual perceives that important others believe he/she should use the system, i.e., is one influenced by others? This was not included in the present study.
- Facilitating Conditions: the degree to which an individual believes that there is support when using a system. The current study explored whether certain conditions affected the use of clickers.

3. Methodology

Although many studies have investigated the effects of clickers, they have been criticised for not using valid and reliable instruments to collect data, for performing limited statistical analyses and for their narrow coverage of subjects (Kay & LeSage, 2009). Various models can be used to investigate the adoption of technology; this study has made use of a modified UTAUT model (Venkatesh et al., 2003). Due to the exploratory nature of this study, not all of the constructs of the model are applicable or appropriate to the context of CLM at Wits.

This study employed a mixed-methods research design, using both qualitative and quantitative data collection methods to explore the usage and experiences of different groups. The sample respondents were the first year CLM lecturers and the first year students that had signed up with the RSP (for logistical reasons the survey was limited to the RSP students). All 37 first-year lecturers were sent an initial survey which asked whether they had attended training and subsequently used clickers in their classes. Lecturers who had used the clickers were asked to attend an interview (the user group), while those who had not used clickers were asked to complete a survey to determine their reasons for not using the clickers (the non-user group). Of the 37 lecturers, only 20 answered the initial survey (54% response rate) with eight of the 20 indicating that they had used the clickers and of the eight, six were interviewed. In contrast, the student survey contained several questions relating to clicker usage and their experiences, while the remaining questions dealt with other aspects of the programme. Of the 855 students on the RSP programme, only 110 completed the survey, thus a 12.9% response rate.

Although demographic data was not collected, the lecturers and students represent various disciplines within the CLM Faculty, namely Information Systems, Accountancy, Law, Computational Mathematics and Economics. However, the user group of lecturers represented only three disciplines, namely Information Systems, Economics and Computational Mathematics.

Furthermore, thematic analysis was used to identify themes from the interviews, while descriptive statistics show the frequencies of responses from students and the non-user group of lecturers. These have been reported under the appropriate UTAUT constructs, with some comment about actual usage.

4. Data analysis
4.1. User group

Usage: All eight lecturers were first-time users of clickers. The clickers were used to: ask between one and six questions per lecture, check understanding of concepts, revise work, increase participation and discussion and/or provide a break in the lecture. None of the lecturers have performed any analysis of the student-answer data collected at this time, nor did they use the clickers as a measure of attendance.

Performance and benefits: The major benefit expected from the use of clickers was increased interaction in the lecture, although "enjoyment", "a more intimate class environment", and "immediate feedback" were also mentioned. All these benefits were realised, with increased participation due to the anonymity of responses.

Effort: None of the lecturers anticipated difficulties in integrating the clickers with the subject content, nor was there concern about the ease of use of the clickers. They did believe that using clickers would take time in the lecture, compromising content coverage, and that it would be difficult to formulate the correct appropriate questions. They thought students might not bring the clickers and/or would not respond and that using technology in the class could be intimidating or require a steep learning curve. The actual experience was that students took time to settle after the question and answer sessions, it was difficult to ensure the correct level for questions and there was decreased spontaneity, as questions required planning beforehand. Integrating the clicker questions into the content took time and effort, and multiple choice questions

were easier to pose than questions requiring numerical or text answers. The students appeared to cope with using the clickers, although they reportedly became bored if the clickers were used too often in a lecture.

Facilitating conditions: Other difficulties experienced were technical and software difficulties. The training was deemed to be too general and most lecturers felt they would benefit from a workshop to see how others are using the clickers and to explore the possibilities of analysing the data. In some lectures, less than half the class brought their clickers, while in others most brought theirs. In the former case, students would get bored although they were told to share and get involved in discussions.

4.2. Non-user group

Usage: Six of the 12 lecturers (50%) could see how they could use clickers in their lectures, with four having no opinion, and two could not see how they could use clickers.

Performance and benefits: Six of the 12 (50%) did think that clickers would be useful, with four not believing that they would be useful and two having no opinion. Six of the 12 (50%) said they saw the value in using clickers, four had no opinion and two could not see the value of using clickers. Five of the 12 (42%) did not feel confident using clickers, while 4 were confident and 3 had no opinion.

Effort: Six of the 12 (50%) thought it would not be easy to use clickers, four thought it would be and two had no opinion. Three thought it would be too much effort (25%), four thought it would not be and five had no opinion. Four suggested it would take too much time in the lectures (33%), while five did not think it would and three had no opinion. Nine of the 12 (75%) believe that using clickers takes extra time to plan lectures, one did not agree and two had no opinion about this.

Facilitating conditions: Only one of the respondents (0.08%) said they hated technology, one had no opinion and the remainder do not hate technology, however, three (25%) are wary of using technology in class, although the remaining nine are not. Four of the 12 (33%) were concerned there would be no support for technical issues, four had no opinion and four were not concerned about technical support.

4.3. Students

Usage: All but one of the students had a clicker and 23 of the 110 did not attend the training.

Performance and benefits: The anonymity was the most positive response with 97 (88%) saying this was great as they did not feel bad if they got an incorrect answer, with four (0.04%) having no opinion and nine (0.08%) disagreeing. Other highly favourable responses were that the clickers: made the students actively participate (93%), made the lectures more interactive than traditional methods (90%), helped them get instant feedback (89%), made them feel more involved in the class (84%), made them focus more in class (76%), facilitated class discussion (74%), heightened interest (73%) and allowed them to apply the course material immediately (70%). Lower positive responses were received for the clickers allowing them to work with the people around them (65%), allowing them to better understand concepts (63%) or making it easy to connect ideas (61%). The students were not convinced that clickers would help them retain information for longer (53%), nor have they attended more regularly because of the clickers (24%).

Effort: The students found the clickers easy to use (89%) and thought they were fun (87%).

Facilitating conditions: 84% of the students believed the clickers worked well and 84% said that more lecturers should use them.

5. Findings and discussion

As this was the first time that clickers had been used, it was expected that usage would be limited, while the lecturers start to feel comfortable incorporating clickers into their lectures and iron out any issues.

Although the non-user lecturer group do not see the usefulness or value of clickers, it appears that both the CLM lecturer user group and students expected and experienced the key benefits of using clickers, namely increased interaction, participation and engagement. A major factor is due to the anonymous participation of students, which is very important in large diverse classes. This confirms the results found in other studies (Kay & LeSage, 2009; Lantz, 2010). Another benefit stated by

the user group and students is that of immediate feedback, confirming previous studies (Or-Bach, 2014; Brenner & Shalem, 2010). Although the user group did not mention class discussion as a very important benefit, the students did feel the clickers facilitated class discussion, although their perception of clickers having less of an influence in allowing them to work with the people around them is slightly contradictory. Lecturers may not have had class discussion as a major focus, although it is a key benefit found in other studies (Kay & LeSage, 2009). The fact that students did not feel that clickers made them attend lectures could be because the user group did not use the clickers to measure attendance, although attendance has been a factor in other studies (Kay & LeSage, 2009; Stagg & Lane, 2010). Both the user group and students believe that clickers help in better understanding concepts, supporting the findings of previous studies (Kay & LeSage, 2009), but the students did not feel that other learning benefits would materialise such as retention of information or linking ideas, and these findings are contrary to what has been found in other research (Kay & LeSage, 2009).

Although the students found the clickers easy and fun to use, there was far more effort required by the lecturers in formulating appropriate questions and integrating the clickers into the lectures, which is perhaps why many of the non-user group decided to not use clickers. These difficulties were also experienced in other studies (Kay & LeSage, 2009; Satheesh et al., 2013). While a lecturer could usually stop at any point in a traditional lecture to ask a question, using clickers requires the lecturers to plan these questions before and spontaneity can be lost. Brenner & Shalem (2010) suggest that it is important to design questions appropriately. Kay & LeSage (2009) suggest that some lecturers may find it difficult to instantly adjust lectures, which was indicated by the lack of confidence in some of the non-user group. The concern of both the user and non-user groups about time taken in lectures when using clickers, which sacrifices time spent on content, confirms the findings of previous studies (Kay & LeSage, 2009; Satheesh et al., 2013).

Previous research has suggested that students not taking clickers to class and technical problems can be major obstacles to the success of using clickers (Kay & LeSage, 2009). These factors were confirmed in this study as students were bored if they had no clicker and lecturers mentioned software and technical difficulties.

Lecturers that are more confident or experienced may be able to adjust (Kay & LeSage, 2009), but lecturers who are wary of technology or concerned about technical support may not want to risk using clickers, such as those in the non-user group. The students felt that the clickers worked well, suggesting that the user group were well prepared or better able to adjust when they encountered difficulties. The need for training on how to integrate clickers confirms the findings of previous studies (Satheesh et al., 2013)

It is important to note that although there were 12 non-users that answered the survey, only three said they would not consider using clickers in their courses in the future.

6. Conclusion

This study set out to investigate the expectations and usage of clickers by lecturers and students in first year classes, by using a modified UTAUT model and both qualitative and quantitative methods. Clickers have been used in only three subjects by eight lecturers thus far, so more research is required before any definitive comment can be made on the success and benefits of using clickers in CLM at Wits. The use of clickers in large diverse classes was found to be extremely useful in engaging the class and allowing them to participate anonymously. Immediate feedback was found to be extremely useful and most students and lecturers enjoyed the experience. Although technical and software challenges were experienced, these have only put off one lecturer and most of the non-user group are considering using clickers in the future. Any faculty looking to incorporate clickers into their classes should ensure that lecturers have the time to change their lectures to integrate clickers and have the appropriate training to do so, rather than just be trained on the use of the device. Although experienced lecturers may want to use clickers for marks and attendance, it is suggested that lecturers should be able to slowly phase in the use of the clickers in order that they are comfortable using them.

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