THE USE OF SMARTPHONES AND SOCIAL MEDIA AS TEACHING TOOLS FOR VISUAL MEDIA STUDENTS AT TSHWANE UNIVERSITY OF TECHNOLOGY

by

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Declaration by candidate

I hereby declare that the dissertation submitted for the degree M Tech: Textile Design and Technology, at the Faculty of the Arts, Tshwane University of Technology, is my own work and has not previously been submitted to any other tertiary institution. All work quoted is indicated as quotations and is acknowledged by means of comprehensive list of references.

Angelica Warchal

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Abstract

Outside the classroom, students constantly interact with technologies such as smartphones, iPods the Internet and social networking sites – this study has identified that these technologies can support learning both in and outside of the classroom.

Through the use of a case study, 95 visual media students at Tshwane University of Technology (TUT) were approached. Three paper-based questions were administered to establish the following: What type of access do students have to different types of technologies outside of class? What number of students engage with social media for personal use? What types of educational technologies are lecturers currently using inside and outside their classrooms?

This study found that visual media students at TUT are active social media users. They are enthusiastic towards efforts of integrating smartphones and social media as teaching tools for learning. Visual media students are competent at using digital editing, imaging and electronic presentation software, but lack the skills and knowledge to use online collaboration and journaling tools. Lastly, at TUT course related communication is still mainly face-to-face due to that fact that infrastructure upgrades such as in-class Wi-Fi networks are needed.
21\textsuperscript{st} century education recognises that learning takes place in various settings (physical and virtual) and not just in the classroom. In a rapidly globalised society, smartphones and social media as teaching tools for visual media students at TUT may possibly offer an affordable and accessible medium to equip students to be able to make local and global connections.
I would like to express my special appreciation and thanks to my supervisors, Professor M Nkomo and Dr. Ariana van Heerden; you have been tremendous mentors to me. I would like to thank you for encouraging my research and for allowing me to grow. Your advice and guidance during my study as well as in my personal life has been invaluable. Thank-you.

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CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND & MOTIVATION

Rather than considering computers and digital technologies primarily as instructional aids, one of the main consequences of why these technologies are so significant is that they affect manners in which society builds up and provides social access to social memory, that is, the pool of insights and experiences that people are expected to know about and to make use of. Technology does not facilitate or improve learning in a linear sense, rather it is currently changing our interpretations of what learning is and changing experiences about what it means to know something (Säljö, 2010: 56).

According to Watson (2008:22) the history of the next fifty years will be about the relationship between digital technology and human beings, but there is inherent instability built into this relationship because digital technology changes fast and exponentially, while human beings change slowly and incrementally. Due to the fast-paced society that designers find themselves surrounded by, it is necessary to gain insight on how the use of smartphones and social media could enhance design education teaching methods for visual media students at TUT. The question arises as to the value of knowing something as a result of ubiquitous technologies such as smartphones and social media inside and outside of a classroom in the 21st Century.

The fusion between technology and education in the 21st century has resulted in the development of new educational resources and teaching methods. Therefore, this study will investigate whether two of these technologies, namely smartphones and social media, can contribute to current design education teaching methods for visual media students at TUT.
1.2 TECHNOLOGY: A LEARNING TRANSFORMATION

New interactions between digital technology and individuals are the elementary reasons for further investigation into the use of digital technologies and visual media for design education. It is necessary for design educators to reflect on the relationship between digital technologies and learning. Säljö (2010:53) states that technologies do not merely support learning; they transform how people learn and how people come to interpret information. New interpretations of learning are taking place as educators evaluate and come to understand the relationship between digital technologies and learning. Laurillard (2008:1) states that education is on the brink of being transformed through learning technologies, but this transformation in education is not new (according to Laurillard it has been on the brink of being remodelled for decades.) Furthermore, Laurillard (2008:1) states that never before has there been such a clear link between the needs and requirements of education and the capability of digital technology to meet such needs. Digital technologies such as smartphones and social media meet design education requirements when they become part of the learning process as an information vehicle for exploring knowledge and as a social medium for conversing.

Research needs to encapsulate the challenges that design education brings to what digital technology has to offer – and demonstrate how it can be used (Laurillard, 2008:27). In other words, using digital technologies as a tool can help students express what they learn and know in various forms – physical, virtual, digital or practical. When no longer conforming to traditional learning tools such as paper, books and libraries, students can reinterpret what they have learned using
digital technologies to support verbal and visual expressions in design education. These expressions extend far beyond the common means of assessment such as tests and written assignments.

Therefore, in design education, using smartphones and social media as a teaching tool makes it possible to establish new verbal and visual expressions that would support the construction of knowledge in students. In an ever increasing globalised world the use of smartphones and social media in design education can generate safe problem-solving environments for students. For the researcher to be able to predict the future requirements of ‘net generation’ visual media students at TUT, a theoretical context of current design education teaching methods at TUT needs to be investigated and the use of smartphones and social media need to be established.

This study could provide a deeper understanding of the problems and opportunities that face educators when applying smartphones and social media as teaching tools for visual media students. Further, this study will benefit design educators in South Africa as the sampling for this study consisted of two local student groups currently enrolled in a design programme. Thus, the findings of this study will be of great benefit to South African educators due to the local proximity of the data that was gathered.

An integral part of this study was to evaluate what net generation teaching and learning needs are and how smartphones and social media can be used as teaching tools to meet these 21st Century learning needs. This study may provide a baseline for other design education researchers providing the opportunity to
examine existing student attitudes towards the use of smartphones and social media as teaching tools.

1.3 DEFINITION OF KEYWORDS

Design Education

Design education can be described as the teaching of theory and the application of design for products, services and environments. It encompasses various disciplines of design, such as graphic design, multimedia, fine and applied art, user-interface design, web design, packaging design, industrial design, fashion design, information design, interior design, textile design, sustainable design, and universal design (Design education, 2012: http://www.edti.eu/index.php?option).

Digital technologies

Digital technologies include technologies such as computers, televisions, smartphones and electronic tablets. The Macmillan English Dictionary (2007:410) describes digital as storing information such as sound or pictures as numbers or electronic signals.

Globalisation

Globalisation can be defined as the exposure to people, products and ideas from everywhere (Watson, 2008:15). It can also be defined as connectedness and mobility; everything from countries and computers to gadgets and global banking being hyper-linked together (Watson, 2008:15).
Net Generation

The net generation is described by Tapscott (2009:1) as the members of a ‘new generation’ that grew up with digital technology that fundamentally shaped them. The net generation share eight ‘norms’: freedom, customisation, scrutiny, integrity, collaboration, entertainment, speed and innovation (Tapscott, 2009:1).

Pedagogy

Pedagogy can be considered as an activity designed to enhance learning for others. In this dissertation pedagogy encompasses the interaction between creative teaching and teaching for creativity (Loveless, 2007: 5). Furthermore, Beetham and Sharpe (2013:2) define pedagogy as learning in the context of teaching, and teaching that has learning as its goal.

Smartphone

A cellular telephone with built-in applications and Internet access. In addition to digital voice service, smartphones provide text messaging, e-mail, Web browsing, still and video cameras, MP3 player and video playback and calling (Smartphone, 2012: http://www.pcmag.com/encyclopedia).

Social media

Kane et al. (2013:275) explain that social media is a new class of information technology which supports interpersonal communication and collaboration using Internet-based platforms. Among the most popular social media networks are ‘sites’ such as Facebook, Pinterest and Twitter.
1.4 RESEARCH PROBLEM

21st Century teaching tools as well as methods of approaching teaching and learning may not be fully integrated in current design education programs for visual media students at TUT at present.

Outside the classroom, students constantly interact with technologies such as smartphones, iPods, the Internet, and social networking sites - the researcher has identified that these technologies could possibly support learning in the classroom. The researcher has also identified that to move beyond the boundaries of classroom walls it is important to take advantage of multiple learning styles. The answer could be in the use of smartphones and social media.

**Sub-problem 1**

It is currently largely unknown what the advantages are of using smartphones and social media as teaching tools for visual media students at TUT.

**Sub-problem 2**

It is currently unknown whether the use of smartphones and social media as teaching tools for visual media students at TUT should be incorporated as teaching tools to meet the needs of net generation students.

**Sub-problem 3**

Methods for the application of smartphones and social media as teaching tools for visual media students at TUT are as yet undefined.
1.5 RESEARCH AIMS AND SUB-AIMS

The aim of this research is to investigate whether smartphones and social media can contribute to current design education teaching methods for visual media students at TUT.

Sub-aim 1:

Sub-aim one is to create a theoretical context of the design education teaching methods currently employed for visual media students at TUT.

Sub-aim 2:

To investigate empirically, through the use of case studies, whether there is a need for the incorporation of smartphones and social media as teaching tools for visual media students.

Sub-aim 3:

Apropos data interpreted from the case studies, to suggest methods of applying smartphones and social media as teaching tools for visual media students at TUT.

1.6 RESEARCH DESIGN AND METHODS

This is a case study-based inquiry, consisting of a qualitative descriptive component – a paper-based questionnaire. The goal of this research is basic and is also applied as it attempts to investigate and establish whether the use of
smartphones and social media can contribute to current design education teaching methods for visual media students at TUT.

1.6.1 Research design

Mouton (2001:55) defines a research design as a plan or blueprint of how one intends to conduct the research. Babbie (2004:87) states that the three purposes of research are exploratory, descriptive and explanatory with the goal being either basic or applied. According to de Vos et al. (2005:106) exploratory research is conducted to gain insight into a situation, phenomenon, community or individual in conjunction with the use of qualitative data. Babbie (2004:88) explains that exploratory studies are most typically done to satisfy the researcher’s curiosity and desire for better understanding by answering the questions ‘what’, ‘why’ and ‘how’. This study allowed the researcher to gain insight into whether smartphones and social media can contribute to current design education teaching methods for visual media students at TUT. Thus, the purpose was exploratory.

Data collecting methods were qualitative in nature. The study investigated whether smartphones and social media can contribute to current design education teaching methods for visual media students at TUT. Therefore, a qualitative approach was used in this study. According to Henning (2004:3) qualitative research is not only about finding out what happens, but also about how it happens and why it happens the way it does. Babbie (2010:394) states that qualitative analysis is the non-numeric examination and interpretation of observations, for the purpose of discovering underlying meanings and patterns of
relationships. Thus, qualitative research concerns words and meaning and takes the view of the research participants, in their natural setting, into consideration to better understand their context and as a result providing rich data.

A qualitative approach was thus used to gain a deeper understanding, through the use of case studies, of what visual media students’ response would be to the use of smartphones and social media as teaching tools for design education.

1.6.2 Research method

According to Babbie (2004:G1) case studies are the in-depth examination of one or a few instances of a social phenomena. An in-depth study of a particular case can yield exploratory insights. The design of this study was exploratory and therefore case studies were used as a research strategy to investigate a chosen group of individuals within their real-life context, namely visual media students at TUT. Rowley (2002:17) states that an important strength of the case study is its ability to undertake an investigation into a phenomenon in its context. Thus, case studies are an empirical method of investigating contemporary events without manipulating relevant behavior of participants.

For this study, the case study comprised two separate groups of second year visual media students at TUT. The first group comprised second year Fine and Applied Arts students; a second group comprised second year Multimedia students. At TUT these individuals are within their real-life context, and therefore they were chosen to yield exploratory insights into the needs of visual media students at TUT.
1.6.2.1 Research population

According to Babbie (2004:190) a population is the theoretically specified aggregation of elements in a study. Denzin and Lincoln (in de Vos et al., 2005:328) state that to study a particular is to study the general. The population of this study comprised ninety-five, second year visual media students, out of approximately 1695 students enrolled at the Faculty of the Arts and 60 000 annually enrolled students at TUT (Tshwane University of Technology, 2014: http://www.tut.ac.za/About%20Us/). A public university in Pretoria, Gauteng, South Africa, Tshwane University of Technology is one of six comprehensive universities in South Africa. Its student body is one of the most demographically representative in the country in terms of both race and gender, reflecting South Africa youth in all its diversity (Tshwane University of Technology, 2014: http://www.tut.ac.za/About%20Us/). The education offered at TUT, with its entrepreneurial focus, opens up unlimited opportunities for students to become job creators and entrepreneurs (Tshwane University of Technology, 2014: http://www.tut.ac.za/About%20Us/).

This study will be confined to the TUT Faculty of the Arts campus. The researcher, also based at the TUT Faculty of the Arts had uncomplicated access to the population.

1.6.2.2 Sampling

Two separate groups of second year visual media students were chosen for this study. The first group, forty-five second year Fine and Applied Arts students, were
approached for their mixed media method to art making. The second group, fifty second year Multimedia students were chosen for their electronic media method to digital design.

The sampling for this study is purposive as the researcher was interested in a specific group with mixed media approaches to art making and these two groups represent a cross section of racial, age and demographic profiles. Babbie (2004:183) defines purposive (judgmental) sampling as a type of non-probability sampling in which one selects the units to be observed on the basis of one’s own judgment about which ones will be the most useful representation for the study. Furthermore, Strydom and Delport (in de Vos et al., 2005:329) state that qualitative research seeks out individuals, groups and settings where the specific processes being studied are most likely to occur. Thus, through the use of purposive sampling the researcher was able to examine a particular group of individuals that represented specific characteristics which were needed to answer the research question.

1.6.2.3 Questionnaire

The objective of a questionnaire is to obtain facts and opinions about a phenomenon from people who are informed on a particular issue (Delport in de Vos, 2005:166). Furthermore, Babbie and Mouton (2001;233) mention that although the term questionnaire suggests a collection of questions, a typical questionnaire will probably contain as many statements as questions, especially if
the researcher is interested in determining the extent to which respondents hold a particular attitude or perspective. For this study, the researcher is particularly interested in the attitude or perceptions of visual media students at TUT. Thus, for the purpose of this study three questionnaires were designed to establish the following:

1. What type of access do students have to different types of technologies outside of class? These technologies would include smartphones, desktop computers, laptops, digital cameras and Internet access.¹

2. What number of students engage with social media for personal use? These include Facebook, YouTube, Pinterest and blogging.²

3. What types of educational technologies are lecturers currently using inside and outside their classrooms? These would include in-class technologies such as laptops, tablets and the availability of Wi-Fi in class and on campus; the use of visual media such as various subject-related films, documentaries, digitally recorded conference proceedings and virtual museum tours; the use of myTUTor by lectures to supplement or enhance face-to-face interactions.³

The questionnaires were written in English to enable all students to understand the questions and provide answers as honestly as possible. The smartphone questionnaire and social media questionnaires were each two pages in length and

¹ See Annexure A
² See Annexure B
³ See Annexure C
the use of educational technologies questionnaire was seven pages long. Copies of the questionnaire are included as Annexure A, B and C.

A combination of mixed questions, closed and open-ended, were used in the design of the three questionnaires providing the researcher with the different kinds of data that was required for this study. The majority of the questions were closed due to the fact that they were easier and less time consuming to complete thus a higher response rate could be expected from respondents. Closed questions were used to evaluate and uncover respondents’ attitudes and opinions. Closed questions also provided uniformity of visual media students’ responses and were easier to evaluate the opinions of the sample group as a whole. The closed questions required the respondents to answer particular questions, again providing a high level of control. However, the disadvantages of using closed questions are that they can be suggestive in nature, may frustrate respondents when their desired answer is not a choice and may force respondents to give simplistic responses to complex issues (Delport, 2005).

Opened-ended questions were used as an additional means of eliciting opinions/attitudes and identifying how strongly attitudes were held or not by the respondents. Additionally, open-ended questions were used so that respondents could elaborate on underlying reasons to answers that respondents provided in the closed questions.

For this study the advantages of using a questionnaire were as follows:

- it was practical and simple to administer by the researcher in person;
large amounts of information could be collected from a large number of respondents in a short period of time and in a relatively cost effective way;
the results of the questionnaires could be easily quantified through the use of SPSS (Statistical Package for the Social Sciences) software;
they were relatively easy to analyse;
their format is familiar to most respondents and therefore simple and quick for the respondent to complete;
information was collected in a standardised way;
the respondents had time to think about their answers and were not required to reply immediately.

However, the limitations to using a questionnaire for this study were as follows:

that respondents who were interest in the subject, the use of smartphones and social media as teaching tools for visual media students, were more likely to respond, skewing the sample;
respondents could ignore certain questions;
the questionnaires could have appeared impersonal;
certain questions could have been incorrectly completed;
respondents may have misunderstood questions because of poor design and ambiguous language;
there was the danger of questionnaire fatigue due to the fact that three questionnaires were administered at once;
questionnaires may require follow up research to investigate issues in greater depth and identify ways to solve problems highlighted by the data collected and analysed.
1.6.3 Data collection and analysis

Data collection is the process of gathering and measuring information of interest, in an established systematic fashion that enables one to answer the research question (Whitey, Lind & Wahl, 1998). Therefore, for this study the use of three questionnaires to gather and measure the required data was administered to two separate groups. The two groups consisted of forty second year Fine and Applied Arts students and forty second year Multimedia students.

The researcher secured the participation of the Fine and Applied Arts and Multimedia lecturers who were responsible for the second year Fine and Applied Arts and Multimedia students. These lecturers facilitated access to the chosen respondents. The researcher personally distributed the questionnaires during an agreed-upon theory lecture in a Fine and Applied Arts and Multimedia lecture hall. Respondents completed the questionnaires on the day of distribution. They spent approximately thirty minutes to complete all three administered questionnaires. The researcher was available to answer questions or to address problems. Afterwards the researcher personally collected the completed questionnaires.

De Vos et al. (2005:333) explain that data analysis is the process of bringing order, structure and meaning to the collected data. For the purpose of the study, the data analysis was performed on the collected data using SPSS version 21. The results were obtained using the descriptive analysis feature included as part
1.6.4 Validity and reliability

The literature consistently points out that validity and reliability establish the basis on which other researchers should regard a piece of research as knowledge that can be assimilated into the knowledge base of a field of study (de Vos et al., 2005; Babbie, 2004; Rowley, 2002).

Rowley (2002:20) states that validity is concerned with exposing and reducing subjectivity, by linking data collection questions and measures to research questions and propositions (Rowley, 2002). Therefore, validity has to do with the association between data and conclusion. Furthermore, validity can be achieved when conducting research in a professional, accurate and systematic manner.

Rowley (2002:20) states that reliability demonstrates that the operations of a study - such as the data collected and produced - can be repeated with the same results. Reliability is achieved through documentation of procedures and appropriate record keeping (Rowley, 2002). A questionnaire is considered reliable if the same results are obtained repeatedly when the questionnaire is re-administered or tested repeatedly.
Therefore for this study reliability is concerned with the accuracy of the actual questionnaires being administered and validity is concerned with the study’s success at measuring what the researchers set out to measure – whether there is a need for the use of smartphones and social media as teaching tools for visual media students at TUT.

1.6.5 Ethical considerations

The ethical behaviour of individual researchers is under unprecedented scrutiny. Thus, the study complied with the ethical requirements as stipulated by the TUT Research Ethics Committee (REC), which included:

- respondents were advised about the nature, aim and importance of the study being conducted and their consent was sought in the form of an information leaflet and consent form before any data was collected;
- the consent form explained that the study is anonymous and voluntary and all information obtained would be confidential;
- respondents could withdraw from the study at any time;
- all information gathered was treated as group data and no individual was singled out;
- a letter of consent was obtained from the section heads of the Fine and Applied Arts department as well as the Multimedia department to ensure that they were informed about the nature of the study.

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4 See Annexure D
5 See Annexure E
6 See Annexure F & G
• the researcher was employed by TUT as the research assistant of Professor M Nkomo – Executive Director: Internationalization and Provisioning for Senior Students and Scholars. Therefore, the researcher had no direct collegial relationship with any Faculty of the Arts staff members nor did she share an instructional relationship with any of the potential student participants;
• there was no conflict of interest that would influence the study procedures, data collection, data analysis and publication of results;
• additionally, no publication prohibitions, conditions or limitations were placed on the researcher;
• finally, the researcher at all times strived to maintain objectivity and integrity to the best of her abilities.

1.7 CHAPTER OUTLINE

Chapter 2

Literature review: In accordance with sub-aim 1, chapter two forms a review of existing literature. With the focus on seminal works in the first section - globalisation and its effect on education by (Burbules & Torres, 2000; Carnoy, 2005 & Spring, 2008), the second section - the net generation by (Oblinger & Oblinger, 2005) and the third section - design education in the 21st Century by (Laurillard, 2008; Loveless, 2011 & Wagner 2006) were consulted for this study as their findings related most directly to the TUT student profile. A contextual review, through the evaluation of current study guides provided by TUT Fine and Applied Arts and Multimedia lecturers, of the current design education teaching methods for visual media students at TUT is discussed.
Chapter 3

Data analysis: The data collected from the questionnaire is analysed and findings are discussed in chapter three. The findings are related to the literature established in chapter two. This was done to successfully bear out sub-aims two and three.

Chapter 4

Conclusion and recommendations: Chapter four is a summary of the research aim and sub-aims. Recommendations and conclusions regarding whether smartphones and social media can contribute to current design education teaching methods for visual media students at TUT are discussed. It condenses the findings of the research carried out in the previous chapters. Furthermore, it presents recommendations for further studies in the field and the implementation of the findings in design education.

The following this chapter is the literature review as it pertains to sub-aim one, to create a theoretical context of the status-quo of current design education, chapter two: The use of smartphones and social media as teaching tools for learning.
CHAPTER TWO

THE USE OF SMARTPHONES AND SOCIAL MEDIA AS TEACHING TOOLS FOR LEARNING

2.1 INTRODUCTION

This chapter, which is a literature review, serves two main purposes. Firstly, it determines what has already been established through the use of existing databases in this field of educational technology. Secondly, it aims to identify whether any contradictions and gaps exist in current research in this field.

The effect that globalisation has had on education as a result of new circumstances (e.g. the ‘knowledge economy’ and the development of information and communication technologies) requires new approaches to education. These effects will be discussed in the first section of this chapter.

Secondly, the ‘net generation’, a technologically knowledgeable generation that has grown up with digital technology from a young age, have very different pedagogical needs compared with previous generations. These needs and consequent preferences will be discussed and summarised in the second section of this chapter.

The third section of the chapter will analyse current teaching and learning practices for design education in the 21st Century. Additionally, as social media platforms are becoming ever-present in all aspects of a 21st Century society, their utilisation as an educational resource is increasing. Web-based social media platforms such as Google drive, YouTube and Pinterest will be discussed to
examine how these social networking sites can enhance participatory interactions in design education pedagogical practice for visual media students at TUT.

Finally, the last section of the chapter will examine the current teaching methods, prescribed resources and assessment techniques for visual media students at TUT.

This chapter will address the first sub-aim under the research question posed, namely to create a theoretical context of the status-quo of current design education for visual media students at TUT as well as to theoretically establish what the advantages are in utilising smartphones and social media as teaching tools in design education.

2.2 GLOBALISATION

2.2.1 The effect on society

In 1965, Alvin Toffler (1970:2) coined the term ‘future shock’. Toffler was referring to unprecedented change in the 20\textsuperscript{th} Century. In the 21\textsuperscript{st} Century, the world is changing at an even more alarming rate and individuals have to cope, endure and adapt to the different aspects of change. Thus, to a certain extent ‘future shock’ continues.

A decade ago, the Internet was a novelty for most people, let alone owning smartphones and iPads, or using social network websites such as Facebook, Twitter or YouTube. Many of these technologies did not exist and yet are now

\footnote{Toffler (1970:2) describes ‘future shock’ as shattering stress and disorientation that is induced in individuals by subjecting them to too much change in too short a time.}
transforming cultures and economies around the world (Robinson, 2011:xiv).\(^8\) It seems that society is open to embrace these new ideas and technologies and how they may possibly affect each individual's life. An example is the way in which Facebook has connected one billion users since its birth in 2004 (Grandoni, 2012: http://www.huffingtonpost.com/2012/10/04/facebook-1-billion-users_n_1938675.html). Smartphones and social media offer attractive features to students such as convenience, flexibility, engagement and interactivity and are all factors that influence their increasing popularity in globalised societies.

### 2.2.2 Globalisation and its relation to education

Cogburn (1998:1) states that at its most organic and fundamental level, globalisation is about the monumental structural changes occurring in the processes of production and distribution in the global economy. This statement does hold a measure of truth. However, it is noted that globalisation may operate differently in different parts of the world and in some contexts have little impact at all (Burbules & Torres, 2000). Burbules and Torres (2000:10) explain that the historical specificity of this process does not necessarily guarantee a symmetrical

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\(^8\) **iPad** - A tablet computer developed by Apple (iPad, 2012: http://news.cnet.com).

**Facebook** - The largest of the social networks, Facebook has become a favourite platform for people, businesses, and organizations to connect and share information because of its easy-to-use interface and interactive features. Members can post text, pictures, audio, and video (Facebook, 2012: http://www.constantcontact.com/learning-center/glossary/social-media/index.jsp#Facebook).


**Youtube** - The largest video sharing site on the Web. YouTube lets anyone upload short videos for private or public viewing. Founded in 2005 by Chad Hurley, Steve Chen and Jawed Karim, it was acquired by Google in 2006 for $1.65 billion. YouTube is another amazing Internet phenomenon with meteoric growth like Amazon.com, Yahoo, Google and Facebook (YouTube, 2012: http://www.pcmag.com/encyclopedia_term).
or homogeneous impact worldwide. In contrast, a growing body of research suggests that the on-going process of globalisation has implications for education and that new global circumstances require new educational responses (Bohemia & Harman, 2008; Burbules & Torres, 2000; Chang, 2008; Cogburn, 1998; Çelik & Gömleksiz, 2000; Education, globalisation & the knowledge economy, 2008; Lam, 2010; Singh, 2004; Spring, 2008; Thackara, 2001; Watson, 2008, 2011). Furthermore, Carnoy (2005:3) explains that two of the main bases of globalisation are information and innovation, and they in turn are highly knowledge intensive. Since knowledge is fundamental to globalisation, globalisation should also have a profound impact on the transmission of knowledge (Carnoy, 2005:3).

In the past two decades globalisation has become a generic term. It has reached society in various ways of which two examples are:

- the way in which the Internet has helped in the dissemination of information and knowledge to millions
- and the way technology-mediated learning has enabled students to gain access to information twenty-four hours a day.

Spring (2008:332) refers to the internet as a library of world knowledge, since it provides a gateway to knowledge and culture. Martin (2009:302) states that ‘knowledge’ is out there to be ‘understood’. However, at the same time, higher education is being challenged by new opportunities relating to technologies that are improving the ways in which knowledge can be produced, managed, disseminated, accessed and controlled (Unesco, 1998:19). In a globalised world
these ‘new opportunities’ include the increased availability and use of technologies such as smartphones and social media.

Recognising that technology offers a new medium of exposing students to local and global perspectives, educators can integrate a global dimension to their subjects through the use of smartphones and social media. Lam (2010:73) states that

> [G]lobalisation drives changes in education towards global perspectives, however, institutions, society, stakeholders, and the public as well as governments in this global world, should be sharing the goal of ever-increasing excellence in teaching combined with concern for local and global contexts.

In other words, there is growing practice towards developing hybrid educational practices that combine the local and the global; local populations adapting global education practices to local needs and cultures (Spring, 2008: 352). Therefore, the content that is taught in a practical or theory design subject at TUT and the method by which it is delivered to visual media students is becoming increasingly important. In a rapidly globalised society, smartphones and social media offer local and global connections that equip students in making critical learning connections.⁹

### 2.2.3 The effects of globalisation on education

According to Spring (2008:330) the major global education discourses are about the knowledge economy and technology, lifelong learning and global migration or

⁹ This will be discussed under section 2.3
'brain circulation’. In this study, the knowledge economy and technology will be explored in their relation to globalisation and design education.\textsuperscript{10}

**The knowledge economy**

Information and communication technologies are speeding up the global flow of information and as a result of these advances large amounts of educational, technical and scientific resources have become globally available. For this reason, knowledge has become a highly sought after commodity in the global economy today. Twenty-first Century technologies have transitioned the global economy from an industrialised, agricultural and labour intensive economy to one which has now evolved into a globalised knowledge-based economy. Ambrosi (2006:ii) defines the knowledge economy as an economy characterised by a world of work that requires and is dependent on intellectual capital or knowledge workers. Spring (2008:337) simply states that “a knowledge economy is where wealth is connected to knowledge workers and ultimately to educational systems”.

The World Bank (2003:xvii) defines a knowledge-based economy as follows:

An economy which relies primarily on the use of ideas rather than physical abilities and the application of technology rather than the transformation of raw materials or the exploitation of cheap labour.

\textsuperscript{10} Cogburn (1998:1) states that globalisation is affecting all of the social, political and economic structures and processes that emerge from this global restructuring. One critical issue that emerges from all of these restructuring processes is the central role of knowledge, education and learning for the success of the Global Information Society (GIS) and global information economy. Knowledge is becoming an increasingly important factor of production. More important, some analysts would argue, than land, labour and capital.
Today, knowledge is being developed and applied in new ways. The knowledge economy relies less on skilled workers in industrial and agricultural sectors and increasingly on intellectually skilled workers for wealth creation. As South Africa’s economy is becoming increasingly knowledge-oriented and therefore dependent on skilled labour and knowledge workers, more emphasis needs to be placed on the role of the knowledge economy for sustainable economic growth to take place.

The World Bank (2003:xvii) states that to be able to equip people to deal with these demands requires a new model of education. In order for this to be achieved, 21st Century skills need to become a priority for educators.11 Spring (2008:337) states that discourse about the knowledge economy should focus on the necessity of educating students with skills for the global workplace. Blankley and Booyens (2010:3) recommend that a focus on education should form part of the important building blocks necessary for South Africa to be able to make the required transition toward a knowledge-based economy. In this regard, technology plays a double role as the medium (e.g. smartphones and social media) and as the mediator of information to facilitate the development of 21st Century skills. What this means is that generating growth in a knowledge-driven society lies in the ability of individuals to produce ideas through the application of technology. Thus, the importance of using smartphones and social media as teaching tools for design educations becomes increasingly apparent.

11 21st Century skills will be explained in Chapter 3.
Technology

There have been many technological advances in the last 30 years, during which the desktop computer and the Internet have been developed, but there have been similar advances throughout the 20th Century – film, radio, videotapes, DVDs. The question that now arises is why the present advances in technology have had an impact on teaching and learning processes. Castells (2005:3) explains that

[W]e know that technology does not determine society: it is society. Society shapes technology according to the needs, values, and interests of people who use the technology. Furthermore, information and communication technologies are particularly sensitive to the effects of social uses on technology itself. The history of the Internet provides ample evidence that the users, particularly the first thousands of users, were, to a large extent, the producers of the technology.

Technology has provided individuals with more flexibility. As noted earlier, information and communication technologies (ICTs) have made it easier for students to access knowledge from anywhere in the world. However, this widespread availability of information poses new challenges and demands for education as the role of an educator has shifted from ‘primary information giver’ to ‘facilitator of information’. In addition, external technologies such as smartphones and social media are forcing institutions to adapt to and integrate these technologies in their current learning environments. Therefore, in this study adaption is considered to be necessary and beneficial in many ways.

Kukulska-Hulme (2010:1) argues that advancing technologies and technology-based services will change public experiences and expectations when it comes to accessing and sharing knowledge. Advances in technologies are breaking down traditional academic barriers (physical and virtual) that previously separated
students from acquiring the skills they need. World-class education that has up until now only been available to a select few is being made available to anyone who is willing to learn.\footnote{The idea behind free online courses is that individuals have the opportunity to watch, share, learn and debate (Academic earth, 2014: http://academicearth.org/). Examples of independent sites that offer a comprehensive collection of free online courses from the world's top universities are www.coursesa.org, iTunes university and www.academicearth.org.} Previously unfeasible, today top universities around the world are offering free online courses.\footnote{Universities such as MIT, Harvard, Carnegie Mellon, Stanford and The University of California, Berkley are offering their course material online for free. The motivation behind such efforts is to expose individuals to lectures taught by world-class professors. Independent individuals are then able to learn at their own pace, to test their knowledge, and to reinforce concepts through interactive exercises (MIT Open Courseware, 2014: http://ocw.mit.edu/index.htm, Open Learning Initiative - Carnegie Mellon Univerisity, 2014: http://oli.cmu.edu/, Stanford University, 2014: http://online.stanford.edu/courses, Open Learning | UC Berkley Extention, 2014: http://www.berkeley.edu/multime dia/index.ph p).} In this regard, globalisation through the use of technology is transforming the availability of information and knowledge production in the 21\textsuperscript{st} Century.

Häkkinen (2010:6) states that as technology is ubiquitous at the beginning of the 21\textsuperscript{st} Century a trend is becoming evident that people access, use and create information and knowledge in different and more flexible ways than earlier. Technology is instrumental in being able to shift learning environments from being teacher-centred to being student-centred. The teacher-centred approach is focused on the memorisation of facts, formulas, dates, names and the ability to recall exact information for a test. However, the student-centred approach focuses on authentic intellectual work in a student-centred environment. This approach requires the student to formulate problems, collect information and data, organise and manipulate the information data and then formulate an answer or solve a problem. Research also shows that the use of technology in student-centred learning environments can result in improved achievement as a result of innovative teaching strategies.\footnote{This concept will be explained in section 2.3.} Thus, effective learning and teaching strategies
combined with the benefits of using smartphones and social media offer new globalised learning experiences that may prove beneficial to 21st Century knowledge production.

Globalisation has a close relationship with education. Education has an important place in shaping a society, in effect, globalisation and global activities have a deep impact on education. Çelik and Gömleksiz (2000:137) state that

> [G]lobalization enhances the student’s ability to acquire and utilize knowledge. Globalization enhances the ability of learners to access, assess, adopt, and apply knowledge, to think independently to exercise appropriate judgment and to collaborate with others to make sense of new situations.

Thus, what globalisation has accomplished in the 21st Century through the use and integration of technology, is the shift from learning content to learning activities.

In the 21st Century, information is by and large freely available. Hence, the most important aspect of learning today is what individuals can ‘do’ with what they know, in other words, using knowledge and skills taught to reinterpret information in a unique and marketable way. Bang (2010:32) states that learning is not couched within the content – learning takes place within the learner as a result of what he or she does with the content. What this means is that students only become active in the learning process when they can produce something useful with their knowledge. Therefore, by using smartphones and social media inside and outside the classroom, educators can facilitate student-centred learning activities that encourage application of knowledge through real-life scenario problem solving. Thus, as learning environments increasingly evolve into hybrid
entities that integrate physical (local) and virtual (global) as well as personal and collective spaces, the gap between classrooms and real-world scenarios decreases.

Understanding the educational needs of the net generation and the larger context of globalisation can help in the development of teaching models to increase successful outcomes of design programmes. However, in order to make changes an analysis of innovative methods of teaching the net generation and their learning requirements is imperative.

2.3 NET GENERATION

Jones and Czerniewicz (2010:317) describe the net generation as a new generation. The net generation, also known as ‘digital natives’, are a new generation of young people who have been “bathed in bits and bytes” since birth (Jones & Czerniewicz, 2010:317). Nicol (2008:95) refers to the net generation (those born in the 1980s or currently aged between 12 and 25) as having very different interaction styles with technology, as well as different learning styles, compared to generations in the past (such as the Baby Boomer generation). However, in South Africa ‘the digital divide’ (disparity in access to ICT) is still very evident in all sectors of the economy – in addition higher education as it is interrelated to all sectors of the economy. Johnston (2013: 262-263) states that in a developing country such as South Africa where technological infrastructure is not yet mature and technological resources such as computers and Internet are not readily accessible, restructuring and transforming the educational experience of the Net Generation is a challenge. On the other hand, the Ericsson Consumer
Insight report (2013:3) states that the Smartphone has the potential to bridge the digital divide by providing universal access and connectivity to a wider scope of citizens, regardless of location or economic status.

2.3.1 Generational trends

The basic difference between the net generation and earlier generations is that while earlier generations were introduced to information through print, this generation takes a digital path (Oblinger & Oblinger, 2005:2.2). Net generation communities and social networks are physical, virtual and hybrid (Oblinger & Oblinger, 2005:2.11). Oblinger and Oblinger (2005:2.8) state that it is often said that one sees the world through one's own eyes; one's experiences and the environment shapes how one thinks, behaves and acts. The chart below displays the idea that individuals are products of their environment.

TABLE 2.1: Generational trends

<table>
<thead>
<tr>
<th>Birth Dates</th>
<th>Matures</th>
<th>Baby Boomers</th>
<th>Generation X</th>
<th>Net Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Greatest generation</td>
<td>Me generation</td>
<td>Latchkey generation</td>
<td>Millennials</td>
</tr>
<tr>
<td>Attributes</td>
<td>Command and control</td>
<td>Optimistic</td>
<td>Independent</td>
<td>Hopeful</td>
</tr>
<tr>
<td></td>
<td>Self-sacrifice</td>
<td>Workaholic</td>
<td>Skeptical</td>
<td>Determined</td>
</tr>
<tr>
<td>Likes</td>
<td>Respect for authority</td>
<td>Responsibility</td>
<td>Freedom</td>
<td>Public activism</td>
</tr>
<tr>
<td></td>
<td>Family Community involvement</td>
<td>Work ethic Can-do attitude</td>
<td>Multitasking Work-life balance</td>
<td>Latest technology Parents</td>
</tr>
<tr>
<td></td>
<td>Laziness Turning 50</td>
<td>Red tape Hype</td>
<td>Anything slow</td>
<td>Negativity</td>
</tr>
</tbody>
</table>

Murray (2004)
It is evident that the learning styles of each generation are considerably different. Baby boomers received information through teachers and textbooks and retained it through memorisation. Net generation students have information readily available ‘24/7’ and as a result they retain information through the use of technology (e.g. smartphones and tablets) uploaded to their personal social media profiles (e.g. Google drive, YouTube and Pinterest). In other words, technology might be the most important difference in net generation learning preferences and styles compared with past generations.

2.3.2 Beyond traditional ways of learning

Tapscott and Williams (2010:18) state that the Internet represents a new mode of production of knowledge, and that a new mode of production of knowledge seems to change almost everything regarding how college and university ‘content’ is created. The role of technologies in the design of learning environments and the construction of knowledge within such environments has been supported by the recognition of the contribution of socio-cultural-historical theories of human activity (Loveless, 2011:304). It seems that as a result of cultural and social changes the net generation has moved beyond the traditional understanding of knowledge construction. What this means it that the construction of knowledge should be communicated to the net generation through distributed cognition, design, interaction, integration, context, complexity, dialogue, conversation, concepts and relationships (Loveless, 2011:304). Understanding net generation learning preferences is vital for educators to help learners retain information, progress in academic environments and participate in class.
2.3.3 Emerging learning patterns of the net generation

The net generation is the first generation of individuals who have grown up with the largest amount of visual stimulation to date. Oblinger and Oblinger (2005:2.4) state that individuals raised with the computer deal with information differently compared to previous cohorts: they have developed hypertext minds, which seem to leap around. To them a linear thought process is much less common than bricolage, or the ability to piece together information from multiple sources.

Many observations can be made about the net generation, however, for this study it is necessary to highlight only those that may contribute meaningful insights in order for educators to provide more interactive teaching and learning approaches to design education for visual media students at TUT. Thus, Oblinger and Oblinger (2005) are the seminal researchers consulted in the following section, as their findings relate directly to TUT student profiles.

Oblinger and Oblinger (2005: 2.5) explain that because of the potential impact on higher education several net generation attributes merit special attention:

- **The ability to read visual images** – they are intuitive visual communicators;
- **Visual-spatial skills** – they can integrate the virtual and the physical;
- **Inductive discovery** – they learn better through discovery than by being told what to do;
- **Fast response time** – they are able to respond quickly and expect rapid responses in return.

Furthermore, Oblinger and Oblinger (2005:2.5-7) suggest that these attributes can also be identified and separated into ten themes: digitally literate; connected; immediate; experiential; social; preference for teams; structure; engagement and
experience; visual and kinesthetic, and things that matter. A short description of each theme will be summarised in the following paragraphs.

**Theme one: digitally literate**

Having grown up with widespread access to technology, the net generation is able to intuitively use a variety of information technology (IT) devices and navigate the Internet. The net generation is more visually literate than previous generations — many express themselves by using images. They are able to weave together images, text and sound effortlessly. Their ability to move between the real and the virtual is instantaneous, expanding their literacy well beyond text. Because of the availability of visual media, their text literacy may be less well-developed than the previous generation (Oblinger & Oblinger, 2005).

**Theme two: connected**

Since their birth, the world has been a connected place. More so than any preceding generation, the net generation have seized the potential of networked media. While highly mobile, moving from work to classes to recreational activities, the net generation is always connected (Oblinger & Oblinger, 2005).

**Theme three: immediate**

Whether it is the immediacy with which a response is expected or the speed at which they are used to receiving information, net generation individuals are fast. They multitask, moving quickly from one activity to another, sometimes performing
them simultaneously — as a result they are natural at multitasking (Oblinger & Oblinger, 2005).

**Theme four: experiential**

Most net generation learners prefer to learn by *doing* rather than by being told what to do. Net generation students learn well through discovery — by exploring for themselves or with their peers. This exploratory style enables them to better retain information and use it in creative, meaningful ways (Oblinger & Oblinger, 2005).

**Theme five: social**

The net generation displays a striking openness to ethnic and cultural diversity and differences. Many of their exchanges on the Internet are emotionally open, sharing very personal information about themselves. They also exhibit learning preferences that are closely related to these characteristics. For example, their social nature aligns with their preference to work in groups or interact peer-to-peer. Dede (as quoted by Oblinger & Oblinger (2005:2.11)) states that in response to a student technology survey the majority of students, year after year, rank face-to-face interactions in either first or second place. What this means is that more technology is not necessarily better, but that technology provides the ability to extend communicative and collaborative activity. For the net generation, technology is part of the fabric of their lives; using technology to enhance learning narrows the gap between their formal and informal learning. When educators

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15 The student technology survey included 4,374 students from thirteen institutions in five states in the United States of America. Ninety-Five percent of the students were twenty-five years or younger (Oblinger & Oblinger, 2005:7.2).
incorporate social media networks as part of a lecture, interactivity and participation in classrooms through the use of social media may possibly provide a social context for learning. In this way, educators can leverage one of the most exciting characteristics of the net generation – their desire to connect with people and to be sociable (Oblinger & Oblinger, 2005).

**Theme six: preference for teams**

As a result of their social nature, the net generation often prefers to learn and work in teams. Research suggests that the net generation finds peers more credible than educators when it comes to determining what is worth paying attention to (Oblinger & Oblinger, 2005). For them, a peer-to-peer approach is common. Siddique, Akasheh and Kremer (2013:2) state that peer learning encourages meaningful learning that involves students teaching and learning from each other as well as the sharing of ideas, knowledge and experiences, and emphasises interdependent, as opposed to independent learning. What this means is that working in teams provides the net generation with an opportunity to be actively as well as socially involved in their learning process.

**Theme seven: structure**

The net generation is very achievement oriented. As a result, they like to know what it will take to achieve a goal. “Their preference is for structure rather than ambiguity” (Howe & Strauss, as quoted by Oblinger & Oblinger (2005: 2.7)).
Theme eight: engagement and experience

The net generation is oriented toward inductive discovery or making observations, formulating hypotheses, and figuring out the rules by changing the rules (Oblinger & Oblinger, 2005). The net generation seem to work to live rather than to live to work, more so than their previous cohorts.

Net generation individuals seem to crave interactivity. The rapid pace with which they like to receive information means that they often choose not to pay attention if a class is not interactive, is unengaging, or if the pace is simply too slow.\(^\text{16}\)

The net generation may need to be encouraged to stop experiencing and rather to spend some time reflecting. Boud, Keogh and Walker state that (as quoted in Fry, Ketteridge & Marshall (2009:16)) reflection is a key part of experiential learning as it turns ‘experience into learning’. Hence, by creating a learning environment where reflection is possible, educators can help the net generation cultivate this valuable learning style.

Digital resources enable experiential learning – in tune with net generation learning preferences. Rather than being instructed on what to do, the net generation are able to construct their own learning: assembling information, tools and frameworks from a variety of digital sources. Tapscott and Williams (2010:18) state that if universities engage and embrace collective learning and collaborative knowledge production, they have a chance of surviving (even thriving) in this

\(^{16}\) In terms of increasing interactivity inside the classroom, online social gaming might provide engaging and fast paced learning activities for learning environments (The Futurist, 2012):

[L]earning will become more social and game-based, and online social gaming may soon replace textbooks in schools. The idea that students learn more when they are engaged—as they are when playing games—is helping educators embrace new technologies in the classroom. In addition to encouraging collaborations, games also allow students to learn from their mistakes through trial and error.
networked, global economy. According to Smith and Macgregor (as quoted in Tapscott & Williams (2010: 20)):

[T]eachers who use collaborative learning approaches tend to think of themselves less as expert transmitters of knowledge to students, and more as expert designers of intellectual experiences for students – as coaches or midwives of a more emergent learning process.

Unfortunately, in a traditional learning environment students tend to be fed information without actively being involved in the learning process. However, the pleasure of discovery learning should form the cornerstone of learning. Furthermore, it seems the net generation desires inductive discovery learning in order to ‘construct’ new knowledge structures and meaning (Tapscott & Williams, 2010). According to Tapscott and Williams (2010:21):

[T]oday, every college and university student has at his fingertips the most powerful tool for discovery, for construction of knowledge, and for learning. Rather than seeing the web as a threat to the old order; universities should embrace its potential and take discovery learning to the next step.

Much like the Gutenberg printing press, ‘the 21st century Gutenberg moment’ is the way in which the web has democratised learning.17

**Theme nine: visual and kinesthetic**

The net generation processes information fundamentally differently to previous cohorts. In contrast to previous cohorts having grown up in predominantly text-rich

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17 Fisher (2013) describes the impact of the digital revolution as ‘our Gutenberg moment’:

Furthermore, the 16th century Protestant Reformation, the 17th century scientific revolution, the 18th century democratic revolutions, and the 19th century and industrial revolution all happened, in part, because of the spread of information in the wake of Gutenberg’s invention, and we should expect similar upheavals in the centuries to come as a result of the digital media now making information so widely available.
environments the net generation prefers image-rich environments as a result of having grown up in a visual-rich culture. Merely reading text is not engaging enough for them. Oblinger and Oblinger (2005:2.7) suggest that net generation students will refuse to read large amounts of text, whether it involves a long reading assignment or lengthy instructions.

**Theme ten: things that matter**

The net generation readily takes part in community activities. Given a choice, they seem to enjoy working on projects that have significance, such as addressing an environmental concern or a community problem (Oblinger & Oblinger, 2005:2.7). They believe that they can make a difference and that science and technology can be used to resolve difficult problems (Oblinger & Oblinger, 2005:2.7).

**2.3.4 The role of technology**

Oblinger and Oblinger (2005:2.10) posit that whether the net generation is purely a generational phenomenon or whether it is associated with technology use, there are a number of implications for colleges and universities. Due to their social nature, their desire for experiential learning and the importance of interaction, the traditional lecture provides very little physical as well as technological engagement for the net generation. In addition, when interaction is limited to classroom settings, the full experience of learning is undercut. Again, Oblinger and Oblinger (2005:2.14) state that
Interaction is not limited to classroom settings. Informal learning may comprise a greater share of students’ time than learning in formal settings. The type of interaction, peer-to-peer instruction, synthesis, and reflection that takes place in informal settings can be critically important. In fact the full range of students’ learning styles is undercut when interaction is limited to classroom settings.\(^{18}\)

Another stark difference between the net generation and the previous generation is their exposure to visual information. Oblinger and Oblinger (2005:2.14) state:

The Net Generation is more visually literate than earlier generations. Many are fluent in personal expression using images; they are comfortable in an image-rich rather than text-only environment. Some educators have realized that text may be the preferred mode of learning for faculty, librarians, and other academics, it is not the preferred mode of learning for most of the population. Students on average retain ten percent of what they read but closer to thirty percent of what they see. Much of the reading done by the Net Generation has been on the Web, where they are more likely to scan than to read. In fact, overreliance on text may inhibit Net Generation participation. Net geners prefer their graphics before their text rather than the opposite.

One can deduce that technology is simply a means to an end. The net generation do not think in terms of technology, rather, they think in terms of the activity technology enables (Oblinger & Oblinger, 2005:2.10). Therefore, this investigation is not about technology, but that technology enables certain types of learning activities. Since technology can increase customisation, convenience, and collaboration, communicating information to the net generation using technology may possibly enhance knowledge construction.

Alvarez, Nussbaum and Milrad (2010:368) state that high penetration of information and communication technologies in individuals’ daily activities causes speculation about the type of skills students need to develop in the 21\(^{st}\) Century. Thus, to foster the development of new media literacy skills in classrooms it is imperative to incorporate information and communication technologies to develop

\(^{18}\) This will be expanded in section 2.3.
skills needed by students of the 21st Century (Alvarez, Nussbaum & Milrad, 2010:368). This is the preparation for the processes of knowledge construction, the moment in which educators and students make conceptual connections within subject domains (Loveless, 2011:303). The effect that digital technology has had on individuals born in this period is exponential. It seems that to the net generation:

- The pedagogical changes that they desire are not technology *per se*, but rather a change in the interaction between students and educators in their learning environments.
- When students become active learners and are engaged in the learning process they take a greater interest in, and reasonability for, their own learning.

Thus, the benefits of using new methods of communicating with net generation students is evident in the way technology offers a new platform for the construction of knowledge, assisting in developing key skills needed in this digital, technology-driven economy of the 21st Century, in addition to delivering the prescribed subject matter of a design education curriculum.

In conclusion, the impact that technology has had on the net generation is no longer a myth; it is a reality. However, in order to make curricula and changes to teaching methods an analysis of 21st Century technologies that incorporate social, visual and engaging learning experiences for the net generation is imperative. Therefore, understanding the educational needs of the net generation and the

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19 Examples of information and communication technologies for visual media students are: Adobe Photoshop, Illustrator and Indesign; Macromedia Freehand and Fireworks are used to create and edit images such as logos, drawings or pictures for use on web sites or other publications. Microsoft Word, Excel and PowerPoint are used to write letters, reports and presentations (Microsoft Word, 2012: http://www.tutor2u.net/business/ict/intro_what_is_ict.htm).
larger context of globalisation can help in the development of teaching models to increase successful outcomes of design programmes

2.4 DESIGN EDUCATION IN THE 21ST CENTURY

With regard to design education in the 21st Century, Loveless (2011:311) suggests the following:

Pedagogy encompasses the relationship between what we teach, how we teach it and why it matters in our communities, societies and times.

Laurillard (2008:28) refers to Cobb et al. in that teaching is not just an art or a science, it is, or should be, more like a design science – experimental, innovative, collaborative, interactive, creative. Despite the fact that technology advancement requires educators to adapt teaching and learning practices to meet the needs of the net generation in the 21st Century, education is actually a fairly new concept. Robinson (2011:8) expands:

Before the middle of the nineteenth century, relatively few people had any kind of formal education. Being educated was mainly the privilege of the few who could afford it. Mass systems of public education were developed primarily to meet the needs of the Industrial Revolution and, in many ways, they mirror the principles of the industrial production. They emphasize linearity, conformity and standardisation.

Plotting comparative timelines of conventional educational technologies (e.g. writing, paper, books, libraries) against their digital equivalents (computers, laptops, tablets, the internet, ICT), it is evident that educators have had only a few years to decipher how to implement the digital equivalents of technologies that took many centuries to shape education (Laurillard, 2008:34). However, Robinson
(2011:8) argues that one of the reasons that conventional educational technologies that emphasize linearity, conformity and standardisation are not entirely working now is that life is organic, adaptable and diverse. In other words, the use of smartphones and social media for visual media students at TUT would allow for more adaptable and diverse classrooms. Integrating 21st Century technology to meet net generation learning requirements should thus include the following:

- The use of technology inside and outside the classroom
- Mobile interactivity
- Social interactivity: physical and virtual
- Real-life learning scenarios

In doing so, the learning preferences of net generation students who emphasise the importance of interactivity and learning-by-doing, experiential learning, working in teams, and social networking can converge.

Researchers and practitioners have demonstrated a growing interest in developing pedagogical practices towards fostering a participatory culture in education (Alvarex, Nussbaum & Milrad, 2010:368). Loveless (2011:301) states that identifying pedagogy as relationship, conversation, reflection and action between teacher, learner, subject and tool is of great importance. However, due to the omnipresence of the web in all areas of students’ personal and social activities, social and mobile teaching tools that support these pedagogical activities need to be put into practice to encourage a participatory culture in the 21st Century classroom.
Due to the development of digital technologies and new visual media content available on the web on a daily basis, there ought to be seamless interactions across different kinds of media in the classroom. In other words, in globalised societies the importance of smartphones and social media, which offer active participation inside and outside of class, is ever increasing. In fact, their value as a crucial part of design education in the 21st Century is only increasing due to the net generation’s’ non-traditional ways of learning.

2.4.1 Actively learning in the 21st century

As a result of the rapid changes brought about by digital technology and globalisation, design education in the 21st Century needs to offer elements of active learning to visual media students at TUT.

Bath and Bourke (2010:25) refer to research that demonstrates that learning is not only more likely to occur but is more enriched (qualitatively better) when students go beyond the passive tasks of listening, reading or viewing. Furthermore, active engagement can be facilitated through individuals as well as collaborative activity (in-class and online) and is vital for learning (figure 2.1). However, this is not new. Bloom’s Taxonomy began the process of active learning when the original taxonomy developed in the 1950s became a widely accepted metric that continues to provoke new research today. Similar to Bloom’s original taxonomy (knowledge, comprehension, application, analysis, synthesis and evaluation) active learning encourages cognitive skills development through active engagement (analyse, define, create and evaluate) with information, in addition
meeting net generation learning requirements (learning-by-doing, experiential learning, working in teams, and social networking) (figure 2.1).

**FIGURE 2.1**: Active versus passive learning (Bath & Bourke, 2010:25).

Students are able to express their ideas and make new connections, relationships and representations through active engagement with digital tools (e.g. smartphones and tablets) and visual media (e.g. films and documentaries) (Loveless, 2007:12). It seems that this might be the most important difference with the past where students received information through teachers and text books and retained it through memorisation.

To the net generation a linear thought process is much less common than bricolage, or the ability to piece together information from multiple sources. Thus, including active learning in their current learning environments offers net generation students the opportunity to learn through discovery — by exploring for themselves or with their peers. This exploratory style enables them to better retain...
information and use it in creative, meaningful ways (Oblinger & Oblinger, 2005). Active learning extends traditional teaching beyond the classroom as it supports net generation learning requirements (learning-by-doing, experiential learning, working in teams, and social networking). The use of 21st Century technologies in combination with active learning offers a model that could possibly encourage students to become actively involved in their own learning. Active learning can further be facilitated through the integration of smartphones and social media platforms that are becoming a medium of teaching and learning practice in the 21st Century.

2.4.2 21ST Century teaching technologies

The visual and creative abilities of visual media students can be enhanced through using digital video content (documentaries, films, conference proceedings and virtual museum tours) to translate traditional learning content (lectures, textbooks and libraries) into new learning experiences.

Furthermore, large amounts of free digital content that focus on design are available in the form of blogs, documentaries, films and digitally recorded conference proceedings (TED.com; 99u.com; ArtBabble; gelconference.com and the Victoria & Albert Museum Channel). An example of this would be exposing

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20 TED.com is a critically acclaimed, award-winning website featuring inspired talks from the world's leading thinkers and doers (TED, 2012: http://www.ted.com). ArtBabble is a website that showcases high quality art-related video content from more than 50 cultural institutions from around the world. Created in 2009, the website was conceived, designed, programmed and launched by a cross-deparmental collection of individuals at the Indianapolis Museum of Art (ArtBabble, 2014: http://www.artbabble.org/about-us). 99u.com is an annual conference held to shift the focus from idea generation to idea execution. 99u.com brings together some of the world's most productive creative visionaries and leading researchers to share pragmatic insight on how ideas are brought to life (99u.com, 2012: http://www.99u.com/conference).
second year fine arts painting (subject code, PNI220T) students to museums from around the world by using virtual field trips to museums that house paintings by Masters before starting their own copy of a Master’s painting.\textsuperscript{21} This provides painting lecturers with an additional teaching tool to engage with theoretical, practical and visual content and to expose students to new learning environments that might otherwise not have been possible. Such activities can be interpreted as a learning adventure without even leaving the classroom. It is also a means of ‘visiting’ places that might otherwise be impossible to travel to physically, as well as giving students the opportunity to connect with different environments beyond the physical classroom. This is the nature of the design education classroom of the 21\textsuperscript{st} Century – ever moving beyond the classroom walls.\textsuperscript{22}

The traditional classroom experience is changing; technologies such as smartphones and social media offer a new way of engaging with students beyond only a physical interaction. Therefore understanding how to improve traditional classroom spaces that provide flexibility and interconnectedness through the integration of 21\textsuperscript{st} Century technologies is becoming increasingly important.

\textbf{Gelconference.com} is a conference and community exploring good experience in all its forms - in art, business, technology, society, and life (Gelconference.com, 2012:\texttt{http://www.gelconference.com/what-is-gel.php}).

\textbf{Victoria & Albert Museum Channel} - As the world’s leading museum of art and design, the Victoria and Albert Museum enriches people’s lives by promoting the practice of design and increasing knowledge, understanding and enjoyment of the designed world (Victoria & Albert Museum Channel, 2014: \texttt{http://www.vam.ac.uk/page/a/about-us/}). To further extend the promoting and practice of design, the Victoria and Albert Museum Channel have made a series of films that allow any person access to virtually explore selected collections from anywhere in the world (Victoria & Albert Museum Channel, 2014:\texttt{http://www.vam.ac.uk/channel/}).

\textsuperscript{21} See Painting (PNI220T) study guide (Stevens & van der Merwe, 2012) for detailed requirements.

\textsuperscript{22} Ubuweb being an example of this:

UbuWeb began in 1996 as a site focusing on visual and concrete poetry (pieces of visual art made with words). UbuWeb is a completely independent resource dedicated to all strains of the avant-garde, ethnopoetics, and outsider arts. All materials on UbuWeb are made available for noncommercial and educational use only. There are over 2500 full-length avant-garde films and videos, both streaming and downloadable (Ubuweb, 2013:\texttt{http://www.ubuweb.com/}).
2.4.3 The need for the old and the new

The main drivers for the teaching professional are curriculum, quality assurance, available resources, and the requirements of the assessment process (Laurillard, 2008:24). However, today educators have a doubly difficult task; not only are they required to improve learners’ reading, writing and arithmetic skills, but now their task includes teaching skills such as entrepreneurship, innovation and creativity (Robinson, 2011:11). Norman (2010) states that the old skills of drawing and sketching, forming and moulding should be supplemented by skills such as programming, interaction, and human cognition.  

Furthermore, unlike previous cohorts, the net generation does not make the same distinctions between real and virtual worlds. For example, social media, an integrating platform, is able to seamlessly connect these real and virtual educational worlds. As a result, design education in the 21st Century might need to offer education in virtual studios across social media networks.

As much as emerging digital technologies are providing educators with new techniques to improve existing methods of teaching and learning practices for design education, it is not merely enough to deliver old content in a new medium. Effective use of smartphones and social media may have the potential to enhance design education in the 21st Century. However, new participatory pedagogical practices need to be applied to achieve high levels of learning.

23 This will be discussed under section 3.6
2.4.4 21\textsuperscript{st} Century technologies: Google Drive, YouTube and Pinterest

Effective planning for the 21\textsuperscript{st} Century classroom requires innovative thinking and will require keen attention to future curricula that accommodates the multiple learning styles of the net generation.

Communication is one essential part of design education and can be defined as an exchange of information (Vavik & Kourenayia, 2006:1). Information is related to concepts such as meaning, knowledge, representation and mental stimuli (Vavik & Kourenayia, 2006:1). Design education is largely situated within a socio-cultural context, which acknowledges the social and communicative nature of design. However, for visual media students to develop these communicative skills, particular attention needs to be paid to the unique learning abilities of the net generation.

No vision of the future, apropos learning, is complete until educators are able to imagine the power of converged digital and mobile technologies for education, training and performance support (Wagner, 2006:41). Wagner (2006:43) explains that

[R]ich internet applications for learning take advantage of distribution media such as WiFi and cellular, ethernet and cable, and radio and television provide rich learning content for the deployment on a variety of digital devices. Whether integrated into face-to-face, formal classes on campus or connected to on-line, self-paced learning (or some combination of both), education unplugged represents an evolution of blended learning that leverages the portability and utility of notebook and tablet computers, Palms and pocket PCs, telephones, communicators, and iPods, enabling rich multimedia experiences in a variety of forms.

At the end of the 20\textsuperscript{th} and the beginning of the 21\textsuperscript{st} Centuries, the introduction of the above-mentioned technologies caused great excitement in society. Despite the potential of new technologies, higher education convention, tradition and habit
still seem to dominate learning environments. However, current academic research suggests that blended learning technologies (the use of a mix of modalities and methods of learning) support deep and meaningful learning (Carman, 2002; Hofmann, 2006; Garrison & Kanuka, 2004). Wagner (2006:44) states that the always-accessible information enabled by wireless devices literally bursts open the walls of the classroom and rocks the locus of classroom control - being able to check facts and figures in the middle of a professor-led discussion democratises classroom dynamics in previously unimaginable ways.

**Google Drive**

In recent years, digital technologies have been developed to bring together both physical and virtual experiences of space, affording people opportunities for exploration, play, risks, reflection and encounters with others (Loveless, 2007:8). Google Drive refers to the web-based Google application. Google Drive provides a single place to store, access, create, edit, and share documents, files, and folders of all types (Google Drive, 2014). The Google Drive application and document creation tools offer real-time editing, powerful sharing controls, and seamless compatibility – an important element for learning in the 21st Century (Google Drive, 2014).

Google Drive allows for free store and access of a user’s files on any device. A user’s files and productivity tools are hosted in the drive and allow for flexible and collaborative work anytime, anywhere and on any device (Smartphone, tablet or laptop).

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24 This will be discussed in Chapter 3
Google Drive (2014) offers a free web-based platform for the 21st Century classroom in the following ways:

1. Docs in Google Drive

The real-time collaboration of ‘Docs in Google Drive’ makes it ideal for group assignments, revision cycles, shared notes and for creating a more efficient classroom. Built-in tools such as ‘autosave’, revision history, comments and an equation editor are useful for students and educators alike and may help to save time in the classroom. Some examples of how educators are using ‘Google Docs & Drive’ include:

- To collaborate and share lesson/curriculum plans;
- To consolidate notes for departmental or faculty meetings;
- To create a simple webpage with ‘Docs publishing’;
- To share and collect assignments without printing;
- To provide instant feedback to students;
- To track instructional interventions.

Some examples of how students are using ‘Docs & Drive’:

- To improve writing skills through peer editing and feedback;
- To access documents in class or at home;
- To work on reports, research or papers together with peers in different classes, schools or countries;

Docs is an abbreviation of the word documents. Google Docs, a free web-based document creation tool offered by Google (Docs, 2014:https://docs.google.com/document/d/1DgxWwzBzudoxxu3tXw6pI8vrAu5A0sv4hHKK SAPlw/edit).
• To keep a continuous, running log for assignments such as journal entries or writing samples.

2. Creating Google spreadsheets

‘Sheets in Google Drive’ allows educators and students to easily aggregate, organise and analyse information all in one place online. With advanced tools to sort, format, create and visualise information with the use of charts and pivot tables, online spreadsheets can be used in a variety of settings.

Some examples of how educators can use online spreadsheets are:

• To record marks/grades with an organised grade book;
• To track attendance, missing assignments and behavior reports;
• To store a database of contact information for students and parents;
• To use ‘word cloud gadget’ to visualise written responses;
• To use an ‘Apps Script’ to automatically email feedback to students.

Some examples of how students can use online spreadsheets are:

• To collect data from across the web for research;
• To create interactive flashcards with the ‘spreadsheet gadget’;
• By formatting a weekly class schedule.

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26 Tag cloud or more commonly known as a word cloud is a visual representation of tags or keywords that classify and describe content, typically a grouping of words in different font sizes, as to show relative frequency or provide links to further information (Tag could, 2014: http://dictionary.reference.com/browse/word%20cloud%20?s=t).

27 Apps Script is a time booking application that stores data in a Google Spreadsheet (App script, 2014: https://developers.google.com/apps-script/articles/building-sites-app-part2).

27 A spreadsheet gadget is a small program that interacts with the content of a spreadsheet (Spreadsheet gadget, 2014: https://developers.google.com/google-apps/spreadsheets/gadgets/). Spreadsheets gadgets
3. Google Drive slides

Google Drive Slides allows educators and students to easily create, share and edit online presentations. Some examples of how educators can use slides are:

- To share class presentations with students and coworkers;
- To upload and convert existing presentations to Google Drive format;
- To download presentations as .pdf, .pptx, or .txt files;
- To insert images and videos to format their slides;
- To publish and embed presentations in a website, allowing access to a wide audience;
- To draw organisational charts, flowcharts and design diagrams within a presentation;
- To add slide transitions, animations and themes to create visually appealing presentations.\(^{28}\)

Additionally, Google Drive Slides also allow collaboration by being able to work on presentations together. Some examples are:

- In real-time a user can see exactly what peers are working on with colourful presence markers;

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\(^{28}\) pdf - A file format, created by Adobe Systems, typically used for saving documents that are comprised of more than a simple text element (pdf, 2014: http://www.businessdictionary.com/definition/Portable-Document-File-PDF.html#ixzz38Gd82XP1).


\(^{28}\) txt - is the filename extension of Text file which is created by Notepad for Windows and by TextEdit for Mac OS X (txt, 2014: http://format.filesatoz.com/txt-file-extension.html).
• To edit a presentation with peers simultaneously from different locations;
• To use revision history to see if peers have made changes, or to revert to earlier versions;
• To use ‘built-in chat’ for ‘instant live conversation’;
• To use the comments feature to provide asynchronous feedback on slides.

4. Building forms in Google Drive

Educators globally are using ‘Google Forms’ to produce better teaching and better learning with Google Drive; educators can quickly create a form or survey to send to students or staff. A recipient’s answers will be tracked in one spreadsheet. Because forms are filled out online, there is no need to enter results manually. Responses are collected and displayed immediately in a corresponding Google Drive spreadsheet (Sheets), which allows educators to quickly and easily sort, analyse and visualise the information. Additionally, Forms also generates automatic summaries from responses in the form of charts, graphs and statistics. Some examples are:

• Structured peer editing and feedback;
• Assignment checklist and submissions;
• Creating an assignment dropbox; ²⁹
• Building class surveys.

²⁹ Dropbox is a cloud storage service that enables users to store files on remote cloud servers and the ability to share files within a synchronised format (Dropbox, 2014: http://www.techopedia.com/definition/26850/dropbox). It is operated by Dropbox, Inc (Dropbox, 2014: https://www.dropbox.com).
'Google Apps for Education’ can help streamline academic tasks like essay writing and class scheduling. A group of students can work together on a project in Google Docs, seeing changes in real-time. The net generation emphasise the importance of interactivity and learning-by-doing, experiential learning, working in teams, and social networking. In recent years, technologies such as Google Drive have been developed to bring together both physical and virtual experiences of space, affording opportunities for exploration, play, risks, reflection and encounters with others (Loveless, 2007:8). Furthermore, mobile devices, such as smartphones offer portability, social interactivity, context sensitivity, connectivity and individuality, and can be used to capture, compose and communicate creative responses to physical settings (Loveless, 2007:8).

The 21st Century classroom provides students with different mediums in order to learn. Google Drive equips students to gain fluency in searching, evaluating, manipulating, creating, and publishing information in a variety of media forms and formats. These are all important 21st Century skills needed for work and life in the knowledge economy.

**YouTube**

Founded in February 2005, ‘YouTube’ allows billions of people to discover, watch and share originally-created videos (YouTube Education, 2013). Digital technologies such as digital video, for example, can provoke teachers’ thinking about the media, the organisation, and the knowledge and skills required to support learners’ creative activities (Loveless, Burton & Turvey as quoted by
Loveless (2007: 5)). ‘YouTube Education’ (2013) encourages the use of YouTube as a teaching medium to enrich classroom lessons in the following ways:

- To spark conversation;
- To make theoretical concepts come alive;
- To tap into the mind of the visual learner;
- To see how fellow educators are incorporating video into their lessons;
- To join the ‘YouTube Teachers’ community.

Embi (2011) states that YouTube is a visual medium that can be used to help students achieve learning goals and objectives. YouTube is able to:

1. **Draw students into the experience** – by viewing and engaging with the content as commentators and creators.
2. **Encourages experimentation** - even if most of the content on YouTube lacks an educational goal, the application encourages experimentation with new media.
3. **YouTube as a trend** – it is part of a trend among net generation students to replace passive learning with active participation. The value lies less in the visual content itself and more in the networks of students that are formed as a result of the interaction; in effect they are then able to support one another in their learning goals.
4. **Provide supplementary information** – it gives students better insight into historical events by bringing events to life, in effect subject content becomes more interactive.
For technology-mediated learning, interaction is a key value proposition (Wagner, 2006). Interaction has been and continues to be one of the most debated constructs in the realms of instructional design and academic transformation, to name two (Wagner, 2006). As noted earlier, the net generation craves interactivity. What this means is that as interactive learning continues to be an essential component of teaching and learning environments the use of social media platforms as teaching tools to promote the facilitation of interactive learning will increase. Pinterest is one such social media platform that may possibly provide interactive and collaborative learning activities for the net generation.

Dunn (2012) states that Pinterest is becoming a powerful tool for educators in that it can:

1. **Curate content** – create resource boards for other educators and students; pin current events or issues to boards for students to read each day; find and pin images, projects, videos, stories (or more) for future lessons and use the search bar to find on-topic content.

2. **Organise ideas** – create pin boards for each theme/component of a subject. Additionally the pin boards help to catalogue each theme in the subject.

3. **Collaborate with others** – find other educators who have similar interests and share lesson projects and teaching ideas; request feedback from other users in order to improve curriculum or projects; connect with other classes, universities and groups.

4. **Allow students to use Pinterest** – aggregate ideas and source for design projects; use boards as visual aggregators for theory and design projects; use community boards for group projects.

Furthermore, Pinterest can be leveraged to cultivate higher order thinking skills in the classroom in the form of the following learning activities (Rao, 2013):
• To build a resource board for a module;
• To list terms and objects with pins;
• To define vocabulary on a board using an image of a term or concept;
• To convert and summarise texts visually with pins;
• To illustrate concepts by pinning descriptive images with no captions;
• To predict design trends based on ‘repins’ and ‘likes’;
• To collect current events articles and images as a class;
• To convince peers of a theoretical argument with only 10 pins;
• To conduct a class debate on a chosen topic using comments and pins for evidence in class;
• To classify objects by organising pins into relevant boards;
• To identify what a credible pin looks like on pinterest;
• To compare to and contrast with other forms of social media;
• To examine successful designers’ and artists’ pinboards for design inspiration, information and bias;
• To learn how to advertise a product using pinterest;
• To plan a project by collecting ideas and organising tasks on a board;
• To design a ‘mockup’ marketing board for each new design project.

It is clear that not only do smartphones and social media networks have the potential to enhance teaching and learning practices but they present challenges for traditional teaching methods. Traditional classroom settings (in terms of spaces, time, portability, connectivity and flexibility) are limited whereas smartphones and social media offer students a range of engaging activities. Technology has extended traditional classroom interactions beyond a particular
time and physical space. In effect, an educator now has a traditional and physical classroom as well as a digital classroom.

Thus, the emergence of easy-to-use digital tools, hardware devices and software applications provide teachers and students with new means for augmenting traditional classroom media and activities (Alvarez, Nussbaum & Milrad, 2010:369). In this regard, Kress and Pachler (as quoted by Loveless (2011:305)) argue that digital technologies and media have shaped not only social and cultural contexts, but also approaches to, and environments for, learning. Therefore, educators cannot ignore that learning environments in the 21st Century are changing to incorporate easy-to-use mobile technologies and user-friendly social media networks as a result of globalisation.

It seems that social media can be used to support and take advantage of multiple learning styles. What this means is that social media platforms in the classroom enhance teaching and learning environments, yet they do not change them completely. In other words, social media networks provide a collaborative environment that supports creative learning activities. Furthermore, social media networks increase 21st Century knowledge and skills development by consequently expanding the traditional lecture beyond its physical walls to allow for the new globalised classroom (without walls). Therefore, social media platforms such as Google Drive, YouTube and Pinterest should be seen as a support system to enhance the exchange and increase of students’ knowledge.

The use of smartphones and social media as teaching tools do not focus on the use of technology in learning environments, but rather in the way in which these
technologies allow educators and students to engage with information. Thus, smartphones and social media extend the potential and quality of learning and teaching by harnessing the potential of technology.

The effect that technology has had on individuals born in the digital age is exponential. The high penetration of information and communication technologies in daily activities of the net generation renews the question about the type of skills learners need to develop in the 21st Century (Alvarez, Mildrad & Nussbaum, 2010:368). Thus, educators have to foster the development of ‘new media literacy skills’ such as mobile devices (smartphones & tablets) and the social media platforms available on the devices in classrooms (Alvarez et al., 2010:368). Google Drive, YouTube and Pinterest allow for peer-to-peer collaboration and interactive development to take place. Social media platforms such as these support educators in developing student-centric learning environments that keep students engaged and motivated in the 21st Century classroom.

Finally, these social media platforms create a truly immersive learning experience advocating and supporting collaborative learning and facilitating learning outcomes such as critical thinking, creativity, global awareness, global collaboration, initiative and self-direction, peer-to-peer feedback and peer-to-peer learning.
2.5 CURRENT TEACHING METHODS FOR VISUAL MEDIA STUDENTS AT TUT

Accountability and quality assurance have become a central concern for higher education in many developed and developing countries, and South Africa is no exception (Lam, 2010:78). The question is how educators can improve quality assurance in their classrooms through the use of smartphones and social media. Lam (2010:80) states that a well-balanced curriculum of basic skills training and technology-based training has become a critical issue in design education. As learning environments increasingly evolve into hybrid entities that integrate physical and virtual as well as personal and collective spaces, the gap between classrooms and real-world scenarios decreases. Therefore, current teaching methods for visual media students at TUT in the Fine and Applied Arts and Multimedia courses should encourage the use of smartphones and social media.

2.5.1 Fine and Applied Arts

The aim of the Fine Arts course is to train artists and designers to develop an authentic and personal approach to contemporary art making in preparation for a chosen career in the visual arts industry. Artists and designers need to develop certain skills and abilities: visual and manual skills, creativity, and conceptual and critical thinking. All of these contribute to a career as an artist or a designer, as well as to culture and society. The practical assignments within each Fine and Applied Arts subject are a means to develop these skills. Courses have practical, intellectual, communal and entrepreneurial applications, and the subjects aim to
allow the student to develop his/her potential as an artist or designer in the Fine Arts or in related artistic fields.

**Prescribed resources: practical and theory subjects**

Fine and Applied Arts subjects are visual in nature. Apart from class notes lecturers encourage students to look at as many quality images of good artworks and designs related to the subject as possible (van Wyk, 2014:6). Fine and Applied Arts lecturers require students to read as widely as possible on topics related to their subject. For theory, in addition to lecturer-compiled class notes, lecturers recommend books as additional resources to enhance students’ understanding and knowledge in the course (Moodley & Scheffer, 2013:6). Additionally, students are encouraged to use the TUT Arts Campus library.

**Audio visual and other course material**

No prescribed films, documentaries or interactive websites were mentioned or recommended in any of the study guides relating to course content (Moodley & Scheffer, 2013; van Wyk, 2014; van Wyk & Sidogi, 2014).

**MyTUTOR**

The TUT recently launched the ‘myTUTOR’ online study system. MyTUTOR is an additional study aid that is meant to enhance students’ academic experience at TUT. Only study materials such as study guides, additional notes and assignment briefs are made available through myTUTOR. However, myTUTOR does offer
additional features such as a course blog and lecture podcast application. It seems that none of these additional applications are made use of by the lecturers.

Fine and Applied Arts lecturers emphasise the fact that myTUTor is not a replacement for attending lectures; therefore, students are still expected to attend classes as prescribed.

**Smartphones and cell phones**

Lastly, no smartphones usage is allowed during lectures, as these devices are seen as an interruption to lectures.

**Assessment**

Assessment in fine and applied courses includes written tests and assignments as well as practical evaluations. Practical course assessments (van Wyk, 2014:11) are based on:

- a. Research (working drawings, written documentation, plans, photocopies of articles on related work and artists, other reference material, sample materials, etcetera)
- b. Problem analysis
- c. Work methods
- d. Application of skills
- e. Conceptual development
- f. Quality of end product
- g. Studio management
No digital or online technologies are made use of for any of the Fine and Applied Arts courses as a method of assessment (Moodley & Scheffer, 2013; van Wyk, 2014; van Wyk & Sidogi, 2014).

2.5.2 Multimedia

The aim of the Multimedia course is to train multimedia and graphic designers. In order for students to attain an in-depth understanding of the fundamentals of graphic design and multimedia theories, practices and techniques, course subjects are integrated in the following way:
Integrated design methodology, technology and project-based, multimedia techniques and methods are taught applying a transdisciplinary method to guide students in a strategic direction, develop problem solving skills and gain a deeper understanding of the multimedia design profession (see Table 2.2).
Prescribed resources: practical and theory subjects

Apart from class notes, no additional prescribed resources were mentioned in the study guides (van Staden, 2014:15). A wide variety of audio visual, digital and social media technologies are made use of in lectures. In the study guide, no mention of any specific audio visual, digital and social media technologies were made (van Staden, 2014:15).

Audio visual and other course material

Audio visual course materials consist of videos, Keynote presentations, iPad integration, online facilitation, Blogging and class notes prepared by the lecturer. These are made available to the students at the beginning of the year for them to access via any platform and any digital platform (van Staden, 2014: 15). However, no mention of any specific social media platforms was made.

MyTUTor

Only study materials such as study guides, additional notes and assignment briefs are made available through myTUTor. However, myTUTor does offer additional features such as course blogs, wiki’s and podcast applications. It seems that none of these additional applications are made use of by the lecturers.

Again, lecturers emphasise the fact that myTUTor is not a replacement lecture; therefore, students are still expected to attend classes as prescribed.
Smartphones and cell phones

Lastly, no smartphones usage is allowed during lectures, as these devices are seen as an interruption (van Staden, 2014:5).

Assessment

For theoretical subjects lecturers make use of class tests, academic essays, assignments, unannounced class exercises and end-of-year exams as methods of assessment (van Staden, 2014). Practical courses are based on projects and use a method of practical evaluation for each project and the subject as a whole (van Staden, 2014).

No digital or online technologies are made use of for any of the multimedia courses as a method of assessment (van Staden, 2014).

Finally, smartphones and social media provide support systems to enhance the exchange and increase of knowledge between educators and students. However, there seems to be little motivation from lecturers to incorporate these technologies as teaching tools. Providing interactive learning activities for visual media students at TUT, lecturers can design learning environments that can keep students engaged and motivated in a physical space through the use of smartphones and social media. However, the current use of social media in teaching-learning environments for visual media at TUT is still not yet well-developed.
2.6 SUMMARY

Educators have a responsibility to recognise changing attitudes and practices in an effort to better understand how they might impact design education for visual media students at TUT. A key to creating educational facilities that adequately address current and future needs in any community is to constantly survey the environment, communicate regularly with fellow educators (e.g. follow educators on social media platforms and monitor new developments) and students, and to keep abreast of current education trends.

In conclusion this literature review has established that:

1. Globalisation has had an effect on education due to:
   - Information resources being freely available through the internet;
   - A shift in knowledge production as a result of freely available resources globally;
   - A shift to multimodal forms of communication due to advances in technology;
   - A shift from an industrialised to a knowledge-based economy apropos all the above.

2. The net generation emphasise the value of each of these activities through the following:
   - interactivity and learning-by-doing;
   - experiential learning;
   - working in teams;
   - social networking.
3. Design education in 21st Century education:
   - demonstrates a growing interest in developing pedagogical practices that foster a participatory culture in education;
   - the use of smartphones and social media inside and outside the classroom allow for more adaptable and diverse teaching and learning;
   - active engagement, through the use of smartphones and social media networks, facilitate collaborative activities which is vital for learning.

4. Social media learning helps support educators in delivering content in deliberate and proactive ways that:
   - develop a range of skills, qualities and knowledge that students will need for the future;
   - make learning more relevant and engaging for students, with them at the centre of their own learning, providing a mix of face-to-face and digital learning;
   - recognises that learning takes place in various settings, not just in the classroom.

5. Current methods of teaching and assessment methods for visual media students at TUT include the following:
   - Apart from class notes a limited amount of audio and visual media technologies are used as additional resources for in-class instruction;
   - No social media networks are used by lecturers;
   - No smartphones are used inside or outside of class activities;
- MyTUTor is only used to post basic course materials. No additional application such as lecture podcasts, course blogs or wiki’s are made use of;
- Traditional methods of assessment such as class tests, written assignments and end-of-year exams are used.

Cultivating an innovative culture inside the classroom and enhancing the student’s inquiry-based approaches to learning is not an easy task. However, incorporating smartphones and social media as a teaching tool, these 21\textsuperscript{st} Century technologies can support educators in providing an active and participatory learning environment. Additionally, offering choices to students enables educators to cater for the needs and interests of the individual (Lam, 2010:81).

Finally, harnessing the power of 21\textsuperscript{st} Century technology (e.g. computers, laptops, tablets, smartphones and social media) enables educators to collaborate, to create and to share knowledge with students in new and interactive ways. Through the use of smartphones and social media educators are able to develop hybrid teaching and learning activities that capture the attention and encourage interaction of students anywhere, anytime and on any device.

In the following chapter through the use of a case study, the researcher investigates whether using digital technologies and social media as teaching tools for design education can enhance the learning requirements of net generation students. Three paper-based questionnaires were used to collect the data for the case study. The data was analysed and presented as well as recommendations made in line with the findings in the next chapter (chapter three).
CHAPTER THREE

THE CASE STUDY: DATA ANALYSIS AND RECOMMENDATIONS

3.1 INTRODUCTION

This chapter will focus on the analysis and interpretation of data that was collected for this study. The research methodology approaches for this study have been described in chapter one, including the instrument that was used to collect the data. The presentation of data is linked to the three self-developed questionnaires attached as annexure A, B & C. In the first section of this chapter the data will be analysed as follows: description of the respondents and the presentation and interpretation of results from the three questionnaires. The areas of focus were smartphone usage, social media activity and current use of educational technology in-class at TUT. Subsequently, the collected data was analysed to assist in answering sub-aim two; to investigate empirically, through the use of case studies, whether there is a need for the incorporation of smartphones and social media as teaching tools for visual media students, and sub-aim three; apropos data interpreted from the case studies, to suggest methods of applying smartphones and social media as teaching tools for visual media students at TUT, outlined in chapter one.

The responses to the questionnaires determined whether there is a need for the incorporation of smartphones and social media as teaching tools for visual media
students at TUT will be discussed in the first section of this chapter. More specifically, the researcher wanted to assess:

- the use and ownership of smartphones by visual media students at TUT
- the active use of social media networks by visual media students
- the current use of educational technology in-class for visual media students at TUT

The analysis of research data does not on its own provide the answers to a research question. The purpose of interpreting the data is to reduce it to a comprehensive form so that its relation to the research problem can be studied, tested and conclusions can be drawn and recommendations can be made.

In the second section of this chapter, methods to incorporate and develop 21st Century skills in current learning environments to help students thrive in the digital age will be discussed. The knowledge economy requires a very different set of skills, compared with what preceded it, namely 21st Century skills. These skills and their importance will be discussed in their relation to the data collected for this study.

The third section of this chapter will examine the different theories of blended learning to establish what the most widely accepted definitions of key concepts in the field are and how blended learning can be used as a learning model for visual media students at TUT.
Finally, the last section of this chapter will discuss key findings that have been made from the interpreted data collected for this study.

3.2 RESPONDENTS

As indicated above, the aim of this study was to investigate empirically, through case studies, whether there is a need for the incorporation of smartphones and social media as teaching tools for visual media students. In order to protect the privacy of the respondents who participated in the study, the demographic statistics were obtained from each head of department respectively. The demographics are accounted according to the Higher Education Data Analyzer (HEDA) report providing student headcounts per gender and age at TUT.\(^{30}\)

Therefore, as described in chapter one, a purposive sample comprising ninety-five visual media students at TUT was chosen, 60 percent of whom were males and 40 percent females. This clearly indicates that there are more males than females who answered the questionnaire and therefore the results of the study are not on 50/50 percent basis in terms of gender.

In terms of the age group of the respondents, it was found that the majority of the students who participated in the study were between the ages of 19-24, representing 77.75 percent. This clearly represents a reasonable age for an individual to be attending a higher education institution in South Africa.

\(^{30}\) See Annexures H & I
3.3 SMARTPHONE QUESTIONNAIRE

To be able to bear out sub-aim two, it was necessary to determine what percentage of visual media students own and use smartphones. A total of 91.3 percent of visual media students reported owning a smartphone. Of the 91.3 percent, 49 percent of the respondents reported owning Blackberry smartphones, 41 percent Android smartphones and 10 percent Apple iPhone smartphones (see figure 3.1 below). One can therefore conclude that as a result of such a high percentage of respondents owning smartphones, that smartphones are well suited as teaching tools for visual media students at TUT.

![Smartphone Ownership by Brand](image)

**FIGURE 3.1:** Smartphone ownership as represented by brand

Furthermore, 56.2 percent of respondents reported that they already use their smartphones for TUT or course-related tasks (see table 3.1 below). As a sizeable
number of students already use their smartphones for personal, social and academic activities the data suggest that there is a need for the use of smartphones as a teaching tool. In other words, using their smartphones for course related activities in addition to their current everyday usage of a smartphone would be a very natural approach for the net generation to expand such usage for teaching.

**TABLE 3.1:** Smartphones usage as reported by visual media students at TUT

Excluding making phone calls, how often do you use your smartphone in the following situations?

<table>
<thead>
<tr>
<th></th>
<th>Multiple times a day</th>
<th>Daily</th>
<th>weekly</th>
<th>rarely</th>
<th>never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idle time at work or school (e.g. during breaks, lunch, boring meetings/classes, etc.)</td>
<td>72.3%</td>
<td>19.1%</td>
<td>2.1%</td>
<td>4.3%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Riding the bus, taxi, or in car as passenger</td>
<td>51.1%</td>
<td>17%</td>
<td>4.3%</td>
<td>25.5%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Waiting in line (e.g. coffee shop, grocery store, for a movie to start, etc.)</td>
<td>38.3%</td>
<td>31.9%</td>
<td>6.4%</td>
<td>17%</td>
<td>6.4%</td>
</tr>
<tr>
<td>For TUT/course related tasks</td>
<td>17.4%</td>
<td>23.9%</td>
<td>15.2%</td>
<td>26.1%</td>
<td>17.4%</td>
</tr>
<tr>
<td>While you are driving</td>
<td>2.1%</td>
<td>10.6%</td>
<td>2.1%</td>
<td>31.9%</td>
<td>53.2%</td>
</tr>
</tbody>
</table>

Furthermore, the researcher wanted to understand what students’ attitudes are toward in-class use of technology for purposes related to class activities. A total of 73 percent of students responded that in-class technology use does not distract from the focus of the lecture, whereas 27 percent of respondents still felt that they were not comfortable with peers using technology in class time (see figure 3.2 below). What this means, is that a majority of visual media students at TUT indicated a positive attitude toward the use of digital technologies such as smartphones in-class. However, 46 percent of respondents emphasised that the use of such technologies should be course related. The findings of the study show
a sizeable number (73 percent) of students already use smartphones in-class for purposes either course related, personal or social. Therefore, the findings of the study reflect a positive attitude toward in-class use of technology.

FIGURE 3.2: In-class use of technology

3.4 SOCIAL MEDIA QUESTIONNAIRE

Part of the aim of this study was to investigate whether there is a need for the incorporation of social media as a teaching tool for visual media students at TUT. To determine if visual media students at TUT make use of social networks the following question “which social networks do you have a personal profile for” was asked. Six different forms of social media - Facebook, Instagram, Pinterest, Twitter, Wordpress, TypePad or Blogger and YouTube or Vimeo and others were
given as possible choices. A total of 95.8 percent of students reported having a Facebook account, followed by 54.2 percent with a Twitter account and 52.1 percent who either have a YouTube or Vimeo account (see table 3.2 below). The results suggest that currently visual media students at TUT have high levels of social media usage.

**TABLE 3.2**: Social networks personal profiles as reported by visual media students at TUT

<table>
<thead>
<tr>
<th>Social Network</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>95.80%</td>
</tr>
<tr>
<td>Instagram</td>
<td>25%</td>
</tr>
<tr>
<td>Other</td>
<td>25%</td>
</tr>
<tr>
<td>Pinterest</td>
<td>29.20%</td>
</tr>
<tr>
<td>Twitter</td>
<td>54.20%</td>
</tr>
<tr>
<td>Wordpress, TypePad or Blogger</td>
<td>16.70%</td>
</tr>
<tr>
<td>Youtube or Vimeo</td>
<td>52.10%</td>
</tr>
</tbody>
</table>
To identify whether using social media as a teaching tool and means of communicating for visual media students at TUT could be advantageous, it was necessary to understand how many hours each individual spends online every day. A total of 29.2 percent of respondents reported being online for at least one hour every day, whereas 70.8 percent of respondents reported being active online between one to four hours every day (see table 3.3 below). Additionally, 46 percent of respondents rate their weekly online social network activity as high, followed by 38 percent as moderate and only 17 percent reported low or very low online activity (see figure 3.4 below). This provides a clear indication that the use of social media as means of communication with visual media students at TUT could be advantageous if implemented as a teaching tool.
TABLE 3.3: Online activity as represented per hour every day

![Bar chart showing online activity per hour]

FIGURE 3.4: Weekly online activity

![Pie chart showing weekly online activity]
In addition, it was important to understand why respondents engage with, and for what reasons they use, social media networks. Individuals were asked to select all options that represented their reasons for use of social media: to keep in touch with friends; to meet new people; to share photos, videos and music; to play games; to discover new music, books, films and other forms of entertainment; to promote a business or a cause; to make professional and business contacts, or other. A total of 81.3 percent of respondents reported that they mostly use social networks to keep in touch with friends and family, 70.8 percent also use social media as a platform to share photos, videos and music (see table 3.4 below). Additionally, 70.8 percent of respondents reported that they use social networks to discover new music, books, films and other forms of entertainment. The findings of the study thus reflect that there could be a need for the use of social media as a teaching tool as students already use these online networks for personal and social means of communication, research and visual stimulation.
TABLE 3.4: Reasons for use of social media

<table>
<thead>
<tr>
<th>Reason</th>
<th>Series 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>To keep in touch with friends and family</td>
<td>81.30%</td>
</tr>
<tr>
<td>To meet new people</td>
<td>29.20%</td>
</tr>
<tr>
<td>To share photos, videos and music</td>
<td>70.80%</td>
</tr>
<tr>
<td>To play games</td>
<td>16.70%</td>
</tr>
<tr>
<td>To discover new music, books, films and other entertainment such as musical and…</td>
<td>70.80%</td>
</tr>
<tr>
<td>To promote a business or cause</td>
<td>41.70%</td>
</tr>
<tr>
<td>To make professional and business contacts</td>
<td>41.70%</td>
</tr>
<tr>
<td>Other</td>
<td>14.60%</td>
</tr>
</tbody>
</table>

To further understand how visual media students at TUT perceive their personal privacy in relation to the use of social media as a teaching tool the question “how would you feel about efforts to integrate social media websites into your academic experience” was asked? A total of 86 percent of students reported a positive response towards efforts to integrate social media into their academic experience (see figure 3.5 below). Therefore, one of this study’s findings shows that students are enthusiastic about the integration of social media as a teaching tool and means of communication for visual media students at TUT.
Having established the use of social media by visual media students at TUT the next section will discuss the use and need of educational technologies for visual media at TUT.

3.5 EDUCATIONAL TECHNOLOGY QUESTIONNAIRE

To further understand whether there is a need for the application of educational technologies as teaching tools for visual media students at TUT the researcher investigated the role that current forms of educational technologies have played in the learning experience of visual media students at TUT. The question “how often do you use the following forms of communication when interacting with your lecturers about class work” was asked. A total of 80.4 percent of respondents...
reported face-to-face communication (daily or weekly) either before or after class with a slightly smaller number, 69.6 percent, indicating that they make use of office hours for face-to-face communication (daily or weekly) with lecturers (see table 3.5 below). Almost half (41.3 percent) of respondents reported using personal or individual e-mails to lecturers as a means of communication, whereas 45.6 percent of respondents reported that lecturers make use of e-mail for mass announcements on a weekly basis. In contrast, the majority (80 percent) of visual media students at TUT rate the use of e-mail to be very useful as a means of communication with lecturers (see below table 3.6). However, the use of myTUTor is still very limited with 77.3 percent of respondents reporting that updates or announcements are rarely or never made on the myTUTor portal. Lastly, 84.4 percent of respondents reported that instant messaging is rarely used as a form of communication between lecturers and students, but in contrast 75.6 percent of respondents reported it to be a very useful means for peer-to-peer communication. This provides a clear indication that for the most part lecturers still use traditional means of communicating course-related information to students. Students are required to be at class and attend classes that provide face-to-face interactions and discussions with lecturers. However, due to the nature of smartphones and social media that allow for physical and virtual means of communication an opportunity to bridge the gap between the two arises. The integration of educational technologies, such as smartphones and social media, can provide invaluable means of communicating course-related information to visual media students at TUT. However, lecturers and students will need to be
receptive to this transition to accommodate the use of smartphones and social media for academic and personal use.\textsuperscript{31}

\begin{table}
\centering
\caption{Visual media students’ means of communicating with lecturers}
\begin{tabular}{|l|c|c|c|c|}
\hline
How often do you use the following when communicating with your lecturers about class work? & daily & weekly & rarely & never \\
\hline
Face-to-face either before or after class & 47.8\% & 32.6\% & 17.4\% & 2.2\% \\
\hline
Face-to-face using office hours & 37\% & 32.6\% & 28.3\% & 2.2\% \\
\hline
Phone & 0\% & 2.2\% & 42.2\% & 55.6\% \\
\hline
Personal/individual email & 10.9\% & 30.4\% & 32.6\% & 26.1\% \\
\hline
Mass email or announcement (to the whole class) & 13\% & 32.6\% & 32.6\% & 21.7\% \\
\hline
Updates/announcements on course myTUTor & 6.8\% & 15.9\% & 31.8\% & 45.5\% \\
\hline
Instant Messaging (whatsapp, bbm etc.) & 8.9\% & 6.7\% & 24.4\% & 60\% \\
\hline
\end{tabular}
\end{table}

\begin{table}
\centering
\caption{Students perception towards the usefulness of digital communication}
\begin{tabular}{|l|c|c|c|c|}
\hline
Please rate the usefulness of each technology? & very useful & slightly useful & not at all useful & never used \\
\hline
E-mail to communicate with lecturers & 80\% & 17.8\% & 2.2\% & – \\
\hline
Instant messaging to communicate with fellow classmates & 75.6\% & 22.2\% & – & 2.2\% \\
\hline
\end{tabular}
\end{table}

Should there be an increase in the use of educational technologies, such as smartphones and social media as teaching tools, the needs of students in this regard would need to be established. The question “what would enable you to use

\textsuperscript{31} This is a necessary area for further research as there is a need to establish the practical application of using these means of communication on a day-to-day basis.
(or use more) of your own technologies in-class” was asked. The respondents were given the choice of selecting all options that apply to the question thus, Wi-Fi access, electrical plugs, safety and space. A total of 91.7 percent of respondents reported that the availability of a Wi-Fi network in their classrooms would increase their use of educational technologies in class (see figure 3.6 below). More than half (54.2 percent) of the students stated that plugs will help, whereas 35.4 percent also reported space and 37.5 percent reported safety will be helpful factors that will enable increased use of their own technologies in-class.

FIGURE 3.6: Factors that would enable the increased use of personally owed technologies in-class by visual media students

To further determine factors that currently present obstacles for students to make more use of educational technologies such as smartphones and social media on campus, the question “to what degree does each of the following (access to a wireless network on campus, successfully connecting to a wireless network on
campus and slowness of wireless network connection) factors present a problem for the use of educational technologies” was asked. A total of 67.5 percent (to a large and moderate degree) of respondents reported that access to a wireless network on campus was a problem, followed by 69.8 percent who struggled to successfully connect to the network and 83.3 percent who reported that when connected the network was very slow (see table 3.7 below).

TABLE 3.7: Access and connection to a wireless network on TUT Arts campus

To what degree does each of the following factors present a problem for the use of educational?

<table>
<thead>
<tr>
<th>Please rate the usefulness of each technology?</th>
<th>large degree</th>
<th>moderate degree</th>
<th>small degree</th>
<th>Not a problem at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to a wireless network on campus</td>
<td>34.9%</td>
<td>32.6%</td>
<td>18.6%</td>
<td>12%</td>
</tr>
<tr>
<td>Successfully connecting to a wireless network on campus</td>
<td>46.5%</td>
<td>23.3%</td>
<td>14%</td>
<td>16.3%</td>
</tr>
<tr>
<td>Slowness of wireless network connection</td>
<td>47.6%</td>
<td>35.7%</td>
<td>9.5%</td>
<td>7.1%</td>
</tr>
</tbody>
</table>

The results above indicate that visual media students are enthusiastic about the use of educational technologies in-class, however basic infrastructure such as campus and in-class Wi-Fi networks, plugs, space and safety are of concern to them and should be addressed in the near future to be able to meet the increased needs and use of technology by net generation learners.  

Furthermore, the researcher wanted to establish if lecturers at TUT use any forms of visual media aids as teaching methods in their practical or theory classes. A total of 93.8 percent of respondents reported that lecturers do. 87.5 percent of the respondents reported that lecturers make use of PowerPoint presentations,  

32 Further research needs to be done to be able to quantify in more detail if the responses reported by students is due to their enthusiasm for using smartphones and social media for non-academic purposes or if they would still be of the same opinion once these technologies are used for academic purposes.
pictures or slides in their lectures with 86.4 percent of respondents reporting that they find PowerPoint presentations very useful followed by 9.1 percent who thought that they were slightly useful (see table below 3.10). A total of 77 percent of respondents reported that lecturers make use of documentaries, 66.7 percent make use of films and 25 percent make use of virtual museum tours, exhibits, points of special interest or real-time journeys. The majority (86.7 percent) of students reported that use of visual media (e.g. subject related films, documentaries and TED talks) to be very useful when used to supplement their lectures. The results above suggest that lecturers currently do use a high percentage of visual media aids as teaching tools. Therefore, one of the study’s findings shows that lecturers are equipped with the knowledge and skills to implement additional technologies such as social media as teaching tools for visual media students at TUT.33 The skills needed to create a Pinterest board or YouTube channel and communicate information using Google drive to students are very similar to the technical skills needed to make a PowerPoint presentation, write a broadcast e-mail or download visual aids for lectures. Both technologies require lecturers to organize and communicate information effectively within the classroom and their courses. Social media technologies require the same skills, however they are applied online in contrast to PowerPoint which is applied offline using Microsoft software.

33 Even though lecturers are equipped with the knowledge and skills further research needs to be done to be able to establish how to practically implement the use of smartphones and social media as teaching tools - to fully populate their potential. A blended learning model, to practically apply and integrate smartphones and social media as teaching tools will be discussed under section 3.6.
**TABLE 3.8:** Current forms of visual media or visual aids used in practical and theory classes by visual media lecturers at TUT

<table>
<thead>
<tr>
<th>Visual Media Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerPoint presentations, pictures, slides</td>
<td>87.50%</td>
</tr>
<tr>
<td>Documentaries</td>
<td>77.10%</td>
</tr>
<tr>
<td>Films</td>
<td>66.70%</td>
</tr>
<tr>
<td>Virtual Museum tours, Exhibits, Points of Special Interest or Real-Time journeys</td>
<td>25%</td>
</tr>
</tbody>
</table>

**TABLE 3.9:** Use of visual media by lectures at TUT

<table>
<thead>
<tr>
<th>IN- AND-OUTSIDE OF CLASS USE OF VISUAL MEDIA</th>
<th>yes</th>
<th>no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currently, do your Lecturers use any form of visual media or visual aids in your practical and theory classes?</td>
<td>93.8%</td>
<td>6.2%</td>
</tr>
<tr>
<td>Have any of your Lecturers used video clips from conferences such as TED, 99u or Gel Conference as part of your lectures?</td>
<td>57.8%</td>
<td>42.2%</td>
</tr>
<tr>
<td>Have any of your Lecturers used documentaries or a documentary series as part of your lectures?</td>
<td>95.8%</td>
<td>4.2%</td>
</tr>
<tr>
<td>Have any of your Lecturers used Films as part of your lectures?</td>
<td>81.8%</td>
<td>18.2%</td>
</tr>
<tr>
<td>Do you think films could enhance your learning experience?</td>
<td>97.8%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Have any of your Lecturers used virtual Museum tours, Exhibits, Points of Special Interest and Real-Time journeys as part of your lectures?</td>
<td>35.6%</td>
<td>64.4%</td>
</tr>
<tr>
<td>Do you know that over 300 Museums, Exhibits, Points of Special Interest and Real-Time journeys offer online multimedia guided tours on the Web (<a href="http://www.virtualfreesites.com/museums_museums.html">http://www.virtualfreesites.com/ museums_museums.html</a>)?</td>
<td>10.9%</td>
<td>89.1%</td>
</tr>
</tbody>
</table>
TABLE 3.10: Students perceptions towards the usefulness of visual media

How useful do you think each of the following educational technologies are? Could these technologies possibly add value to your lectures?

<table>
<thead>
<tr>
<th>Please rate the usefulness of each technology?</th>
<th>very useful</th>
<th>slightly useful</th>
<th>not at all useful</th>
<th>all never used</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerPoint presentations in class and available on myTUTor</td>
<td>86.4%</td>
<td>9.1%</td>
<td>4.5%</td>
<td>–</td>
</tr>
<tr>
<td>In-class use of visual media (e.g. subject related films and documentaries, ted talks)</td>
<td>86.7%</td>
<td>13.3%</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Digital texts books</td>
<td>60%</td>
<td>28.9%</td>
<td>6.7%</td>
<td>4.4%</td>
</tr>
</tbody>
</table>

To better understand the value of visual media aids as teaching tools the question “do you think films could enhance your learning experience” was asked. A total of 97.8 percent of respondents expressed the view that they believe that films enhance their learning experience (see figure 3.7 below). This provides a clear indication that students do prefer visual media aids to traditional teaching aids as teaching tools to enhance their learning experiences.

FIGURE 3.7: Students’ perceptions toward film as an enhancement to their learning
For this study the researcher investigated the current use of virtual museum tours and exhibits, points of special interest and real-time journeys, to supplement traditional lectures. The results of the study found that 64.4 percent of respondents reported that these forms of online visual media experiences are not used to supplement their lectures (see figure 3.8 below). Furthermore, the majority of students (89.1 percent) reported that they were not aware of over 300 museums tours and exhibits, points of special interest and real-time journeys available online for free.\(^{34}\)

Currently, as mentioned in chapter two, in addition to lecturer-compiled class notes, visual media lecturers recommend books as additional resources to enhance students’ understanding and knowledge in the course.\(^{35}\) Additionally, Fine and Applied Arts lecturers encourage students to research as many quality images of artwork and design related to their course as possible, by making use of virtual museum tours and exhibits, points of special interest and real-time journeys, which will further improve the quality of their learning experience.\(^{36}\) In the same way, virtual museum tours and exhibits, points of special interest and real-time journeys can be used to enrich existing teaching methods and deliver course content in a way that is experimental, social and visually appealing (net generation learning needs). Visual media courses are visual in nature, thus one of the study’s findings suggests that visual media aids such as the above-mentioned are valuable teaching tools that can enhance students’ understanding and knowledge in the course.

\(^{34}\) Discussed under section 2.3.2  
\(^{35}\) Discussed under sections 2.4.1 and 2.4.2  
\(^{36}\) Discussed under section 2.4.1
FIGURE 3.8: Use of virtual museum tours and exhibits, points of special interest and real-time journeys to supplement traditional lecture

FIGURE 3.9: Percentage of visual media students that knew of over 300 museums, exhibits, points of special interest and real-time journeys offered online for free.
On-campus facilities

A total of 15.8 percent of respondents reported that they use the Arts Campus electronic resource centre (ERC) on a daily basis, followed by 15.8 percent two or three times a week (see table 3.11 below). It can therefore be concluded that the majority (84.2 percent) of visual media students at TUT make use of personally owned equipment (e.g. smartphones, computers, printers and Internet connections) to complete course-related work or access to the internet. A total of 68.9 percent of respondents reported owning either a laptop or a netbook, 42.2 percent of respondents reported owning a tablet followed by 19.5 percent who own an ‘e-book reader’ and 77.8 percent who also own a digital camera or digital video camera (see table 3.12 below).

TABLE 3.11: Visual media students’ use of Arts Campus ERC

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once a day</td>
<td>15.80%</td>
</tr>
<tr>
<td>2-3 times a week</td>
<td>15.80%</td>
</tr>
<tr>
<td>Once a week</td>
<td>10.50%</td>
</tr>
<tr>
<td>2-3 times a month</td>
<td>26.30%</td>
</tr>
<tr>
<td>Once a month</td>
<td>5.30%</td>
</tr>
<tr>
<td>2-3 times a semester</td>
<td>15.80%</td>
</tr>
<tr>
<td>Almost never</td>
<td>10.50%</td>
</tr>
</tbody>
</table>
A majority (91.1 percent) of respondents reported making use of the Arts Campus library with 32.5 percent of respondents using the library at least once a week and 47.5 percent at least more than once a month (see figure 3.10 below). As mentioned above, apart from class notes, Fine and Applied Arts lecturers require students to read as widely as possible on topics related to their subjects and recommend books as additional resources to enhance students’ understanding and knowledge in the course.37 One can therefore conclude that currently the Arts Campus library is a widely used source of information for visual media students at TUT. Thus, this could suggest that information sources recommended by lecturers are highly regarded by students and that they should take advantage of this by encouraging new media forms/types of prescribed and recommended resources for course work.

37 Discussed under section 2.4.2
FIGURE 3.10: Visual media students’ use of the Arts Campus library

myTUTor

MyTUTor has made it possible for lecturers to post subject-related materials (e.g. PowerPoint slides, course readings, or links to relevant websites) available to students online. A total of 31.8 percent of respondents reported that their lecturers do not use myTUTor in contrast to 68.2 percent of students that reported one to five of their lecturers make use of myTUTor (see figure 3.11 below). The study found that 31 percent of the respondents reported that they access online course material (e.g. study guides, additional notes and assignment briefs) at least once a week. MyTUTor can be used to supplement or enhance face-to-face lectures (e.g. course blogs and lecture podcasts) and the use of it should be encouraged as it offers a wide variety of features that could enhance communication and provide course related-information in new media forms.
FIGURE 3.11: Percentage of visual media lecturers (presented in numbers) that make use of myTUTor

FIGURE 3.12: Percentage of visual media students (presented by frequency) that make use of myTUTor
Fine and Applied Arts and Multimedia lecturers emphasise the fact that myTUTor is not a replacement for attending lectures – therefore students are still expected to attend classes as prescribed.\textsuperscript{38} However, to further understand visual media students’ preferences and perceptions towards the use of smartphones and social media as teaching tools the question “which of the following best describes your preference with regard to the use of educational technology in your classes” was asked. Respondents were asked to select one of the following options: I prefer having a class that makes use of a small amount of technology (e.g. PowerPoint in class); I prefer having a class that makes use of a moderate amount of technology (e.g. PowerPoint in class, some content on myTUTor, e-mail to communicate with lecturer, class lecture notes online); I prefer having a class that makes use of a large amount technology (e.g. PowerPoint, audio and video presentations in class, e-mail to communicate with the lecturer, lecture notes online, lecture podcast available online, online discussions, class wiki’s, class blog); I have no preference. It was found that a total of 65 percent of respondents would prefer having a class that makes use of a large amount of technology (e.g. PowerPoint, audio and video presentations in class, e-mail to communicate with the lecturer, lecture notes online, lecture podcast available online, online discussions, class wiki’s, class blog) (see figure 3.13 below).

This thus provides a clear indication that visual media students at TUT have a positive perception and preference for the use of educational technologies in-class. Also, myTUTor is an additional study aid that is meant to enhance students’ academic experience at TUT, thus lecturers should be encouraged to make more use of existing technology infrastructure provided in the TUT network.

\textsuperscript{38} Discussed under section 2.4.1 and 2.4.2
TABLE 3.13: Visual media students’ perception toward the usefulness of myTUTor

How useful do you think each of the following educational technologies are? Could these technologies possibly add value to your lectures?

<table>
<thead>
<tr>
<th>Please rate the usefulness of each technology?</th>
<th>very useful</th>
<th>slightly useful</th>
<th>not at all useful</th>
<th>all never used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture Podcasts available on myTUTor</td>
<td>46.7%</td>
<td>33.3%</td>
<td>11.1%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Online tests on myTUTor</td>
<td>40%</td>
<td>24.4%</td>
<td>17.8%</td>
<td>17.8%</td>
</tr>
<tr>
<td>Subject blog on myTUTor</td>
<td>53.3%</td>
<td>33.3%</td>
<td>6.7%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Subject wiki on myTUTor</td>
<td>25%</td>
<td>38.6%</td>
<td>11.4%</td>
<td>25%</td>
</tr>
<tr>
<td>myTUTor- based discussions (e.g. to discuss class material with other students)</td>
<td>47.7%</td>
<td>36.4%</td>
<td>6.8%</td>
<td>9.1%</td>
</tr>
</tbody>
</table>

FIGURE 3.13 Visual media student preferences towards the use of educational technology
Technology comfort levels

For this study, it was necessary to determine what visual media students’ comfort levels are when using digital imaging, editing and presentation software as well as social media websites (e.g. wikis and blogs). The respondents were asked to select one of the following options when answering the questions: very comfortable; comfortable; uncomfortable and never used/don’t know. A total of 66.6 percent of respondents reported being comfortable using editing video and multimedia programmes, 88.9 percent of respondents reported being comfortable with programmes such as Photoshop and the majority of students (91.1 percent) felt very comfortable creating presentations with software such as PowerPoint and Keynote (see table 3.14 below). However, visual media students reported lower levels of comfort with social media websites. The study found that 75.4 percent of respondents reported that they are uncomfortable or never use online collaboration tools such as wikis. More than half (55.6 percent) of respondents reported that they are uncomfortable or never use/don’t know how to use or contribute to online journaling tools such as blogs. On the other hand, more than half (64.4 percent) of respondents felt comfortable with ‘social bookmarking’ websites such as Pinterest, followed by 62.3 percent who felt comfortable using ‘voice-over-IP’ services such as ‘Skype’ or ‘Facetime’. Lastly, more than half (55.6 percent) of respondents felt comfortable using ‘microblogging’ services like Twitter or ‘Tumblr’. Therefore, one of the key findings of this study is that visual media students at TUT are generally comfortable using digital imagining and editing software as well as electronic presentation software, but that they lack the skills or
knowledge to use online collaboration and journaling tools (e.g. wikis and blogs) to present or share their work online.\textsuperscript{39}

\textbf{TABLE 3.14:} Students’ perceptions toward their technology comfort levels when using different forms of software and social media

<table>
<thead>
<tr>
<th>Please rate your level of comfort in each area?</th>
<th>very comfortable</th>
<th>comfortable</th>
<th>uncomfortable</th>
<th>never used/ don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editing video and audio with multimedia programs</td>
<td>24.4%</td>
<td>42.2%</td>
<td>15.6%</td>
<td>17.8%</td>
</tr>
<tr>
<td>Creating animations with animation software</td>
<td>11.1%</td>
<td>42.2%</td>
<td>17.8%</td>
<td>28.9%</td>
</tr>
<tr>
<td>Modifying images with graphics programs such as Photoshop</td>
<td>57.8%</td>
<td>31.1%</td>
<td>8.9%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Contributing to wikis (online collaboration tools)</td>
<td>4.5%</td>
<td>20.5%</td>
<td>34.5%</td>
<td>40.9%</td>
</tr>
<tr>
<td>Contributing to blogs (online journaling tools)</td>
<td>15.6%</td>
<td>28.9%</td>
<td>15.6%</td>
<td>40%</td>
</tr>
<tr>
<td>Using social bookmarking/tagging websites such as Pinterest</td>
<td>31.1%</td>
<td>33.3%</td>
<td>8.9%</td>
<td>26.7%</td>
</tr>
<tr>
<td>Using microblogging services like Twitter, Tumblr, Pownce</td>
<td>20%</td>
<td>35.6%</td>
<td>11.1%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Using voice-over-IP services like Skype, Facetime</td>
<td>26.7%</td>
<td>35.6%</td>
<td>15.5%</td>
<td>22.2%</td>
</tr>
<tr>
<td>Creating presentations with software such as PowerPoint or Keynote</td>
<td>57.8%</td>
<td>33.3%</td>
<td>6.7%</td>
<td>2.2%</td>
</tr>
</tbody>
</table>

Having established the use of educational technologies as teaching tools for visual media students at TUT the next section will discuss the importance of 21\textsuperscript{st} Century skills as part of 21\textsuperscript{st} Century education needs.

\textsuperscript{39} Discussed under section 2.3.5
3.6 21st CENTURY SKILLS

The literature reviewed in chapter two discussed the use of digital technologies such as smartphones and social media for net generation learners. Furthermore, it established that harnessing the power of 21st Century technology (e.g. computers, laptops, tablets, smartphones and social media) enables educators to collaborate, to create and to share knowledge with students in new and interactive ways.40

Furthermore, the data presented in sections 3.3 to 3.5 of this chapter have highlighted a positive response by visual media students towards the integration of these technologies as teaching tools at TUT. But what role do 21st Century technologies really play in the learning process of visual media students at TUT? What value do technologies such as smartphones and social media add to the current learning environment and what type of skills do such technologies help to develop in current visual media students at TUT? In the next section of this chapter the researcher will address these three questions.

3.6.1 The 21st Century

Citizenship in the digital age, in contrast to the industrial age, requires a different set of skills – 21st Century skills. Despite accelerating change in the 21st Century, teaching practices and core curricula have remained nearly the same for the past fifty years or so (see section 2.1). Wagner (2008:xxi) states that in today’s highly

40 Discussed under sections 2.2 & 2.3
competitive global knowledge economy, students need new skills for college, careers and citizenship. In the 21st Century, basic skills such as reading, writing and computation are no longer enough. Mitara (2013) made the following statement in an article for The Guardian entitled *Advent of Google means we must rethink our approach to education*:

Would a person with good handwriting, spelling and grammar and instant recall of multiplication tables be considered a better candidate for a job than, say, one who knows how to configure a peer-to-peer network of devices, set up an organization-wide Google calendar and find out where the most reliable sources of venture capital are, I wonder? The former set of skills are taught in schools, the latter are not.

Furthermore, Wagner (2008:xxiii) states that individuals are comforted by exponential increases of readily available information as well as new technologies that are constantly changing.

Thus, work, learning, and citizenship in the 21st Century demand that we know how to think—to reason, analyze, weigh evidence, problem solve—and to communicate effectively. These are no longer skills that only the elite in society must master; they are essential skills for all of us.

What this means is that all individuals, not just an elite few, require 21st Century skills that will increase their marketability, employability and readiness for citizenship in the 21st Century. Additionally, 21st Century skills (e.g. social media literacy, ICT knowledge, global awareness and problem solving) have become as important to an individual’s marketability and employability as much as traditional skills (e.g. reading, writing, drawing and sketching) were in the past.

Today world economies are driven by information. Knowledge today is a commodity. However, in contrast to the past where students learned from their
lecturers and facts were taught from text books and learning took place in the classroom, today knowledge is freely available, students learn from their lecturers, each other, the internet, books, documentary films, peers inside the classroom, peers outside the classroom and people in other countries.41

In the 21st Century, information is by and large freely available. Hence, the most important aspect of learning today is how an individual can apply what he/she knows, in other words, using knowledge and skills taught to reinterpret information in a unique and marketable way. Bang (2010:32) states that learning is not within the content – learning takes place within the learner as a result of what he or she does with the content. What this means is that students only become active in the learning process when they can produce something useful with their knowledge.

Furthermore, in a very short period of time, economies have shifted from a system where most people earned a living by working with their hands, to a system where people work with their minds. Wagner (2008:xxiv) states that throughout history and until very recently, most people worked with their hands – not with their heads – and so they did not need analytical skills in their daily lives.42 In the global

41 Khan Academy, a not-for-profit organisation with the mission of providing free world-class education to anyone, anywhere offers online practice exercises, instructional videos, and a personalized learning dashboard that empower learners to study at their own pace in and outside of classrooms. Offering 2000+ video tutorials on subjects such as math, science, computer programming, history, art history, economics, and more, Khan Academy has also partnered with institutions like NASA, The Museum of Modern Art, The California Academy of Sciences, and MIT to offer specialized content. (Khan Academy, 2014:https://www.khanacademy.org/about).

42 Castells (2005:3) explains that social transformation in society has been a process:

The world has been in a process of structural transformation for over two decades. This process is multidimensional, but it is associated with the emergence of a new technological paradigm, based in information and communication technologies, that took shape in the 1970s and diffused unevenly around the world.
knowledge economy, every young person will need new skills if he/she is to have a successful career; to be a successful learner and an active, informed citizen. What is important about 21\textsuperscript{st} Century skills is that they are not only survival skills, but are also learning skills and thus become the domain of all educators.

3.6.2 Challenges and changes in the 21\textsuperscript{st} Century

The Internet not only provides access to information, but in effect allows individuals to create new information. What this means is that present-day technology has led to an increasing ability for interaction on a global scale and the availability of information in hyper-abundance. As a result, the net generation is very differently motivated to learn than previous generations. As noted in chapter two, the net generation’s motivation derives from engagements and experiences that are experimental, social and visually appealing. However, Robinson (2011:105) states that

[S]ome of the most powerful tools for promoting creativity, communication and collaboration ever devised now offer unprecedented opportunities for education to be personalized to cater for the interests, abilities and learning styles of every student.

The challenge for educators is to weave together technology and curricula designed to meet net generation learning expectations (experimental, social and visually appealing engagements and experiences) and to develop much needed 21\textsuperscript{st} Century skills. The findings of the study show that more than half (56 percent average of all forms of social media contribution by participating respondents) of
visual media students never create new content on social media networks (see table 3.15 below).

### TABLE 3.15: Frequency of content contribution to a social networking website

<table>
<thead>
<tr>
<th>How often do you use, contribute or create new content on each of the following social networking websites?</th>
<th>daily</th>
<th>weekly</th>
<th>monthly</th>
<th>rarely</th>
<th>never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create or contribute to a blog</td>
<td>2.1%</td>
<td>4.3%</td>
<td>6.4%</td>
<td>27.7%</td>
<td>59.6%</td>
</tr>
<tr>
<td>Create or contribute to a wiki</td>
<td>0%</td>
<td>6.4%</td>
<td>0%</td>
<td>19.1%</td>
<td>74.5%</td>
</tr>
<tr>
<td>Create a podcast</td>
<td>0%</td>
<td>4.3%</td>
<td>0%</td>
<td>17%</td>
<td>78.7%</td>
</tr>
<tr>
<td>Upload video (e.g. YouTube, Vimeo)</td>
<td>2.1%</td>
<td>8.5%</td>
<td>12.8%</td>
<td>40.4%</td>
<td>36.2%</td>
</tr>
<tr>
<td>Upload photos (flickr, Picasa)</td>
<td>10.6%</td>
<td>25.5%</td>
<td>19.1%</td>
<td>14.9%</td>
<td>29.8%</td>
</tr>
<tr>
<td>Send tweets via Twitter</td>
<td>12.8%</td>
<td>10.6%</td>
<td>6.4%</td>
<td>12.8%</td>
<td>57.4%</td>
</tr>
</tbody>
</table>

This data provides a clear indication that visual media students are high users of social media networks, but they either lack the skills or knowledge to produce and post their own original content online. For instance, it becomes problematic when, due to the nature of the knowledge economy, many skills taught in classrooms today may be obsolete in 10 years. Casserly (2012) reported in *Forbes Magazine* that many of the top jobs in 2012 didn’t even exist in 2002. What this means is that many of the jobs that visual media students will have in the future do not yet exist today. However, Purdy (as quoted by Casserly (2012)) does not believe that new needs have been created; merely that society has created new ways and adopted new technologies to satisfy the economic needs. One could say that future students will use technologies that haven’t been invented to find

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43 As referenced in chapter two, section 2.1.3 i.e. an economy characterised by intellectual capital rather than physical labour.

44 For example, ‘social media strategist’, ‘user experience specialist’, ‘applications developer’, ‘sustainability manager’ and ‘market research data developer’ (Casserly, 2012).
solutions for problems that haven’t yet emerged. In other words, higher education will require more than educators merely using technologies such as Google, YouTube and Blogger - it will mean using core curricula content in tandem with these technologies to teach social media literacy, problem solving, global awareness, work ethic, writing skills, advocacy, ICT skills and creativity. Furthermore, educators need to teach students to be able to analyse information, to be information-and-social-media literate and how to apply a range of ICT skills. The role of an educator is to create an environment where students can find their own ‘groove’ and in doing so consequently help students to engage more fully in the present (Robinson, 2009:11). It seems that individuals become truly engaged when they are able to learn by doing where real-life experiences are at the core.

Again, the role of an educator is to equip students to reconfigure and reshape knowledge in order to solve a problem, which is different to acquiring passive knowledge (Lam, 2010:81). Today education is about adapting to a changing world and educators are becoming aware that teaching basic factual information is not enough (Spring, 2008). Incorporating the use of smartphones and social media as teaching tools for visual media students at TUT will help promote the development of social media literacy as well as a range of ICT skills needed for 21st Century citizenship.

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45 Robinson (2009:20) uses the word element to describe the place where the things we love to do and the things we are good at come together. He believes that it is essential that each of us find his or her element, not simply because it will make us more fulfilled but because, as the world evolves, the very future of our communities and institutions depend on it. Robinson (2009:20) states that the world is changing faster than ever before, our best hope for the future is to develop a new paradigm of human capacity to meet a new era of human existence.
3.6.3 The skills


For students, proficiency in 21st Century skills—the skills, knowledge and expertise students must master to succeed in college, work and life—should be the outcome of a 21st century education. To be “educated” today requires mastery of core subjects, 21st century themes and 21st century skills. To help students achieve proficiency in 21st century skills, teachers and administrators need education support systems that strengthen their instructional, leadership and management capacity. And both students and educators need learning environments that are conducive to results.

In his book *Creating Innovators*, Wagner (2012) has identified the following skills as the most important:

1. Critical thinking – how to make an argument, how to analyze and evaluate information, solve problems;
2. Communication – how to communicate ethically and effectively through information and communication technologies. How to make yourself understood within and across cultures;
3. Collaboration – how to work in teams, how to work on projects with other people when they are not necessarily in the same room or city. How to be an effective leader;
4. Creativity – how to innovate and come up with useful ideas that have value. How to express yourself in more than one way;
5. Digital literacy - how to deal with information overflow, how to make sense of new media. How to use technology effectively;
6. Lastly, language (e.g. English, French and Mandarin). How to speak and write the international language of business, the Internet and international travel.

Preparing students for the 21st Century is not merely about using technology or nurturing relevant skills for the global knowledge economy. 21st Century education has a critical role in developing creativity, cultural awareness, problem solving, innovation, civic engagement, communication, productivity, collaboration, accountability, exploration, initiative, responsibility and leadership (Wagner, 2008; Wagner, 2012; Watson, 2008; Watson 2011; Robinson, 2011). Ultimately, educators need to teach students to learn, because in today’s knowledge economy people will be learning throughout their lives (Spring, 2008). Due to the nature of the knowledge economy, the rate of change seems to be accelerating and will, in all probability, continue to do so. What educators can do is to keep pace with this acceleration and in so doing keep curricula content up-to-date as well as students engaged in learning, which will ensure that students are equipped to deal with the future.

As mentioned earlier, due to the nature of the knowledge economy, the economic needs of the 21st Century will in all probability require a shift in current curricula and teaching methods. Educators need to progress from a content-based curriculum (emphasising the recall of facts and information) to a 21st Century skills-based curriculum which emphasises the process and the way in which individuals learn, rather than what they learn. To teach students how to learn is
one of the key skills necessary to survive and be successful in the 21\textsuperscript{st} century. As an individual in the 21\textsuperscript{st} Century it is difficult to absorb the amount of information being produced on a daily basis. For a student to survive the information overload he/she will need to have skills of critical thinking, critical reading and be able to critically appraise information. This is not a new notion, but has become increasingly important due to the changes brought about by the development of new technologies and globalisation.\textsuperscript{46}

Finally, design education in the 21\textsuperscript{st} century has to adapt to the challenges and changes presented by the knowledge economy not only in realising each student’s learning potential in an enriching curriculum, but also in raising the levels of achievement through 21\textsuperscript{st} Century skills development for each student to increase economic innovation and wealth creation (Loveless, 2007:5). Twenty-first century learning is not predicated on technology. However, technology is a tool – breaking global barriers, providing access to information anywhere, anytime and enabling collaboration between students, lecturers, classrooms and countries.

3.7 THE BLENDED LEARNING MODEL

As mentioned in chapter two and three, a number of scholars (for example, Mitara, 2013; Robinson, 2009; Robinson, 2011) highlight that education is changing. What are the implications of this change? Traditionally education

\textsuperscript{46} As referenced in chapter two i.e. information resources being freely available through the internet; a shift in knowledge production as a result of freely available resources globally; a shift to multimodal forms of communication due to advances in technology; a shift from an industrialised to a knowledge-based economy apropos all the above.
offered a single type of learning experience, however a single type of student never really existed. It is clear that the traditional lecture, a single point solution, is not enough anymore. Design education in the 21st Century needs to move beyond single point solutions to blended solutions. What this means is that the traditional lecture currently doesn’t meet net generation needs. A total of 86.7 percent of respondents reported that in-class use of visual media (e.g. subject related films, documentaries and TED talks) are useful and add value to their lectures (see table 3.10 on page 93). Furthermore, 80 percent of respondents reported e-mail communication with lecturers to be very useful, 75.6 percent of respondents indicated that peer-to-peer communication by the way of instant messaging to be very useful and 60 percent of respondents rated digital texts books as very useful (see table 3.5 & 3.6 on page 88 and table 3.10 on page 93). This provides a clear indication that visual media students at TUT rate the use of technology high when it is used as an educational tool. Therefore, the data suggests that the incorporation of online components or course-related actives for visual media students at TUT will be advantageous.

How does blended learning offer a solution? It offers the ability to weave together the intimacy of the traditional classroom with the power of eliminating the boundaries of time and place. The primary interest of blended learning is to benefit the educational process by means of providing a more engaged learning experience (Garrison & Vaughan, 2008). Blended learning is a combination of two models. Bonk and Graham (2006) define blended learning environments as a combination of face-to-face (FTF) instruction as well as computer mediated or

47 As discussed under section 2.3
online instruction. Krause (as quoted by Bath & Bourke (2010:1)) defines this model as follows:

Blended learning is realised in teaching and learning environments where there is an effective integration of different modes of delivery, models of teaching and styles of learning as a result of adopting a strategic and systematic approach to the use of technology combined with the best features of face to face interaction.

As blended learning is a convergence of traditional educational technologies and Information and Communication Technologies (ICTs) to enhance learning and teaching activities, it is vital to define such, as well as explain where they are useful and why they are important. Bath and Bourke (2010:1) state that blended learning technologies can:

- Broaden the spaces and opportunities available for learning;
- Support course management activities (e.g., communication, assessment, submission, marking and feedback);
- Support the provision of information and resources to students;
- Engage and motivate students through interactivity and collaboration.

As noted in chapter two, Google Drive, a web-based application, allows flexible and collaborative work anytime, anywhere and on any device (smartphone, tablet or laptop). Google Drive is one example of the manner in which educators can apply online instruction to support the provision of information and resources to
students, thereby broadening the opportunities for learning through engagement and interaction.  

Digital technology should not simply be used because it is available. Rather, blended learning incorporates technology to help find better ways of supporting students in achieving their learning objectives and providing them with the best possible learning and teaching experiences, as well as supporting educators in their roles (including the management and administration of courses) (Bath & Bourke, 2010). In effect, blended learning environments provide a platform for a new type of communication to develop between educator and student at TUT.

As discussed in chapter two, Google Drive offers all the readily available applications: it broadens the spaces and opportunities available for learning and support course management activities (e.g., communication, assessment, submission, marking and feedback); it supports the provision of information and resources to students, engages and motivates students through interactivity and collaboration. Thus, blended learning does not necessarily require any large financial investments from the faculty, but infrastructure such as a Wi-Fi network is necessary to apply a model such as blended learning at TUT. At TUT 91.7 percent of respondents reported that the availability of a Wi-Fi network would increase their use of their own personal technologies for class related activities. The results show that currently at TUT there are no in-class Wi-Fi networks. Thus, the findings of the study reflect that to make use of a blended learning model at

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48 These concepts were explained under section 2.3.5.
TUT, basic infrastructure (e.g. Wi-Fi networks) will first have to be implemented to support the successful management and administration of the model.

3.7.1 The blended learning lecture

Traditionally a lecture is a method of disseminating information that emerged before the advent of the printing press (Garrison & Vaughan, 2008). The traditional pedagogical approach to the lecture included:

- Classroom discussions;
- Homework or reading assignments;
- Development of papers;
- Group projects;
- Assessments or exams; and
- One-to-one coaching during office hours.

To be able to transcend the conventional classroom paradigm, traditional approaches of encouraging interaction between teacher, student and subject content can be made possible by establishing a framework for this process in which to take place. Blended learning environments facilitate a framework in which interdependence between face-to-face encounters and digital technology facilitation allow students to be actively engaged in the process of inquiry.
When planning and developing blended lectures compared to traditional lectures, many factors need to be considered. The success of a blended lecture will be greatly improved when it is implemented in an environment that is student-centred, uses a form of inquiry and engages students in meaningful and collaborative group work (Morrison & Lowther, 2010). Thus, blended learning environments facilitate a framework in which interdependence between face-to-face encounters and digital technology facilitation form a new type of educational experience.

Morrison & Lowther (2010:15) state that the philosophical approach for creating this ‘reformed’ environment needs to be different from the traditional approach. An example of this would be the NTeQ model: a step-by-step model designed for creating 21st-century classrooms, called the iNtegrating Technology for inquiry, or the NTeQ model.

![Diagram of the Ten-Step NTeQ Model for Planning a Technology Integrated Lesson](image)

**FIGURE 3.14:** The Ten-Step NTeQ Model for Planning a Technology Integrated Lesson (Morrison & Lowther, 2010:53).

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49 See Appendix D for a redesign guide for blended learning developed by Garrison & Vaughn (2008). Bear in mind that some subjects might not need such deep analysis or adaptation from their current form to be redesigned for a blended learning model.
The NTeQ model consists of five basic components: the educator, the student, the lesson, the computer and the learning environment. Morrison and Lowther (2010:15) state that when the NTeQ model is successfully implemented it will have the following characteristics:

1. The educator is technologically competent and assumes the role of designer, manager and facilitator.
2. The student actively engages in the learning process, assuming the role of researcher and gaining technological competence.
3. The computer is used as a tool, as it is in the future workplace, to enhance learning through the use of real-world data to solve problems.
4. The lesson is student centred, problem based and authentic; and digital technology is an integral part.
5. The environment incorporates multiple resource-rich activities.

In other words, when these characteristics are present in a learning environment there is a shift away from a providing environment to a facilitating environment. What this means is that traditionally educators would provide students with what they need to learn or read, however in a blended environment educators provide a resource-rich environment for students to be guided in learning.
The first challenge for any educator is time – the blended learning environment with its online component saves valuable time in-class. Additionally, students may watch presentations (content such as related videos, pictures, podcasts, etcetera) at home and then spend lecture time for discussions and higher thinking activities. An educator can change the nature of classroom discussions, saving and gaining time to promote student-centred instruction, accommodating new learning styles and finally promoting collaboration between students. This will allow educators to create a community of learners who have easier access to class materials and their peers through the use of smartphones and social media, as well as access to their lecturer beyond the traditional lecture.\textsuperscript{50}

Thus, blended learning is about leveraging digital content to provide students with the basic information while the lecturer can focus on depth and application of concepts to teach higher-order thinking skills. Blended learning frees up valuable lecture time providing more opportunities to exchange, discuss and productively work together in class.

In the 21\textsuperscript{st} Century a great deal is required from educators: teaching in various learning styles, incorporating 21\textsuperscript{st} Century skills and having knowledge of global and local connections. Teaching methods are changing as educators increasingly become facilitators of information. Schools, universities and educators used to be the main providers of information. In contrast, today if students are asked a

\textsuperscript{50} Further research is needed to be able to provide practical solutions to harness the potential of smartphones and social media in which communication between lecturers and students is limited to traditional office hours so as not to invade the private time of lecturers beyond work.
question to which they do not have an answer they may immediately resort to Google. Students are living in a world where they can access data anywhere, anytime. The traditional lecture cannot successfully reach the net generation. Blended learning offers a solution in which design education can meet the expectations of net generation students while still attaining academic requirements and developing 21st Century skills.

Blended learning has proven to be very effective in higher education. It has changed the way educators and students interact. Educators are increasingly becoming facilitators and less the sole provider of information. Thus, educators need to start investing in blended learning for design education that will ensure that all visual media students have access to the right blend of theoretical knowledge, practical skills and 21st Century skills (critical thinking, communication, collaboration, creativity, digital literacy and language). Blended learning and the use of technology in the classroom provides facilitation for learning.

Finally, successful blended learning practices require the educator to select the appropriate tools for learning to be achieved. Blended learning practice, for design education, has the potential to enhance both the effectiveness and efficiency of meaningful learning experiences for students in the 21st Century. Blended learning facilitates a flexible, adaptable and interactive learning environment for students. However, as much as the blended learning model provides much potential to combine face-to-face and digital technologies to offer more interactive learning environments for visual media students, future research is needed to be able to develop more practical ways of applying it at TUT.
3. 8 KEY FINDINGS

The data analysis was performed on the collected data using SPSS (Statistical Package for the Social Sciences) version 21. The results were obtained using the descriptive analysis feature included as part of the base software (http://www-01.ibm.com/software/za/analytics/spss/). The key findings of the study can be summarized as follows:

1. A very high percentage of visual media students own a smartphone; more than half of visual media students already use their smartphones for TUT or course related tasks. Smartphones have the potential to be incorporated as teaching tools for visual media students at TUT, but the practical application of their use still needs to be established.

2. The majority of visual media students felt that in-class technology use does not distract from the lecture, however a small percentage of respondents still felt that they were not comfortable with peers using technology in class time if it was not related to course work.

3. Visual media students at TUT are active social media users. The majority of students are actively online between one to four hours every day. They primarily use social media networks to keep in touch with friends, although features such as sharing photos, videos and music are also made use of. A large number of visual media students also use social media networks to discover new music, books, films and other forms of entertainment.
4. Visual media students use social media networks for personal and social means of communication, research and visual stimulation. Therefore, they are enthusiastic towards efforts to integrate social media as part of their academic experience.

5. Largely, visual media students still interact with lecturers face-to-face, either before or after class or during office hours. Lecturers use e-mail to communicate with the group as a whole, but personal communication via e-mail with students is still not extensively used. The use of myTUTor by lecturers and students is still very limited. The use of instant messaging as a form of communication to students is also not used. For the most part, at TUT traditional means of communicating course related information to students is still used. As a result this requires students to attend lectures to acquire most information relating to course work. In contrast, visual media students are very enthusiastic about the integration of educational technologies such as smartphones, social media and myTUTor as a means of communicating and providing course related information.

6. At TUT infrastructure such as in-class Wi-Fi networks and enough accessible plugs for students to make use of their own devices (e.g. laptops or netbooks) are very much needed. The majority of visual media students at TUT reported that such infrastructure will encourage them to make use of their own devices related to course work or educational technology implementation or requirements. Visual media students are enthusiastic about the use of technology for course related work. As a
result attention needs to be given to the use of technology in classrooms and as part of lectures. The technology should either be supplied by the university or the use of personally owned devices should be encouraged inside the classroom or during lectures.

7. Findings of the study conclude that lecturers currently do use a high percentage of visual media aids as teaching tools. Therefore, one of the study’s findings suggests that lecturers are equipped with the knowledge and skills to implement additional technologies such as smartphones and various forms of social media as teaching tools for visual media students at TUT. Furthermore, visual media students are particularly enthusiastic about the use of visual media aids as a large majority of respondents reported that the use of films as a teaching tool enhances their learning experience. Visual media students indicated positive opinions towards the integration of visual media aids as teaching tools to enhance their learning experiences. In addition, lecturers do have the knowledge and skills to make use of such technologies and should be encouraged through faculty (staff), funding and additional training to implement such technologies.

8. Lastly, the study found that the majority of visual media students at TUT make use of personally owned equipment (e.g. smartphones, laptops, netbooks, tablets, printers and Internet connections) to complete course-related work or access the internet. Equally so, visual media students at TUT are generally very comfortable using digital imagining and editing
software as well as electronic presentation software, but a majority of students lack the skills or knowledge to use online collaboration and journaling tools (e.g. wikis and blogs) to present or share their work online.

3.9 SUMMARY

Due to the nature of the knowledge economy, several skills taught in classrooms today may become obsolete in a decade and as a result many of the jobs visual media students will have in the future do not yet exist today. Therefore, 21st Century education has a critical role in developing the following:

- creativity;
- cultural awareness;
- problem solving;
- innovation;
- communication;
- collaboration;
- exploration;
- initiative;
- responsibility and leadership.

Again, due to the knowledge economy, these skills are needed for marketability and employability in the 21st Century.
21st century educators must:

- be facilitators of knowledge and information;
- help students to reconfigure and re-shape knowledge in order to develop problem solving skills;
- teach students to learn in order for them to develop lifelong learning skills much needed for employability and marketability in the knowledge economy;
- develop global awareness.

Traditional learning skills (reading, writing, drawing and sketching) need to be supplemented by skills such as:

- innovation;
- creativity;
- problem solving;
- critical analysis;
- ICT knowledge;
- social media literacy.

Blended learning facilitates development from a content-based curriculum (emphasising the recall of facts and information) to a 21st Century skills-based curriculum which emphasises the process and the way in which individuals learn, rather than what they learn.
Blended learning provides the following:

- a flexible, adaptable and interactive learning environment for students;
- the use of technology in the classroom provides facilitation for student-centred learning;
- by leveraging digital content it saves time during lectures;
- by providing a platform for face-to-face and virtual communication to develop between educator and student.

In conclusion, the key findings of the study are as follows:

1. that visual media students at TUT do own smartphones;
2. that visual media students do personally own laptops, netbooks and tablets;
3. that in-class use of technological devices, such as smartphones, must be course related;
4. that visual media students at TUT are active social media users;
5. that they are enthusiastic towards efforts of integrating smartphones and social media as teaching tools;
6. that visual media students are competent at using digital editing, imaging and electronic presentation software, but lack the skills and knowledge to use online collaboration and journaling tools;
7. that at TUT course related communication is still mainly face-to-face;
8. that visual media lecturers at TUT do currently make use of visual media;
9. that infrastructure upgrades such as in-class Wi-Fi networks are needed.

Finally, for economic innovation and wealth creation to increase in South Africa, design education in the 21st century has to adapt to the challenges and changes presented by the knowledge economy. This not only means providing an enriching curriculum, but by developing 21st Century skills and ICT knowledge to equip net generation students for employment and citizenship in the 21st Century.

The following chapter will provide a summary of the research aim and sub-aims, as well as present the recommendations and conclusions regarding whether smartphones and social media can contribute to current design education teaching methods for visual media students at TUT.
CHAPTER FOUR

CONCLUSIONS AND RECOMMENDATIONS

This chapter concludes and summarises the aim and sub-aims of this study, makes recommendations and proposes further areas of research for this field.

4.1 SUMMARY OF AIM AND SUB-AIMS OF RESEARCH

The research problem was that design education lacks 21\textsuperscript{st} Century teaching tools and methods of approaching teaching and learning. The research started with identifying that outside the classroom, students constantly interact with technologies such as smartphones, iPods, the Internet and social networking sites and that these technologies could possibly support learning in the classroom. The researcher also identified that to move beyond the bounds of the classroom walls it is important to take advantage of multiple learning styles made available through the use of smartphones and social media. The following research problems were framed to determine whether 21\textsuperscript{st} century technologies can contribute to new teaching and learning methods for visual media students at TUT.

1. It is currently largely unknown what the advantages are of using smartphones and social media as teaching tools for visual media students at TUT.

2. It is currently unknown whether the use of smartphones and social media as teaching tools for design education can meet the requirements of net generation students.
3. Methods for the application of smartphones and social media as teaching
tools for visual media students at TUT are as yet undefined.

These problems led to the formation of the following aim and sub-aims for this
study.

The aim of this research was to investigate whether smartphones and social
media can contribute to current design education teaching methods for
visual media students at TUT. Three sub-aims were identified with the purpose
of realising this aim.

Non-empirical data sources and empirical data sources were used to gather the
information and data needed for this study. Non-empirical sources included
journal and newspaper articles and official reports. The empirical data for this
study was in the form of a case study, utilising questionnaires to be able to obtain
the facts and opinions of visual media students at TUT.

The first sub-aim was to create a theoretical context of design education
teaching methods currently employed for visual media students at TUT. This
was done in chapter two. Harnessing the power of 21st Century technology (e.g.
computers, laptops, tablets, smartphones and social media) enables educators to
collaborate, to create and to share knowledge with students in new and interactive
ways. Through the use of smartphones and social media, educators are able to
develop hybrid teaching and learning activities that capture the attention and
encourage interaction of students anywhere, anytime and on any device. The
following conclusions were made apropos the literature review:
1. Globalisation has had an effect on education due to information resources being freely available through the internet. Likewise it has brought about a shift from an industrial and agricultural economy to a knowledge-based economy as a result of freely available resources globally. Due to advances in technology there has been a shift from traditional forms to multimodal forms of communication. As a result globalisation has brought about a shift from an industrialised to a knowledge-based economy apropos all the above.

2. The net generation emphasise the value of learning experiences that offer interactivity, learning-by-doing, experiential learning, working in teams and social networking due to a globalised and technologically advanced society.

3. Design education in the 21st Century demonstrates a growing interest in developing pedagogical practices that foster a participatory culture in education. Therefore, the use of smartphones and social media inside and outside the classroom allow for more adaptable and diverse teaching and learning practices. Active engagement between educators and students through the use of smartphones and social media networks can facilitate collaborative activities (physical and virtual) which are vital for learning in the 21st Century. 21st Century education recognises that learning takes place in various settings, not merely in the classroom.
4. Social media networks help support educators in delivering content in deliberate and proactive ways that develop a range of skills, qualities and knowledge that students will need to work and function fully and effectively in the 21st Century. Through the use of social media learning becomes more relevant and engaging for students, with students at the centre of their own learning, resulting in a mix of face-to-face and digital learning environments.

5. Current teaching and assessment methods for visual media students at TUT do not include a wide variety of audio and visual media technologies used as additional resources apart from class notes. Currently, no social media networks are used by lecturers. No smartphones are used inside or outside of lectures as a means to support learning or enhance communication. Likewise, myTUTor is only used to post basic course materials. No additional myTUTor applications such as lecture podcasts, course blogs or wiki’s are made use of.

The second aim was to investigate empirically, through the use of case studies, whether there is a need for the incorporation of smartphones and social media as teaching tools for visual media students. This was done in the first section of chapter three. The following conclusions were made by means of a case study, utilising three paper-based questionnaires with visual media students at TUT:
1. A very high percentage of visual media students own a smartphone; more than half of visual media students already use their smartphones for TUT or course related tasks. Smartphones have the potential to be incorporated as teaching tools for visual media students at TUT, but the practical and effective application of their use as a teaching tool still needs to be established.

2. The majority of visual media students felt that in-class technology use does not distract from the lecture, however a small percentage of respondents still felt that they were not comfortable with peers using technology in class time if it was not related to course work.

3. Visual media students at TUT are active social media users. The majority of students are active online between one to four hours every day. They primarily use social media to keep in touch with friends, however, features such as sharing photos, videos and music are also made use of. A large number of visual media students also use social media networks to discover new music, books, films and other forms of entertainment.

4. Visual media students use social media networks for personal and social means of communication, research and visual stimulation. Therefore, they are enthusiastic towards efforts to integrate social media as part of their academic experience.
5. Largely, visual media students still interact with lecturers face-to-face, either before or after class or during office hours. Lecturers use e-mail to communicate with the group as a whole, but personal communication via e-mail with students is still not extensively used. The use of myTUTor by lecturers and students is still very limited. The use of instant messaging as a form of communication to students is also not used. For the most part, at TUT traditional means of communicating course related information to students is still used. As a result this generally requires students to attend lectures for accessing most information relating to course work. In contrast, visual media students are very enthusiastic about the integration of educational technologies, such as smartphones, social media and myTUTor as a means of communicating and providing course related information.

6. At TUT infrastructure such as in-class Wi-Fi networks and enough accessible plugs for students to make use of their own devices (e.g. laptops or netbooks) is very much needed. The majority of visual media students at TUT reported that such infrastructure will encourage them to make use of their own devices related to course work or educational technology implementation or requirements. Visual media students are enthusiastic about the use of technology for course related work, therefore attention needs to be given to this for the use of technology either supplied by the university or to encourage the use of personally owned devices.
7. Findings of the study conclude that lecturers currently do use a high percentage of visual media aids as teaching tools. Lecturers are equipped with the knowledge and skills to implement additional technologies such as smartphones and various forms of social media as teaching tools for visual media students at TUT. Furthermore, visual media students are particularly enthusiastic about the use of visual media aids as a large majority of respondents reported that the use of films as a teaching tool enhances their learning experience. Visual media students indicated positive opinions towards the integration of visual media aids as teaching tools to enhance their learning experiences. In addition, lecturers do have the knowledge and skills to make use of such technologies and should be encouraged through faculty (staff), funding and additional training to implement such technologies.

8. Lastly, the study found that the majority of visual media students at TUT make use of personally owned equipment (e.g. smartphones, laptops, netbooks, tablets, printers and Internet connections) to complete course-related work or access the internet. Equally so, visual media students at TUT are generally very comfortable using digital imagining and editing software as well as electronic presentation software, but a majority of students lack the skills or knowledge to use online collaboration and journaling tools (e.g. wikis and blogs) to present or share their work online.
The third sub-aim followed from data interpreted from the case studies, to suggest methods of applying smartphones and social media as teaching tools for visual media students at TUT. This was done in the second section of chapter three.

Due to the nature of the knowledge economy, several skills taught in classrooms today may become obsolete in a decade or so and as a result many of the jobs or career directions that visual media students will have in the future do not yet exist today.

1. Traditional learning skills (reading, writing, drawing and sketching) need to be supplemented by skills such as innovation, creativity, problem solving, critical analysis, ICT knowledge and social media literacy.

2. 21st century educators must be facilitators of knowledge and information to encourage the development of lifelong learning skills much needed for employability and marketability in the knowledge economy.

3. Educators today need to help students to reconfigure and re-shape knowledge in order to develop problem solving skills, global awareness, creativity, cultural awareness, innovation, communication, collaboration, exploration, initiative, responsibility and leadership.
4. Blended learning facilitates the development of a content-based curriculum (emphasising the recall of facts and information) to a 21st Century skills-based curriculum which emphasises the process and the way in which individuals learn, rather than what they learn.

5. Blended learning provides a flexible, adaptable and interactive learning environment for students to use technology in the classroom that provides facilitation for student-centred learning. By leveraging digital content, blended learning saves time in lectures providing a platform for face-to-face and virtual communication to develop between educator and student.

4.2 RECOMMENDATIONS AND AREAS OF FURTHER RESEARCH

To cultivate an innovative culture inside the 21st Century classroom and enhance a student’s inquiry-based approaches to learning is not an easy task. Incorporating smartphones and social media as teaching tools thus supports educators in providing an active and participatory learning environment. As educators there is a responsibility to recognise changing attitudes and teaching practices in 21st Century education in an effort to better understand how they might impact on teaching methods for visual media students at TUT. Teaching tools such as smartphones and social media offer multi-modal forms of communication, visual media interactions and enable educators to cater for the needs and interests of individuals more so than traditional teaching practices have been able to do.
Based on the literature reviewed and data gathered, the researcher believes that the following recommendations will improve teaching and learning practices for visual media students at TUT.

1. Social media platforms offer a type of participatory culture outside of classrooms that has not previously been possible. The three social media platforms (Google drive, YouTube and Pinterest) discussed in this study are all freely available on the Internet for any user to access. They offer convenience, flexibility and the type of engagement and interaction enjoyed by the net generation. These features are influencing their increasing popularity under the net generation and therefore their potential should be leveraged by educators and incorporated into visual media classrooms.

2. Technology is globalised in nature. It offers information and knowledge from local and global perspectives which gives visual media lecturers at TUT the opportunity to integrate global dimensions and experiences to their classrooms. There is a need to integrate the use of visual media content in the form of lectures and courses and this should be explored to be able to provide students with the opportunity to discover a topic of interest in depth, on their own time, in any medium (visual, written, on any device). As hybrid educational practices that combine local and global perspectives increase, so will their need to be used as part of current teaching practices for visual media students at TUT.
3. In a rapidly globalised society, smartphones and social media will continue to offer an affordable and accessible medium to equip students to make local and global connections, which become part of a learning connection. Smartphones and social media provide affordable and freely accessible means to websites (e.g. TED, Victoria & Albert channel, ArtBabble, Lourve virtual museum tours, etcetera) providing students with a medium to engage in their own curiosity or to enhance their understanding in a certain field of interest.

21st century education recognises that learning takes place in various settings (physical and virtual) and not just in the classroom. Blended learning was developed on the notion that teaching and learning practices can combine face-to-face and online components to provide successful outcomes. Therefore the blended learning model should be leveraged to provide a way for lecturers at TUT to incorporate smartphones and social media into and outside of their classroom. The following are suggestions:

1. The expanded use of social media freely available on the Internet should be encouraged. This will stimulate and develop multi-modal forms of communication between lectures and peers which in-turn meets the digital technology needs of net generation students. In addition, by providing virtual platforms for multi-modal communication and the distribution of subject content, lecturers are able to transcend traditional (physical) classroom limitations such as time and space.
2. The expanded use of visual media, freely available on the Internet should be encouraged. This will stimulate the use of local and global visual communication, as the net generation are intuitive visual communicators and this strength should be leveraged to help them learn.

3. The use of Pinterest to introduce the use of digital storyboards into the classroom should be encouraged. Lecturers and students can add pins to storyboards created for each subject and in so doing build visual and digital storyboards for various subjects, themes and ideas. Leveraging the net generation’s ability to integrate the physical and the virtual seamlessly.

4. Lastly, apropos all the above, multi-modal forms of communication (these include the use of smartphones and social media) are instrumental in the shift away from teacher-centered learning environments and move more toward student-centred learning where educators become facilitators of information rather than merely fulfilling the role of providers. As technology continues to be instrumental in being able to shift learning environments from a teacher-centred approach to a student-centred approach, this approach focuses on authentic intellectual work in a student-centred environment. It furthermore provides students with an environment that encourages discovery and curiosity and thus should be encouraged.
Having addressed the research problem and answered the research question, a need for further research in the following areas has been identified:

1. Trends toward the use of technology-mediated learning will increase in the 21\textsuperscript{st} Century. Growing interest towards developing hybrid educational practices for visual media students at TUT will continue to be of importance as globalisation and the knowledge economy carry on shaping 21\textsuperscript{st} Century education. The demand for 21\textsuperscript{st} Century skills in a growing knowledge economy and an increasing need for new forms of knowledge production through the use of digital technologies in work and in life will continue to be sought after. Further research should thus be encouraged.

2. Facilitation versus teaching will need to continue to be a topic of discussion and development for visual media students at TUT as new technologies provide novel means of communication and collaboration in the future. Thus, a shift from learning content to learning activities will increasingly take place and further research should be encouraged.

3. As technological infrastructure continues to be a challenge in a developing country such as South Africa, smartphones might provide the potential to bridge this digital divide. The potential of implementing these devices practically as teaching tools is still very limited and much more research still needs to be done in the field of design education for visual media students at TUT.
4. Understanding net generation learning preferences is vital for educators to help learners retain information, participate in class and progress in academic environments. Growing up digitally will continue to be the norm as new technologies continue to be developed. Further research should thus be encouraged.

5. More research is required to quantify in more detail if visual media students at TUT would still be of the same opinion once smartphones and social media are used for academic purposes. Currently, their enthusiasm towards the use of smartphones and social media as teaching tools derives from the use of these technologies for non-academic purposes.

6. Even though visual media lecturers at TUT are equipped with the knowledge and skills to implement smartphones and social media as teaching tools, future research needs to be done to establish how to practically implement the use of smartphones and social media as teaching tools – to be able to fully realise students’ potential.
Limitations of this study were as follows:

1. The study only focused on second year visual media students at TUT. This was due to time constraints, funding limitations and ethical considerations.

2. This study does not necessarily reflect the learning requirements of all visual media students at TUT as the answering of questions was based on respondents’ own interpretations of questions and some respondents might not have understood the questions clearly.

3. Literature with regard towards the use of smartphones and social media as teaching tools for design education in South Africa is lacking and future research needs to be done in this field to be fully realise students’ potential.

4.3 CONCLUSION

It is against this background that an exciting ‘new kind’ of learning can take place in visual media programmes at TUT. As knowledge continues to be applied in new ways the knowledge economy will increasingly become dependent on knowledge-orientated skills and workers. Advances in technology have changed society’s expectations and experiences when it comes to creating, sharing and accessing knowledge and information today. As globalisation, due to the increasing development of new technologies, continues to transform the availability of
information and the production of knowledge, the pedagogical needs of the next generations will change, develop and increasingly be transformed.

As a result the purpose of 21\textsuperscript{st} Century education is to move beyond academic outcomes to entrepreneurial outcomes which allow for active participation and citizenship. The education offered at TUT is entrepreneurial in its focus and therefore more emphasis should be placed on discovery and curiosity (two important net generation needs). Edwards (2014) refers to discovery processes gaining ground at Harvard University as follows:

Peter Galison, in History of Science, asks his students to make films, to understand science; Michael Chu, in business, brings students to low income regions to learn about social entrepreneurship; Michael Brenner, in Engineering and Applied Science, invites master chefs to help students discover the science of cooking; and Doris Sommer, in Romance Languages, teaches aesthetics by inviting students to effect social and political change through cultural agency. Similarly, in the course I teach, How to Create Things and Have Them Matter, students are asked to look, listen, and discover, using their own creative genius, while observing contemporary phenomena that matter today.

The examples mentioned above are a few ways in which technology and globalisation are able to create awareness and cross-fertilisation of ideas and interdisciplinary endeavours in 21\textsuperscript{st} Century classrooms. Failing to create a new way of learning and establishing new environments for learning to take place in contemporary circumstances will have negative outcomes. In South Africa there is a need for innovation and collaboration between individuals to prompt entrepreneurship and knowledge creation in order to meet economic and social challenges. Therefore, changes in teaching and learning practices that help promote the development of the above mentioned skills is very much needed.
In conclusion, to be aware of the shifts taking place in 21st Century education is as important as trying to understand them. As technology continues to advance so will the way in which students learn, teach and retain knowledge. The opportunity that lies in understanding and adapting to these changes is what will define successful outcomes of visual media programmes at TUT in the future.
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Dear Sir/ Madam,

Introduction

Thank you for participating in this research. This questionnaire is part of a study designed to determine whether the use of smartphones and social media as teaching tools for visual media students at Tshwane University of Technology can enhance the learning and technology requirements of ‘net generation’ students. The smartphone questionnaire should only take up to 5 minutes of your time. Your cooperation is greatly appreciated.

General Instructions

The following instructions and conditions must be understood by all respondents:

(a) Answer from your own perspective, as honestly as possible;
(b) Please complete all sections, do not leave any unanswered questions;
(c) Please note that your name is not required nor is it requested, hence confidentiality is assured.

Thank you.

Sincerely,

Angelica Warchal

We empower people

Tel (084) 5141 865, Email: WarchalA@tut.ac.za Web: www.tut.ac.za P/Bag X680 PRETORIA
Smartphone’s can be defined as a messaging cellular telephone with built-in applications and Internet access. In addition to digital voice service, modern Smartphone’s provide text messaging, e-mail, Web browsing, still and video cameras, MP3 player and video playback and calling (http://www.pcmag.com/encyclopedia).

Q1. Do you own a Smartphone?

☐ Yes
☐ No

Q2. If yes, what brand of smartphone do you use?

☐ iPhone
☐ Blackberry
☐ Android
Q3. Excluding making phone calls, how often do you use your smartphone in the following situations?

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Multiple times a day</th>
<th>Daily</th>
<th>Weekly</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Idle time at work or school (e.g. during breaks, lunch, boring meetings/classes, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3.2</td>
<td>Riding the bus, taxi, or in car as passenger</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3.3</td>
<td>Waiting in line (e.g. coffee shop, grocery store, for a movie to start, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3.6</td>
<td>For TUT/course related tasks</td>
<td></td>
<td></td>
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<tr>
<td>3.8</td>
<td>While you are driving</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q4. How often are you consuming different types of information on your Smartphone?

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Multiple times a day</th>
<th>Daily</th>
<th>Weekly</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Text messaging (SMS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.2</td>
<td>Reading e-mail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.3</td>
<td>Searching for specific information</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4.4</td>
<td>Talking on the phone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td>Viewing content on social networks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.6</td>
<td>Maps, GPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4.7</td>
<td>Communicating with friends on social networks</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>4.8</td>
<td>Listening to music</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4.9</td>
<td>Watching video (e.g. YouTube, Vimeo etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.10</td>
<td>Listening to audio podcasts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4.11</td>
<td>Reading books (e.g. Kindle Reader app, iBooks)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q5. How often do you create different types of content on your Smartphone?

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Multiple times a day</th>
<th>Daily</th>
<th>Weekly</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Text messaging (SMS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2</td>
<td>Writing or responding to e-mail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.3</td>
<td>Taking photos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.4</td>
<td>Taking videos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.5</td>
<td>Updating Facebook status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.6</td>
<td>Tweeting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.7</td>
<td>Audio recording, creating podcasts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q6. Many students use digital technology during their classes for purposes that may or may not be related to the class itself (e.g. sending text messages, read, checking social networking sites like Facebook). Do you use technology in this way, or have you seen other students do so? If so, what are your thoughts about this practice?

☐ In-class tech use distracts other, hence not ok.

☐ In-class tech use does not distract other, but is still not ok.

☐ In-class tech use does not distract other, and is therefore ok.
Dear Sir/ Madam,

Introduction

Thank you for participating in this research. This questionnaire is part of a study designed to determine whether use of smartphones and social media as teaching tools for visual media students at Tshwane University of Technology can enhance the learning and technology requirements of ‘net generation’ students. The social media questionnaire should only take up to 5 minutes of your time. Your cooperation is greatly appreciated.

General Instructions

The following instructions and conditions must be understood by all respondents:

(d) Answer from your own perspective, as honestly as possible;
(e) Please complete all sections, do not leave any unanswered questions;
(f) Please note that your name is not required nor is it requested, hence confidentiality is assured.

Thank you.

Sincerely,

Angelica Warchal
Social media employ mobile and web-based technologies to create highly interactive platforms via which individuals and communities share, co create, discuss, and modify user-generated content Kietzmann et al (2011:241). Facebook, Pinterest, Blogger, YouTube, Vimeo to name a few.

Q.1 Which social networking websites do you use? Please select all that apply.

☐ Facebook
☐ Twitter
☐ Blogs (that you author or contribute to – Wordpress, TypePad, Blogger, etc.)
☐ Social Media sharing (Instagram, Flickr, YouTube, Vimeo, Pinterest, etc.)
☐ Wikis
☐ Online gaming
☐ Other  ____________________________________________________________
                                                             __________

Q.2 Please select all the social networks for which you have created a personal profile? Please select all that apply.

☐ Facebook
☐ Twitter
☐ Instagram
☐ Pinterest
☐ Wordpress, TypePad or Blogger
☐ Youtube or Vimeo
☐ Other  ____________________________________________________________
                                                             __________

Q.3 How many hours do you spend on social networks every day?

☐ 0-1
☐ 1-2
☐ 2-3
☐ 3-4

Q.4 How would you rate your weekly level of activity on social networks?

☐ Very High
☐ High
☐ Moderate
☐ Low
☐ Very low
Q.5 Why do you use an online social network? Please select all that apply.

- To keep in touch with friends and family
- To meet new people
- To share photos, videos and music
- To play games
- To discover new music, books, films and other entertainment such as musical and drama performances, social events etc
- To promote a business or cause
- To make professional and business contacts
- Other

______________________________________________________

Q.6 When using a social network which of these areas are most important to you right now?
Please select all that apply.

- To keep in touch with friends and family
- To meet new people
- To share photos, videos and music
- To play games
- To discover new music, books, films and other entertainment such as musical and drama performances, social events etc
- To promote a business or cause
- To make professional and business contacts
- Creating new content
- Blogging basics
- Other

______________________________________________________

Q.7 How often do you use, contribute or create new content on each of the following social networking websites:

<table>
<thead>
<tr>
<th></th>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1</td>
<td>Create or contribute to a blog</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.2</td>
<td>Create or contribute to a wiki</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.3</td>
<td>Create a podcast</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.4</td>
<td>Upload video (e.g. YouTube, Vimeo)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.5</td>
<td>Upload photos (flickr, Picasa)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.6</td>
<td>Send tweets via Twitter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q.8 Many students use social networking sites (such as Facebook, MySpace) to keep in touch with friends and acquaintances. If you use such a site, how would you feel about efforts to integrate that site into your academic experience – seeing announcements from your classes in Facebook, for instance? In response to student privacy concerns, however, educators would use technical means to prevent instructors and administrators from gaining access to students’ personal information (e.g. their Facebook profiles and walls).

☐ Positive: explain-___________________________________________________________

☐ Negative: explain-___________________________________________________________

Q.9 Do you use any other social networking websites that have not been mentioned above?

------------------------------------------

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Dear Sir/ Madam,

Introduction

Thank you for participating in this research. This questionnaire is part of a study designed to determine whether the use of smartphones and social media as teaching tools for visual media students at Tshwane University of Technology can enhance the learning and technology requirements of ‘net generation’ students. The educational technology questionnaire should only take up to 10 minutes of your time. Your cooperation is greatly appreciated.

General Instructions

The following instructions and conditions must be understood by all respondents:

(g) Answer from your own perspective, as honestly as possible;
(h) Please complete all sections, do not leave any unanswered questions;
(i) Please note that your name is not required nor is it requested, hence confidentiality is assured.

Thank you.

Sincerely,

Angelica Warchal
Educational technology is designed to improve the learning experience for students in a variety of ways.

1. Please rate each of the following statements about the role educational technology has played in your learning experiences at the TUT.

1.1 How often do you use the following when communicating with your Lecturers about class work?

<table>
<thead>
<tr>
<th></th>
<th>Daily</th>
<th>Weekly</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1 Face-to-face either before or after class</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.2 Face-to-face using office hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.3 Phone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.4 Personal/individual email</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.5 Mass email or announcement (to the whole class)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.6 Updates/announcements on course myTUTor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.7 Instant Messaging (whatsapp, bbm etc.)</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

1.2 What, if anything, would you change about how you communicate with your lecturers about your class work?

_________________________________________ ______________________

--------------------------------

IN-CLASS TECHNOLOGIES

2. For each of the following, please do two things:

2.1 Indicate how often you use this Technology in your classes, and Frequency of use

2.2 Evaluate the importance of this technology for your learning.

<table>
<thead>
<tr>
<th></th>
<th>All classes</th>
<th>Regularly, but not all classes</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never, don’t want to use</th>
<th>Never, but want to use</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.1 Laptop/netbook (for lecture notes, slides etc)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.2 Tablet device (e.g. iPad, Galaxy, Blackberry playbook)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.3 Digital Camera or digital video camera (not part of a Smartphone)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Not at all important</th>
<th>Somewhat unimportant</th>
<th>Important</th>
<th>Somewhat important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.1 Laptop/netbook (for lecture notes, slides etc)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2.2</td>
<td>Tablet device (e.g. iPad, Galaxy, Blackberry playbook)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>-------</td>
<td>------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2.3</td>
<td>Digital Camera or digital video camera (not part of a Smartphone)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2.4</td>
<td>Wi-Fi access (e.g. in practical and theory classes)</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

2.3 What would enable you to use (or use more) of your own technologies in-class? Check all that apply.

- Wi-Fi access
- Plugs
- Space
- Safety
- Other

---

IN- AND-OUTSIDE OF CLASS USE OF VISUAL MEDIA

3.1 Currently, do your Lecturers use any form of visual media or visual aids in your practical and theory classes?

- Yes
- No

3.2 If yes, what types of visual media or visual aids do your Lecturers use in practical and theory classes?

- PowerPoint presentations, pictures, slides
- Documentaries
- Movies
- Virtual Museum tours, Exhibits, Points of Special Interest or Real-Time journeys
- Other:

3.3 Do you know and use websites such as www.TED.org, www.99u.com, www.gelconference.com?

- I regularly visit www.TED.org
- I regularly visit www.99U.com
- I regularly visit www.gelconference.org
- I regularly visit all of the above
- Know of these sites, but have not visited any of the above mentioned
- No
- Other:

3.4 Have any of your Lecturers used video clips from conferences such as TED, 99u or Gel Conference as part of your lectures?

- Yes
- No

3.5 Have any of your Lecturers used documentaries or a documentary series as part of your lectures?

- Yes
- No

3.6 Do you know and watch any documentaries produced by National Geographic, BBC or documentaries available on websites such as http://www.artbabble.org/, http://www.ubuweb.com/, http://topdocumentaryfilms.com/ ?

- Yes
- No

3.7 Do you think films could enhance your learning experience?

- Yes
- No
3.8 Have any of your Lecturers used virtual Museum tours, Exhibits, Points of Special Interest and Real-Time journeys as part of your lectures?

☐ Yes  ☐ No

3.9 Do you know that over 300 Museums, Exhibits, Points of Special Interest and Real-Time journeys offer online multimedia guided tours on the Web (http://www.virtualfreesites.com/museums.museums.html)?

☐ Yes  ☐ No

4. On-campus facilities

4.1 Do you ever use the Arts Campus ERC?

☐ Yes  ☐ No

4.2 If, yes how often?

☐ Once a day  ☐ 2-3 times a week  ☐ Once a week  ☐ 2-3 times a month  ☐ Once a month  ☐ 2-3 times a semester  ☐ Almost never

4.3 Do you ever use the Arts Campus Library?

☐ Yes  ☐ No

4.4 If, yes how often?

☐ Once a day  ☐ 2-3 times a week  ☐ Once a week  ☐ 2-3 times a month  ☐ Once a month  ☐ 2-3 times a semester  ☐ Almost never

5. MyTUTor

5.1 MyTUTor has made it possible for lecturers to post subject-related materials (such as PowerPoint slides, course readings, or links to relevant websites) available to students online. How many of your lecturers use MyTUTor?

☐ None  ☐ 1-2  ☐ 2-3  ☐ 3-4  ☐ 4-5

5.2 If you answered between 1-5, how often do you access online course materials?

☐ Once a day  ☐ 2-3 times a week  ☐ Once a week  ☐ 2-3 times a month  ☐ Once a month  ☐ 2-3 times a semester  ☐ Almost never
5.3 MyTUTor can be used to supplement or enhance a face-to-face class. Which of the following best describes your preference with regard to the use of educational technology in your classes? Please only mark one.

- I prefer having a class that makes use of a small amount of technology (e.g. PowerPoint in class)
- I prefer having a class that makes use of a moderate amount of technology (e.g. PowerPoint in class, some content on myTUTor, e-mail to communicate with lecturer, class lecture notes online)
- I prefer having a class that makes use of a large amount technology (e.g. PowerPoint, audio and video presentations in class, e-mail to communicate with lecturer, lecture notes online, lecture podcast available online, online discussions, class wiki’s, class blog).
- I have no preference

6. Technology

6.1 Owning

Which of the following devices do you own (or have regular access to), and which would you like to own? Mark one answer for each

<table>
<thead>
<tr>
<th>Own</th>
<th>Don’t own but would like to</th>
<th>Don’t own and don’t want to</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1.1 Tablet device (e.g. iPad, Galaxy, Blackberry playbook)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1.2 Audio player (e.g. mp3 player, iPod)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1.3 Laptop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1.4 Netbook</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1.5 Digital Camera or digital video camera (not part of a smartphone)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1.6 e-book reader (kindle, Gobii, Elonex)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.2 Usefulness.

How useful do you think each of the following educational technologies are? Could these technologies possibly add value to your lectures? Please rate the usefulness of each technology?

<table>
<thead>
<tr>
<th>Very useful</th>
<th>Slightly useful</th>
<th>Not at all useful</th>
<th>Never used</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2.1 PowerPoint presentations in class and available on myTUTor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.2.2 In-class use of visual media (e.g. subject related films and documentaries, ted talks)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.2.3 Lecture Podcasts available on myTUTor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.2.4 Online tests on myTUTor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.2.5 Subject blog on myTUTor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.2.6 Subject wiki on myTUTor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.2.7 myTUTor-based discussions (e.g. to discuss class material with other students)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.2.8 E-mail to communicate with lecturers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.2.9 Instant messaging to communicate with</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### fellow classmates

<table>
<thead>
<tr>
<th>6.2.10</th>
<th>Digital texts books</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2.11</td>
<td>Other</td>
</tr>
</tbody>
</table>

### 6.3 Technology comfort levels

How comfortable are you when using each of the following technologies? Please rate your level of comfort in each area?

<table>
<thead>
<tr>
<th></th>
<th>Very comfortable</th>
<th>Comfortable</th>
<th>Uncomfortable</th>
<th>Very uncomfortable</th>
<th>Never used/don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.3.1</td>
<td>Editing video and audio with multimedia programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3.2</td>
<td>Creating animations with animation software</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3.3</td>
<td>Modifying images with graphics programs such as Photoshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3.4</td>
<td>Contributing to wikis (online collaboration tools)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3.5</td>
<td>Contributing to blogs (online journaling tools)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3.6</td>
<td>Using social bookmarking/tagging websites such as Pinterest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3.7</td>
<td>Using microblogging services like Twitter, Tumblr, Pownce</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3.8</td>
<td>Using voice-over-IP services like Skype, Facetime</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3.9</td>
<td>Creating presentations with software such as PowerPoint or Keynote</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 6.4 Technology use

To what degree does each of the following factors present a problem for the use of educational technologies in your classes?

<table>
<thead>
<tr>
<th></th>
<th>Large degree</th>
<th>Moderate degree</th>
<th>Small degree</th>
<th>Not a problem at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4.1</td>
<td>Problems with my computer/laptop</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.2</td>
<td>Cost of software</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.4.3 Problems using myTUTor
6.4.4 Instructors not using educational technologies at all
6.4.5 Instructors not using educational technologies well
6.4.6 Amount of time needed to learn how to use educational technologies
6.4.7 Amount of time needed to use educational technologies
6.4.8 Access to a wireless network on campus
6.4.9 Successfully connecting to a wireless network on campus
6.4.10 Slowness of wireless network connection

7. Open-ended questions

7.1 Individuals have many different types of learning styles. Do you think educational technologies may help you learn in a more personalized way? What is the most effective use of educational technology that you’ve encountered while you have been a student at the Tshwane University of technology; technology used in class and outside of class?

_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

7.2 Many universities are trying to make a variety of resources available to students by means of handheld mobile devices like Smartphone’s. If you own such a device, please describe your experience accessing Tshwane University of Technology resources with it. What resources, including class materials, have you accessed with your device? Was your experience a good one? What other resources do you think should be made available by means of your mobile device?

_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

7.3 Do you have any further comments or suggestions regarding using educational technology at the Tshwane University of Technology?
ANNEXURE D

TUT Research and Ethics Committee Approval letter

Research Ethics Committee

The TUT Research Ethics Committee is a registered Institutional Review Board (IRB 0005968) with the US Office for Human Research Protections (OHRP) (Expires 19 Jan 2014). Also, it has Federal Wide Assurance for the Protection of Human Subjects for International Institutions (FWA 0001 501) (Expires 31 Jan 2014). In South Africa it is registered with the National Health Research Ethics Council (REC-160509-21).

August 29, 2013

Ms A Warchal
C/o Prof M Nikomo & Ms A van Heerden
Dept of Fine and Applied Arts
Faculty of the Arts

Dear Ms Warchal,

**Decision: Approval with Recommendations**

**Name:** Warchal A  
**Proposal:** The use of digital technologies and visual media as teaching tools for visual media students at TUT  
**Qualification:** M Tech (Textile Design and Technology)  
**Supervisor:** Prof M Nikomo  
**Co-supervisor:** Ms A van Heerden

Thank you for submitting the revised project documents for ethics clearance by the TUT Research Ethics Committee (REC). In reviewing the application, the comments/notes below are tabled for your consideration/attention/notification:

- **Proposal, Empirical Data Sources, Mock Interventions**
  
  - The clarification paragraphs are in order and duly noted. The REC wishes to sensitise the researcher to be vigilant throughout the mock intervention stage in order to identify, monitor and address any potential negative outcomes or academic disadvantage for the participating students. The researcher has an ethical obligation to manage all potential risk/s and/or negative outcomes, as well as to adequately protect the students’ academic vulnerability throughout the research project; the academic interests of the research participants must in all cases take priority over the research interests of the project.

  - **Research participants groups.** The inclusion of additional students and lecturers from Multimedia and Graphic Design to the original sample of students and lecturers from Fine and Applied Arts in

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172
order and duly noted. Note that formal permission letters from the respective Heads of Department need to be submitted to the REC for notification and archiving purposes.

- Information Leaflet & Informed Consent

  > "What are you required to do in the study" section. All the required revisions are in order and duly noted.

  > "Who can you contact for additional information" section. The inclusion of the contact details for the TUT REC is in order and duly noted.

  > Conflict of Interest. The declaration of the researcher’s conflict of interest is in order and duly noted.

An expedited review panel of the Research Ethics Committee of Tshwane University of Technology reviewed the revised documents on August 25, 2013. Approval with Recommendations is granted to the study. The decision will be tabled at the next REC meeting on September 16, 2013, for notification.

The proposed research project may now continue with the proviso that:

1) The researcher/s will conduct the study according to the procedures and methods indicated in the approved proposal, particularly in terms of any undertakings and/or assurances made regarding informed consent and the confidentiality of the collected data.

2) The proposal (inclusive of the applicable information leaflet/s, informed consent document/s, interview guide/s and/or questionnaire/s) will again be submitted to the Committee for prospective ethical clearance if there are any substantial changes from the existing proposal, particularly if those changes affect any of the study-related risks for the research participants.

3) The researcher will act within the parameters of any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.

Note:
The reference number [top right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants.

Annual review:
1. The formal ethics approval of all research projects need to be renewed on an annual basis.
2. The current ethics approval expiry date for this project is 31 December 2014.
3. No research activities may continue after the ethics approval expiry date indicated on the formal Research Ethics Committee approval letter.
4. The Research Ethics Progress Report (electronic copy available at the following website: http://www.tut.ac.za/Other/mineew/ResearchEthicsCommittees/Pages/default.aspx) constitutes an application for such ethics approval renewal and must be submitted to the REC by November 1, 2014.

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Yours sincerely,

WA HOFFMANN  (Dr)
Chairperson: Research Ethics Committee
[Ref#2013=07=008=Warchal]
ANNEXURE E

LETTER OF INFORMED CONSENT

Faculty of the Arts

Department of Fine and Applied Arts

INFORMATION LEAFLET AND INFORMED CONSENT

PROJECT TITLE: THE USE OF SMARTPHONES AND SOCIAL MEDIA AS TEACHING TOOLS FOR VISUAL MEDIA STUDENTS AT TSHWANE UNIVERSITY OF TECHNOLOGY

Primary investigator: Angelica Warchal (TUT)
Study leader: Prof M Nkomo (TUT)
Co-study leader: Ms A van Heerden (TUT)

Dear research participant,

You are invited to participate in a research study that forms part of my formal MTech studies. This information leaflet will assist you to decide whether you would like to participate. Participation is voluntary, and you will not be penalized if you do not participate. Before you agree to participate, you should fully understand what is involved. You should not agree to participate unless you are completely satisfied with all aspects of the study.
WHAT THIS STUDY IS ABOUT

Outside the classroom, students constantly interact with technologies such as smartphones, iPods, the Internet and social networking sites - the researcher has identified that these technologies could possibly enhance learning in the classroom. Furthermore, the researcher has identified that to move beyond the bounds of the classroom walls it is important to investigate the potential advantages of multiple learning styles through the use of smartphones and social media.

Two separate groups of second-year students will be approached as case studies. The first group will consist of second-year Fine and Applied Arts students and will be approached for their mixed-media method to art making. The second group will consist of second-year Multimedia students and will be approached for their electronic media method to digital design.

An integral part of this study will be to evaluate current face-to-face pedagogical practices. Furthermore, this investigation could provide a deeper understanding of the problems and opportunities that face teachers when applying smartphones and social media as teaching tools. Thus, this research may provide a baseline for other design education researchers as well as provide the opportunity to examine existing student attitudes towards the use of smartphones and social media as teaching tools.

The aim of this research is to investigate whether smartphones and social media can contribute to current design education teaching methods for visual media students at TUT. The sub-aims identified in order to bear out the aim of the study are:

- **Sub-aim one**, to create a theoretical context of the design education teaching methods currently employed for visual media students at TUT.
- **To investigate empirically**, through the use of case studies, whether there is a need for the incorporation of smartphones and social media as teaching tools for visual media students.
- **Apropos data interpreted from the case studies**, to suggest methods of applying smartphones and social media as teaching tools for visual media students at TUT.
WHAT YOU WILL BE REQUIRED TO DO IN THIS STUDY

- To sign this informed consent form
- You will need to answer three paper-based questionnaires in order to establish the following:
  1. What type of access do students have to different types of technologies outside of class? These technologies would include smartphones, desktop computers, laptops, digital cameras and Internet access.
  2. What number of students and lecturers engage with social media for personal use? These include Facebook, YouTube, Pinterest and blogging.
  3. What types of educational technologies are lecturers currently using inside and outside their classrooms? These would include in-class technologies such as laptops, tablets and the availability of Wi-Fi in class and on campus; the use of visual media such as various subject-related films, documentaries, digitally recorded conference proceedings and virtual museum tours; the use of myTUTor by lectures to supplement or enhance face-to-face interactions.

Questionnaires will contribute to the data needed for this study to be able to make suggestions for new teaching tools. Approximately 30 minutes will be needed to complete all three questionnaires and can be answered in a manner convenient to you or at a designated venue at the Faculty of the Arts after your lectures are completed.

CONDITIONS THAT MAY EXCLUDE YOU FROM THIS STUDY

None

STUDY PROCEDURES THAT MAY RESULT IN PERSONAL RISK, DISCOMFORT OR INCONVENIENCE

Questionnaires: The study and procedures involve no foreseeable physical discomfort or inconvenience to you or your family.

POTENTIAL BENEFITS THAT MAY COME FROM THE STUDY

- As a result of your participation in the study the data generated through the questionnaires will add to the growing body of research that is helping to remodel current education approaches.
• Findings from this investigation will help the researcher to evaluate and make suggestions which current face-to-face pedagogical practices might possibly be improved through the use of smartphones and social media as teaching tools.
• Findings from the investigation will contribute to the transformation in education that is currently taking place through the development of new learning technologies.

FINANCIAL COMPENSATION OR INCENTIVE FOR PARTICIPATING IN THE STUDY

Please note that you will not receive financial compensation for participating in the study.

YOUR RIGHTS AS A PARTICIPANT IN THE STUDY

Your participation in this study is entirely voluntary. You have the right to withdraw at any stage without any penalty or future disadvantage whatsoever.

Should you elect to be excluded from the questionnaire, interview or mock intervention phase of the investigation, you may do so. It must be noted that only people directly involved in the experiment will be privy to such recordings and/or information. Such people will be identified to you before commencement of the experiments.

HAS THE STUDY RECEIVED ETHICAL APPROVAL?

Yes. The Faculty Research and Innovation Committee as well as the Research Ethics Committee of the Tshwane University of Technology have approved the formal study proposal. The ethics clearance number is Ref #: REC2013/07/008

WHO CAN YOU CONTACT FOR ADDITIONAL INFORMATION REGARDING THE STUDY?

The primary investigator, Ms Angelica Warchal, may be contacted at 084 514 1865. Should you have any questions regarding the ethical aspects of the study, you can contact the chairperson of the TUT Research Ethics Committee, Dr WA Hoffmann, during office hours at Tel (012) 382-6265/46, E-mail hoffmannwa@tut.ac.za. Alternatively, you can report any serious unethical behaviour at the University’s Toll Free Hotline 0800 21 23 41.

DECLARATION: CONFLICT OF INTEREST

The researcher is currently employed by TUT as the research assistant of Professor MNkomo – Executive Director: Internationalization and Provisioning for Senior Students and Scholars. Therefore, the researcher has no direct collegial relationship with any Faculty of
the Arts staff members nor does she share an instructional relationship with any of the potential student participants. There is no conflict of interest that may influence the study procedures, data collection, data analysis and publication of results. In addition, no publication prohibitions, conditions or limitations were placed on the researcher.

A FINAL WORD

Your cooperation and participation in the study will be greatly appreciated. Please sign the informed consent if you agree to partake in the study. In such a case, you will receive a copy of the signed informed consent from the researcher.

INFORMED CONSENT

I hereby confirm that I have been adequately informed by the researcher about the nature, conduct, benefits and risks of the study. I have also received, read and understood the above written information. I understand that my participation is voluntary and that I may, at any stage, without prejudice, withdraw my consent and participation in the study.

Research participant's name:--------------------------------------------------------

Research participant’s signature:--------------------------------------------------------

Date:--------------------------------

Researcher’s name:------------------------------------------------------------------------

Researcher’s signature:---------------------------------------------------------------------

Date:--------------------------------
ANNEXURE F
Letter of permission Fine and Applied Arts

Faculty of the Arts
Department of Fine and Applied Arts
Tel: +27 12 382 6021
Fax: +27 12 382 6184

June 2013

Dear Ms Warchal

Permission to administer questionnaires, conduct semi-structured interviews and implement mock interventions with our students

We have taken your request to administer questionnaires, conduct semi-structured interviews and implement mock interventions with our students (specifically with the Art Theory 2 [ARH 210T] group), into consideration. It is our understanding that you wish to determine their approach to the use of digital technologies as teaching tools for your M Tech Textile Design and Technology. We hereby grant you permission to conduct your research accordingly, with access to the specified group.

We wish you all success with your research.

If any further information is required, do not hesitate to contact us.

Yours sincerely,

R. Kruger.

Runette Kruger
Head of Department
Department of Fine and Applied Arts
Faculty of the Arts
Tshwane University of Technology
Tel: (012) 382 6021
Fax: (012) 382 6184
krugerr@tut.ac.za
ANNEXURE G

Letter of permission Multimedia

Tshwane University of Technology

Faculty of the Arts
Department of Visual Communication

June 2013

Dear Ms Warchal

Permission to administer questionnaires, conduct semi-structured interviews and implement mock interventions with our second year students.

We have taken your request to administer questionnaires, conduct semi-structured interviews and implement mock interventions with our second year students for research towards completion of your M Tech Textile Design and Technology. We hereby grant you permission to conduct your research accordingly, with access to the specified group.

We wish you all success with your research.
If any further information is required, do not hesitate to contact us.

Mr H Bates
Acting HOD: Department of Visual Communication
Faculty of the Arts
Tshwane University of Technology
ANNEXURE H

HEDA Student Headcounts Subject Examination Statistics & per Ethnic Group and Gender: Fine and Applied Arts

**Subject Examination Statistics**

<table>
<thead>
<tr>
<th>Report Parameters:</th>
<th>2013</th>
</tr>
</thead>
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<tr>
<td>Department (Subject) (Only)</td>
<td>FINE AND APPLIED ARTS</td>
</tr>
<tr>
<td>Subject Code</td>
<td>ARH210T</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Ethnic Group Grouping</th>
<th>Ethnic Group</th>
<th>Normal Registrations</th>
<th>Normal Registrations Except All Cancellations</th>
<th>Exam Admissions</th>
<th>Exam Admission Rate</th>
<th>Subjects Passed</th>
<th>Distinctions</th>
<th>Distinction Rate</th>
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<td>45</td>
<td>41</td>
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<td>6</td>
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</tr>
<tr>
<td></td>
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<tr>
<td>TOTAL</td>
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<td></td>
<td>45</td>
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<td>41</td>
<td>100.00%</td>
<td>31</td>
<td>10</td>
<td>24.39%</td>
</tr>
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### Student Headcounts per Ethnic Group and Gender

**Report Parameters:**
- **Year:** 2013
- **Approved Qualification Name:** N DIP FINE ART

### Table
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<th>Qualification Code</th>
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<th>Age Group</th>
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<td>26-30</td>
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<td>11</td>
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<td>11</td>
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<tr>
<td></td>
<td>31-45</td>
<td></td>
<td></td>
<td>6</td>
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<td>7</td>
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<td>12</td>
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</table>

# ANNEXURE I

HEDA Student Headcounts per Ethnic Group and Gender: Multimedia

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### Student Headcounts per Ethnic Group and Gender

<table>
<thead>
<tr>
<th>Campus</th>
<th>Qualification Code</th>
<th>Gender</th>
<th>Age Group</th>
<th>Female</th>
<th>Male</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BLACK</td>
<td>COLOURED</td>
<td>INDIAN</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BLACK</td>
<td>COLOURED</td>
<td>INDIAN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td></td>
<td>TOTAL</td>
<td>TOTAL</td>
<td>TOTAL</td>
</tr>
<tr>
<td>Arts Campus Pretoria</td>
<td>6DUM04</td>
<td>F</td>
<td>19-20</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>19-20</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>21-22</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>23-24</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>25-29</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>19-20</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>21-22</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>23-24</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>25-29</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>30-34</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOTAL</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>
## ANNEXURE J

**Redesign Guide for Blended Learning**

1. **Analysis Phase** (understanding the big picture and identifying what you want to preserve and transform in your course redesign)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Comments</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. What do you want your students to know when they have finished taking your blended learning course (e.g., key learning outcomes – knowledge, skills, and attitude)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. What do you want from your existing course format?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. What would you like to transform?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. **Design Phase** (identifying learning activities, assessment plans, and key components of your course)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Comments</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Blended teaching is not just a matter of transforming a portion of your current course to the Web. Instead it involves developing challenging and engaging learning activities that occur within and outside of the classroom. What types of learning activities will you design that integrates face-to-face (F2F) and time-out-of-class (TOC) components?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. What means will you use to assess these integrated learning activities?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. What are your expectations for student participation within and outside of the classroom? How will you configure and schedule the percent and of time between the F2F and TOC components of your course?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. How will you use your course outline to communicate the learning outcomes, activities, assessment plan, schedule, and key content topics to your students?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. **Development Phase** (creating the learning activities, assessment plan, and content for your course)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Comments</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. How will you use a learning management system (i.e.,</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
blackboard) to create a structure for your course (e.g., content modules, key topic areas)?

b. What existing resources can you use for your blended course (e.g., existing handouts, digital learning objects)?

c. What new learning activities and/or content do you need to develop for your course?

4. Implementation Phase (actual course delivery—“where the rubber hits the road”)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Comments</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Have you contacted the Registrar’s Office about scheduling and approving the format of your blended learning course?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. When students are involved in TOC activities within a blended course, they frequently have problems scheduling their work and managing their time. What plans do you have to help students address these issues?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Students sometimes have difficulty with Blackboard and other educational technologies. What proactive steps can you take to assist students to become familiar with these Forms of technology? If students need help with technology in your course, how will you provide support?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Evaluation Phase (determining the effectiveness of the blended learning course and disseminating the results)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Comments</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. What kind of assessment and data collection are you planning in order to effectively evaluate your project and inform efforts to improve the course in future offerings (e.g., midterm evaluations, peer-observations and feedback, journal, teaching assessments, and evaluations of student learning, student ratings of instruction)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Assuming evaluation activities yield information to suggest your blended learning course should continue, what measures will you and your faculty or department take to ensure the continuation and improvement of the course? How will you share what you learn with others in your faculty?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### ANNEXURE K

#### TABLE 1.1: Smartphone usage

Excluding making phone calls, how often do you use your smartphone in the following situations?

<table>
<thead>
<tr>
<th>Situation</th>
<th>Multiple time a day</th>
<th>daily</th>
<th>weekly</th>
<th>rarely</th>
<th>never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idle time at work or school (e.g. during breaks, lunch, boring meetings/classes, etc.)</td>
<td>72.3%</td>
<td>19.1%</td>
<td>2.1%</td>
<td>4.3%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Riding the bus, taxi, or in car as passenger</td>
<td>51.1%</td>
<td>17%</td>
<td>4.3%</td>
<td>25.5%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Waiting in line (e.g. coffee shop, grocery store, for a movie to start, etc.)</td>
<td>38.3%</td>
<td>31.9%</td>
<td>6.4%</td>
<td>17%</td>
<td>6.4%</td>
</tr>
<tr>
<td>For TUT/course related tasks</td>
<td>17.4%</td>
<td>23.9%</td>
<td>15.2%</td>
<td>26.1%</td>
<td>17.4%</td>
</tr>
<tr>
<td>While you are driving</td>
<td>2.1%</td>
<td>10.6%</td>
<td>2.1%</td>
<td>31.9%</td>
<td>53.2%</td>
</tr>
</tbody>
</table>

#### TABLE 1.2: Information consumed through the use of a smartphone

How often are you consuming different types of information on your Smartphone?

<table>
<thead>
<tr>
<th>Information type</th>
<th>Multiple time a day</th>
<th>daily</th>
<th>weekly</th>
<th>rarely</th>
<th>never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text messaging (SMS)</td>
<td>53.2%</td>
<td>27.7%</td>
<td>8.5%</td>
<td>8.5%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Reading e-mail</td>
<td>29.8%</td>
<td>36.2%</td>
<td>17%</td>
<td>8.5%</td>
<td>8.5%</td>
</tr>
<tr>
<td>Searching for specific information</td>
<td>34.8%</td>
<td>30.4%</td>
<td>19.6%</td>
<td>15.2%</td>
<td>0%</td>
</tr>
<tr>
<td>Talking on the phone</td>
<td>34.8%</td>
<td>41.3%</td>
<td>19.6%</td>
<td>4.3%</td>
<td>0%</td>
</tr>
<tr>
<td>Viewing content on social networks</td>
<td>59.6%</td>
<td>23.4%</td>
<td>6.4%</td>
<td>8.5%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Maps, GPS</td>
<td>2.1%</td>
<td>6.4%</td>
<td>17%</td>
<td>57.4%</td>
<td>17%</td>
</tr>
<tr>
<td>Communicating with friends on social networks</td>
<td>66%</td>
<td>23.4%</td>
<td>6.4%</td>
<td>4.3%</td>
<td>0%</td>
</tr>
<tr>
<td>Listening to music</td>
<td>48.9%</td>
<td>29.8%</td>
<td>12.8%</td>
<td>4.3%</td>
<td>4.3%</td>
</tr>
<tr>
<td>Watching video (e.g. YouTube, Vimeo etc.)</td>
<td>10.6%</td>
<td>21.3%</td>
<td>17%</td>
<td>38.3%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Listening to audio podcasts</td>
<td>4.3%</td>
<td>10.6%</td>
<td>10.6%</td>
<td>48.9%</td>
<td>25.5%</td>
</tr>
<tr>
<td>Content Type</td>
<td>Multiple time a day</td>
<td>Daily</td>
<td>Weekly</td>
<td>Rarely</td>
<td>Never</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>---------------------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>Reading books (e.g. Kindle Reader app, iBooks)</td>
<td>12.8%</td>
<td>4.3%</td>
<td>12.8%</td>
<td>23.4%</td>
<td>46.8%</td>
</tr>
<tr>
<td>Text messaging (SMS)</td>
<td>45.7%</td>
<td>32.6%</td>
<td>13%</td>
<td>6.5%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Writing or responding to e-mail</td>
<td>23.9%</td>
<td>23.9%</td>
<td>21.7%</td>
<td>19.6%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Taking photos</td>
<td>34%</td>
<td>31.9%</td>
<td>17%</td>
<td>14.9%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Taking videos</td>
<td>12.8%</td>
<td>6.4%</td>
<td>25.5%</td>
<td>51.1%</td>
<td>4.3%</td>
</tr>
<tr>
<td>Updating Facebook status</td>
<td>14.9%</td>
<td>17%</td>
<td>23.4%</td>
<td>31.9%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Tweeting</td>
<td>10.6%</td>
<td>6.4%</td>
<td>8.5%</td>
<td>17%</td>
<td>57.4%</td>
</tr>
<tr>
<td>Audio recording, creating podcasts</td>
<td>2.1%</td>
<td>8.5%</td>
<td>4.3%</td>
<td>40.4%</td>
<td>44.7%</td>
</tr>
</tbody>
</table>

**TABLE 1.3:** Information created through the use of a smartphone

How often do you create different types of content on your Smartphone?
ANNEXURE L

TABLE 1.1: The use of a social media as rated by importance

<table>
<thead>
<tr>
<th>Activity</th>
<th>Series 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>To keep in touch with friends and family</td>
<td>77.10%</td>
</tr>
<tr>
<td>To meet new people</td>
<td>20.80%</td>
</tr>
<tr>
<td>To share photos, videos and music</td>
<td>56.30%</td>
</tr>
<tr>
<td>To play games</td>
<td>12.50%</td>
</tr>
<tr>
<td>To discover new music, books, films and other enter...</td>
<td>60.40%</td>
</tr>
<tr>
<td>To promote a business or cause</td>
<td>35.40%</td>
</tr>
<tr>
<td>To make professional and business contacts</td>
<td>39.60%</td>
</tr>
<tr>
<td>Creating new content</td>
<td>22.90%</td>
</tr>
<tr>
<td>Blogging basics</td>
<td>14.60%</td>
</tr>
<tr>
<td>Other</td>
<td>10.40%</td>
</tr>
</tbody>
</table>

FIGURE 1.1: Use of social networking websites as reported by visual media students at TUT
FIGURE 1.2: Average percentage of time spent of each social networking website per individual
**ANNEXURE M**

**TABLE 1.1**: Knowledge of online museums exhibits, points of special interest and real-time journeys

| Do you know that over 300 Museums, Exhibits, Points of Special Interest and Real-Time journeys offer online multimedia guided tours on the Web ([http://www.virtualfreesites.com/museums.museums.html](http://www.virtualfreesites.com/museums.museums.html))? | YES 10.9% | NO 89.1% |