Reflection of using Smart Mobile Devices to Support Teaching and Learning in Higher Education

Walter Matli

Vaal University of Technology, Ekurhuleni campus
24 Plane road Spartan, Kempton Park, South Africa (satellite campus)

ABSTRACT— ***In the coming years all students are likely to own smart mobile phones in higher education institutions and it is important that as higher education we bridge the gap of learning with tools and techniques which are more relevant to the current students. Teaching and learning in Higher education institutions must be innovative and transformed to give support to the current generation we currently have in the education system. It is critical that as a university of technology we introduce new modernize ways of enhancing learning that will grant opportunities to allow students to attain their full potential and to get the support they require to help them achieve academic excellences. The current higher education students should be educated in ways which are more appealing and interactive. Most of our students uses their mobile phones every day and they enjoy the technology that mobile phones offers them, it is important as higher education we find ways of using the same tool (mobile phone) that they like using for other personal or social purposes to use it for educational purposes. The researcher gathered data by joining a messaging services application (Whatsapp) group that was being used by the students already and accepting students as friends on Facebook. This research was conduct at VUT Ekurhuleni satellite campus. The findings of this paper indicate that smart phones messaging applications do have a positive impact on supporting teaching and learning and increase participation of students in their learning. Currently most students in VUT Ekurhuleni today have access to a mobile phone than computers. There is no better time than now to blend the face-to-face learning with mobile-learning. The primary aim of this research was to determine if smart phones can play a role in supporting education at Vaal University of Technology. This research has provided a humble basis for higher education academic leaders to start the discussion and the possibility of introducing the use of smart phones to support teaching and Learning.***

Keywords— learning support, higher education, m-learning, smart phone

1. INTRODUCTION

Communication has vastly improved by the advances of social media technologies (Tutty & Klein, 2008). As a result family, friends and strangers as well are connected in an instant and news is transportable faster. Higher education students of the current generation depend on their mobile phones to do almost everything; it is important that we take advantage of using smart phones to support teaching and learning. Most of our students have smart mobile phones access, it is important that we find ways of using mobile phones to strengthen learning. It is important that as academic staff and students we take advantage of mobile phones to support learning, with mobile phones students are able to learn beyond the classroom and the lecturer can communicate with students regardless of time and location.

Smart mobile phone is defined as mobile phone that integrated the technology of multimodal connectivity to the internet and run different applications on complete operating system software, like one would on a normal computer machine (Zhong, 2013; Schroeder, 2010). The use of smartphones is one the most exciting innovations in the 21st century; smartphone allows users to access information online and it is portable that gives the users the opportunity to take it everywhere they go with them. Smartphones afford the users with new type of computer-mediated communication (Ling, 2008). Smartphones emerged from the normal mobile phone which does not include modern technology and are used only to carry out text messages and voice calling.

With the use of smartphones students are able to access information using their mobile phones and communicate beyond the classroom with their peers and lecturers. Technology devices such as smart phones can offer support to students in the process of learning (Upadhyay, 2006). Smartphones privileges students to access internet at their finger-

tip at anytime, previously students needed a computer with internet access to be able to search on the internet. With smart phones students do not need a hardcopy of notes from the academic staff to study, the lecturer can email notes or slides to students and they can access them on their mobile phone and read at their convenient.

As this applications and services grow in popularity, there is a lot of speculation about who uses them, how frequently, and for what purposes (Reich *et al*, 2012). Technology should be rooted to support education by encouraging the development of ground-breaking technological solutions to education issues through ICT enhanced learning opportunities.

2. HIGHER EDUCATION THEORITICAL FRAMEWORK

2.1 Background of Higher education in South Africa

The system of higher education in South Africa has been influenced by international movements (Sutherland, 2009; De Jager & Nassimbeni, 2005). Higher education institutions are facing numerous challenges; these challenges arise from the impacts of globalization, the increasing importance of knowledge as a principal driver of growth, and the information and communication revolution (De Jager & Nassimbeni, 2005).

Most of the students enrolling in higher education in South Africa are under prepared; this is caused by inadequate life skills input at basic education level of schooling (Sutherland & Waetzel, 2005). The basic education schooling does not prepare students fully for higher education schooling, most students cannot cope with the pressure of higher education and that result in students under performing in first year level, dropping out and "course touring" changing courses every year. The higher education diversity is one of the factors that contribute to students not performing adequate more especially at first year level. First year student experience coming from Outcome Based Education (OBE) in secondary education to higher education learning, students need support to cope with the transition.

New forms of higher education institutions are driving traditional higher education institutions to bring alteration to their methods and approaches of delivery teaching to students and to take advantage of the openings offered by the new information and communication technologies (The world Bank, 2002). With technology that we currently have higher education has to reposition and transform itself to suite the current generation of students.

2.2 Background of the Vaal University of Technology (VUT)

The VUT has undergone a drastic shift from 1966 as Vaal Triangle College for Advanced Technical Education to Vaal Triangle Technikon in 1979 and later to Vaal University of Technology in 2004. The University has enrolled 21 468 undergraduate students in 2011 of which 11 431 are in Science, Engineering and Technology study field. This is no surprise as VUT is a University of technology and endeavour to be a University that leads in innovative knowledge and quality technology education.

VUT strive to provide quality education and in return it attracts more foreign students from all over the African continent because of the higher standard of education in higher education institutions in the country. VUT is one of the Universities that accept the challenge to move towards new era and brave enough to keep what is worthy and substitute what is required in making sure that they deliver quality education.

VUT is responding to the call that higher education academic staff cannot teach, although they hold postgraduate degrees in the field of course they lecturer. This is simply because they have not been trained how to teach in higher education, academic staffs need some sort of training that will best assist them to understand the field of teaching and learning. VUT has invested in educating their academic staff so that they can have a better understanding of the teaching environment.

The university has also developed a department called Centre for academic developments (CAD). The department conducts workshops on staff development, assessor training that is very crucial for academic staffs to understand the assessments of students in higher education. These programmes are conducted in all campuses of VUT.In addition the University started their first in-house staff development conference in 2012, the conference is held annually and aims at gathering academics and researchers of VUT to share knowledge and their research findings.

3. PURPOSE

The aim of the research was to investigate if the use of smart mobile phones (m-learning) can be used successfully as an extra tool to support teaching and learning of students in higher education, more so that students have access to the devices.

The study is positioned with higher education in South Africa and smart phone (m-learning) applications. To make teaching and learning effective for the current generation of students who are diverse, the higher education institutions must constantly come up with measures of supporting these students. The basic reason for embarking on this study was first-hand experience of the effect of student needing supporting to their learning, following observations of students by the researcher that students spent most of their time online engaging. In addition the research was to determine if the introduction of m-learning as a measure of supporting higher education is ready to be used for VUT Ekurhuleni.

4. OPPORTUNITIES OF USING SMART MOBILE PHONES IN HIGHER EDUCATION INSTITUTIONS

The academic staffs are able to assess performance of individual students easily, and most students make an initiative to participate using a tool they always use for socializing. Students are able to work as a team when they collaborate on certain activities; they learn a long life skill of working with people. The current generation of students in higher education are technology wise; they are their smartphone applications almost daily for personal and social purposes.

Higher education institutions are capable of benefiting from smartphone applications, what is foremost important is for institutions to spent more funds on investing in technology infrastructure that with make the use of technology friendly and benefit both the institution and the learning of students. Smart phones applications can be used successfully to enhance students learning and improve learning. smartphone applications can be realigned in teaching successfully and enables students to restructure their understanding when learning. Academic staffs have a lot of preparations to do before they enter the classroom and at the same time mostly they have large classes they teach yet the institutions expects them to do research. Technology can also assist in reducing the work of academic staff; academic staff can make use of online test which can mark itself and provide fast feedback to students.

Using smartphone applications in Higher education will allow students to collaborate, engage in academic matters and understands each other a bit since they come from different backgrounds and have different ethics. In return the use of messaging services applications will empower students for the future.

5. TEACHING AND LEARNING IN HIGHER EDUCATION

"An understanding heart is everything in a teacher and cannot be esteemed highly enough. One looks back with appreciation to the brilliant teachers, but with gratitude to those who touched our human feelings. The curriculum is so much necessary raw material, but warmth is the vital element for growing plant and the soul of the child" _ _ _
Carl Jung

Academic staff deals with students who have different problems and who happen to be in the classrooms. As academic staff we have to take into consideration some of these points that can affect the performance and learning of an individual student. *How do I make a student going through any of the problem to learn successfully in class?* To be an academic staff it must be a calling to serve the community, you are not only concerned with the learning of students but you end up being an external parent to the students.

Higher education academic staff finds themselves teaching students without understanding how the current generation of students learn (Fry et al, 2009). Usually academic staffs conduct teaching in their classroom the same way they were taught and how they individually learn, and most do not see anything wrong. It is important that as academic staff we understand that as people we are unique and we learn differently. Increasingly higher education institutions blend their face-to-face teaching and learning with online. Higher education institutions now use LMS such as Blackboard and Sakai that makes teaching to take place electronically.

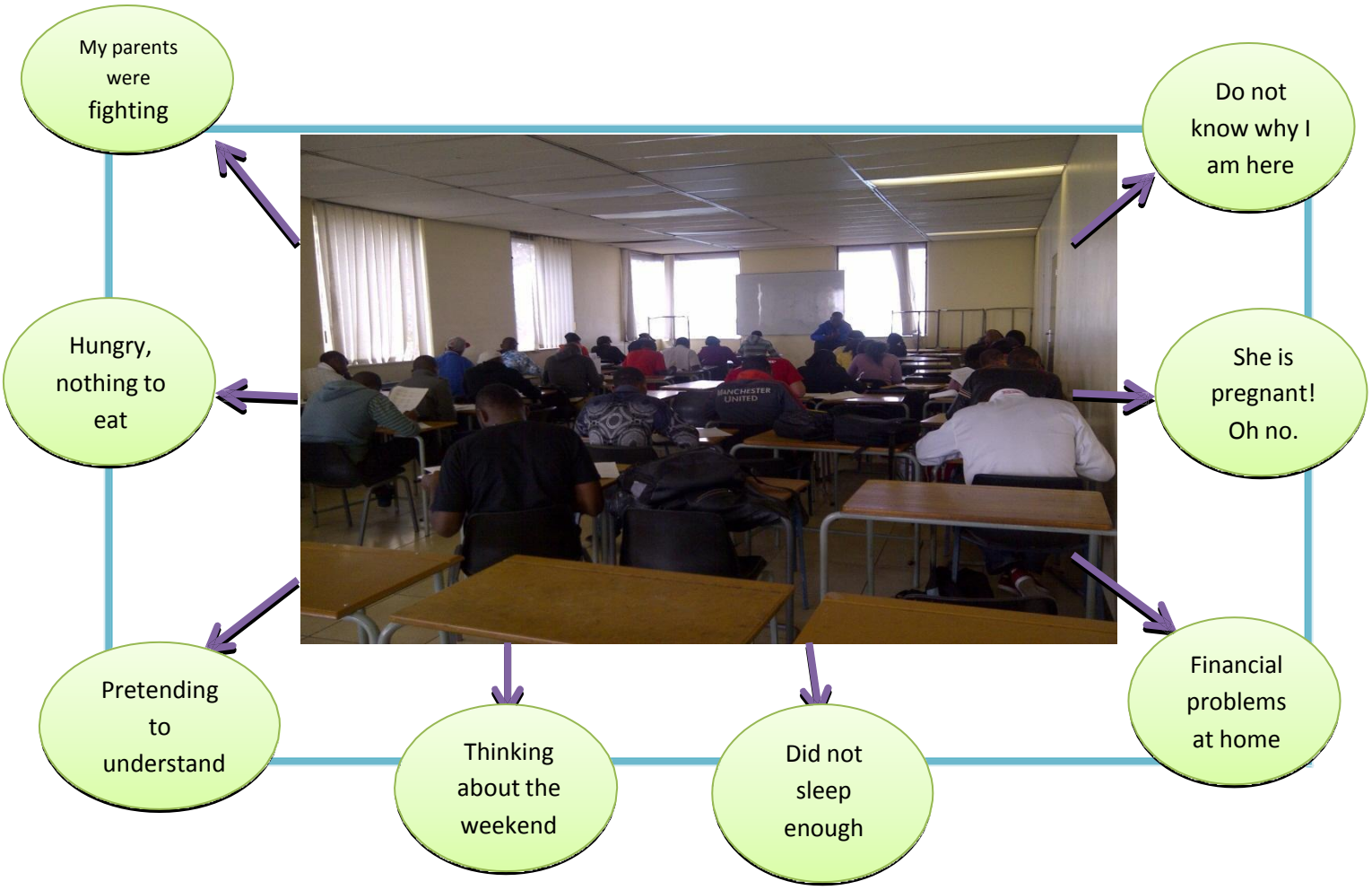

Figure 1: VUT class

Higher education academic staff has to understand the diversity of this entity called student, students in higher education comes from different background educationally and culturally. Students have different skills and goals, they need their academic staff to nurture and support them. Inadequate teaching theories applied by the academic staff will negatively affects the students' academic performance, the academic staff must constantly evaluate his methods of teaching if they are adequate to be used for the age group of students in the classroom.

Higher education institutions and academic staff have to understand how the current generation of student learn and how to enhance student learning. Academic staffs have to constantly engage in educational training that will from time to time keep them up to speed on how they can enhance the way they teach. Current students (generation y) in higher education cannot be taught in the same approach the students of the nineteen-sixties (generation x) were taught in higher education. There are more technology tools now that were not available then that can be used successfully in higher education.

Higher education institutions have to use technology that is fully available to the students to connect, interact and share knowledge using messaging services applications. This generation of students spent most of their time online, applications such as Google+, blog's and Whatsapp to name the few can play an important role in supporting teaching and learning.

Higher education institutions have to keep up with the standards of other higher education institutions that are using technology and benefiting from using it. Investing in technology is critical to every higher education institution that plans to cater for the generation y students and subsequently be prepared for the generation z that that has started entering higher education this year (2013) but in small margins.

Academic staff in higher education should be flexible and constantly be able to adapt if they want to be relevant and understandable to the current generation of students in higher education institutions. With technology we have today learning does not have to take place during the class contact session (formal learning) only, we are living in the era where there are more tools which can be adopted by higher education institutions to support the learning of students. This

students come from different background and have different cultural believe but they all want to learn as students in higher education (Moore et al, 2007).

Academic staff in Higher education institutions has the power to shape and break the future of students in the classroom, it is important for academic staff to have a building attitude and a positive teaching philosophies. There are two types of students in the classroom, surface and deep learning (Rust, 2002; Biggs, & Tang, 2007). The deep learning students are those students that academic staff do not spent most of their time concentrating on them making sure they understand, this are students who take the initiative and the responsibility of their learning. On the other hand, the surface learning students are those that academic staffs have to make an initiative that they better their understanding. One of the reasons why some students are surface learning type might be caused by the way the academic staffs offer their lecture to the students.

This generation y student's finds technology appealing to them, academic staff can incorporate teaching and learning to the language they fully understand technology (Schroer, 2013). Although it is not the responsibility of the academic staff to force individual students to complete successfully, they have a responsibility of learning their students in the classroom and changing now and then the way they conduct their teaching. Some students can shift from being surface learning students to deep learning students if the academic staffs make the initiative. While in most cases surface students have their own attitude towards education; they only aim for minimum understanding just to pass (Biggs & Tang, 2007).

The main mandate of higher education is to teach students. The critical part is how do stakeholders (students, staff and institutions) improve education teaching and learning (Arthur et al, 1987). Higher education must constantly conduct research to get a better understanding on how they can enhance the teaching and learning. With the current generation of students we have in higher education, Education can be improved by taking learning and teaching to the space students finds appealing, the online space.

6. TYPES OF GENERATION

There are currently three types of generation according to (Schroer, 2013), he classify them as:

Generation x

These are people born between 1966 and 1978. Their population is estimated to be forty one million. These students were not exposed to too much technology while they were in higher education.

Generation y

These are people born between 1977 and 1994. Their population is said to be seventy one million. The students we have currently in higher education institutions belong to this generation and they are exposed to technology. These students are known as incredibly sophisticated and technology wise.

Generation z

These are children born between 1995 and 2012. Their population is estimated to be twenty three million and growing rapidly. These children will be future students in higher education we need to prepare for them. Higher education institutions have to have higher levels of technology that will make significant inroads in academics for this generation who will be enrolling in Higher education in few years from now. Generation z kids are growing up with a highly sophisticated media and computer environment and they will be more internet savvy and expert that their generation y forerunners.

Higher education has to acknowledge the current generation of student we have in the higher education system and adapt to what is appealing to the primary stakeholders which are students. Students spend most of their times on smart mobile phone applications reading and chatting to other friends, students, family and their virtual friends most of which they have not met physically. As higher education institutions we need to use the same space they spent most of their time chatting to try and make them engage not only about their social lives but also to use this technology for academic engagement and effective learning.

Higher education has to be flexible and adapt easily to accommodate difference students that come and go in higher education. At present, higher education is more mobile and connected. With the fast globalization of the economy and technology, therefore, Higher education systems have to transform with times. Higher education institutions are losing

focus on their fundamental role in our societies. It has become difficult for higher education institutions to focus on their core purposes, this is caused by what the market expect them to be in most cases.

Teaching is when the lecturer contracts furthermost students to practice the level of cognitive process needed in order to accomplish the planned outcomes of the module (Biggs & Tang, 2007). Teaching theory refer to how students learn when they being taught and what transpires when learning takes place (Knight et al, 2006).

Assessment is the process whereby students' performance is audited. In the education environment; assessment is the process where the lecturer tries to measure student's progress of learning (Ewan & White, 1984). The methods used to assess generation x students then has to change because of the technology era we find ourselves in. Assessing student in higher education institutions has significantly changed the old system of teaching and learning, this in turn provides educational opportunities to students and academic staff (Alant & Casey, 2005).

Generation x depended on auditory style of learning more than other learning styles because then the tools being used in higher education to complement other learning styles were not fully available in most higher education institutions. With the generation x higher education in South Africa was not faced with the issue of too much diversity of students, these was caused by the apartheid regime. Some higher education institutions were traditionally meant for white people others for black people.

Generation y, the higher education institutions was/is able to support the generation y with tools that not only auditory student type benefit but also visual students can get to understand better when the academic staff uses visual to interpret a scenario and tools such as PowerPoint presentations. Currently the higher education institutions are very diverse because of the post-apartheid in 1994 in South Africa. Some of the challenges of post-apartheid (1994) was for higher education institutions to accomplish equality of student's enrolment.

Generation z, the researcher cannot argue or claim anything at this stage of the research, as the first group from the generation z will enrol for higher education for the first time next year (2014) within the South African context, the researcher determined this by the following formula. Normally students start grade 1 at the age of seven years, and by the time the finish grade 12 (known as matric) they will be 18 years old. A person born 1995 and did not repeat any grade in basic education is supposed to be in higher education next year (2014). According to Schroer (2013) generation z are people born between 1995 and 2012.

7. CASE STUDY: Using Whatsapp chat group and Facebook application to support teaching and learning

7.1 Introduction

Recent research indicates that to get student to participate in learning, higher education institutions need to identify the level of student involvement (Strydom *et al*, 2010). Academic staffs need to get students involved in their education, students as primary stakeholders need to feel that they are constantly engaged this will assist academic staff to get to understand how they would sometimes prefer to be taught. Students must be at the centre of their learning (Maher, *2004*). Over the past decade higher education teaching has seen cultural change moving from content-base to student-centre approach (Robertson, 2001; Maher, *2004*).

At the beginning of the new semester (July - December, 2012) the researcher asked students in a class by a show of hands, "*how many of you access messaging services applications from your smart mobile phones?"* all the students hands were up, this meant all students in the classroom had access to smartphones mostly used brand being Blackberry. The researcher then asked "*which messaging application can we use as a class to have a group to discuss and learn outside the contact session?"* students choose Whatsapp and Facebook applications. The researcher did not want to choose for students which application they can use to be in-contact outside the classroom because he wanted the students to be involved in the decision. Fortunately the researcher was already using the two applications so both the researcher and students needed no training of using Whatsapp and Facebook applications.

7.2 Methodology applied

The researchers experiment was conducted at VUT Ekurhuleni satellite campus located in the metropolitan of Ekurhuleni formerly known as the East Rand of Johannesburg. VUT Ekurhuleni campus is right in the middle of industrial hub of Ekurhuleni in Spartan, Kempton Park. Data was collected online from the Whatsapp chat group and

Facebook applications. Data was collected from one semester when this group of students where in module two of their first year. The method of phenomenology was used to collect data because it brings the experiences and perceptions of individual students from their own perspectives to the forefront. The researcher used qualitative research approach and domestication theory to monitor the researcher when doing data analysis on the reflections from students which was anonymously and voluntarily (Chigona, 2013).

Facebook: It was used on individual level students posted questions to the academic staff and he replied to individuals. This was to give space to those students that where not too confortable to post on the Whatsapp group chat. And those that preferred Facebook than Whatsapp.

Whatsapp: The academic staff together with students was part of the group chat were they constantly engaged. The group was also utilized by the academic staff as notice board; the academic staff was able to post important urgent notices to students. The group chat created a good bond between students themselves and with the academic staff outside the class contact sessions, as most students in first year feel isolated and fear to engage with their academic staff and other classmates.

7.3 Participants

These were first year students who were in their second semester for the subject (Information system 1 module 2) this is one of the major subject for Information Technology national diploma qualification. The researcher selected this group because it was the smallest groups from three subjects the researcher facilitated. There was no formal questionnaire created to depict how students felt about using smartphone applications to support teaching and learning. During the first week of learning the researcher had a discussion with the students, to know which application would they like us to use, and by show of hands how many were on that messaging application. The purpose of using the Whatsapp and Facebook applications tool was to extend teaching and learning for students. The researcher wanted students to feel part of this initiative, so the researcher asked one of the students to create a group on Whatsapp. The researcher wanted the students to be involved and basically run the initiative, he was there just to facilitate, in this way the researcher used the student learning centred approach putting student at the centre of their learning.

7.4 Positive results

The researcher asked students to reflect after they wrote their examination for the subject, it was important that the students reflect so that the researcher knows how they felt after using their smart mobile phone devices to engage academically and socially as a class.The reflection was voluntarily, some of the positive reflections include:

> *"The facilitator gave us topics to discuss, this platform gave me the opportunity to share with the rest of the class my understanding and thoughts and my classmates then asked me follow-up questions from my statement and I had to explain to them. It was very interesting because I have learned that as students we don't see things in the same way and we don't answer a question from the same angle".*

Education is built on what action the students carry out through the module and learning is what they do, and not concerned more with what the lecturer does (Biggs & Tang, 2007).Students were able to show that they understand the content of the matter discussed.

> *"As we were discussing I benefited because every student was posing questions or comments according to his/her sources and personal knowledge".*

The academic staff encouraged self-directed learning to students, making students to think about their own thinking. Students had the opportunity to interpret what was discussed towards deeper understanding.

> *"It helped me to be a critical thinker, I know my classmates better"*

This group made them to know each other better. They learned team work and the importance or sharing knowledge with other students and their academic staff.

> *"The lecturer was able to remind us of any important announcements; he used the platform to notify us maybe when an activity's due date is nearer".*

Just like a notice board the researcher used to post to the students on the group chat. The researcher used the same space to announce and remind students of anything urgently important; the researcher did not have to wait for the class contact session to communicate with the students.

7.5 Negative results

The researcher asked students to reflect positive and negative thoughts after using the Whatsapp group chat and Facebook applications. Some of the negative reflections include:

"My smart phone battery was flatting, while I had no charger in position"

Most of the students smart phones were blackberry, but like other brands of smart phones the more you spent online chatting the more the mobile phone battery goes low. The researcher fully agrees with the student, but since in most cases we engaged while we were home, the researcher assumes they had access to their phone charger.

"….was forever commenting on the group chat, got irritated at times"

Students are not the same; there will always be childish ones and childlike students. The researcher constantly had to monitor the group in making sure that other students do not feel their comments were irrelevant to the group, making sure that all students felt welcomed to part take and that their inputs are equally important.

8. MY REFLECTION ON THE EXPERIENCE

It was a risk I as the academic staff took when I also joined the Whatsapp chat group and accepted friend's requests from students on Facebook application, because Whatsapp application requires the users in the group to have a mobile number. So my students had my mobile number, and anything could have gone ugly but fortunately my students treated this project with positive thoughts and behaved like adults I expected them to be.

I had to transform myself a bit to fit into the group. The group was used for not only as a supporting tool for learning but it was also used for social purposes. The researcher took part in some social issues such as current affairs that students were discussing in the group, one of the topic at some stage was the 2014 election of South Africa. It was astonishing for me as their lecturer to see how informative my students were. And of cause, they access latest information online using their smart mobile phones. From the experiment the researcher realized that students spent most of their time online, using variety of messaging services applications to chat with people they know and people they do not know. This generation of student enjoy chatting online than in the classroom. I was surprised how some quite students in the classroom fully participate on messaging services applications, this way even the shy students get to participate because there is no face-to-face intimidation for them.

The academic staff did not want students to spent money to get a tool to access Whatsapp application and Facebook application; he used a tool (smart phones) that students already had access to.

This project assisted my communications skills, as I had to be professional at all times when I had to write something. I have also learned that it is possible to learn outside the classroom and learn effectively so. In terms of demarcation, although I was home in Kempton Park or at a pub around the Gauteng province and my students from other parts of Gauteng province, we were able to communicate through smart phones messaging applications. This project was very interesting for me as an academic staff because with technology rapidly changing we will have to add online learning tools that student have access of to support learning in higher education.

Overall I have learned that for students to learn they do not need an academic staff to stand in front of them every day. As an academic staff in a disadvantage higher education institution in terms of resources such as (Wi-Fi connection and sufficient computer labs) I am really motivated by using smart phones. This project should serve as an example to other higher education Institutions that smartphones applications can go a long way as a tool of supporting teaching and learning. Some higher education institutions have more internet access than others; there is still inequality of resource in higher education institutions.

With this experiment I had enough time to support students with learning by using interactive classroom technique blended with Facebook and Whatsapp applications accessed on smart phones. The emergence of new forms of teaching and learning in higher education are based on new Information technologies and has important pedagogical implications. Technology has a positive influence on refining teaching and making learning more effectively.

9. CONCLUSION

It is critical that academic institutions present first-hand innovative ways of improving learning that will award opportunities to let students to reach their full potential and to get the support they require in order to support them attain academic excellences. Investing in technology is very essential because it makes the image of the institution to attract more students from all corners of the country and some part of the continent. Technology is deeply changing student's relationship with knowledge. It is important that higher education institutions use technology effectively.

How students learn? As students are different, they learn in different ways. Although some make an initiative in their learning not all are like that. Academic staffs constantly have to observe students in the classroom and use different learning styles to make learning interesting to the students. *To what extend are institutions employing effective tool to make students learn?* Students want to have some fun when they learn. The lecturer bought the fun to the students learning by using tools that they like applications on their smartphones.

Therefore, the research indicate that students have access to smart phones than computers and the significant role the smart phone can play in higher education, by allowing students and academic staffs to use various applications on smart phones to support teaching and learning in higher education.

10. REFERENCES

[1] Alant, E., & Casey, M. Assessment concessions for learners with impairments, South African Journal of Education, Vol. 25, no 3, pp.185-189. 2005

[2] Arthur, W.,Chickering and Zelda, F,.Gamson. Seven principles for good practice in undergraduate education. Publisher: Washington centre news. 1987

[2] Biggs, J., Tang, C. Teaching for quality learning at University. 3rd ed. McGraw Hill. 2007

[3] Chigona, A. Pre-service teacher's appropriation of new technologies into their teaching and learning. Paper presented at the 15th annual conference of www application. Cape Town, South Africa. 2013.

[1] De Jager, K., &Nassimbeni, M. Information literacy and quality assurance in South African higher education.Libri, Vol. 55, no. 1, pp. 31-38. 2005

[2] Ewan, C & White, R. Teaching nursing: Self-instructional handbook. London: Croomhelm. 1984
[2] Fry, H., Ketteridge, S., Marshall, S. Hand book for teaching and learning in higher education. Enhancing academic practices. 3rd ed. Routledge: New York and London. 2009
[1] Knight, P. T., Tait, J & Yorke, M. The professional learning of teachers in higher education. Studies in Higher Education, vol. 31, no. 3, pp. 319-339. 2006

[2] Ling, R. New tech, new ties: how mobile communication is reshaping social cohesion. Cambridge, MA: M IT press. 2008
[1] Maher, A. Learning outcomes in higher education: Implications for curriculum design and student learning. http://www.hlst.heacademy.ac.uk/johlste. Accessed 21November 2012. 2004

[2] Moore, S., Walsh, G., and Risquez, A. Teaching at College and University.1st ed. McGraw Hill. 2007

[1] Robertson, C. What's the outcome? LINK 2, October. LTSN for hospitality, Leisure, sport and tourism. 2001

[1] Rust, C. The impact of assessment on student learning. Active learning in higher education, vol. 2, no 3, pp.145-158. 2002

[1] Reich, J., Murnane, R., and Willet, J. The state of Wiki Usage in U.S K-12 schools. Educational Researcher. Vol. 41 no. 1, pp.7-15. [online], http://dx.doi.org/10.3102/0013189x11427083 . Accessed 04 January 2013. 2012

[1] Schroeder, R. Mobile phones and the inexorable advance of multimodal connectedness. New Media & Society. Vol. 12, no. 1, pp. 74-90. 2010

[1] Schroer, W.J. The social librarian: Generation x, y, z and others cont'd. [online] http://www.socialmarketing.org/newsletter/features/generation3.htm . Accessed on 07 February 2013. 2013

[2] Sutherland, G. A curriculum framework for introductory programme in the national diploma: Engineering at the Vaal University of Technology. Stellenbosch University. 2009

[2] Strydom, J.F., Basson, N., & Mentz, M. Enhancing the quality of teaching and learning: using student engagement data to establish a culture of evidence. Publisher: Council of higher education SA. 2010

[1] Sutherland, T., &Waetzel, M. OBE-Africanising teaching and learning at introductory level. http://www.interaction.nu.ac.za/SAARDE2005. Accessed on 19 September 2012. 2005

[1] The world Bank. Constructing Knowledge Societies: New Challenges for Tertiary Education. Washington DC: World Bank. 2002

[1] Tutty, J.I., & Klein, J.D. Computer-mediated instruction: a comparison of online and face-to-face collaboration. Educational technology research and development, Vol. 56, no. 52, pp. 101-124. 2008

[1] Upadhyay, N. M-Learning: A new paradigm in education. International journal of instructional technology and distance learning. Vol. 3(2), pp. 31-34. 2006

[1] Zhong, B. From smartphones to iPad: Power users' disposition toward mobile media devices. Computers in human behavior, 29 (2013) 1742-1748. 2013