

**THE 21ST CENTURY STUDENT: AN EXPLORATION INTO THE EVOLUTION
OF TEACHING AND LEARNING PRACTICES REQUIRED IN A GENERATION
OF DIGITAL CHANGE**

By

Lyndall Kemm-Stols

202515592

Dissertation submitted in partial fulfilment of the
requirements for the degree of Master in Higher Education Teaching and Learning

School of Education

University of Kwa-Zulu Natal

Durban, South Africa

December 2014

Supervisor: Ms. R. Searle

Dissertation Document: Final

Date Submitted: 01 December 2014

DECLARATION:

A document submitted in partial fulfilment of the requirements for the degree of Masters in Higher Education, University of Kwa-Zulu Natal, Durban, South Africa.

I declare that this dissertation is my own unaided work. All citations, references and borrowed concepts have been duly acknowledged.

None of the work has been submitted previously for any degree or examination in any other university.

Signed:

Lyndall Kemm-Stols

202515592

01 December 2014

ACKNOWLEDGEMENTS:

I would like to acknowledge the following people who have played a pivotal role in the realisation of this dissertation and would like to give my sincere gratitude to:

Ruth Searle, my dissertation supervisor. Thank you for your patience, commitment and guidance which you have shown me throughout the process of this document. Thank you for giving me the freedom to explore concepts and sparking new ideas or thoughts.

All of my willing participants, who generously assisted me in gathering information and initially inspiring this topic. To my learning institution, thank you for being so accommodating throughout the research process and giving me the scope and freedom required to undertake this project.

My husband, Dennis, for believing in me and giving me the support needed when things became overwhelming or challenging. To our expectant babies, thank you for giving me a very specific timeframe of completion.

And finally, to all those people, who have made various contributions of providing information, assistance and moral support to this dissertation.

ABSTRACT:

The 21st Century is an ever changing context with rapid developments in technology affecting the manner in which we live, communicate and engage with the globe. These developments have contributed to creating categories of individuals who can be labelled as “Digital Natives,” who have grown up surrounded by technology and are comfortable using digital tools, and in contrast “Digital Immigrants,” those who have had to learn how to use technological tools, such as smartphones, wireless internet or laptops, in order to function in the current context. This is bound to affect teaching and learning strategies within the Higher Education sector, as generally “Digital Immigrants” will be facilitating “Digital Natives.” The need to understand how “Digital Natives,” process information, how technology is integrated into their studies is important in discovering the most effective teaching and learning strategies in order to fulfil 21st Century Higher Education outcomes.

The study is situated within the local context of the Applied Arts, an area which has had less exposure than other disciplines. It is based in a private higher education institution, where access to digital tools and resources is prominent. The research method is largely qualitative in nature and involves the use of focus group discussions, reflective journaling and in class observations using a case study of ten active participants. The data is then categorised and analysed using a suggested framework, which combines the theory of Connectivism and Vygotsky’s Zone of Proximal Development.

The study is concluded with teaching and learning recommendations specific to Digital Natives as identified within the group of participants in the study.

Keywords: Digital Native, Digital Immigrant, Applied Arts, Teaching and Learning, 21st Century Learning, Connectivism, Vygotsky’s Zone of Proximal Development.

TABLE OF CONTENTS

Title Page.	i
Declaration:.....	ii
Acknowledgements:.....	iii
Abstract:.....	iv
List of Figures:.....	viii
Chapter One: Introduction	1
Changing concepts of the Globe:.....	1
Impact of Digital Technologies on Teaching and Learning:	3
Key research questions:	6
Chapter Two: Review of Related Literature:.....	7
Introduction:.....	7
The Concept of the Digital Native:.....	7
Impact on Teaching and Learning:	10
Digital Natives	10
Digital Immigrants:.....	14
Critique of the Digital Divide Concept:.....	14
Nueroscientific Evidence:.....	15
Homogeneity in the Presence of Diversity:	15
Creating Difference through Othering:.....	16
The Local South African Context:.....	17
Redefining the concept of the Digital Native:	18
Theoretical and conceptual framework:.....	19
Conclusion:.....	23
Chapter Three: Methodology.....	24

Introduction:.....	24
Research Design:.....	24
Sampling:	25
Methods of Data Collection:	27
Observation:.....	28
Participant Reflective Journaling:.....	28
Focus group discussions:	29
Data Analysis:.....	30
Quality, Validity and Reliability:.....	30
Ethical considerations:	30
Limitations:	32
Chapter 4: Data Analysis and Interpretation.....	33
Introduction:.....	33
21 st Century Knowledge:	33
Digital Technologies as a Mediator:	35
Community Through Collaboration:.....	42
Learning Environment:	46
Knowledge Construction:	55
Conclusion:	56
Chapter 5: Conclusion.....	58
Introduction:.....	58
The Context:.....	58
Processing Information Within the 21 st Century Context:.....	59
Integration of Technology into Educational Practices:	60
Developing Effective Learning and Teaching Strategies Applicable in the 21 st Century: ..	61
Future Areas of Study:	62

Conclusion:	63
Reference List	65
Appendices:.....	73
Appendix A: Institution request to conduct Research	73
Appendix B: Institution Consent Form.....	75
Appendix C: Informed Consent Letter	77
Appendix D: Participant Consent Form.....	79
Appendix E: Focus Group Discussion Guideline	81
Appendix F: Class Observation List	82
Appendix G: Ethical Clearance Letter	83
Appendix H: Turnitin Report	84

LIST OF FIGURES:

Figure 1: Zone of proximal development21

Figure 2: Proposed framework.....23

Figure 3: Gender of sample24

Figure 4: Race demographic of sample.....26

Figure 5: Age of sample27

Figure 6: Ratio of disciplines in sample27

Figure 7: Access to digital tools.....35

Figure 8: Time spent on digital technologies per day36

Figure 9: Purposes for which the internet is used on a daily basis37

Figure 10: Length of time using a Digital Device41

Figure 11: Method of learning how to use a computer42

Figure 12: Method of communication between students working in a group43

Figure 13: Student's approach to Research53

CHAPTER ONE: INTRODUCTION

CHANGING CONCEPTS OF THE GLOBE:

Today's world is one of constant flux. This can be argued is as a result of the "Digital Revolution," sometimes referred to as the "Third Industrial Revolution," where the change was made from analog, mechanical or electronic technology to various digitally based technologies. The majority of these developments revolve around digital computing technologies emergent during the latter half of the 20th Century and marks the beginning of the "Information Age."

The first online bulletin board system was introduced in the 1970's which allowed individuals to send messages to one another, read news and exchange documents via the telephone line. E-mails were developed from this and were used as an effective way to communicate within the American military. It was only in the 1980's when emails became popular for the general public. The World Wide Web was introduced globally in 1991 and included search engines, portals and easy access to information resulting in a growing online community and expanding commerce industry. The turn of the new Century saw the explosion of online blogs and social networking sites such as MySpace, Twitter, Facebook and Instagram. This dramatically changed the manner in which communication was possible. The global impact of the Digital change was felt by mainstream businesses such as the American powerhouse Tower Records, who after 46 years of trade, liquidated it's stores in 2006, just as iTunes became the largest music retailer in America (Palfrey & Gasser, 2008).

Today, a new virtual world has been created where two thirds of the world's population own a mobile phone, engineers have created wearable technologies which operate as a hands free smart device, connecting the wearer instantly to the internet, email and various other applications, television shows encourage audience participation through live messaging and individuals can communicate with each other in live time around the world. All of this data flowing around the globe has created a new knowledge economy which has resulted in IBM releasing the Watson Discovery advisor, which can analyse and draw patterns from massive amounts of data. Pharmaceutical companies are programming the software to analyse massive amounts of data, Dr Olivier Lucharge from the Baylor College of Medicine claims that Watson automatically analysed 70 000 articles which would have taken him the

equivalent of 38 years to achieve the same outcome. According to Palfrey and Gasser (2008) this has had a large impact on all aspects of modern life, from business which can be conducted over greater distances with less financial capital and quicker than ever before, to religion, where priests, rabbis and monks have had to reach their followers through blog posts or other forms of digital media. It has become inevitable that these factors have had a profound social impact on those born within this era of change, individuals who have never hand written and posted a letter to somebody, who prefer to befriend another on Facebook rather than in a real life setting, or who simply cannot imagine a world without a mobile phone.

Africa, classified as a developing continent, has also not escaped this digital expansion, although it has happened more recently and under differing circumstances when compared to its Western counterparts. The African mobile phone industry has been credited with initiating this change and is a true revolution in a continent where landline connections were limited to only a select few families. It is of interest that in the poorest continent of the world, with only one in every three people having access to electricity has, according to GSM Association, created the fastest growing region for mobiles with an estimated 700 million sim cards in Africa. The majority of these phones are non-touchscreen, with FM connection, a torch and can be ingeniously charged through car batteries when required. However these mobile phones have revolutionised the way in which individuals operate, interact with the world and think. In East Africa mobile money is as equally used as paper money, money can be sent to another mobile and cashed out where needed, in fact, according to The Guardian (Smith & Shapshack, 2012) it is estimated that half of Kenya's GDP is calculated on mobile money. All across Africa individuals can now instantaneously connect with each other, where it would have taken days on foot to relay messages, individuals can look for employment without the cost of commuting and learn about upcoming weather for agricultural purposes.

This rapid growth is not predicted to slow down any time in the near future; the Ericsson Sub-Saharan Africa Mobility report (2014) indicates mobile internet usage is anticipated to increase by twenty times between 2013 and 2019, which is twice of that of global expected expansion. This will be aided with the launch of under \$50 smartphones which have 3G and even 4G technologies, allowing for social media platforms, various apps, live streaming of video content and full access to the internet. This indicates that Sub-Saharan Africa's mobile

penetration of 70% is fast catching up to the global rate of 92%, perhaps narrowing the digital divide between the Africa and the Western world.

South Africa is currently the digital leader of the African continent, according to the 2011 South African census (Census 2011, 2012), 88,9% of South Africans have access to a mobile phone, showing an increase from 31,9% in 2001. Likewise access to a computer has increased from 8, 5% in 2001 to 21, and 4% in 2011. To put this in perspective, more South Africans have access mobile communications than they do running, clean water. Smartphone technology is also allowing functions which used to require a computer to now only rely on the mobile device, and accounts for 20% of the South African mobile industry; this percentage is expected to grow as the technology becomes more affordable. This technology could hold the key to bridging the digital divide by providing “access and connectivity to all citizens regardless of their location or economic status.” (Ericsson Sub-Saharan Africa Mobility report, 2014, p. 2) The primary users of this new technology are said to be less than 30 years of age, the age of the majority of students enrolled in South African Higher Education institutions. This has prompted local research by Brown & Czerniewicz (2010), and Thinyane (2010), who all comment on the potential which this device has on the impact of teaching and learning and the need to investigate this further within the South African context.

IMPACT OF DIGITAL TECHNOLOGIES ON TEACHING AND LEARNING:

“Our students have changed radically. Today’s students are no longer the people our education system was designed to teach,” (Prensky, 2001a, p. 1). Various titles have been used to describe students of the Digital Era, some of which include; “Digital Natives” (Prensky, 2001 a) “The Net Generation” (Tapscott, 1998) or “Millennials” (Howe & Strauss, 2000). All of these designations focus on the significance and importance of new technologies, which have been a determining factor in how 21st Century students socialise, create, learn and communicate. According to Prensky (2001a), Gibbons (2007) and Underwood (2007), this has profound consequences for how education is developed, delivered and organised within this generation. Garrison & Anderson (2003) concur by commenting that the impact of digital development will undoubtedly affect teaching and learning, which has remained largely unchanged in the digital era.

International research into this area is vast, and often highly contested. Interest has been sparked since the release of Marc Prensky's 2001 paper, *Digital Natives, Digital Immigrants*, and has continued since. More recently, in the past five years, South African researchers have started to explore the topic; however studies from Brown & Czerniewicz (2008, 2010) and Hodgkinson-Williams & Mostert (2006) focus more on assessing the student's use of technologies or the availability thereof, than evaluating the effectiveness of Teaching and Learning practices. These mentioned studies have also largely been contextualised within large public higher education institutions, which may generate different results when compared to smaller private South African institutions. Nevertheless, Bennet (2012) further emphasises the need for additional local research initiatives, in suggesting that similar studies should be encouraged in developing countries, as to contribute to a global understanding of the issue.

Overall, little attention, either internationally or especially locally, has been given to the use of such technologies educationally within the field of the Applied Arts, in which the proposed study is based. This may be surprising given the changes that digital technology has effected in art, graphic design and other related areas. The field of the Applied Arts is relatively small in South Africa and includes the disciplines of Graphic, Industrial, Fashion and Interior Design to name a few. The discipline involves the application of design in order to create functional and aesthetically pleasing objects for society and as such differs from the performing or language arts. This however may change in the future as the disciplines are overlapping with increasingly blurring boundaries attributed to new technologies being introduced. The dependency on digital technologies has grown with the turn of the century, with Applied Arts students moving away from hand drawn solutions to rather opting for digital software applications. Graphic designers are expected to create computer aided artworks, be familiar with various printing technologies, have an awareness of website functioning and create three Dimensional animated Graphics all through the use of Software programmes. Likewise Interior Designers are required to produce animated fly throughs of proposed Interiors, generate accurate computer aided drawings with the capacity to generate three dimensionally printed replicas of designs. Fashion Designers need to be able to generate patterns digitally, in order to mass produce garments effectively, use printing technologies on fabrics and communicate designs using digital media. The impact of the digital era on these

students requires further study as it has such a profound impact on their chosen vocation, as well as their experiences of higher education.

This research is three pronged in its attempt to fill the identified research gap. Firstly the issue is being examined from a teaching and learning perspective, and not an investigation into access to technologies, the research is based within the private education sector of South Africa as opposed to a public one, and it is based within the Applied Arts field, which is somewhat uncharted territory in terms of the subject at hand.

The motivation for this topic in particular stems from an acknowledgement that the 21st Century educational context is changing, largely due to a dependency on digital technologies, most especially and relevantly in the Applied Arts. If, as educators, we are able to understand this transformation then perhaps effective Teaching and Learning principles can be developed to produce graduates who are relevant to 21st Century demands. “To educate, we must listen” (Prensky, 2001a, p. 5).

The proposed study intends understanding the experiences of a 21st Century student through explorative means in order to establish effective teaching and learning strategies. A total of ten Applied Design students, composed of a combination of Graphic, Interior and Fashion designers, will be selected from a class group, and will be asked to document their experiences during both traditional and millennial orientated learning and teaching strategies during the course of two modules within a predetermined subject. The selected subject is theory based, which traditionally does not require any digital tools as a prerequisite. During this period it will be established to what extent the selected students engage with digital technologies as part of their educational practices, and how this affects their learning. Their response and the associated experiences to the different teaching techniques will be analysed in order to establish the most effective means of teaching “digital native” individuals. The results will be analysed in conjunction with Lev Vygotsky’s writings, Sociocultural theory and Connectivism.

KEY RESEARCH QUESTIONS:

1. How does a group of “21st Century” applied arts students process information differently to that of previous generations?
2. What is the extent and how does a group of 21st Century applied arts student integrate technology into their educational practices?
3. How could delivery, teaching and learning practices be made more effective for applied art students in a digital era within a local context?

CHAPTER TWO: REVIEW OF RELATED LITERATURE:

INTRODUCTION:

Twenty first Century living is dominated by a fast paced environment and ever changing technologies driven by a postmodern ideal of constantly challenging metanarratives and seeking individual truth. Digital technologies have enabled time and space to come together with ease, creating a globalised environment. Castells (2000) goes so far as to state that a new society has emerged due to changes in relationships of production, globalisation and the associated experiences. In a world where two thirds of the population own a mobile phone, the influence of technology can no longer be ignored as this virtual world coexists alongside our physical one. Inevitably, this has begun to affect the manner in which young adults interact with the world, and according to various theorists, possibly has an impact on their learning and ultimately what and how they are taught.

THE CONCEPT OF THE DIGITAL NATIVE:

The literature concerning the Digital Native is diverse; however in terms of where the studies are located there is consistency. Traditionally, nearly all studies within this area are conducted in North America, or otherwise originate from high income Western countries. It is important to understand the global position and assess the impact of these studies, however the local South African context, will be examined in closer detail to ascertain if the South African context differ and therefore the people respond differently.

The idea that technology would have an impact on the way in which individuals experienced the world was first introduced in an essay entitled "*Declaration of the Independence of Cyberspace*" by John Barlow (1995). Barlow challenges parents in arguing "You are terrified of your own children, since they are natives in a world where you are immigrants" (Barlow, 1995, p. 12). Tapscott (1998) discussed the concept in the late 1990s and gave individuals born from January 1977 to December 1997 the label "net generation". This coincided with the so called "Digital Revolution" and because of their close association with new digital media they can be described as being "exceptionally curious, self-reliant, smart, focussed, able to adapt, and has global orientation," (Tapscott, 1998, p. 12). This concept is discussed further by Oblinger & Oblinger (2005) who add that the net generations' birthdays coincides with the time in which the computer was introduced and started to gain popularity.

Perhaps most recognised are the terms “Digital Native” and “Digital Immigrant” popularised by Marc Prensky (2001a) in his various writings regarding the significance and importance of new technologies within the lives of youths. Prensky (2001a) defines the “digital native” as an individual born roughly within the last two decades, who is technologically literate and advanced. These individuals have grown up surrounded by new technologies; they live their lives surrounded and engrossed by tools of the Digital era, such as emails, cell phones and the internet, and speak a language including “liking,” “unfriending,” “retweeting,” “selfies,” and “whatsapping.” In order to achieve this, individuals spend their existence plugged into portable, manmade devices; such as Tablets, Phones, Laptops or MP3 devices, in fact smart technology is allowing the convergence of their functions into one small device –the Smartphone. The Smartphones operate as a touchscreen computer, and includes web browsing, GPS navigation, a digital camera, media player and third party apps. With more than one billion Smartphones in global circulation, and in excess of 102 billion mobile apps being downloaded per year the dependency on digital technologies is evident, so much so that digital natives are nearing “Cyborg” status, a term coined by Clynes and Kline (1960) to describe an organism that has enhanced facilities due to an introduced technology. The concept of a Cyborg was commercialised in popular culture with half human, half robot characters such as the Terminator or Darth Vader in Star Wars, which then remarkably became a reality in the field of medicine where bionic implants allow body parts to mimic the original functioning. Chrost (2011) a receiver of a bionic ear wrote a memoir titled "Rebuilt: How Becoming Part Computer Made Me More Human," which is a testimony to the impact of digital technologies on his everyday life. The future of Smart Technology currently revolves around the development of wearable technology such as Smartwatches and Google Glass which can be worn by the user and used on a hands free basis, totally affecting the way in which individuals engage with the world.

Prensky (2001a) continues to suggest that because of this immersion with digital technologies from birth, young people think and learn differently, to the extent that their brains are physically changing, becoming rewired as a response to the altering stimulus. Prensky (2001b) substantiates these claims by referring to various studies in neurobiology, which indicate that different kinds of stimulation “actually changes brain structures and affect the way people think.” (Prensky, 2001b, p. 2)

Contrary to this Prensky (2001a) describes a “Digital Immigrant” as an individual who was born before the previous two decades, who has rather adopted technology than being born into it. This is echoed by Robinson (2008) who states that these individuals may have acquired a “form of digital literacy” (Robinson, 2008, p. 67) but still live for the majority of speaking in the past. Prensky (2001a) explains that, although these individuals have adapted to their new environment, they will always “retain their accent of the past.” (Prensky, 2001a, p. 2) This manifests itself in tendencies described by Prensky (2001a) such as printing and filing emails, turning to the internet for research as a second point of call, prefer to read manuals, preferring to make a phone call as opposed to visiting a website or may even speak in an outdated language.

Later in the 2000’s the term “millennial” was used by Howe and Strauss (2000) who characterised these individuals as technology dependent, noting that a survey completed in 2007 indicated that 97% of college students owned a cell phone. This was followed up with a survey conducted in 2013 by the Financial Times which looked at the 12 000 internet users between the ages of 18 and 30 from 27 countries. It was established that this generation is more optimistic about its future and are using digital technologies to engage with their world. Even though the participants were diverse it did indicate that they do have a shared set of ideals or beliefs.

The disconnect between the two described groups is clear, and would reflect in educational situations where teachers may well be digital immigrants and the students digital natives. As such, the educational processes may be affected and Prensky (2001a) argues that a change in teaching and learning is required. Further studies by Raine (2006), Gibbons (2007) and Underwood (2007) concur with the initial findings and support Prensky’s observations. Other labels have since been assigned to similar groupings, and are often used interchangeably, including “The Net Generation” (Tapscott, 1998), “Millennials” (Howe & Strauss, 2000), “Generation Y”, (Jorgensen, 2003), “Homo Zappiens”, (Veen, 2003) or the “i-Generation” (Rosen, 2010). It should be noted that all these terms have originated from high income countries, and there is a need to examine this from a developing world context.

IMPACT ON TEACHING AND LEARNING:

DIGITAL NATIVES

The aforementioned predispositions are manifested in how each group functions and importantly learn, (Prensky, 2001a), (Howe & Strauss, 2000), and (Robinson, 2008) describe Digital Natives as preferring to multitask, completing many tasks simultaneously. According to Roberts, Foehr and Rideout (2005) this actually helps concentration levels. Most students engage with media multitasking, defined as engaging with multiple media activities simultaneously, which, according to Foehr (2006) has become a way of life for young adults. Because media multitasking is a relatively new development, researchers are still in the process of determining its impact on learning, however there is a long history of research which indicates that our ability to engage successfully in simultaneous tasks is limited (Lang, 2001). The preferences of Digital Natives continue to include; a rapid rate of information processing, an expressed impatience with slower means of acquiring information, a preference to graphics or visuals over text, thrive on frequent rewards and expectation of immediate responses. Prensky (2001b) attributes this to neuroplasticity, where stimulation of the brain causes a change to the structure and affects the way in which people process information. This leads to him claiming that individuals raised surrounded by digital tools think differently as they have “hypertext” minds which indicate a change to the physical brain. In turn this leads to an assumption that Digital Natives learn differently and a claim by Prensky goes so far as stating that traditional “educational systems can actually retard learning” (Prensky, 2001b, p. 12)

Another concept which Prensky (2001a) discusses is the preference of Digital Natives to work in collaborative based environments, using a variety of platforms and technologies to do so. Collaborative learning is not a new theory and is traditionally based on the premise of grouping students together to work towards attaining a common goal. These students become responsible for their own learning as well as the other members of the groups learning. Enthusiasts for this concept, Totten, Sills & Russ (1991) claim that participants become critical thinkers by engaging with the subject and generate knowledge through discussions, debates and negotiations, thereby attaining higher levels of thought when compared to working as an individual. In the 21st Century, this concept can be expanded on as digital technologies and the flow of information can enable collaboration beyond the lecture room.

Groups can be made up of individuals from around the world, and discussions can take place in real time or not. The benefits of collaborative learning are not introduced or debated by Prensky (2001a); however understanding how digital technologies can be used to promote this method is valid within the context of this study.

Leu, Kinzer, Coiro, & Cammack (2004) argue that the role of the teacher is changing and as educators it is important to consider students who are eager to use technology by reevaluating traditional teaching methodologies. Warlick (2001) defines traditional teaching as a top down process, with the teacher providing all of the knowledge in the process, whereas in the digital age it is becoming evident that the teacher's role is to equip students for a future which cannot be accurately described. It is suggested (Cummins, Brown, & Sayers, 2007) that because of this, teachers need to reevaluate their role in the educational context, teachers are required to be facilitators rather than pure knowledge providers and learners are no longer only pure knowledge consumers. According to Ertimer & Ottenbreit-Leftwich (2010), teachers are utilising technology for general communication and online research, but the time has come to explore digital tools as facilitators for meaningful learning.

According to Prensky (2001a) teachers are classifying themselves as digital immigrants and are therefore hesitant of introducing new teaching techniques into the learning environment, which is filled with more experienced Digital Natives, this is supported by Ertimer & Ottenbreit-Leftwich (2010) who claim that there is a need to teach teachers how to use technology based training in their "digital rich" classrooms. It has been documented (Zur & Zur, 2011) that some teachers reject a change to their teaching strategies as it represents a new era, this as a result, produces tension within the digital age framework (Lankshear & Knobel, 2003). On the one hand there are those that believe this era to be merely an extension of the Industrial Revolution and therefore do not believe that teaching strategies need to be altered and so resist change. On the other hand, there are those that believe that Digital Technologies have transformed the world to such a large extent, making change inevitable. What makes the situation delicate, is not change itself, but asking teachers to move from one mindset to another where there are pre-existing tensions between them (Lankshear & Knobel, 2003). This is especially critical within the field of the Applied Arts, given how technology has impacted the inner workings of industry, and exerts further pressure onto the teacher. This relates well to Mort (1964) writing in terms of implementation of innovation in schools,

his initial findings indicate that it takes fifty years for an innovation to be fully adopted and integrated into American School system. He breaks it down into periods of fifteen years for the practice to initially appear, twenty years for rapid diffusion of the innovation and another fifteen years of slow dissemination into the last few schools. Mort's studies were based in the 1930s, and without a doubt the rate of change has accelerated since then, especially when one considers the digital world in which we currently occupy. Rates of adoption are also closely related to the availability of technology which supports the innovation and the associated costs thereof, the ease of use or the extent of the change in behaviour and the apparent knowledge in regards to the introduced idea. The adoption process occurs in stages, firstly the innovator will introduce a new concept or theory, this will lead to early adopters who will become involved on the basis that there are no contradictory theories. The middle phase is where the majority will accept the innovation, which is primarily influenced by the innovators themselves. This is followed by the last group, the resisters or laggards who will eventually succumb, but under duress and may never fully accept the change. It is worthwhile to consider that individuals are influenced by groups and so the number of adopters will generally increase in proportion to the number of adopters who have previously grasped onto the concepts. However, each adopter will tend to adopt the innovation differently depending on their perceptions, their culture and their individual contexts (Mort, 1964).

In terms of innovating new teaching concepts in a Digital era, Prensky (2012) argues that the responsibility is on the teacher to bring about change to avoid students being forced to go "backwards." Bayne & Ross (2007), Feeney (2010) and Ertimer & Ottenbreit-Leftwich, (2010) suggest that by looking at "legacy", or, traditional curricula, and "future", involving digital content curricula, balance could be achieved through an active collaboration between students and teachers. This partnership may also assist teachers in learning how their students think, leading to a new era in education where teaching and learning are blended. Theorists Bayne and Ross (2007), Prensky (2001a) and Rosen (2010) have emphasised the importance of understanding digital students in terms of their behaviour, and their observations can be summarised as follows:

Communication: Due to the fast pace students have developed their own language which consists of codes, abbreviations and numbers. They communicate with each other on

platforms such as email and can easily engage with each other on live digital online platforms.

Sharing: Students are willing to share with each other and use various platforms to do so, such as cameras, smartphones or blogs.

Exchanging: Students comfortably engage with each other in terms of exchanging movies, clips, and partake in peer to peer exchanges.

Creating: Students can create online profiles, avatars; publish their own opinions through blogs or even their own websites with ease.

Through engaging with these principles, new types of knowledge generation start to emerge, an important factor in an era where information is readily available, facts or concepts change at a continuous rate and in turn knowledge becomes obsolete. Siemens (2004) states that learners in the 1960's would complete the necessary schooling and enter a career which would span a lifetime. Generally knowledge would take decades to become obsolete, however today the lifespan of knowledge is measured in months. Gonzalez (2004) states that half of what is known today was not known ten years ago, or the amount of global knowledge has doubled in the past ten years, therefore the mode of instruction needs to be reviewed in order to remain relevant. The core outcomes of Higher Education in the 21st Century can be described as producing lifelong learners who are critical thinkers, show innovation, adaptability and entrepreneurialism, can collaborate across networks or with individuals and can solve problems using information at hand. The Art and Design Benchmark Statement (2008) argue that common teaching and learning practices in the Applied Arts, which consist of developing a conceptual problem, providing support in the form of regular studio sessions, followed by a series of critiques by facilitators are preparing students for industry and are therefore aligned to current global expectations. This will ensure that graduating students become lifelong learners and are prepared for working in industry where careers can fast become redundant, new careers are introduced and the need for specialised knowledge grows exponentially. Carroll (2009) speculates that by 2020, education will be about "just in time knowledge," indicating that no one person will be expected to know all information, however all of us will be required to have the ability to find the right knowledge for the right purpose, at the most opportune time. The need to reform Higher Education in post-Apartheid South

Africa in the 21st Century has been recognised in various documents including the White Paper on Higher Education (1997). During the year 2000, the Council of Higher Education was tasked by the then Minister of Education, Professor Kader Asmal, to design strategies to ensure that the Higher Education system in South Africa was on par with 21st Century expectations. While the focus leaned towards creating a democratic, fair and equal Higher Education landscape, the principle of the document indicates the willingness and necessity to engage with, and develop an appropriate Higher education system suited to 21st Century expectations of a “Digital Native” globe, which will ensure South Africa’s competitiveness in an international market.

DIGITAL IMMIGRANTS:

In contrast to Digital Natives, Digital Immigrants prefer a more linear learning process, focussing their energies on one thing at a time and work well independently. They are seen as individualistic learners and prefer to be passive during lectures. Digital Immigrants take their work very seriously, and there is a definite line between work and play, strongly believing that Digital Native students cannot work while listening to music, watching television or messaging friends (Prensky, 2001a), all of which are more readily available in today’s world. Traditional teaching methods are generally employed by Digital Immigrants as they are well understood, researched and documented, even though this may not be the most beneficial method of teaching Digital Natives.

CRITIQUE OF THE DIGITAL DIVIDE CONCEPT:

Prensky’s (2001a) writings have long attracted critique from Koutropoulos (2011), Bennet & Mouton (2010), Helsper & Eynon (2010) and Bennett (2012) to name a few, however, as controversial as it is, the original paper is still widely regarded as being the original source for this concept, and should be consulted with as such. Whilst acknowledging the complexity of engagement with technology, and recognising the shortcomings and rather simplistic generalisations of the characteristics Prensky (2001a) attaches to each category, they do provide a useful descriptive device for this study in order to articulate broad differences between users, adopters and resisters.

NUEROSCIENTIFIC EVIDENCE:

The characteristics of the learning preferences of various generations have been extensively studied, although there is little empirical research supporting these claims. Bennet, Maton & Kervin (2008) argues that there is little evidence to show that young individuals are radically different in the way in which they process information, and disputes the theory of neuroplasticity (Prensky, 2001b) by stating that it is not documented what physical differences there are in the structure of a Digital Immigrant or Digital Native's brain. This is admitted by Prensky himself (Prensky, 2001b), who comments that the exact physical changes to the brain are still being studied and identified by neuroscientists. Koutropoulos (2011) continues this argument by claiming that Prensky failed to acknowledge that, as humans we never reach a state of fossilisation, rather, our brain is continuously rewiring itself throughout our lives, as we learn to use the tools around us and have the ability to adapt to new environments. Writings have also attracted various critiques, in terms of validity, in particular, there are claims that his discussions rely on speculation, anecdotes or suppositions rather than proven fact (Bennett, 2012). Koutropoulos (2011) concurs by stating that Prensky fails to demonstrate that these technological skills transfer automatically to the academic sphere, he rather poses the question that if a student can update a status on Facebook, and will this skill be able to be applied within the academic context?

HOMOGENEITY IN THE PRESENCE OF DIVERSITY:

According to Helsper & Eynon (2010), one of the most important criticisms include various researchers questioning Prensky's (2001a) ability to make broad claims in regards to learning preferences, methods of processing information and technology use, in reference to an entire generation, without giving any contextual analysis. Prensky's (2001a) discussions are largely based on the premise that all young students are experts with technology, regardless of their access and use of technology. Other authors have established that there are many differences in how, why and the effectiveness of young people using various digital technologies, and comment that this is often minimised in arguments supporting the Digital Native concept (Helsper & Eynon, 2010). However, it should be noted that there are vast differences in how, why and to what extent these technologies are used DiMaggio & Hargittai (2001) Facer & Furlong (2001) and Hargittai & Hinnart (2008). Bennett (2012) emphasises this point in claiming that international research has "largely debunked the idea of a uniformly technically

savvy generation,” and that the term “digital native” actually only applies to a small percentage of the population (Bennett, 2012, p. 12).

This is an especially important consideration within developing countries, specifically in the South African context, given the diversity of local student intake and the disparities in economic statuses. Local research conducted by Brown & Czerniewicz (2008) indicates that although technology use is increasing, the students’ utilisation for learning is still relatively narrow. It is also suggested (Brown & Czerniewicz, 2010) that the label “Digital Native” may imply superiority, or eliteness, of those with particular skills and may not be widely accepted within a particularly sensitive South African democracy. They go on to name a portion of South African students as “Digital Strangers” (Brown & Czerniewicz, 2010) and explain that this is because there are areas where electricity is scarce, literacy rates are low and teachers who are digitally knowledgeable are in short supply with access to media being limited.

According to Palfrey and Gasser (2008), this growing difference also exists within wealthy, first world countries, specifically in the lower income areas indicating that the phenomenon is economically driven. UNICEF, together with Harvard University have drawn comparisons between low income groups to developing countries by detailing the common issues which each have. Firstly access to basic technologies and infrastructure, such as electricity, internet, skills to use such technologies and a thorough understanding of how young adults utilise digital technologies are central to the argument. Further studies within developing nations, including the South African context are needed, Bennet (2012) elaborates on this point by remarking that qualitative research in developing countries would assist in gaining a global perspective on the issues. The implications for teaching and learning within the 21st Century is vast, however Bennet (2012) argues that the problems are different to what Prensky (2001a) describes, given the fact that learners represent a diverse group as opposed to a homogenous one.

CREATING DIFFERENCE THROUGH OTHERING:

The concept of Digital Natives has been argued (Brown & Czerniewicz, 2010) as setting up binary opposites, where you are either classified as being Digitally Native or not. This results in the alienation or polarisation of one group over the other and indicates that an individual who falls into one category cannot exhibit tendencies from the other. A concept such as this

is commonly known as “othering,” and has been previously used in contexts of racism or colonialism.

Within the South African context, the label of “Digital Native” is likely to be problematic and cause offense to individuals as locally, the terms native and immigrant differ in meanings when compared to Prensky’s (2001a) North American frame of reference (Brown & Czerniewicz, 2010). In South Africa, a colonised country with a history of Apartheid, the immigrant is perceived as the progressive, forward thinker and the native is seen as those who needed to convert (Brown & Czerniewicz, 2010). Prensky’s writings however, refer to an implied power or superiority that the Digital Natives have over the Immigrants which could begin to stir memories of past oppressions.

THE LOCAL SOUTH AFRICAN CONTEXT:

Post-Apartheid South Africa faces unique challenges within the context of Higher Education. The Education White Paper 3 on Higher Education (1997) aims at transforming education in a Post- Apartheid South Africa through addressing problems of equity, access autonomy and efficiency. According to a paper entitled “*Debunking the Digital Native: Beyond digital apartheid, towards digital democracy*” conducted by Brown and Czerniewicz (2010) this has led to a diverse student intake across six Higher Education public Universities of which only 26% can be described as growing up digital although 54% are classified according to their age as being “millennials” (Howe & Strauss, 2000). These findings demonstrate that students born in the millennial generation cannot be assumed to have grown up digital, nor can we generalise over their computer or digital skill level. There is however a group of students (12%) who meet Prensky’s definition of Digital Natives, they have grown up with digital technologies, they are familiar with computers on entry into university and they engage regularly on such platforms. Brown and Czerniewicz (2010) comment that this group is comprised evenly of male and females come from high to average socio-economic groups and speak either English or Afrikaans as their home language. They have access to computers at home and 43% of them have mobile access. When questioned, a vast majority, 65%, use digital platforms for social purposes, and they can easily describe the value that their digital capabilities brings to their work. “Being a Digital Native in South Africa speaks of advantage” (Brown & Czerniewicz, 2010, p. 63) and has become an elitist concept.

A portion of the group studied (22%), although born in the millennial period, were found to lack experience and opportunities, had less than four years of computer experience, have no direct access to computers off campus and therefore do not comply with Prensky's categories. This group was labelled as "Digital Strangers" (Brown & Czerniewicz, 2010, p. 363) and comprise of more women than men, speak a South African home language and at times indicated they shared a campus computer between four students. These students recognise that they have a lack of basic digital knowledge and acknowledge that this may affect their academic performance and future employment. This stark contrast between the two groups demonstrates the power of othering and shows that there is still a deep divide in South Africa, which becomes a challenge to the educator.

One commonality which is shown in the data (Brown & Czerniewicz, 2010) is that 98,5% of students own a cellphone and these are used by both groups for academic purposes. This is most especially interesting when analysing the usage of these devices, where evidence indicates that 67% of the group uses their cellphone for off campus internet access. This indicates an opportunity which educators can capitalise on, and is especially suitable to South Africa, where we have the highest cellphone uptake in Africa and are ranked 6th in the global top 10 mobile internet users (von Tetzchner, 2009). This finding is supported by further studies (Thinyane, 2010) which also establish the potential of cellphone technology in higher education. The paper concludes with a suggestion for educators to embrace the education opportunities held in cellphone technology, and proposes that these practices be coupled with expert digital learning knowledge, in order to create digital democracy within the context of South African Higher Education.

REDEFINING THE CONCEPT OF THE DIGITAL NATIVE:

According to Jones & Shao (2011) the technological demands on 21st century students is complex, and there is no common explanation, they continue to argue that "the gap between students and their teachers is neither fixed, nor is the gulf so large that it cannot be bridged" (Jones & Shao, 2011, p. 40). An important aspect of research within this area is that it has prompted educational technology studies, which "has the potential to lead to better informed decision making about technology and to improved teaching and learning" (Bennett, 2012, p. 11). Bennet & Maton (2010) argue that it is "time to move beyond the "Digital Native" debate as it currently stands and towards a more sophisticated, rational debate that can enable

us to provide the education that young people deserve” (Bennett & Maton, 2010, p. 24). Brown and Czerniewicz (2010) advise that it is our responsibility as educators and academics to avoid the use of exclusionary labels and instead work on changing the associated discourse. It is not questioned that Digital Technologies shape the way in which we function and interact with the world, however the challenge for education is to understand the diversity of its impact instead of resorting to exclusionary dichotomies.

According to Resnick (2002), now is the time for educational reform and suggests that we need to rethink how, what, where and when people learn. Instead of a top down teacher approach, an entrepreneurial method could be used where students are more active and independent as learners and the teacher acts as the facilitator. Instead of systematically working through a textbook, various themes can be addressed that move across subjects, taking advantage of the rich diversity of student impact. This could also filter to collaborative work; students need not be divided by age only, but rather across years of study allowing older students to lead and younger students to learn from peers. Instead of the day being divided up into sessions, students could work on projects for an extended period of time, allowing a deep reflection on the work completed.

In terms of what individuals learn, we can no longer rely on curricula based on “pencil and paper” knowledge, this needs to be adapted and made relative in a digital era, as it is the responsibility of education institutions to prepare students to function in a digital society. New technologies can also affect what students can learn as there are now no restrictions to traditional teaching and the limitations of paper, pencils, textbooks and blackboards no longer exist. There is also the suggestion of transforming curricula so that the focus is not on things to know, but rather on learning strategies to develop things that one may not know.

In terms of rethinking where and when individuals learn, a suggestion could be to move away from traditional timetabled learning by incorporating learning with the internet, where communities around the globe could collaborate on projects enabling knowledge building societies.

THEORETICAL AND CONCEPTUAL FRAMEWORK:

Current digital technologies support a collaborative problem based learning environment and challenge more traditional education of the 20th Century, which generally assumes that

knowledge presented in textbooks or from a top down approach will produce students who satisfy 21st Century outcomes. This framework is based partly on a constructivist theory where historically, students would receive a problem from the teacher, and would proceed in actively moving through the stages of integrating new knowledge into existing knowledge using Piaget's theory of cognitive development. The key concepts of this theory are; knowledge concerns a student's conceptual operation, each individual must create their own knowledge and teaching is a social activity, but learning occurs in private (von Glasersfeld, 1992). Although this theory involves the students constructing knowledge and not merely acquiring it, there is still a large emphasis on independent or individual learning. Social Constructivism, on the other hand, shares core principles of Constructivism in terms of the student being an active participant of knowledge construction; however the importance is shifted from the individual to that of a group. There is an emphasis on creating a collaborative environment and an acknowledgement of the cultural and social contexts, with all knowledge construction believed to originate in social interactions of the group members, including the process it takes to develop an answer to a proposed problem.

It is perhaps more suited to argue that Sociocultural theories compliment the Digital Era, where the social environment are placed at the centre of the learning, without which, the "development of the mind is impossible" (Cole & Wertsch, 2001, p. 4). Lev Vygotsky, a Russian psychologist who began much of his work post Russian Revolution in 1917 was seen as controversial in the Soviet Union during the 1930s, and so it was only during the development of new paradigms in developmental and educational psychology in the West where his concepts gained recognition. Vygotsky (1978) proposed that in the learning environment tools can be used to mediate learning, and that cognitive development is not as a direct result of the activity itself, but rather occurs through interaction within an authentic social context, composed of individuals who will commonly use language, tools and new concepts in a natural manner. The initial interaction with the tools can be facilitator or mediator led, moving onto student internalisation which demonstrates the affect that the social environment has on learning (Cole & Wertsch, 2001). Sociocultural theories suggest a facilitator role in learning, (Wheeler, Yoemans, & Wheeler, 2008); this support can come from a peer, and not necessarily an expert or teacher to create a collaborative learning environment. Vygotsky (1978) suggested a "Zone of Proximal Development" to illustrate his

point further. This concept is explained (Chaiklin, 2003) as when faced with a new learning situation the student requires new tools or mental capacity for the specific activity. Should the learning environment be familiar, with support structures in place then the student will demonstrate success in the learning activity. The Zone of Proximal Development can be visually represented, as indicated in figure 1, as three circles; the outer circle represents the position where the student begins, being their existing knowledge they demonstrate, the following zone represents where assistance is given within a supportive context and the final zone is where the student shows mastery or understanding of the concept, not previously known. Traditionally the central zone is representative of people, such as peers or teachers, or the learning environment and represents the zone of Proximal Development.

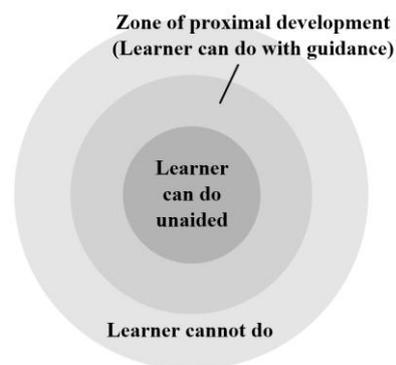


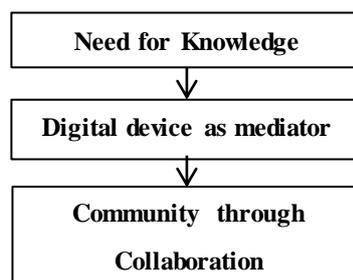
FIGURE 1: ZONE OF PROXIMAL DEVELOPMENT

Taking this logic a step further, Connectivism has become a debated concept in the last few years and has been termed the “learning strategy for the digital age.” This theoretical framework is based on Sieman’s article *Connectivism: Learning as Network Creation* (Siemans, 2005) and Downes’s *An Introduction to Connective knowledge* (Downes, 2005). In Connectivism the learning process begins when the student is connected to and feeds information to a learning community. This learning community is described as a node, and is often part of a bigger community of connections called networks which can store information on various digital platforms. This insinuates that learning is a process which can reside outside of ourselves, is focussed on creating networks and that these connections with communities which enable us to learn are more important than our current state of knowing. It also suggests that these connections could act as mediators within the Zone of Proximal Development. The learning which follows is based on the diversity of opinions held within the network, which requires the student connecting the information sources and critically

evaluating their value. Perceiving the connections between the information is seen as a key skill which will facilitate lifelong learning through the generation of current up to date knowledge. This theory is closely related to the outcomes required of a 21st Century student.

In the context of this particular study, mentioned theory is not an exact fit, the Zone of Proximal Development emphasises only an individual as the facilitator of knowledge construction and Connectivism accentuates the importance of learning through connections only. The intention for this study is to propose that Digital Technologies can act as a tool for knowledge construction within a collaborative based environment and as a response to this a new framework could be proposed which is the result of combining the relevant principles of the original theories in conjunction with key literature discussed.

It has been mentioned that during the 21st Century teaching and learning is primarily pivoted on knowledge construction as opposed to traditional beliefs around knowledge retention. Using Vygotsky's (1978) principle of learning as a mediated process through the zone of proximal development, it can be suggested that one of the forms of mediation could be a digital device, such as smartphones, tablets, laptop and the internet, as opposed to a teacher or peer. In this way, a new framework could be proposed where a student, considered a digital native, who naturally engages with a digital device as a form of mediated process could establish communities or nodes through collaborating with local and global networks, aligned with Connectivism. Information could be gathered at any time, beyond the classroom through a virtual environment giving the student more control over their learning and development by drawing on aspects which are not facilitated purely by the teacher. In order for the student to make meaning of, and construct knowledge from the variety of information available to them, they have to evaluate, critique and make the necessary connections between the information within a learning environment which facilitates and is supportive of method in allowing the teacher to fulfil the facilitator role. The proposed framework allows the student to progress from one zone to the next progressively.



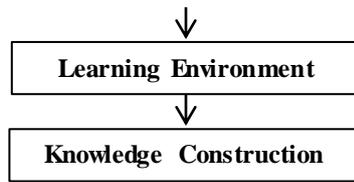


FIGURE 2: PROPOSED FRAMEWORK

This proposed framework will be used as a guide when analysing the generated data in order to explore if digital technologies can act as a mediator for knowledge construction, thereby creating a foundation for teaching and learning strategies required in a digital era within the field of the Applied Arts.

CONCLUSION:

It is clear that the concept of the Digital Native has attracted much attention, both in terms of critique as well as commendation. One thing which perhaps can be agreed on is that students do adapt quickly to digital technologies, and this has the potential to become a powerful tool in education. More research into the way in which students of the Information Age work, learn and understand things are needed as we, as a generation, start to become more digitally active. It is important to explore the role which these technologies have, and establish if they do in fact impact the structure of the learning process. According to the International Telecommunication Union (2013) statistics indicate that since 2007, internet usage in the developing world has increased from 11, 9% to 30,7% in 2012, predicting that the digital native population in developing countries will more than double in the next five years. This trend demonstrates that although there may well be an existing digital global divide, this will not always ring true. Developing countries will catch up to digital capitals, and it is in our interests to ensure that this development can be integrated into teaching and learning. It is also advised that research is focussed on students from developing countries who are more likely to be most impacted by the resultant information, we need to “focus on them, learn from them and grow with them” (International Telecommunication Union, 2013, p. 157).

CHAPTER THREE: METHODOLOGY

INTRODUCTION:

In order to understand the experiences of 21st Century students and associated learning and teaching strategies thereof, an interpretivist type paradigm has been engaged with. There are various descriptions for this approach, however the below extract from (Walsham, 1993) seems appropriate:

“Interpretive methods of research start from the position that our knowledge of reality, including the domain of human action, is a social construction by human actors and that this applies equally to researchers. Thus there is no objective reality which can be discovered by researchers and replicated by others, in contrast to the assumptions of positivist science.” (Walsham, 1993, p. 5)

This reveals that in interpretivism, the final perspective should be from multiple realities as opposed to only searching for one absolute, objective truth. This decision is also guided by Cohen, Manion, & Morrison (2007) who describes that the “central endeavour in the context of the interpretive paradigm is to understand the subjective world of human experience” (Cohen, Manion, & Morrison, 2007, p. 21)

Central to this study is the experience of the students or participants, which requires an exploratory qualitative research approach. This methodology is appropriate as it allows for a rich, deep understanding of the human behaviour under investigation. It has been defined by Merriam (2009) as studies which are interested in understanding the meaning people have constructed, and how people make sense of their world and their shared experiences.

RESEARCH DESIGN:

The main objective of this study is to ascertain how students of the 21st Century learn, and if associated international findings are similar within the context of a Private Higher Education Applied Arts Institution in South Africa. In order to establish this, a second year class has been selected to participate; this class is roughly equally divided into the three disciplines of Graphic, Interior and Fashion Design. The study will entail the teaching of two consecutive modules in a theoretical based subject, which will last for a duration of four weeks each, or

one academic term in total. One of the modules will be taught on the basis of Prensky's (2001a) definition of a Digital Immigrant learning preferences; this will involve traditional textbook teaching, with associated independent assignments, approaching concepts in a linear form, working to traditional class sessions and making use of standard classroom resources such as notebooks, textbooks, whiteboard and class discussions. The subsequent module will be taught on the basis of Prensky's (2001a) definition of a "Digital Native" learning preferences. This will involve the integration of digital technologies, such as using various media platforms to create discussions which extend beyond the classroom, lectures which involve visual presentations, videos and key visuals, dealing with multiple concepts simultaneously, the teacher will take on a facilitator role as opposed to a top down approach and collaboration will be encouraged through assignments or discussions. It will be vital for the students in these sessions to make use of any digital tools which they have at their disposal; this can be in the form of laptops, mobile phones, smartphones, tablets and internet access through Wi-Fi or 3G connection.

Before the various teaching methodologies have been implemented, the participants were asked to take part in a focus group discussion in order to establish their general use and opinion of digital technologies. During the process the participants were asked to write in a reflective journal in order to document their experience of the various teaching and learning strategies. Each participant were labelled as A, B, C etc. and their contributions to the focus group discussions were matched to their journal entries using this method of coding. The researcher, as the teacher engaged with observation of the class and took note of various behavioural changes which may be demonstrated over the period of time.

SAMPLING:

Morrison (1993) explains that the quality of the final research output relies not only on the appropriateness of methodology and instrumentation but also the suitability of the sampling strategy. As described this research will be Qualitative in nature thereby focusing on in-depth analysis and rich description, thus the need for large or random samples is not required (Terre Blanche & Durrheim, 1999). For the purpose of this study a preselected class of twenty four second year students attending a private design college in Durban will be monitored. From this class ten students will be selected as participants, the predetermining factors will be their field of study, as relatively equal portion of Graphic, Fashion and Interior Design students are

desired, as well as their availability and their willingness to partake in the study. Access to the participants is permitted and practical (Cohen, Manion, & Morrison, 2007). The students have been selected as they satisfy the “Digital Native” age guideline and definition given by Prensky (2001a).

Cohen, Manion, & Morrison (2007) describe non probability samples as being participants who are specifically targeted by the researcher; it is used in smaller scale studies and is an acceptable method where no attempt to generalise is desired, but rather the intention is to understand the phenomenon in the contextual circumstances. Convenience sampling is described as a type of non-probability sampling which satisfies the above mentioned conditions. It involves “choosing the nearest individuals to serve as respondents and continuing that process until the required sample size has been obtained” (Cohen, Manion, & Morrison, 2007, p. 114). This level of autonomy is important to this study as the researcher is attempting to establish if a change has occurred and how it has ultimately affected the participant in this context only.

In order to make sense and organise the data, it is important to begin with understanding the sample population and establishing the specifics. This information was assessed in the initial focus group discussion held with the ten study participants.

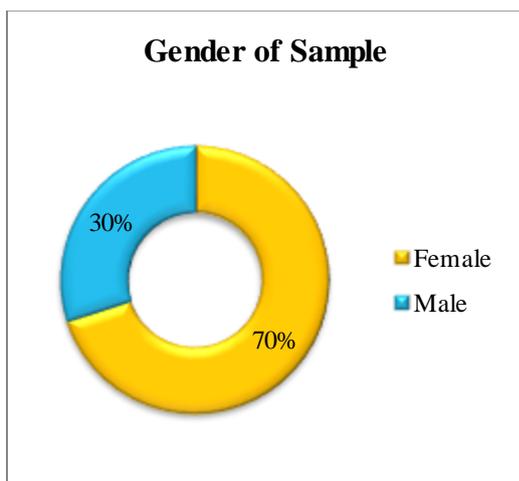


FIGURE 3: GENDER OF SAMPLE

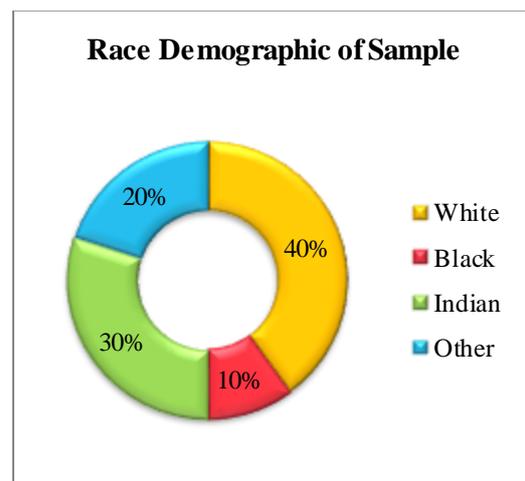


FIGURE 4: RACE DEMOGRAPHIC OF SAMPLE

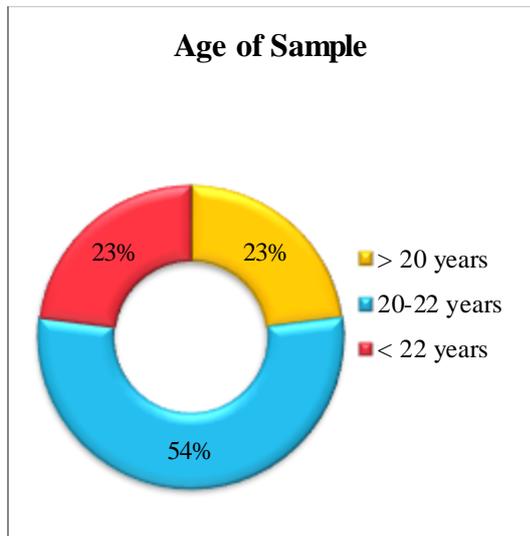


FIGURE 5: AGE OF SAMPLE

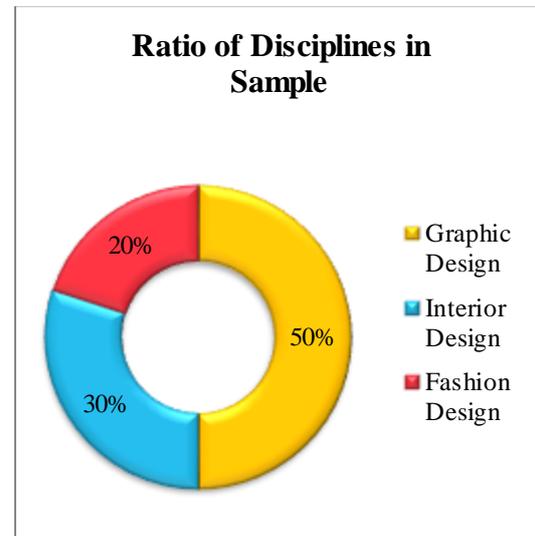


FIGURE 6: RATIO OF DISCIPLINES IN SAMPLE

The sample of ten students were comprised of a majority female grouping, this is accurate as the disciplines in the Applied Arts are generally female dominated. The literature does not mention specifics about gender preferences and so it is assumed that this will not affect the results, given that the field is predominantly female dominated and requires a solid application of technological skill regardless of gender. The variety of races indicate that there is a fair demographic distribution in the sample, this is important to the study given the local context of post-Apartheid South Africa as it demonstrates that Private Education is not driven by race, but largely by economics. The age of the sample is an important factor, the oldest student in the group was 26 years of age, which indicates that theoretically all were born during or after the 1980's and therefore satisfy Prensky's (2001a) age requirements of a Digital Native. The ratio of disciplines in the study is generally equal and consistent with the Institution's overall ratio of students, Fashion Design is the smallest of the departments and so these results will effectively illustrate the Applied Arts at the Institution.

METHODS OF DATA COLLECTION:

The methods to be used in this research include a variety of observation, participant reflective journaling, and focus group discussions throughout the duration of the module teaching period.

OBSERVATION:

Cohen, Manion, & Morrison (2007) describe observation as a research process which allows gathering of live data from its natural context. This first-hand information can thereby be seen as valid and authentic. This is further supported by Robson (2002) who states that observation can provide a reality check of sorts as in some instances what people do and what they say they do may differ. Observation in this study is important as the researcher needs to establish how the participants react to the differing learning and teaching methods, from the perspective of the facilitator. It can also be used later as validation for participant journaling. There are varying degrees of participation in observation (LeCompte & Preissle, 1993). During this research observation will take the form of observer as participant, (Cohen, Manion, & Morrison, 2007), as the researcher identifying themselves as such to the participants which will allow for a more holistic view which can generate rich descriptions vital to qualitative research (Morrison, 1993). Cohen, Manion, & Morrison (2007) advises that it is important for the researcher to reduce reactivity effects, as does Nieuwenhuis (2007) who cautions researchers to remain uninvolved and not to influence the context thereby tainting the data subjectively. Observation in this study will take the form of the researcher being an observer to the reactions and performance of the students during the teaching of the specific modules.

Class Observations were made during classes in the form of notetaking and reflection thereafter. Although the students are generally encouraged to use digital tools, and are freely allowed to incorporate them into their studies and lessons in all subjects, however, specific attention as to how they are used and when the students engage with the technologies has not been previously noted. The purposeful classroom observations ensured that sufficient attention was given to the use of technology within the classroom environment. This information can be used to triangulate the data obtained from the other types of data collection techniques.

PARTICIPANT REFLECTIVE JOURNALING:

A reflexive journal is defined as an annotated chronological record of experiences and events, which is generated by the participants themselves (Wellington, 2000). Marefat (2002) continues to argue the importance of journaling by describing it as a method to establish what is important for the learner, or participant, which may be difficult for other research methods

to ascertain. Faizah (2004) argues that these journals encourage student's reflections on their performance, experiences and development, and can be effectively used to enlighten researchers to student challenges and how these were overcome throughout the duration of the study. Wellington (2000) continues to describe that the researcher is not confined to any specific rules, however one should ensure that the participants write "a chronological account of events with the diarist's own interpretation or version of them, and reflection on them" (Wellington, 2000, p. 119)

In the proposed study the participants are to make entries into their journals which document their experiences of each lesson within the taught modules. They will be encouraged to focus on any difficulties experienced, their performance and level of understanding. Each entry should be labelled according to lesson and day.

FOCUS GROUP DISCUSSIONS:

Morgan (1998) describes a focus group as interaction which relies more heavily on the participants who discuss a topic supplied by the researcher; this generates a collective view rather than an individual one. The interaction between the participants is where the data emerges. Focus groups are generally more economical on time, however it is mentioned that the quantity of data is less than traditional interviews with the same number of participants (Cohen, Manion, & Morrison, 2007). Nieuwenhuis (2007) emphasises the role of differing opinions as participants may enter into a debate with each other which will widen the range of responses, according to Nieuwenhuis (2007) this conflict can result in better data generation. Morgan (1998) advises that this method of data collection is well suited to gathering opinions on attitudes, values and opinions which are crucial to the proposed study.

Focus Groups sessions will be held with the class group of ten students, consistent with Morgan's (1998) recommendation of four to twelve participants per focus group discussion. These sessions will be held before and after each taught module, in total the researcher would aim for a minimum of four sessions with the same group. These sessions will be used to track their experiences and learning development through each stage of the project. A limitation to this type of research tool is that group dynamics may lead to non-participation or alternatively dominance by some participants, it is important to take note that focus groups require skilful facilitation and management by the researcher (Cohen, Manion, & Morrison, 2007).

DATA ANALYSIS:

Cohen, Manion, & Morrison (2007) describes Qualitative data analysis involving organising, understanding and explaining the data in order to effectively note patterns, themes and categories. The data from this proposed study will be collected and through content analysis will be coded, categorised and themed across participants. These findings will be related to literature until a theory emerges which can be used to explain the core phenomenon. This approach is described by Cohen, Manion, & Morrison (2007) as working within a predetermined analytical frame that crosses the concerned participants. In this instance the researcher sets out the main concepts initially and assembles groups of data looking for differences, similarities and comparisons in all data with the intention of moving from description to theory generation informed by grounded theory as well as the conceptual framework of the study (LeCompte & Preissle, 1993).

QUALITY, VALIDITY AND RELIABILITY:

“Validity is an important key to effective research” (Cohen, Manion, & Morrison , 2007, p. 133). In qualitative studies validity can take the form of triangulation of data, richness and depth of detail or through researcher objectivity, however as Gronlund (1998) advises the participant’s subjectivities and attitudes can lead to a degree of bias. It is the researcher’s intention to monitor these factors to ensure that this does not become study limitation.

Central to the topic of validity is triangulation, which can be defined as the “use of two or more methods of data collection in the study of some aspect of human behaviour” (Cohen, Manion, & Morrison , 2007, p. 141). This concept is particularly important in qualitative research as Campbell and Fiske (1959) describe it as being a powerful tool for demonstrating validity, which has informed the mixed data collection tools for the proposed study.

This study will also make use of participant validation as a method of quality control and will allow all participants to review the collected data before the research is completed.

ETHICAL CONSIDERATIONS:

All prospective participants of the study were informed in terms of their rights during and after the research project, ensuring that the participants are fully aware of the nature and purpose of the study, as well as the implications of their involvement, before they were given

the option of participating in the study. All participation in the study was voluntary, and should a participant have opted not to be involved, their decision had no bearing on their academic progress in the future. After agreement to take part, all participants were required to sign an ethical consent form. This form was formatted on a UKZN letterhead and was written in plain language, free from jargon. It included information regarding the recording of certain data collection techniques, both the researcher and participant were required to sign and date the form. The participant received a copy of the consent form for record keeping. All prospective participants were over 18 years of age and therefore a legal guardian's permission was not required. It remained clear at all times that should they have wished to withdraw from the study at any time, they were within their legal rights to do so, without any explanation or any sort of penalty. The instruments used to collect data for the research were monitored to ensure that no harm will come to the users, and they were designed to be as user friendly as possible to ensure the process was as stress free as possible. Each participant was given an individual opportunity to review the analysis of results based on their input which allowed them a chance to clarify specific points as required. This process of participant checking ensured that the data is accurate and ultimately generate high quality research.

At no point did this study jeopardise the learning of the students, as both proposed methods of teaching are accepted practices.

Participants in the research were assured that all data collected remained confidential at all times. If need be pseudonyms were used in order to further ensure the participant's anonymity. All documents related to the research were safely stored and will be destroyed after a set period of five years.

As the research progresses ethical issues may materialise, and in that instance it is the researcher's responsibility to ensure that all practices are followed in an acceptable manner. In this instance I would consult with my supervisor to ensure that the issue is handled in an ethically sensitive, respectful and responsible manner. Participants will be provided with details of who can be contacted if they wish to make a complaint based on ethical grounds during the research period.

LIMITATIONS:

The qualitative study will be focused on one class in an isolated environment within a private Higher Education Institution in South Africa, in order to provide an in-depth understanding of this specific situation and does not intend to make generalisations to other contexts, or Public Institutions.

Awareness to the role of being both the teacher in the classroom and the researcher in this study needs to be addressed. Students may mask their true responses or actions, as they will perceive the researcher to be in a position of power, as their educator, which could act as a limitation in this regard. In response to this it will be emphasised that their reactions or recorded data will have no bearing on their academic performance. Natural responses will be encouraged and emphasised.

In terms of the mixed approach to teaching strategies; the digital native approach and traditional approach, one must acknowledge the variety of concepts being tested in one instance. As examples, digital vs static, images vs text, group vs individual or technology enhanced vs not. Analysing all of these concepts in one study can become difficult and a study which isolates these factors could explore the issues with more depth.

CHAPTER 4: DATA ANALYSIS AND INTERPRETATION

INTRODUCTION:

The purpose of this chapter is to analyse the generated data into concepts determined by the proposed Conceptual Framework of the study. This is done through the coding of data collected in the focus group discussions, participant journals and observation of the students' experiences. These themes will then be discussed within the context of appropriate grounded theory.

21ST CENTURY KNOWLEDGE:

As established within the literature, 21st Century knowledge is less about information retention and more about knowledge construction in terms of knowing how to process and where to find information. In order to establish how the participants process information and generate knowledge, the topic was brought up in the focus group discussions. During the discussions the students were asked to identify the steps which they take to process information.

Participant B, Focus Group: *"I generally start off my research by googling on the web, this lets me open multiple sources at once and I have easy access to images and videos if I need any further help. I am aware that the internet has a few sources which are not credible, but I use these to give myself an understanding, and then in my assignment I use the most credible source. It is easy to compare the various sources to each other; so that I am sure what I am writing is researched and informed."*

This process outlines the various stages of information construction of the sample group. At first there is an intention to research, naturally resorting to the use of a digital tool as a mediator to do so, secondly this response indicates that the student is accustomed to completing various tasks simultaneously, and gaining information instantaneously by opening and reading many references by shifting between the tabs of information quickly, with each source being critically analysed in order to assess credibility. The ability to assess credibility of a source is tackled in a compulsory first year subject at the institution, in an attempt to provide students with this foundational ability, which they will need in later years of study. This particular subject has a module dedicated to research methodologies and covers

elements such as, credibility of publication, triangulating various sources of information and assessing the author/s authority. The conclusion that they can actively assess credibility is based on the knowledge of the supporting curriculum as well as the student's own comment. There is also an interest expressed in exposing themselves to multimedia in the form of videos, images or animated explanations – all available through their digital technologies. They were observed to move between these media sources in order to find information, which is all facilitated by digital tools, without much attention given to the textbook, even though there is graphic content in the mentioned textbook. This is interesting as it suggests that the student's opinion is one that a textbook is perhaps only an individual's opinion, and in order for them to gain true knowledge they favour information arising from various sources, which they can piece together themselves. This is demonstrative of Perry's (1970) levels of cognitive development which indicate that the students have progressed from dualistic, one answer type methodology (Perry, 1970), to a more pluralistic sense of knowledge. Only once all sources of information are analysed can the answer be formulated and recorded by the student, again employing digital tools to do so. In this instance the process of attaining an answer is clearly different to previous generations when information may have been presented in textbooks, libraries or by the teacher with the emphasis on knowledge retention rather than the process of knowledge construction.

When asked if the student's digital technologies enhanced their learning, the comments were strongly suggestive that they regard their digital tools as integral to their learning process;

Participant F, Focus Group: *“Yes [digital tools] allows for faster, simpler and easier to understand information minus travelling costs and time wasted.”*

Participant A, Focus Group: *“Yes, digital technologies provide us with resources that make learning, research and college work easier and faster.”*

Participant H, Focus Group: *“Yes, [digital tools] helps to make things more captivating and much easier to find information which is simple to understand.”*

It becomes evident in these responses that the participating student's opinions revolve around digital technologies allowing their studies to become easier, faster and captivating for them, ensuring that they maintain motivation and commitment to their studies. It also

indicates that the process which these 21st Century students follow when researching is largely dependent on a virtual world of information and connections, accessible only through the use of digital technologies as a mediator, even though there are other traditional avenues available to them, such as libraries or textbooks containing visuals, which are quite clearly overlooked by the participating students.

DIGITAL TECHNOLOGIES AS A MEDIATOR:

In order to assess how a 21st Century student applies digital technologies to their learning practices, it is important to ascertain the accessibility and associated use of such tools. The following information in the graphs below was generated from focus group discussions, with journal entries and class observations noted in the written dialogue.

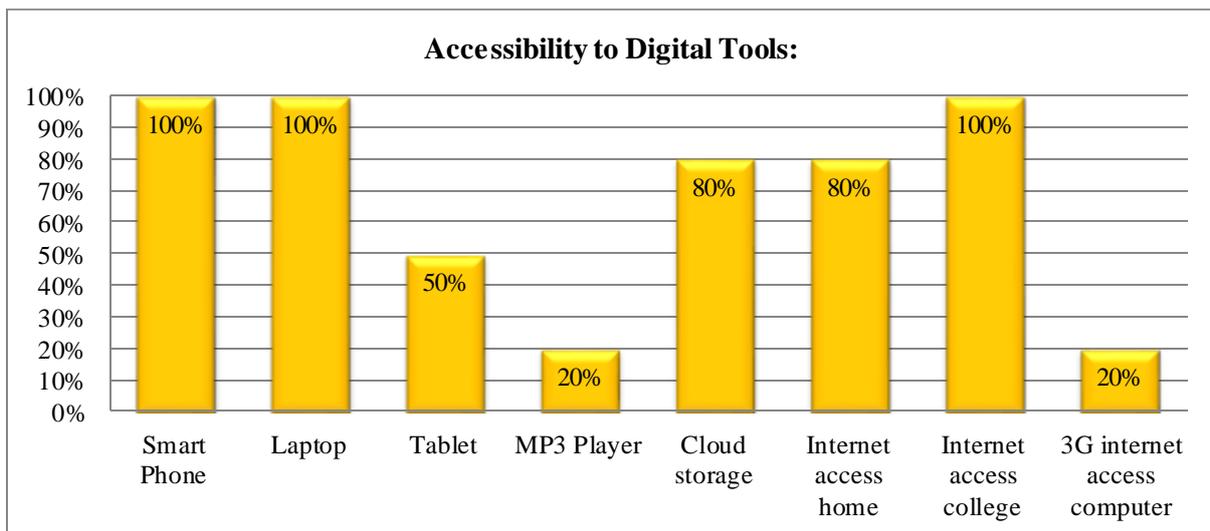


FIGURE 7: ACCESS TO DIGITAL TOOLS

It is clear from the data shown in figure 7 that all students within the participant group had access to a Smart Phone, and their own personal laptop, one member of the group admitted to having to share her laptop with her brother, but only at home. Of these students, another half owned their own tablet, and so it can be concluded that half of the sample had multiple devices namely; a Smart Phone, Laptop and Tablet. When questioned, these students acknowledged that they rarely bring their tablet to college; they rely solely on their laptop and smartphone while on campus. All of the sample population had internet access at the college, as Wi-Fi is provided, and all of the students have internet access off campus, either in the form of ADSL or 3G, internet access can also be achieved through their smartphone.

This data is contradictory to another South African study (Brown & Czerniewicz, 2008) and is therefore unusual for students to embrace this technology to such an extent. This can however, be explained as the sample population is within the context of a private higher education institution with different infrastructures in place, and so variations in the data will be expected when compared to public higher education institutions.

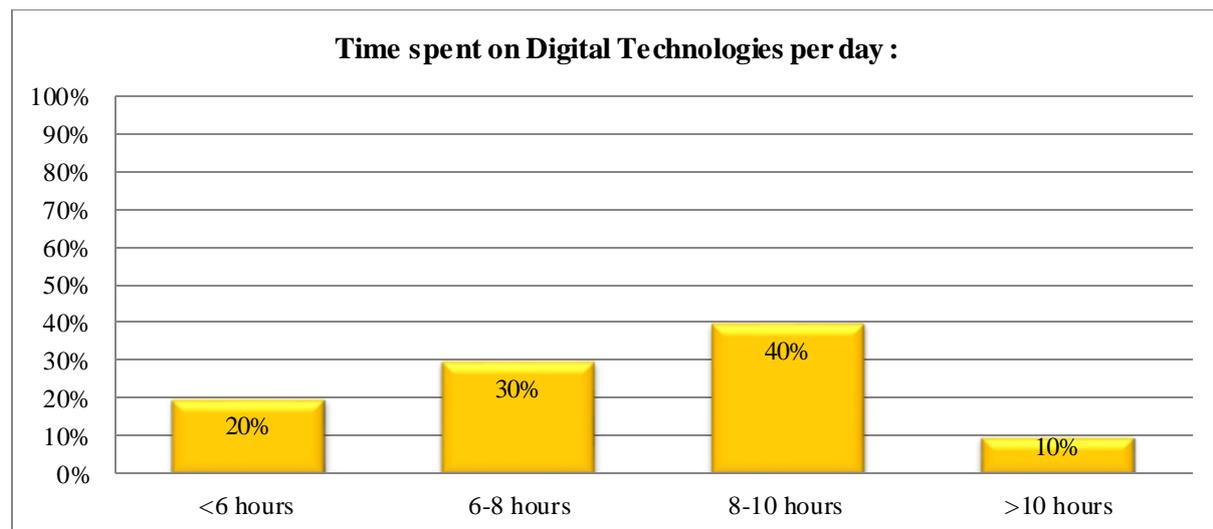


FIGURE 8: TIME SPENT ON DIGITAL TECHNOLOGIES PER DAY

The data in Figure 8 represents the amount of time which the students say that they spend on these digital technologies per day. It is evident that the median spends between 6-10 hours per day on their devices. When questioned as to how this figure is achieved, the response was as follows;

Participant E, Focus Group: *“I generally do two things at once, so I can easily be working on my computer and chatting (instant messaging) to a friend on my phone.”*

When asked if this practice was distracting, the response was;

“No, I am still able to do my work effectively, but at least I am not missing out on anything either.”

This is an interesting statement, as it suggests that young adults can operate successfully whilst undertaking various tasks simultaneously as claimed by Prensky (2001a) and Foehr (2006), as well as a demonstration of the nature of instant gratification desired in 21st Century living. It does not suggest that multitasking is an effective learning strategy, but it would

however explain how so many hours of use are accumulated as they are possibly completing multiple tasks simultaneously. During the lectures it was observed that students often had their smartphones on their desk and would regularly check for any activity. This habitual behaviour intensified during the traditionally taught modules where students would actually interact with their phones, whether this is checking emails or communication with others is unclear. This may be a sign of distraction or boredom, instead of a demonstration of effective multitasking; alternatively it could also indicate a lack of discipline and lack of commitment to their immediate studies or class environment.

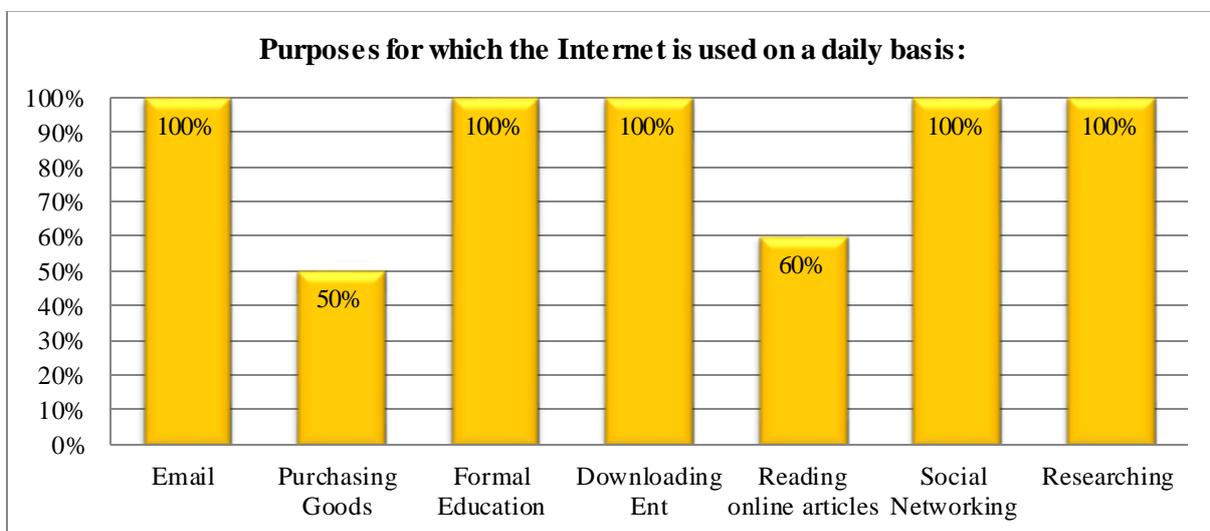


FIGURE 9: PURPOSES FOR WHICH THE INTERNET IS USED ON A DAILY BASIS

The data in Figure 9 represents the purposes for which the internet is used, the categories were supplied to them and the results are representative of how many students indicating what they use the internet for. Each category was verbally explained during the focus group as follows:

Email: Sending and receiving of emails, both personal communication as well as for college related tasks.

Purchasing Goods: Online shopping of any kind, including browsing for products or searching for prices.

Formal Education: Downloading software, working on assignments, troubleshooting the internet for educational purposes.

Downloading Entertainment: Downloading entertainment such as music, series or games.

Reading Online Articles: Online articles can include academic journal references, or articles from News24, newspapers etc.

Social Networking: Includes platforms such as Facebook, Twitter, Snapshot, Whatsapp or Instagram.

Researching: Entails all research involved in completing an assignment or task, and only academic based. This can be in the form of an internet search or searching the online library resources which is provided to all students.

It is clearly evident that the internet is used as a primary tool for learning and researching and all participants agreed that it was the first resource consulted when given a new brief or assignment or alternatively to troubleshoot any problems encountered. Comments include:

Participant C, Journal: *“The first thing I do [when given a new assignment] is Google the topic, all the information is there and it saves me time.”*

Participant B, Journal: *“Going to the library to source information takes too long, Google is instant and you can start straight away.”*

Participant J, Journal: *“I don’t have to move to Google information; it is accessible from wherever I am.”*

What is striking from these responses is how heavily the students rely on Google, to the point where the noun, Google, has actually become a verb. Participant J has a particular interesting comment, which suggests how accessible information is for students, to the point where they do not even have to move to be able to access information –it is all literally at their fingertips. The learning environment has now been extended beyond the realms of the classroom as learning can occur at any time and any place. There is also no distinction shown between researching and googling, or using the internet as a researching tool – to them these are one in the same activities and demonstrates how integrated digital media is to their learning. This has led to Google taking on an authoritative role in the student’s lives and highlights the need to teach students to be critical and discerning on issues of credibility. What is also evident

is the need for instantaneous information, which aligns with Prensky's (2001a) assumptions in regards to neuroplasticity or Digital Natives having 'hypertext' minds.

This became noticeable in the class observations, when teaching using a Digital Native strategy, the students were asked to split themselves into groups and find information on various concepts, which they would then share with the class. No limitations were given in terms of what tools they could use to achieve this. Immediately they began working on the task by reaching for their laptops and began internet based research, the groups interacted well, demonstrated an ability to evaluate the validity of the information together and prepared their discussion points for the rest of the class. It was a simple process which took no longer than twenty minutes to explain and implement. The explanations to the concepts were varied, informed and well understood by the students who explained them. However, when teaching using a traditional strategy, the same exercise was asked of the students, with the exception that they could not use any digital technology to assist, they had to find and share the information found within their prescribed, hardcopy textbook. Initially the students fumbled around their bags, a large majority had not even brought their textbooks to class, and this led to confusion as students resorted to sharing with group members. Discussions proceeded with regard to where to find the information, complaints about the large bodies of text, bearing in mind that the textbook's information is formatted differently to that of a digital media source, where one is able to use the search command for keywords easily and does not seem so overwhelming to the student. This led to the point where most discussions had little to do with content, but more to do about how, or where to find the desired information content, in order to begin processing the assignment. When the information was found the groups did discuss pertinent points, however on presenting back to the class the students seemed less confident and were less able to describe the concepts in their own words, indicating a lack of engagement with the subject matter, perhaps due to the mode of teaching. The process took just over forty minutes to complete, with less success than the previous example. Within the student journals on these particular days, there were recordings as follows:

Participant E, Journal: *"The class exercise was easy; I enjoyed the interaction between groups, and learnt from other group's presentations."* (Digital Native strategy)

Participant F, Journal: *“Today’s class was ok, I did not enjoy looking for information in the textbook – it is too long with too many big words which makes it difficult to understand.”*
(Traditional strategy)

This statement is profound, as it suggests that the layout of the textbook is vastly different when compared to the layout of digital media. The information displayed in digital media is designed to entice individuals, with embedded video clips and links to other sites, easily located highlighted information – this is what the Digital Natives have come to expect from all sources of information, and if this cannot be found in a traditional textbook, they lose interest, as a textbook can be described as a static source of information, with long passages of text, even if broken up with images or visuals.

Participant A, Journal: *“Today’s class was interesting as it wasn’t just a lecture; we had to get involved with the process which will help me to remember what I learnt about. Our Group worked well together and it motivated me to get good feedback from the rest of the class”* (Digital Native strategy)

When comparing this response to the class observations noted during the experience, it became evident that there is a direct correlation between the amount of digital media used in within the class environment and the enjoyment and learning possibility of the outcome. The key lies in developing an open platform where students are comfortable to discuss their ideas and findings freely in a mode in which they are comfortable. This then naturally leads into more animated class discussions and interactions, in turn producing more varied responses which are easier to grasp for the students.

Participant A, Journal: *“Today we were asked to look for certain things in our textbook; I had to share my book with somebody else which made it difficult. The textbook is hard to work with and takes a long time to understand. I don’t understand why we couldn’t just google it”*
(Traditional strategy)

These varied responses on essentially the same exercise indicate that the student is more comfortable with digital tools and an associated set of skills or developed language as a method for learning. It could also indicate that there is more openness to collaboration when using digital media in class, as if the need to interact with each is promoted through the

digital tool as a mediator for learning. Using digital tools is something which comes naturally and when this is removed, puts stress on their learning environment. This is reflected in the class, as the first point of call for students is to search on a digital device, even though they had textbooks and a facilitator available to them. The computer in this case can be seen as a mediator of knowledge which relates appropriately to the Zone of Proximal development (Vygotsky, 1978) except in this instance the student has learnt through the assistance of a digital device as opposed to a teacher or facilitator. It also alludes to the principles of Connectivism, where students make their own connections between nodes of information, evaluate their credibility and construct new knowledge based on their findings. In promoting the use of digital tools, it is suggestive that this could ensure variety and variation in the student’s final task, especially considering their lack of engagement with physical libraries or lack of enthusiasm for textbook based research.

As per the reflected data in figure 10, sending and receiving emails is also a dominant use for the internet, this could be for personal reasons, however it should be noted that the Institution and lecturers communicate with the students via email, so it is within their interests to check mail on a regular basis for college updates. This would explain the high percentage of email usage.

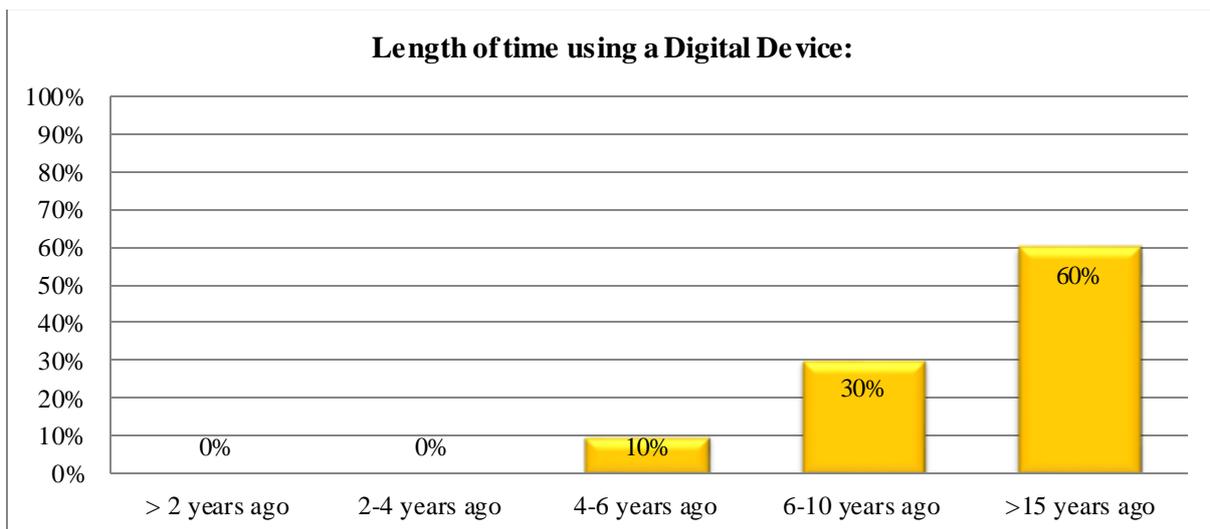


FIGURE 10: LENGTH OF TIME USING A DIGITAL DEVICE

The length of time that the students have used a computer is important to ascertain as it demonstrates how digital tools are naturally integrated into their learning behaviours. It is

evident that the majority of the participant group have been using computers for more than 15 years, making them an average of 6-10 years of age when first used. Most of the students were introduced to computers in school, figure 11, indicating that from a young age, they connect the computer, and it's capabilities with learning. Their reliance on computers and the digital as a mediator of learning only increases as they get older, or as more advanced technologies are developed.

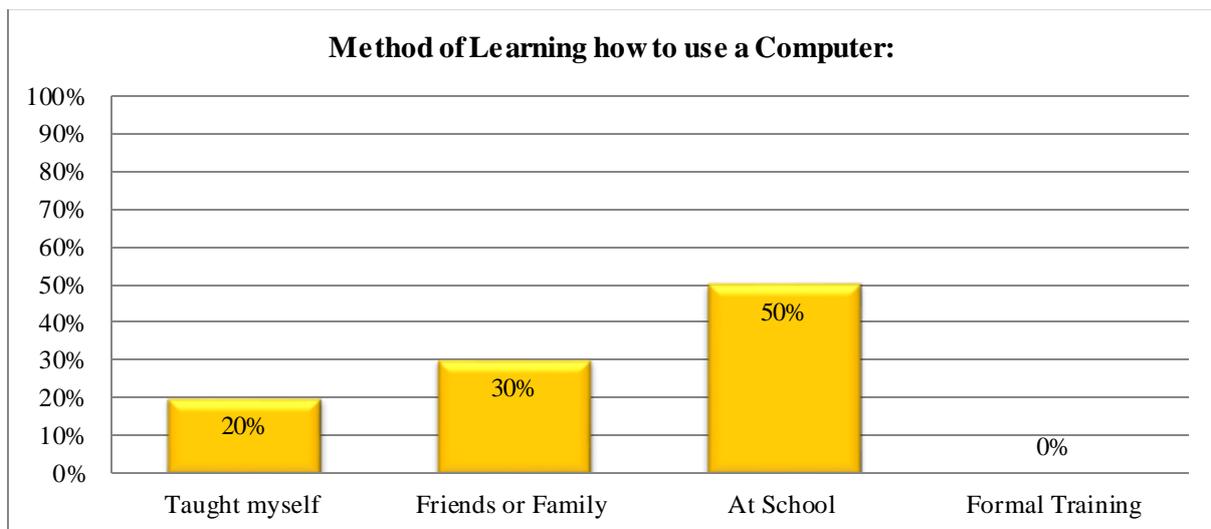


FIGURE 11: METHOD OF LEARNING HOW TO USE A COMPUTER

Based on this information, it can be concluded that the participants in this study would fit comfortably into the Digital Native (Prensky, 2001a) category; they were all born within the last two decades, they all have access to various digital technologies, use them extensively on a daily basis, and rely on them for information construction which is unlike previous generations. They are familiar with multitasking as a process and they are all competent with digital technologies, having used them for many years. This does differ with other studies based in the South African context (Brown & Czerniewicz, 2010), (Brown & Czerniewicz, 2008) and so the findings cannot be generalised to other circumstances, but is specific to an Applied Art based private institution.

COMMUNITY THROUGH COLLABORATION:

It has been claimed that 21st Century students prefer to work in collaboration with each other rather than traditionally as individuals (Prensky, 2001a). This collaboration not only involves the students in the class, but also collaboration through social networking and digital devices.

Collaborative based work was reserved for the digital native method of teaching, whereas the traditional method was linear and more individually centred, a decision which was based on Prensky’s (2001a) findings. During the digital native classes, the students were asked to work on a collaborative class exercise, which extended beyond the classroom hours, this is an important aspect of the study as it demonstrates that perhaps there are wider opportunities to collaborate work than previously utilised within the classroom environment. The class was intentionally put into groups based on their disciplines, to ensure that each group had a mix of Fashion, Interior and Graphic design students. The brief for the exercise covered various themes across the module. These decisions were informed by Resnick (2002) who discusses educational reform required in the 21st Century. After the exercise was complete the following information was recorded as part of the focus group discussions and found in their journal entries.

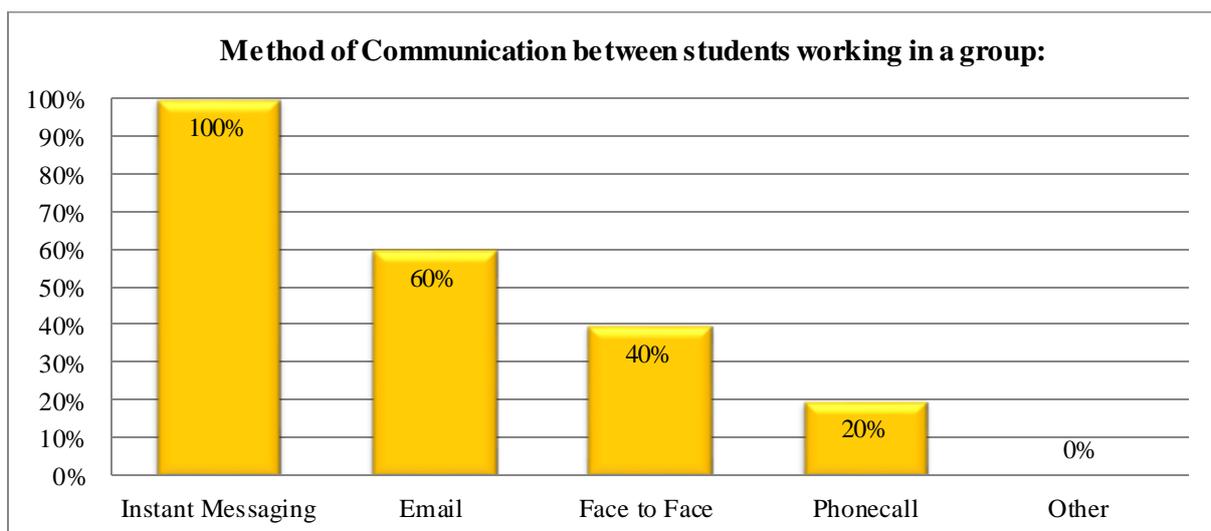


FIGURE 12: MEIHD OF COMMUNICATION BETWEEN STUDENTS WORKING IN A GROUP

Figure 12 represents the data collected in the focus group where students were asked to rank each option in terms of how they communicated with members of their group. All of the students ranked instant messaging as the top method of interaction, with feedback such as:

Participant B, Focus Group: *“I feel that it is helpful, because you can keep in contact with one another regarding the brief at any time.”*

Participant D, Focus Group: *“It makes it easier and more convenient to communicate and exchange information, especially images or quick ideas – for this I also make use of snapchat which is specifically for images only.”*

Participant I, Focus Group: *“It is instant and everybody always has their phones with them so I can get feedback immediately at any time. This way I do not have to wait for a response or wait to see the person at college only”*

The individual responses all resonate with the concept of the Digital Native requiring instant information, and immediate feedback, they have the ability to communicate in visuals, using an application called *“Snapchat”* which essentially allows for communication using photographs only, as opposed to words Prensky (2001a), this a particular strength given the field of research being studied. Given participant I’s comment of everybody always having their phones with them, as observed in class, indicates that they have reached a point where they are permanently plugged into their smartphones, having reached an almost cyborg status (Clynes & Kline, 1960). This dependency on digital tools were observed in the classroom during the lectures – students were seen to simply photograph notes, or PowerPoint presentations rather than taking down the notes themselves. This is a strong indication that behaviour within the classroom environment is also adapting due to the digital tools we are surrounded by.

Emails were also found to be commonly used for inter group communication, but were reserved for more official correspondence:

Participant F, Focus Group: *“I prefer to receive college information via email, I can file it and I can easily keep track of who is assigned to what task”*

Although face to face contact time with the group features in the data, it was mainly reserved for class time, and few meetings were scheduled between this. When questioned as to why this was, the response was:

Participant A, Focus Group: *“It is so difficult to arrange a meeting time with everybody, and it is much easier to communicate through email or whatsapp that there is no point in discussing anything face to face”*

Participant E, Focus Group: *“If we communicate with each other online then we can work at any time of the day, not only when we are all together at college”*

When the class exercise was discussed in class, it was observed that the students had assigned tasks to each other, collaborated with one other in terms of evaluating the validity of the information distributed and worked on a visual presentation for the rest of the class. During this process the students made use of digital tools in the form of their laptops, for notetaking, they used their mobile phones to begin chat groups and sent an email designating specific tasks. From that point onwards, the outcomes of the assignment were achieved without meeting face to face; rather they were fully reliant on digital technologies in the form of the internet, their smartphone and their tablet or laptop. It is interesting that the students are completely unaware that in this process they are demonstrating the required outcomes of a 21st Century student by multitasking, developing independence, becoming critical thinkers, showing innovation and constructing their own knowledge beyond the realm of the classroom (Resnick, 2002). The teacher’s role has in this study has also changed from one of the bearer of all knowledge to now a facilitator of student constructed knowledge which is perhaps a more supportive role, involving assisting students to develop their own answers, instead of actively supplying answers. This assignment was setup in order to assess this relationship, however there was strong evidence generated to support the principle of a new emergent role of the teacher. Having said that, as the teacher, I did not feel my value was compromised during this process, it was still my responsibility to ensure that the information covered was aligned to the required outcomes, was of sound quality and being applied effectively.

In reviewing the journal entries it became apparent that collaboration, especially across disciplines in terms of Fashion, Interior and Graphic Design was indeed valued by the students, although there was acknowledgement of the challenges which it brings, this is an expected challenge of working with others and will prepare them for industry where collaboration is key within the field of Applied Arts.

Participant H, Journal: *Collaborating with others helps me see and understand different perspectives which I find helpful, but it can also be frustrating at times when others don’t do what is asked.”*

Participant D, Journal: *“I enjoy working in groups as we all get input into the project, but sometimes the disagreements can be tricky to work out.”*

Participant C, Journal: *“I enjoy working with people from other fields, as we each bring something different to the project and I start to see things in a different way.”*

From these quotations it can be seen that students benefit from collaboration with others, they established a means of working together beyond the boundaries of the traditional classroom, their final assignments demonstrated a more informed and well resolved solution and the students seemed more confident in the answers which they had provided demonstrating an active engagement and comprehension of the subject matter. What is striking is that they do so using the digital technologies available to them, with ease. Given the opportunity they could collaborate with other global or local students, or professionals without any apparent issues, provided that there is allowance for this made in the teaching methodology, once this has been established as an effective learning tool, perhaps it will be freely used by students in the classroom. Again it is evident that these digital technologies are mediators for information gathering and are effectively incorporated into 21st Century learning.

LEARNING ENVIRONMENT:

Over the course of the term, two teaching strategies were used, the first one implemented was the traditional teaching approach which consisted of creating an environment based on Prensky's (2001a) definition of how digital immigrants prefer to learn and therefore teach. The learning environment followed the top down teacher approach. Lectures were taught from the prescribed textbook, which does contain supportive visuals and additional readings. Concepts were covered consecutively or in a linear format and any class based assignments were individual exercises where the students were asked to refrain from using any digital devices, but rather source the required information from either their textbook or the campus library. Although class discussions were encouraged in order to ascertain the level of engagement in the subject matter at hand, the tasks were individually student centred with very little attention given to true collaborative based learning. The class discussions were implemented to quality assure the information being researched.

In terms of teaching while referencing a textbook, it was observed that as soon as the instruction was given to turn to the relevant chapter for the class, there was a distinct

hesitation from the class. Approximately one third of the class did not even have their textbook with them, and when told they would need to share they became even less enthusiastic. The class's attention seemed to waiver, this was observed through their body language of looking away, acting restless which resulted in a response to check their smartphones, which were often on the desk next to them. The decision was taken to not interfere with this natural tendency, as this is relevant to the research and demonstrates how digital technologies can be used as distraction within the class environment. When questioned in regards to the impact of the textbook based lectures the participants comment as follows:

Participant C, Focus Group: *"I instantly felt bored and could not really relate to what was being discussed even though the information was in front of me. The textbook used words which I did not understand and there was too much writing to follow."*

Participant A, Focus Group: *"Generally there was too much writing, and so I can't remember much of what was covered in those classes. It felt like my concentration levels drifted off."*

Participant I, Focus Group: *"Even though we discussed the images in the book, I was bored and became irritable and uncomfortable. I didn't enjoy the classes and I can't say that I remember too much of what we spoke about."*

Participant C's response is suggestive that Digital technologies could be responsible for devaluing traditional academic learning strategies, in that knowledge construction has become more superficial and students are not engaging with formal academic materials. However in an environment where information can be explained visually and instantaneously through open source resources as well as academic online resources perhaps it is the medium of delivery which has changed and become more recognisable to the student than the actual message in the medium. If traditional textbooks need to be used, a potential compromise would be to create a collaborative online space, where students can share visuals, information or resources which contribute to the traditional textbook. Participant A and I's responses who demonstrate a short attention span, due to limited engagement with an unfamiliar material, such as the textbook, could be indicative that students are not accustomed to academic research or reading, however it is important to note that they are still engaging with academic materials and critically researching, just in a different format. This lack of concentration correlates with the class observation of becoming easily distracted and resorting to using their

smart phones during the traditional teaching strategy, although no student admits to resorting to using their Smartphone as a distraction, this could be because they know that this is not acceptable practice during lecture time, or it has become such a natural tendency for them, that they do not even acknowledge themselves doing it. If the latter is indeed a correct assumption, this relates well to Clynes & Kline's (1960) description of a cyborg and the dependency which is placed on technological devices.

When briefing the students on their class based exercise, which were all in hardcopy format, it was made clear that no digital devices could be utilised in the process. It was also explained that this was an individual task and that they needed to work by themselves. When this was explained, the class appeared to be confused and asked perhaps obvious questions such as:

“Do you mean we can't use Google?” or “But can we use Wikipedia?” or “But where will we find the information?” or “Can we not talk to each other at all?”

This uncomfortable reaction indicates that the students were not at ease with the idea of not using a device, to the point where they felt lost as to where to begin. It also demonstrates their negative reaction to not being able to discuss concepts amongst themselves, but rely solely on their own solutions. This point could indicate a change in teaching strategies and the classroom environment as even in traditional means of teaching, there is a natural desire to include groupwork, which is easily facilitated and mediated through digital technologies. During the exercise much of the class became distracted, they were observed to initiate private conversations, using social media on their digital devices and battled to find solutions within the textbook, as the textbook is considered user friendly it can be concluded that the students' apparent awkwardness stems from engaging with an unfamiliar medium which is out of their comfort zone. There was a dull hum of students attempting to share answers or discuss their understandings further, indicating that sharing and collaboration are concepts which do come naturally to the students, as mentioned by Prensky (2001a). Their journal entries included comments such as:

Participant F, Journal: *“Following the textbook and trying to find information was difficult, and slow, I became impatient and would have rather worked with somebody else.”*

Participant B, Journal: *“The information in the book was difficult to find and it took a long time, I did begin to lose interest.”*

Participant E, Journal: *“Using the textbook was difficult, but when I did find the answer I felt like I had accomplished something especially because I had done it on my own.”*

These entries indicate that the students were frustrated by the process in expressing their impatience with a slower means of gathering information that what they are accustomed to in other classes. Participant F’s expression of preferring to work with another member of the class indicates that this collaborative learning environment has a behavioural impact on independent study, with weaker students perhaps relying on stronger students to perform. Links could be drawn to peer to peer learning in this instance.

What is particularly interesting is participant E’s response, where the difficulties of using a text book are acknowledged, however this difficulty translates to accomplishment and pride once the task has been completed, most especially as it was done so independently. This indicates that perhaps there is merit in allowing a student to explore methods of information gathering which has now become foreign to them, but it must be noted that this was the only positive comment from the ten participants in total.

This exercise was touched on in later focus group discussions in order to ascertain the retention of the information, in general most of the participants agreed that because they were distracted, they just wanted to get the exercise over with and this led to “lazy” answers which ultimately did not assist in retaining the information sourced. It was only when the answers to the exercised were discussed as a class that some of them started to understand the core concepts, which can be perceived to be a challenge to collaborative learning. This was observed during the particular class discussion as students started to engage with the subject matter by asking relevant questions. At this point it was also observed that the more confident members of the class started to contribute to the answers, not only relying on the teacher, again indicating a natural inclination to collaborate with each other, without them even being aware of it happening. When questioned as to the impact of not being able to use any digital technologies the participants responded as follows:

Participant I, Focus Group: *“Using the internet would have been a lot quicker and our answers would have probably come from different sources, making the answer more accurate.”*

Participant D, Focus Group: *“I don’t see the point of not being able to use resources which are available to us – it (the internet) makes finding information so much easier and faster.”*

The most striking response was from participant I, who recognises that the information on the internet is composed from various sources and in researching each one will result in a more accurate answer, with the understanding that the sources of information are credibly sourced and legitimate. This is evidence which demonstrates how these 21st Century students evaluate information, make necessary connections and apply these to form new concepts, closely linking to the theory of Connectivism. This same ability could also be applied to comparing the textbook to further sources of literature, but yet it is not seen to be the same for the students, who would find that process too slow and they would ultimately lose focus. Instead the internet is seen as the most effective way to gather information from various sources by the majority of participants.

During this module concepts were purposefully discussed in a linear format, in order to mimic the Digital Immigrant preferences of learning. The concepts were discussed one at a time, with separate exercises for each. When asked during the focus group discussion what their overall experience of the classes were, their comments are as follows:

Participant A, Focus Group: *“Overall the classes felt slow and were quite dull.”*

Participant F, Focus Group: *“Generally I felt that the classes seemed longer and I was easily distracted.”*

Participant J, Focus Group: *“Overall I thought the classes were boring, which made it difficult for me to concentrate or remember anything after the class. The best part was the exercises.”*

These comments indicate that the students generally felt demotivated and not stimulated enough in the classroom environment, perhaps due to the reduced pace of the lesson. This led to a high level of distraction and this is also echoed in their class attendance during these

modules. The attendance did drop by 15% from the first to last class taught, and this could be an indication that the students felt like they were not getting anything out of the classes.

The subsequent module was taught employing a Digital Native approach. This was vastly different and involved targeting assumptions made by Prensky (2001a). Firstly, students were taught in a collaborative based environment, the lectures were completely based on visual presentations, with no reference to the textbook, the concepts were handled concurrently in this study which is addressed as a limitation, the students were able to use all forms of digital technologies available to them and were encouraged to multitask as much as possible.

The lectures were prepared from the prescribed textbook; however the information was presented to the students using a combination of PowerPoint, video media and additional visual imagery. The PowerPoint contained keywords only, which led to class discussions rather than formal theoretical lectures. The intention for this was to engage students to examine the visuals critically and together form an assessment of the concept covered. This technique worked well for two reasons, firstly the students became active participants in the class and less distractive type behaviour was observed during the lecture time, and secondly a few of the discussions led to related or different areas of study, making the class less predictable and more interactive. This was reflected in the student journals as such:

Participant F, Journal: *“I enjoy the open discussions as there are better points brought up and help me relate what we are learning to other thing I already know.”*

Participant A, Journal: *“I find them helpful to hear and understand other people’s perspectives, thoughts and ideas and the lesson becomes more interactive.”*

Participant C, Journal: *“I enjoy them as they are informative, interesting and I enjoy hearing other points of view which I hadn’t have thought of before.”*

The responses were unanimous; all of the students expressed their enjoyment for class interaction and could see the benefit from learning from each other. The information presented was largely contributed by internet sources using digital tools. It is essential that the teacher controls the topics for discussions, however in this instance the teacher has become a facilitator rather than the bearer of knowledge.

Videos, which were attained by downloading from the internet, were shown to the students after the concepts had been discussed in order to further enhance their understanding. Additional visual imagery was also used during the lecture to enhance discussions and to allow the students to develop a critical and analytical mind-set. It was observed that in the instances where numerous images were used, the class became more vocal in their interactions and eager to share their individual opinion. A few occasions saw conflicting opinions being discussed, which only added to the class dynamic, it is these types of discussions which students remember and tend to retain information from. Comments in the journals reflect these active classes as such:

Participant D, Journal: *“I enjoy the images and videos; it makes it a lot easier to understand and to remember. I even starting looking forward to it.”*

Participant E, Journal: *“It is more interesting and I feel that I can concentrate better for longer.”*

Participant J, Journal: *“It makes it so much easier to see what is actually being described, especially because I have a photographic memory.”*

These journal entries suggest that visual stimulus generated from digital tools is closely linked to Digital Native’s natural method of learning and can be used as an effective tool in the classroom environment, most especially in the field of the Applied Arts. This does correlate to Prensky’s (2001a) comments that Digital Natives prefer to learn via visuals than text only, this concept has been studied by various other researchers in regards to how students learn, and is not solely reliant on digital technologies, however these technologies facilitate this type of learning and makes it easier to access within the classroom environment. It is perhaps even more applicable in the field of the applied arts, where it is assumed that all students are right brain orientated and respond better to visual imagery than perhaps students in alternative disciplines would. It must also be noted that some of the students used information gathered in these sessions to great effect in their marked assignments, instead of merely relying on individually sourced information sourced from the internet purely. Their assignments demonstrated a good level of understanding as they wrote naturally about the topic, as opposed to relying on references or standard definitions to

explain themselves. This indicates a good depth of information retention and their application thereof at a later stage.

The students were exposed to multiple concepts simultaneously and the class exercises were all interlinked to these concepts concurrently. The students were then expected to research the given topic using any method which they chose, and collaborate with each other in groups. The exercise was purposefully intensive with various aspects to it in order to assess how the students dealt with handling concurrent processes. The students were given one lesson in class to work on the exercise, and then had to report back to the class in the following lesson, this was to encourage them to connect with each other beyond the boundaries of the classroom as discussed in the previous section. During the work session it was observed that the students were quite frantic in their discussions, each group tended to disseminate different responsibilities to individuals and they quickly got down to researching the various requirements. All of the students in the class used their laptops or tablets with internet connection to do so. It was observed that not one student made reference to their textbook or the library in this session, demonstrating that there is a strong connection between digital tools and learning which exists in their minds. In order to establish if this could be generalised, the student’s approach to research was discussed further in the focus group discussions.

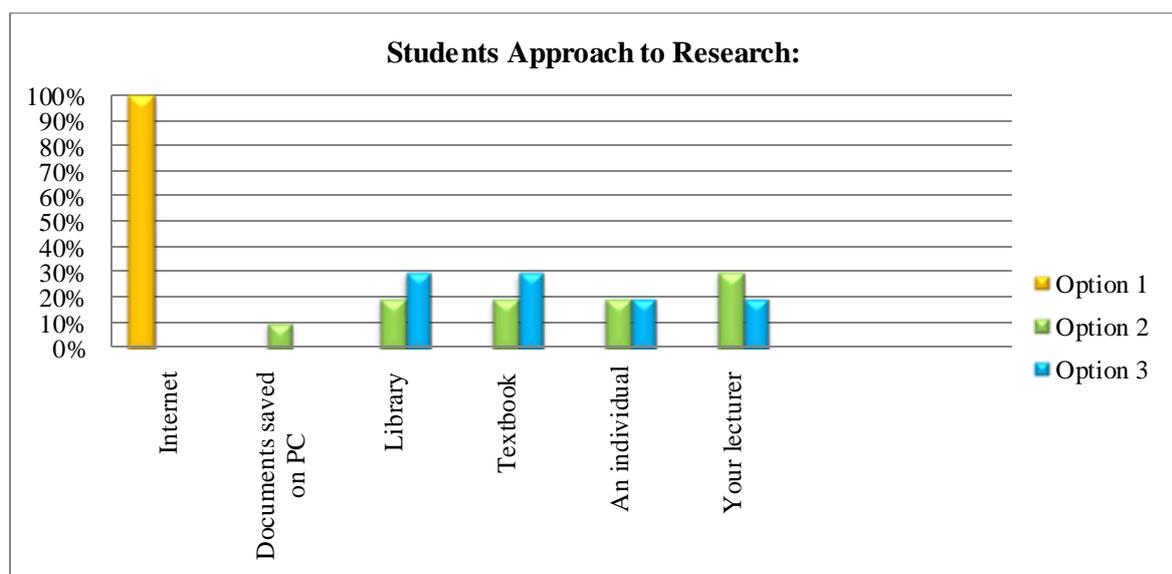


FIGURE 13: STUDENTS APPROACH TO RESEARCH

When questioned, 100% of the students confirmed that the internet acts as their first point of call for research of any type, followed by option 2, asking the lecturer for guidance and then finally consulting with the library or textbook. Again they emphasised how much more accessible and faster the internet is and explained how they could access various types of information by simultaneously opening multiple tabs at the same time, potentially indicating a natural inclination towards multitasking, and demonstrating their impatience with even waiting for a page to load.

The reaction to the exercise was discussed in the focus group discussions.

Participant G, Focus Group: *“The exercise given was quite broad and difficult to understand at first, but once we discussed it in a group we were each able to make our own contributions which made it easier. Most of the work was completed outside of class time, but we managed this process through emails and messages to each other so it wasn’t really a problem.”*

Participant I, Focus Group: *“The work we needed to produce for the exercise was too much for the time we had, and so this led to lots of after hours work for all of us.”*

When questioned as to how this was handled by the group, the answer was as follows:

Participant I, Focus Group: *“We had to work together in the time we did have, and then we created a group on whatsapp and emailed each other the work we had completed, so the next person could carry on with it.”*

In both of these responses it is evident that the students used Digital Technologies as a tool to communicate with each other and as a tool to work and learn from. What is striking is they do not even acknowledge the role of the digital in this process, and merely take it as being the most obvious choice to complete their work. They do comment on the quantity of work, but do not openly protest about having to collaborate with others, communicate through other channels or designate roles. This may illustrate that the students can handle large amounts of information, are able to critically process it through collaboration and designating tasks, which all relate to the desired outcomes of 21st Century students.

Their journal entries over the course of this exercise reinforce their enjoyment as such;

Participant B, Journal: *“Although there was a lot of work to be done, I was proud of what we produced in the amount of time given.”*

Participant F, Journal: *“There were a few challenges along the way, but overall I was happy with what we handed in and I feel like I will remember the work we did.”*

KNOWLEDGE CONSTRUCTION:

In terms of class observations, both exercises from the differing teaching strategies involved a final verbal presentation by the students. The traditional strategy required an individual presentation using traditional paper based materials and the Digital Native technique a group one, using any digital media of their choice. Although the manner of presentations is not directly related to use of technology it is important to understand how digital tools affect classroom behaviour and is demonstrated in the final outcomes. The overall results of the exercises were noticeably different. The traditional presentations, although well informed were textbook orientated with little understanding demonstrated by the students. Most students spoke to the class with little preparation, in terms of being confident in their knowledge and presentation skills, indicating a lack of genuine engagement with the subject matter. At best there were a handful of students who used a large scale poster to present their findings, which were presented with little enthusiasm and appeared to be roughly displayed. The students' demeanour was demotivated and during the presentations the rest of the class became fidgety and distracted. This could indicate a general disinterest in other student's work, but more likely owing to the type of media being presented being static based, in judging from the comparison to the Digital Native presentations.

The digital native presentations were altogether more synthesised, the students were able to openly discuss concepts, without having to make reference to additional notes, which demonstrates an engagement with the materials. The presentations were all digitally based, some used embedded videos, prezzi, PowerPoint and imagery to explain their understanding which captivated the rest of the class as it was a stimulating. These flashy presentation did not disguise the content value, which still needs to be quality assured by the facilitator, but it does assist in engaging the class in the subject matter, making the subject matter understandable and memorable. The work produced was a reflection of the lecturing style

employed to teach them, and it seemed to have motivated the students to produce work which was dynamic. The students' entries in their journals reflect this statement;

Participant A, Journal: *"I much preferred working in a group and being able to use every resource available to me in completing the exercise. When I felt like I didn't understand something clearly I could ask the group or just google it myself – by doing this I was confident in the work and could explain it easily."*

Participant H, Journal: *"I was much more interested in the second (Digital Native) assignment presentations; I will remember the rest of the classes' presentations because they showed good examples and discussed them in words I could understand easily."*

Participant C, Journal: *"I really enjoyed the way which Group X presented their work – I have never used Prezzi (an online presentation format) before, but in my next presentation I think I will give it a try."*

In these instances it becomes clear that various digital technologies were used as a successful tool for finding information, critically evaluating it, drawing connections between concepts and developing a creative report back in a collaborative based environment. The students acknowledged the difference using familiar technologies made to their final output and to the quality of the class lectures. There is therefore suggestive of a link which exists between digital technology and knowledge construction.

CONCLUSION:

The data in the research has demonstrated that these particular 21st Century students respond better to a more millennial, digital native based teaching strategy. This is a consequence of circumstance as information is so readily available to them and is changing at such a rapid pace. Knowledge retention is not necessarily as important or relevant to these students, as having the skills to be able to find information, critically analyse it and develop connections for the purpose of constructing knowledge.

The participants involved have easy access to a wide variety of digital technologies, they view the internet as a platform for learning and researching primarily, secondary to social aspects and they have been immersed with these technologies for the better part of their lives. The participants use these digital technologies in the classroom as a method to construct

knowledge, and without these tools there is an uncertainty which translates into their class exercises or assignments. The participants spend large portions of their day engaged with these digital platforms and in so doing expect instant information, visual stimulus in the form of videos, images and keywords, interaction or collaboration and are able to multitask without even acknowledging it. This becomes evident in the classroom environment as the students respond better to lectures which engage them on this level as opposed to traditional textbook based education which is essentially foreign to them.

The students displayed a natural inclination to collaborative based work and enjoyed the process of learning from each other. Again, digital tools were employed to communicate with each other beyond the classroom context, which leads to an expansion of the boundaries of the learning environment. In communicating with their peers it is again evidence of constructing knowledge using a digital tool or device as a mediator of the process.

In light of these findings, it is evident that methods of teaching could be made more relevant in order to challenge the 21st Century student.

CHAPTER 5: CONCLUSION

INTRODUCTION:

The purpose for this chapter is to review the key findings of this study in order to suggest answers to the predetermined research questions. Recommendations on teaching strategies will be suggested with reference to the analysed data as well as literature covered and future areas of research within this field will be suggested.

THE CONTEXT:

We are living in an era which has been described as the “Digital Revolution,” the “Third Industrial Revolution,” or the “Information Age” to name a few. New technologies emerge on a regular basis and up to date, current information is readily available at our fingertips and sourced by students. It has been established that we are increasingly demonstrating dependency on digital appliances, where two thirds of the globe own mobile phones, many of these being Smartphones, capable of completing tasks which previously only desktop computers the size of rooms could accomplish. Africa, even though considered a developing continent, has not been left behind with regards to this trend, and in fact has seen a larger impact than it’s western counterparts. Mobile phone technology has changed the manner in which individuals communicate with each other and this has led to a complete change of lifestyle for communities in rural settings, even impacting the economy in certain locations. More individuals have access to mobile phones than they do electricity or clean running water, demonstrating the importance which has been placed on these technologies. The use of these devices show no indication of slowing down, in fact they have been predicted to increase twenty fold in the coming years especially with the launch of smartphones. Given this context of flux and change, and researching the widespread impact of technology it becomes vitally important to understand its impact on teaching and learning within the 21st Century in order to ensure relevancy and cohesion in an emergent and dynamic context.

Various researchers have contributed to this area of study; however most of the research has been conducted in developed, westernised areas, such as North America or parts of Europe, with little attention given to the South African context. Those studies that were locally based were found to be biased towards more traditional qualifications and located in Public Higher Education Institutions and so an appropriate gap in the research was identified and capitalised

on for this paper. The focus of this paper therefore became an exploration of 21st Century students' experiences of various teaching and learning strategies within the discipline of the Applied Arts within a local Private Higher Education Institution.

PROCESSING INFORMATION WITHIN THE 21ST CENTURY CONTEXT:

The manner in which these participating students process information is closely linked to the associated outcomes currently required of 21st Century students. These outcomes include students developing an attitude of being lifelong learners, display critical thinking by collecting, analysing the credibility of all sources and making necessary connections, are collaborative in nature, effective problem solvers and demonstrate adaptability and entrepreneurialism. These differ from previous generations in that learning has become less about knowledge retention than it has become about knowledge construction. This corresponds with the theory which suggests that the cycle of knowledge in the 21st Century has shortened, with implications being that knowledge covered in the first year of a qualification may have already become redundant by the time the student has graduated. Therefore the purpose of education has changed from teaching knowledge to facilitating the process of knowledge generation, and in so doing the manner in which the students' process information has undergone an adaptation.

Students of the 21st Century expect information to be instantaneous, and available to them at all times. The data demonstrates this in observing their immediate responses during class exercises both during the traditionally taught strategy, where they did not know where to begin, and in the digital native strategy where they instantly worked with their devices to get information immediately. As educators we need to be aware of this tendency and be encouraged to where possible build this into the teaching and learning strategy of the institution, where appropriate. This information is readily and quickly accessible through their digital device, which allows them to instantly engage with a broad community of learning. The principle that this community exists beyond oneself is evidence that learning can now reside outside of oneself and can occur at any time. Once this information has been sourced from the broader, internet based community, a process of critical evaluation occurs where students compare references to each other in order to establish their validity. During this process, collaboration with other members of the class is preferred over independent, individual working and it is through these discussions where understanding of the content

begins to emerge through formulating connections between the information resulting in knowledge construction. The final step in the process involves the documentation of the solution, which is again heavily reliant on digital technologies. This resultant solution can therefore be seen as a dynamic process of information collection and knowledge construction which differs from the learning processes of the past generation, as the focus has shifted to the process and not necessarily the final outcome.

INTEGRATION OF TECHNOLOGY INTO EDUCATIONAL PRACTICES:

On analysis of the data, it became evident that the participants have access to a variety of digital technologies, which include smartphones, laptop computers and mobile tablets in some cases. They have generally been exposed to and engaging with these technologies for more than half of their life and most were taught about how to use computers at a Primary School level. Currently in the context of Higher Education the majority of the participants claim to spend between 8 – 10 hours per day engaging with these platforms, primarily using them to research information, communicate with each other and to produce academic assignments. The constant exposure to these technologies has had multifaceted implications; firstly they have become a mediating tool for the students to be productive and to learn, to the point where the concept of learning has become integrally linked to a digital device. These devices have affected the student's attitude to learning by engaging them on a level which demonstrates commitment to their studies. This was observed during class time where students make use of their tablets or laptops to take notes in class, they recognise and are familiar with the context of digital applications and take comfort in having the ability to source massive amounts of information spontaneously. When these platforms were made unavailable to the students, it was evident how uncomfortable this made them feel, which resulted in frustration and a demonstration of a lack of commitment to the classes or content. The participants' interest in the class was directly related to the amount of, and how digital technologies were used in the class. It is important to note that a balance in the classroom needs to be established, as the foundations of knowledge in some cases do require independent action, which cannot be solely reliant on digital tools. The students need to develop a skill set which can be demonstrated in all scenarios within industry, making use of critical skills which technology has enabled them to establish.

DEVELOPING EFFECTIVE LEARNING AND TEACHING STRATEGIES APPLICABLE IN THE 21ST CENTURY:

Based on the findings of the research, certain recommendations can be made in order to satisfy the outcomes required of the sample population, making the learning environment a functional and conducive space. These recommendations can be summarised as follows:

Facilitate rather than teach: The typical classroom space has changed, and the way in which students think have altered therefore the role of the teacher has to adapt. No longer is the teacher seen as the only mediator for knowledge generation, the suggested framework indicates that there is potential for digital technologies to support in this process, and so a more facilitator type role is encouraged. The teacher as facilitator involves directing the students into constructing their own knowledge, by allowing them to make use of the digital tools which they are accustomed to and directing them where necessary. The teacher should not feel threatened by digital technologies, but rather embrace it as a tool to use in order to mediate knowledge generation. The teacher is ultimately still responsible for the student's learning and progress however the manner in which this is achieved has changed.

Subject Integration: These 21st Century students have demonstrated that they are able to deal with information concurrently and are able to apply a cross disciplinary approach encouraging collaboration. Instead of dividing up the curriculum into separate standalone subjects, perhaps a move would be to focus on specific concepts and themes which run across disciplines hereby maximising collaboration and networks of information.

Extend learning beyond the confines of the Classroom: Digital technologies allow learning and collaboration to occur outside the confines of the classroom, this type of learning environment should be encouraged and facilitated by teachers as a method to prepare the students for industry. In the digital age learning should be seen as something which is a daylong or lifelong experience.

Knowledge through Collaboration: Part of successful teaching and learning strategies in the 21st Century is to encourage group work or collaboration where possible. This is a strategy which is successfully employed by these 21st Century students to process and validate information whilst generating knowledge. Collaboration can also occur in the digital realm where students can collaborate with a learning community much broader than the confines of

their classroom which will challenge them to broaden their mindset whilst exposing them to new ways of learning making use of digital tools. In order to maximise this ability, assignments and classes should encourage collaboration, with each other as well as with other individuals across the globe. This can be achieved through digital technologies, such as Skype, email or instant messaging; in so doing you are diversifying the learning experience and exposing students to alternative ways of learning.

Digital Technologies: Utilise digital technologies as a mediator of information gathering, knowledge generation and engaging students during the lesson, as it is something which they can relate to and respond to. Presenting concepts digitally through projections, using images or videos stimulate the students and ensures that the content is memorable and can later be applied to different contexts.

Digital technologies also have the ability to alter the content which can be covered in a syllabus, or at least when it is covered, by enabling teachers to expose students to complex concepts, which may not be as well understood in the chalk and blackboard era. This can be achieved through simulations, animations or multimedia.

Allow students to engage with digital tools as a valid method to collect information, even if it their smartphone, the emphasis should be placed on being able to source the information not known, rather than focussing on what is known.

Assessment or Evaluations: Any type of brief or assignment needs to challenge the students beyond the scope of knowledge construction, how the student came to the conclusion or found the relevant information is to be emphasised over the actual ability to recite content. Assignments need to push students outside of their comfort zone and into areas where they can explore concepts beyond the classroom in order to generate lifelong learners.

FUTURE AREAS OF STUDY:

This is a dynamic and ever changing field of research, which perhaps indicates that education in the 21st Century is in the midst of transition. The possibilities of extending this study can then be described as diverse. There could be scope to identify and develop specific learning tools using digital technologies such as Smart Phones or laptops. These could be extended into public higher education, with studies indicating this as a viable option, considering that

mobile phone technology is available in these contexts. The learning and teaching strategies could then also be explored further within the context of public higher education.

The study could also be extended into alternative disciplines, this study was primarily based in the field of the Applied Arts where the students are incredibly reliant on their digital tools, tend to be more creative and right brain orientated, making them good candidates for visual, technology based learning. Perhaps in other fields, where the focus was not so heavily based on these tools, would generate alternative results which could be examined further. The study could also be broadened across multi disciplines simultaneously in order to allow for generalisations to be made in general.

An area which could also be considered in future studies is the longevity of these digital tools in the classroom environment. It has been established that we are living in a world where technology is rapidly expanding with new developments occurring regularly, this would suggest that the technologies applicable to this study may become out-dated fairly quickly. This highlights the need for both students and lecturers to remain adaptable and open to change, both in their environments and how they engage with such a dynamic context based largely on change and adaption. This indicates that in the future there may be a point where we reach information oversaturation or overload, the impact of which could become a study within itself.

CONCLUSION:

Through the course of recent time there have been many labels associated to various eras, which have defined the particular viewpoint of that time period. According to Resnick (2002) this has gone from the “Information era” of the 1980s, to the “Knowledge era” of the 1990s and currently the “Digital Era” of the 21st Century. These definitions have, and will continue to impact educational strategies in the classroom as well as the development of future learning policies, as indicated in the collected data of this study. Perhaps it can be argued that the concept of “Natives” and “Immigrants” has always been prevalent in education; however in a digital context the gap between the two groups has become more obvious and greater as technical advancements are made, resulting in the need to formally label the two groups. A requirement of education, both in the 21st Century and beyond, is the ability to acknowledge change, and as a result, adapt and remain flexible in an ever shifting environment. As time

progresses and technologies continue to develop, there is constant pressure for teachers to keep up with their students and let go of how they learnt in order to teach effectively in a developing context. Classrooms may become unrecognisable in the future; they may involve virtual spaces with holograms and podcasts with embodiment becoming secondary to information construction. This does not mean that education is becoming a gimmick it simply indicates that education is continuously developing, in order to prepare students for a successful future in a perpetually changing global context.

REFERENCE LIST

- Africa, S. S. (2012). *Census 2011*. Pretoria: Statistics South Africa.
- Barlow, J. (1995). *Declaration of the Independence of Cyberspace*. Retrieved November 20, 2013, from <http://homes.eff.org/~Barlow/Declaration-Final.html>
- Bayne, S., & Ross, J. (2007). *The 'digital native' and 'digital immigrant': A dangerous opposition*. London: Annual Conference of the Society for Research into Higher Education.
- Bennet, S., Maton, K., & Kervin, L. (2008). The digital natives' debate: A Critical review of the evidence. *British Journal of Educational Technology* 39(5), 775-786.
- Bennett, S. (2012). Digital Natives. In Z. Yan, *Encyclopedia of Cyber Behaviour* (pp. 212-219). United States of America: IGI Global.
- Bennett, S., & Maton, K. (2010). Beyond the "digital native" debate: Towards a more nuanced understanding of students' technology experiences. *Journal of Computer Assisted Learning* 26(5), 321-331.
- Brown, C., & Czerniewicz, L. (2008). Trends in student use of ICT's in higher education in South Africa. *World Wide Web Applications*. Cape Town: World Wide Web Applications.
- Brown, C., & Czerniewicz, L. (2010). Debunking the Digital Native: beyond digital apartheid, towards digital democracy. *Journal of Computer Assisted Learning* 26(5), 357-369.
- Campbell, D., & Fiske, D. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin* 56(2), 81-105.
- Carroll, J. (2009). *Jim Carroll*. Retrieved September 5, 2014, from Jim Carroll: <http://www.jimcarroll.com/2009/11/report-the-future-of-education/>
- Castells, M. (2000). *The Information Age: Economy, Society, Culture. Volume 3*. Chichester: Blackwell Publishers.

- Chaiklin, S. (2003). The zone of proximal development in Vygotsky's analysis of learning and. In A. Kozulin, B. Gindis, V. Ageyev, & S. Miller, *Vygotsky's educational theory and practice in cultural context*. Cambridge: Cambridge University Press.
- Chrost, M. (2011). *Rebuilt:How becoming part computermade me more Human*. Boston: Houghton Mifflin Harcourt.
- Clynes, M., & Kline, N. (1960). Cyborgs and Space. *Astronautics*, 22-26.
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research Methods in Education (6th Ed)*. New York: Routledge.
- Cole, M., & Wertsch, J. V. (2001). *Beyond the individual-social antimony in discussions of piaget*. Retrieved November 20, 2013, from charter.net: <http://webpages.charter.net/schmolze1/vygotsky/colewertsch.html>
- Cummins, J., Brown, K., & Sayers, D. (2007). *Literacy, Technology, and Diversity: Teaching for Success in*. Boston: Allyn & Bacon/Pearson.
- DiMaggio, P., & Hargittai, E. (2001). *From the digital divide to digital inequality: studying Internet uses as preperation increases*. Retrieved November 20, 2013, from Princeton University, Centre for Arts and Cultural Policy Studies: <http://www.princeton.edu/culturalpolicy/workpap/WP15%20-DiMaggio+Hargittai.pdf>
- Downes, S. (2005). *An Introduction to Connective Knowledge*. Retrieved September 7, 2015, from downes.ca: www.downes.ca/cgi-bin/page.cgi?post=33034
- Education, D. o. (1996). *Green Paper on Higher Education Transformation*. Pretoria: Department of Education.
- Education, D. o. (1997). *Education White Paper 3: A Programme for the Transformation of Higher Education*. Pretoria: Department of Education.
- Education, Q. A. (2008). Subject Benchmark Statement, Art and Design. *Subject Benchmark Statement, Art and Design*. Gloucester: Education, Quality Assurance Agency for Higher Education.

- Ertimer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher Technology Change: How Knowledge, Confidence, Beliefs and Culture Intersect. *Journal of Research on Technology in Education* 42(3), 255-284.
- Facer, K., & Furlong, R. (2001). Beyond the myth of the "Cyberkid: young people at the margins of the information revolution. *Journal of Youth Studies* 4(4), 451-469.
- Faizah, A. M. (2004). *Adult learners' characteristics and their academic reading strategies: a case study*. Malaysia.: UKM.
- Feeney, L. (2010). *Digital denizens*. Retrieved August 22, 2014, from The Richard Stockton College of New Jersey: <http://loki.stockton.edu/~intech/spotlightdigital-denizens.html>
- Foehr, U. G. (2006). *Media Multitasking Among American Youth: Prevalence, Predictors and Pairings*. Washington: Kaiser Family Foundation Study.
- Garrison, D. R., & Anderson, T. (2003). *E-learning in the 21st Century: A framework for research and practice*. London: Routledge/Falmer.
- Gibbons, S. (2007). Redefining the roles of information professionals in higher education to engage the net generation. *Educause*. Australasia.
- Gonzalez, C. (2004). *The Role of Blended Learning in the World of Technology*. Retrieved September 5, 2014, from unt.edu: <http://www.unt.edu/benchmarks/archives/2004/september04/eis.htm>
- Gronlund, N. (1998). *Measurement and Evaluation in Teaching (4th Ed)*. New York: Colliers-MacMillan.
- Hargittai, E., & Hinnart, A. (2008). Digital inequality: differences in young adults use of the Internet. *Communication Research* 35 (5), 602-621.
- Helsper, E. J., & Eynon, R. (2010). Digital Natives: where is the evidence? *British Educational Research Journal* 35(5), 503-520.
- Hodgkinson-Williams, C., & Mostert, M. (2006). *Using ICTs in Teaching and Learning: A Survey of Academic Staff and Students at Rhodes University*. Grahamstown: Rhodes University.

- Howe, N., & Strauss, W. (2000). *Millennials Rising: The Next Great Generation*. New York: Vintage.
- Jones, C., & Shao, B. (2011). *The net generation and digital natives: implications for higher education*. York: Higher Education Academy.
- Jorgensen, B. (2003). Generation X and Generation Y? Policy implications for defence forces in the modern era. *Foresight* 5(4), 41-49.
- Koutropoulos, A. (2011). *Digital Natives: Ten Years After*. Retrieved August 20, 2014, from MERLOT:Journal of Online Learning: http://jolt.merlot.org/vol17no4/koutropoulos_1211.htm
- Lang, A. (2001). The limited capacity model of mediated message processing. *Journal of Communication*, 46-70.
- Lankshear, C., & Knobel, M. (2003). New technologies in early childhood literacy research: A review of reserach. *Journal of Early Childhood Literacy*. 3(1), 59-82.
- LeCompte, M., & Preissle, J. (1993). *Ethnography and Qualitative Design in Educational Reserach (2nd Ed)*. London: Academic Press.
- Leu, D. J., Kinzer, C. K., Coiro, J., & Cammack, D. (2004). Toward a theory of new literacies. In R. B. Ruddell, & N. J. Unrau, *Theoretical models and processes of reading* (pp. 1570–1613). Newark: International Reading Association.
- Marefat, F. (2002). The impact of diary analysis on teaching/learning and writing. *RELC Journal* 33(1), 105-110.
- Merriam, S. (2009). *Qualitative Reserach: A guide to design and implementation*. San Francisco: Josey-Bass.
- Morgan, D. (1998). *The Focus Group Guidebook*. California: Sage Publications.
- Morrison, K. R. (1993). *Planning and Accomplishing SchoolCentred Evaluation* . United Kingdom: Peter Fancis.

- Mort, P. D. (1964). Studies in Educational Innovation from the Institute of Administrative Research: an Overview. In M. Miles, *Innovation in Education* (pp. 224-267). New York: Teachers College Press,.
- Nieuwenhuis, J. (2007). Introducing qualitative research. In L. E. J.W. Creswell, *First Steps in Research* (pp. 46-68). Pretoria: Van Schaiks publishers.
- Oblinger, D. G., & Oblinger, J. L. (2005). *Educating the Net Generation*. Boulder: Educause.
- Palfrey, J., & Gasser, U. (2008). *Born Digital: Understanding the First Generation of Digital Natives*. Philadelphia : Basic Books.
- Perry, W. G. (1970). *Forms of Intellectual and Ethical Development in the College Years. A Scheme*. New York : Holt, Rinehart and Winston .
- Prensky, M. (2001a). Digital Native, Digital Immigrants. *On the Horizon*, 1-6.
- Prensky, M. (2001b). Digital Natives, Digital Immigrants. Part 2: Do they Really think Differently? *On the Horizon*, 1-6.
- Prensky, M. (2012). *From Digital Natives to Digital Wisdom*. London: Corwin.
- Rainie, L. (2006). Retrieved November 23, 2013, from [pewInternet.org: http://www.pewInternet.org/pt/Teens%20adn%20technology.pdf](http://www.pewInternet.org/pt/Teens%20adn%20technology.pdf)
- report, E. S.-S. (2014). *Ericsson Sub-Saharan Africa Mobility report*. Stockholm: Ericsson.
- Resnick, M. (2002). Rethinking learning in the digital age. In G. Kirkman, *The Global Information Technology Report: Readiness for the Networked Word*. Oxford: Oxford University Press.
- Roberts, D. F., Foehr, U. G., & Rideout, V. (2005). Generation M: media in the lives of 8-18 year-olds. *Kaiser Family Foundation*, 50-62.
- Robinson, M. (2008). Digital nature and digital nurture: libraries, learning and the digital native. *Library Management*, 67-76.
- Robson, C. (2002). *Real World Research (2nd Ed)*. Oxford: Blackwell.

- Rosen, L. D. (2010). *Rewired: Understanding the i-Generation and the Way They Learn*. New York: Palgrave Macmillan.
- Siemans, G. (2005). *Connectivism: Learning as Network-Creation*. Retrieved September 7, 2014, from elearnspace: <http://www.elearnspace.org/Articles/networks.htm>
- Siemens, G. (2004). *A learning theory for a Digital Age*. Retrieved September 5, 2014, from elearn Space: <http://www.elearnspace.org/articles/connectivism.htm>
- Smith, D., & Shapshack, T. (2012). *Digital revolution lights up Africa with maps, mobiles, money and markets*. Retrieved September 1, 2014, from The Gaurdian Online: <http://www.theguardian.com/world/2012/oct/30/africa-digital-revolution-mobile-phones>
- Tapscott, D. (1998). *Growing upDigital: The Rise of the Net Generation*. New York: McGraw Hill.
- Terre Blanche, M., & Durrheim, K. (1999). *Research in Practice*. Cape Town: University of CapeTown Press.
- Thinnyane, H. (2010). Are digital natives a world-wide phenomenon? An investigation into South African first year students' use and experience with technology. *Computers and Education* 55(1), 406-414.
- Totten, S., Sills, T., & Russ, P. (1991). *Cooperative learning: A guide to research*. New York: Garland.
- Underwood, J. (2007). Rethinking the Digital Divide: impacts on student-tutor relationships. *European Journal of Education* 42(2), 213-222.
- Union, International Telecommunication. (2013). *International Telecommunication Union*. Geneva: Telecommunication Development Bureau.
- Veen, W. (2003). A new force for change: homo zappiens. *The Learning Citizen* (7), 5-7.
- von Glasersfeld, M. (1992). Constructivism reconstruction: A reply to Suchting. *Science and Education* 1, 379-384.

- von Tetzchner, S. (2009). *State of the Mobile Web*. Retrieved September 7, 2014, from Opera Software: <http://www.operasoftware.com/archive/smw/2009/01/>
- Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.
- Walsham, G. (1993). *Interpreting information systems in organisations*. Chichester: Wiley.
- Warlick, D. F. (2001). *Redefining Literacy for the 21st century*. Worthington: Linworth Publishing.
- Wellington, J. (2000). *Educational Research: Contemporary Issues and Practical Approaches*. New York: Continuum.
- Wheeler, S., Yoemans, P., & Wheeler, D. (2008). The good, the bad and the wiki: Evaluating student generated content for collaborative learning. *British Journal of Educational Technology*, 987-995.
- Zur, O., & Zur, A. (2011). *On Digital Immigrants and Digital Natives: How the Digital Divide Affects Families, Educational Institutions, and the Workplace*. Retrieved August 2014, 20, from Zur Institute : http://www.zurinstitute.com/digital_divide.html.

APPENDICES:

APPENDIX A: INSTITUTION REQUEST TO CONDUCT RESEARCH



UKZN Research Office:

Ms P Ximba

Email: ximbap@ukzn.ac.za

Tel. 031 260 3587

Dear Principal,

Re: Request For Permission To Conduct Research In XXX School

I am currently studying towards my Master of Education (Higher Education) degree through the University of Kwa-Zulu Natal. I hereby wish to apply for permission to conduct research at your campus of XXX College. The research topic which I will be exploring is as follows: *The 21st Century Student: An exploration into the evolution of teaching and learning practices required in a generation of digital change.*

This study will involve the incorporation of various methods of delivery, teaching and learning informed by literature and research within the field of study. This will involve ten students of my XXX class. All teaching techniques are acceptable methods and will not compromise their learning over the duration of the study. I will ask each student to write in a journal after each lesson and will be hosting focus groups at regular intervals to assess their reactions to the differing teaching methods. These focus groups will be recorded and transcribed for analysis. As part of the study I will also be observing the student's reactions to the techniques and assessing the effectiveness each teaching method. At no point will I deviate from the prescribed subject matter and will ensure that the students remain focused on the learning materials.

All information obtained will be treated with the strictest confidentiality and will be used solely for the purpose of this research study. At no point will either the institution's or student's identity be

revealed, all data will be stored securely. Each student will be given a letter of informed consent to sign before the research commences.

It is my supposition that the research findings could make a credible contribution towards identifying effective strategies, techniques and methods of delivery, teaching and learning for the ultimate benefit of the students.

If you agree to allow me to conduct this research in the institution, please fill in the consent form provided below. If you have any questions, do not hesitate to contact my supervisor or me at the numbers given below, or via E-mail.

Many Thanks

Signature of student

Name of student: XXX

XXX (Supervisor)

Contact number for student: XXXX

XXXX

E-mail of student: XXXX

XXXX

APPENDIX B: INSTITUTION CONSENT FORM



UKZN Research Office:

Ms P Ximba

Email: ximbap@ukzn.ac.za

Tel. 031 260 3587

Institution Consent Form:

I, Principal of Durban agree / do not agree (delete what is not applicable) to allow Lyndall Kemm- Stols to conduct research within this institution for the topic: *The 21st Century Student: An exploration into the evolution of teaching and learning practices required in a generation of digital change.*

I understand that this will involve the Year 02 Visual Communication class and the incorporation of various accepted delivery, teaching and learning techniques. I acknowledge that the participants will be asked to construct journals and be involved in taped focus group discussions throughout the duration of the project. At no such time should this study compromise the student's academic progress or use any class dedicated time. I understand that observations will be made within the classroom sessions.

I understand that the researcher subscribes to the principles of:

Voluntary participation in research, implying that the participants might withdraw from the research at any time.

Informed consent, meaning that research participants must at all times be fully informed about the research process and purposes, and must give consent to their participation in the research.

Safety in participation; put differently, that the human respondents should not be placed at risk or harm of any kind

Privacy, meaning that the confidentiality and anonymity of human respondents should be protected at all times.

Trust, which implies that human respondents will not be respondent to any acts of deception or betrayal in the research process or its published outcomes.

Principal's Signature.....

Date:

Principal's Name

Researcher's Signature

Date:

Researcher's Name

APPENDIX C: INFORMED CONSENT LETTER



UKZN Research Office:

Ms P Ximba

Email: ximbap@ukzn.ac.za

Tel. 031 260 3587

Dear Participant

Informed Consent Letter:

My name is Lyndall Kemm-Stols. I am a Higher Education Masters candidate studying at the University of KwaZulu-Natal, Howard College campus, South Africa.

I would like to invite you to be a participant in the research. The research topic which I will be exploring is entitled: *The 21st Century Student: An exploration into the evolution of teaching and learning practices required in a generation of digital change.*

This study explores the concept of the 21st Student, how digital technologies have perhaps altered the way in which you, as students, prefer to learn and be taught. This study will involve the incorporation of various methods of delivery, teaching and learning informed by literature and research within the field of study during your XXX class. All teaching techniques are acceptable methods and will not compromise your learning over the duration of the research. I will ask you to write in a journal after each lesson as well as participating in focus groups discussions at regular intervals to assess your reactions to the differing teaching methods. These focus groups will be recorded and transcribed for analysis. As part of the study I will also be observing your reactions to the techniques and assessing the effectiveness of each teaching method. At no point will I deviate from the prescribed subject matter and will ensure that you remain focused on your academic progress.

Please note that:

Your confidentiality is guaranteed as your inputs will not be attributed to you in person, but reported only as a population member opinion.

Any information given by you cannot be used against you, and the collected data will be used for purposes of this research only.

Data will be stored in secure storage and destroyed after 5 years.

You have a choice to participate, not participate or stop participating in the research. You will not be penalized in any way for taking such an action.

The research aims at understanding your experiences of teaching and learning strategies.

Your involvement is purely for academic purposes only, and there are no financial benefits involved.

If you are willing to participate, please indicate (by ticking as applicable) whether or not you are willing to allow the focus group to be recorded by the following equipment:

	Willing	Not willing
Audio equipment		
Photographic equipment		
Video equipment		

0

I can be contacted at: lyndall@inhabitdesign.co.za or +27731701242 or 27312056463.

My supervisor is Ruth Searle who is located at the Faculty of Higher Education, Pietermaritzburg campus of the University of KwaZulu-Natal. Contact details: email: SEARLE@ukzn.ac.za Phone number: +2732606250

You may also contact the Research Office through:

Ms P Ximba, Email: ximbap@ukzn.ac.za, Tel. 031 260 3587

Thank you for your contribution to this research.

APPENDIX D: PARTICIPANT CONSENT FORM



UKZN Research Office:

Ms P Ximba

Email: ximbap@ukzn.ac.za

Tel. 031 260 3587

Consent form

I, (your name), student of(Institution) agree / do not agree (delete what is not applicable) to take part in the research entitled: *The 21st Century Student: An exploration into the evolution of teaching and learning practices required in a generation of digital change.*

I understand that this will involve XXX class and experiencing various accepted delivery, teaching and learning techniques. I am aware and commit to construct lesson journals and be involved in taped focus group discussions throughout the duration of the project. I understand that observations will be made within the classroom sessions.

I understand that the researcher subscribes to the principles of:

Voluntary participation in research, implying that the participants might withdraw from the research at any time.

Informed consent, meaning that research participants must at all times be fully informed about the research process and purposes, and must give consent to their participation in the research.

Safety in participation; put differently, that the human respondents should not be placed at risk or harm of any kind

Privacy, meaning that the confidentiality and anonymity of human respondents should be protected at all times.

Trust, which implies that human respondents will not be respondent to any acts of deception or betrayal in the research process or its published outcomes.

Participant's Signature.....:

Date:

Participant's Name

Researcher's Signature

Date:

Researcher's Name

APPENDIX E: FOCUS GROUP DISCUSSION GUIDELINE

The following points were used as a guideline in the initial focus group discussion:

- Introduce group to process of Focus Groups.
- Note ages, demographics of group.
- Establish group's accessibility to Digital Technologies – mainly:
 - Smart Phones
 - Laptops
 - Tablets.
- Establish group's accessibility to the internet – mainly:
 - College based Wi-Fi only
 - ADSL at home
 - 3G connections etc.
- Establish what primary uses used for the internet.
- Establish how long the group has been using computers.
- Establish who taught individuals to use computers or digital technologies.
- Establish length of time spent on these devices in the average day. Discuss what purposes used etc.
- Open Discussions on their opinions of digital technologies, how integrated they are to the individual's lives, if they think they can live without them, if they see them as a learning tool or merely social devices.

The following points were used as a guideline in the final focus group discussion:

- Comparing the impacts and effects of the two different teaching methodologies.
- Establish if a difference was experienced by the students during the varying teaching strategies.
- Sharing experiences of collaborative work.
- Sharing experiences of working with their digital technology as a tool for learning.
- Sharing experiences of using visuals, sounds, and videos as part of the lessons.
- Sharing experiences of the traditionally taught module, explore how they retained the knowledge, their challenges in this process and how they feel like they have benefited from the strategy.

APPENDIX F: CLASS OBSERVATION LIST

During Active Class in both teaching strategies the following pointers were used as guideline:

- Use of Digital Technologies, and what are they?
- What purpose were they being used for?
- Students focus or attention to the class content.
- Students becoming distracted by digital technologies, and note when this happens.
- Student's engagement in the lecture in the form of:
 - Asking questions
 - Discussing concepts with each other
 - Using devices to extend their knowledge
- Their reaction to collaborative work
 - How they interacted with each other during the process
 - How they communicated with each other during the process
 - The final results
- Their reaction to visual stimulus (or the lack thereof) within the classroom environment:
 - Video
 - Visual
 - Audio
- Their reaction to textbook based, linear type lectures.
- Their reaction to individual based exercises.
- Any attendance changes which should be noted during the process.
- Any changes in individual's attitude towards the subject, what would indicate these changes.

APPENDIX G: ETHICAL CLEARANCE LETTER



14 April 2014

Mrs Lyndall Elizabeth Kemm-Stols (202515592)
School of Education
Edgewood Campus

Protocol reference number: HSS/0235/014M

Project title: The 21st Century Student: An exploration into the evolution of teaching and learning practise required in a generation of digital change

Dear Mrs Kemm-Stols,

Full Approval – Expedited

In response to your application dated 12 March 2014, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol have been granted **FULL APPROVAL**.

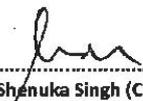
Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully


.....
Dr Shenuka Singh (Chair)

/ms

cc Supervisor: Ms Ruth Searle
cc Academic Leader Research: Professor P Morojele
cc School Administrator: Mr Thoba Mthembu

Humanities & Social Sciences Research Ethics Committee

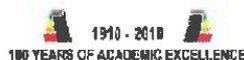
Dr Shenuka Singh (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban 4000

Telephone: +27 (0) 31 260 3587/83504557 Facsimile: +27 (0) 31 260 4809 Email: simbao@ukzn.ac.za / snymann@ukzn.ac.za / mohung@ukzn.ac.za

Website: www.ukzn.ac.za



Founding Campuses:  Edgewood  Howard College  Mediocal School  Pietermaritzburg  Westville

APPENDIX H: TURNITIN REPORT

Turnitin Originality Report

digital diss draft 1 by Lyndall Kemm

From draft dissertation (Dissertation check)

- Processed on 01-Dec-2014 9:54 AM CAT
- ID: 484097030
- Word Count: 25895

Similarity Index

9%

Similarity by Source

Internet Sources:

8%

Publications:

3%

Student Papers:

5%

sources:

1

1% match (Internet from 03-Mar-2013)

<http://www.vmd.de.fra.gov.uk/pdf/vmr13/DraftRegsTracked.pdf>

2

1% match (student papers from 27-Nov-2014)

[Submitted to University of KwaZulu-Natal on 2014-11-27](#)

3

1% match (Internet from 17-Jan-2014)

<http://ww.cash4appliances.org/2008publications/RETI-1000-2008-003/RETI-1000-2008-003-D-REDLINE.PDF>

4

< 1% match (Internet from 23-Sep-2014)

<http://upetd.up.ac.za/thesis/available/etd-07212009-135205/unrestricted/dissertation.pdf>

5

< 1% match (Internet from 24-Apr-2014)

http://boletines.prisadigital.com/MIS2013_without_Annex_4.pdf

6

< 1% match (student papers from 21-Aug-2014)

[Submitted to University of South Africa on 2014-08-21](#)

7

< 1% match (Internet from 17-Sep-2013)

<http://ro.uow.edu.au/cgi/viewcontent.cgi?article=2364&context=edupapers>

8

< 1% match (student papers from 28-Oct-2012)

[Submitted to University of KwaZulu-Natal on 2012-10-28](#)

9

< 1% match (Internet from 18-Sep-2014)

<http://umu.diva-portal.org/smash/get/diva2:717029/FULLTEXT01.pdf>

10

< 1% match (Internet from 21-Aug-2010)

<http://www.cet.uct.ac.za/files/file/2010/Debunking%20the%20digital%20native%20draft.doc>

11

< 1% match (Internet from 07-Feb-2014)

<http://stiba-malang.com/uploadbank/pustaka/RM/RESEARCH%20METHOD%20COHEN%20ok.pdf>

12

< 1% match (Internet from 20-Dec-2012)

<http://dilemma-x.net/2012/10/30/tech4africa-2012-conference-begins-in-johannesburg/>

13

< 1% match (Internet from 14-Jun-2010)

[http://web.up.ac.za/UserFiles/Educationethicsapplication_V08.02_\(E.A_05-08\).doc](http://web.up.ac.za/UserFiles/Educationethicsapplication_V08.02_(E.A_05-08).doc)

14

< 1% match (student papers from 31-May-2010)

[Submitted to University of KwaZulu-Natal on 2010-05-31](#)

