

**DIRECTIVES FOR THE APPLICATION OF SOCIAL MEDIA AS  
COMPUTER-MEDIATED COMMUNICATION IN SOUTH AFRICAN  
HIGHER EDUCATION**

by

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**2014**

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## **DECLARATION**

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I hereby declare that the work submitted here is the result of my own independent investigation. Where help was sought, it has been acknowledged. I further declare that this work is submitted for the first time at this university and the Department of Communication Science towards a Ph.D. degree and that it has never been submitted to any other university/faculty/department for the purpose of obtaining a degree.

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# For Kyle

"IT ALWAYS SEEMS IMPOSSIBLE UNTIL IT'S DONE."

Nelson Mandela

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# APPENDICES

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Appendix A: Alphabetical list of documents included in systematic analysis 317

## LIST OF ACRONYMS AND ABBREVIATIONS

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<b>ARPA</b>	Advanced Research Projects Agency
<b>ASTD</b>	American Society of Training and Documentation
<b>CMC</b>	Computer-mediated Communication
<b>CRD</b>	Centre for Reviews and Dissemination
<b>CS</b>	Communication Science
<b>CTL</b>	Centre for Teaching and Learning
<b>DHET</b>	Department of Higher Education and Training
<b>EBSCO</b>	Elton B Stephens Company
<b>ERIC</b>	Education Research Information Centre
<b>FtF</b>	Face to face
<b>GST</b>	General System Theory
<b>HE</b>	Higher Education
<b>HEI</b>	Higher Education Institutions
<b>HTML</b>	Hyper Text Markup Language
<b>HTTP</b>	Hyper Text Transfer Protocol
<b>ICT</b>	Information and Communication Technology
<b>IDRC</b>	International Development Research Centre
<b>IM</b>	Instant Messaging
<b>IRC</b>	Internet Relay Chat
<b>LMS</b>	Learning Management System
<b>MMOGs</b>	Massively Multiplayer Online Games
<b>MMVWs</b>	Massively Multiplayer Virtual Worlds
<b>OML</b>	Online Markup Language
<b>OWL</b>	Web Ontology Language
<b>PDF</b>	Portable Document Format
<b>PMC-NCBI</b>	PubMed Central – <i>National Centre for Biotechnology Information</i>
<b>QDA</b>	Qualitative Data Analysis
<b>RDF</b>	Resource Description Framework
<b>RSS</b>	Real Simple Syndication / Rich Site Summary

<b>SIDE</b>	Social Identity of De-individuation Effects Model
<b>SIP</b>	Social Information Processing Theory
<b>SA</b>	South Africa
<b>SMS</b>	Short Messaging Service
<b>SN</b>	Social Network
<b>SNSs</b>	Social Networking Sites
<b>Tandfonline</b>	Taylor and Francis Online
<b>TB</b>	Terabytes
<b>TCP/IP</b>	Transmission Control Protocol / Internet Protocol
<b>UDL</b>	Universal Design for Learning
<b>UFS</b>	University of the Free State
<b>UGC</b>	User-generated Content
<b>UGT</b>	Uses and Gratifications Theory
<b>URL</b>	Uniform Resource Locator
<b>VoIP</b>	Voice over Internet Protocol
<b>WWW</b>	World Wide Web
<b>XML</b>	Extensible Markup Language
<b>ZiBs</b>	Zettabytes

## SUMMARY

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This study has been conducted from the disciplinary context of Communication Science (CS) and more specifically, the subfield of Computer-mediated communication (CMC). The field of application of the study is higher education and, specifically, the educational context of higher education (teaching and learning) with its specific users (learners and educators). As a result of the continuous developments in CMC technologies, research in the possible application of social media in HE has exploded. Unmanageable amounts of information have become available, making it difficult to keep up with primary research evidence about the way social media may be utilised in an educational context. In addition, available studies in this regard do not show any uniform theoretical basis, nor do they consider communication theory, or connections between communication and educational theories. These problems informed the decision to conduct a systematic review of selected studies on the topic and to summarise existing information about the use of CMC and social media in HE into directives for the utilisation of CMC and social media in South African higher education.

The literature review reflects the three angles from which the use of social media in HE had to be considered, referred to as three theoretical "lenses" in the study. The first lens, the "communication-centred lens", provides important background and theoretical perspectives (principles) on effective communication, which includes communication by means of social media. The second lens, the "social media-centred lens" provides focus on the social media landscape and recent and predicted developments in technology and social media. The third lens, the "education-centred lens", highlights the educational context through a discussion of applicable educational theory and principles. The many similarities and congruities between educational principles and the theories and principles derived from CS and CMC theories, provide a strong binding factor in the study. The literature review aided the compilation of a conceptual framework that guided the study and the ultimate compilation of a set of directives for effective teaching and learning using social media in higher education.

The empirical investigation took on the format of an extensive systematic analysis on 220 relevant research documents. Using inductive category coding, data were

categorised according to themes and then organised into data sets which were used for the analysis. The findings provide perspectives on the effective use of social media in the educational context, and the most effective social media tools to be used in this regard. Key perspectives gained from the analysis and the literature review are presented in an integrated framework from which 12 possible directives for the utilisation of CMC and social media technologies in South African higher education are proposed. The directives focused on: 1) Factors impacting on access to and effective use of social media technologies; 2) The role of the educator in the choice and use of applicable social media technologies; and 3) The effective use of social media technologies to ensure active learning.

The significance of the study lies in the contribution the study makes to the theory of CS and CMC, especially in regard to the use of social media in South African higher education. The study furthermore highlights the important link between Communication Science and Education as disciplines. The directives and other findings of the study, if appropriately disseminated, may also foster broad interest and contribute to a more extensive and effective application of social media in higher education worldwide.

**Key words/terms:**

computer-mediated communication, CMC, social media, Web 2.0, systematic review, Facebook, blogs, wikis, Millennials, higher education, teaching and learning

# OPSOMMING

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Hierdie studie is onderneem vanuit die Kommunikasiewetenskapdissipline, spesifiek vanuit die veld van Rekenaargebaseerde kommunikasie (RGK). Die toepassingsveld van die studie is hoër onderwys, by name die onderwyskonteks (onderrig en leer) met spesifieke gebruikers (leerders en opvoeders/dosente). As gevolg van die voortdurende veranderinge in rekenaargebaseerde kommunikasietegnologie, het navorsing in die moontlike toepassing van sosiale media in die hoër onderwys geweldig toegeneem. Groot hoeveelhede inligting is beskikbaar, wat dit moeilik maak om op datum te bly met primêre navorsingsbewyse wat handel oor die wyse waarop sosiale media in onderwysverband gebruik kan word. In aansluiting hierby toon die beskikbare studies in hierdie verband geen konsekwente teoretiese grondslag nie, en is dit ook nie op kommunikasieteorie, of op verbintenisse tussen kommunikasie- en onderwysteorieë gebaseer nie. Hierdie probleme het gelei tot die besluit om 'n sistematiese navorsingsonderzoek op geselekteerde studies, wat oor die onderwerp handel, uit te voer en om, gebaseer op die bestaande inligting oor die gebruik van GRK en sosiale media in hoër onderwys, 'n stel rigtingwysers vir die gebruik van RGK en sosiale media in Suid-Afrikaanse hoër onderwys op te stel.

Die literatuuroorsig reflekteer drie perspektiewe (in hierdie studie die drie teoretiese "lense" genoem) waaruit die gebruik van sosiale media in die hoër onderwys oorweeg kan word. Die eerste lens, die "kommunikasiegerigte lens", verskaf belangrike agtergrond- en teoretiese perspektiewe (beginsels) rakende effektiewe kommunikasie, wat ook op kommunikasie met behulp van sosiale media van toepassing is. Die tweede lens, die "sosiale media-gerigte lens", fokus op die sosiale media landskap en onlangse en voorspelde ontwikkelinge in tegnologie en sosiale media. Die derde lens, die "onderwysgerigte lens", belig die onderwyskonteks deur die bespreking van toepaslike onderwysteorieë en -beginsels. Die vele ooreenkomste tussen die onderwysbeginsels en die kommunikasie- en RGK teorieë en -beginsels, verseker 'n sterk bindende faktor in die studie. Die literatuuroorsig versterk die skep van 'n konseptuele raamwerk wat die studie en die uiteindelige saamstel van 'n stel rigtinggewers vir die effektiewe onderrig en leer deur die gebruik van sosiale media in die hoër onderwys ondersteun.

Die empiriese ondersoek is uitgevoer in die formaat van 'n omvattende sistematiese analise op die 220 fyngeselekteerde navorsingsdokumente. Deur middel van induktiewe kategoriekodering, is data volgens temas gekodeer en daarna in die datastelle georganiseer wat vir die analise gebruik is. Die bevindinge het perspektiewe op die effektiewe gebruik van sosiale media in onderwyskundige konteks geplaas, en wat die mees effektiewe sosiale media-tegnologie vir gebruik in dié verband is. Sleutelperspektiewe wat deur middel van die analise en die literatuurstudie geïdentifiseer is, word in 'n geïntegreerde raamwerk aangebied waaruit 12 moontlike rigtingwysers vir die gebruik van RGK- en sosiale media tegnologieë vir Suid-Afrikaanse hoër onderwys voorgestel word. Die rigtingwysers fokus op: 1) Faktore gerig op toegang tot en effektiewe gebruik van sosiale mediategnologieë; 2) Die rol van die opvoeder in die keuse en gebruik van toepaslike sosiale mediategnologieë; en 3) Die effektiewe gebruik van sosiale mediategnologieë om aktiewe leer te verseker.

Die belangrikheid van die studie berus op die bydrae wat die studie tot die teorie van Kommunikasiewetenskap en RGK maak, wat ook op die gebruik van sosiale media in Suid-Afrikaanse hoër onderwys van toepassing is. Die studie beklemtoon verder die belangrike verband tussen Kommunikasiewetenskap en Opvoedkunde as vakdissiplines. Die rigtingwysers, sowel as die ander bevindinge van die studie, indien op toepaslike wyse aangewend, kan wye belangstelling wek, en kan bydra tot 'n meer omvattende en effektiewe toepassing van sosiale media in die hoër onderwys wêreldwyd.

**Sleuterwoorde/-terme:**

Rekenaargebaseerde kommunikasie, RGK, sosiale media, Web 2.0, sistematiese analise, Facebook, wikis, Millenials, hoëronderwys, onderrig en leer

## CHAPTER 1

### ORIENTATION TO THE STUDY

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*“The basic idea of the Web is that of an information space through which people can communicate, but communicate in a special way: communicate by sharing their knowledge in a pool.”*

Tim Berners-Lee, 1996

#### 1.1 INTRODUCTION

Computer technology has permanently changed the ways in which people communicate: the World Wide Web (WWW) has become the primary source of information for most people, while Web 2.0-based social networking sites have become the main means of communication and interaction. Highly popular social media websites and applications (Facebook, Twitter, blogs, wikis, etc.) are constantly changing to accommodate the needs of users, while new applications are added daily to the repertoire of available computer-mediated communication (CMC) technologies. Institutions of higher education (HE) need to interact in innovative and stimulating ways with a generation of students (often referred to as “Millennials”) who are accustomed to these technologies. The use of CMC technologies and social media for learning is appealing to these students, and studies show that social media have a large potential for supporting and facilitating learning processes (Wilson 2004: 60; Harasim 2000: 59; Cochrane 2011: 258).

This study, which emanated from the field of Communication Science, investigates the use of CMC technologies, mainly social media applications, in the educational context by means of a systematic analysis of internationally published and researched studies about the topic. The study synthesised empirical evidence on the use of social media in education and structured findings in themes relevant to good practice in higher education from which a framework as basis for a set of directives was developed.

The aim of this first chapter is to orientate the reader to the study. It provides background to the research problem, followed by the research questions and the research objectives that will be addressed. A brief overview of the research design and



methodology to be employed in the study is provided thereafter. In order to familiarise the reader with the subsequent chapters, a layout of the chapters is also presented.

## **1.2 BACKGROUND TO THE RESEARCH PROBLEM**

South Africans are embracing the advantages of CMC technology: the Digital Media and Marketing Association (DMMA 2013: 1) reported that 6.7 million South Africans read real-time news online, use nearly 90% of online time to read e-mails, and use 70% of online time for online banking. Although half of the 50 million people in South Africa live below the poverty line, more than 29 million (75%) own a mobile phone, while only five million use landline phones (Nielsen Company 2011: 1; Peyper 2013: 1). With a network that is 99.9% digital and includes the latest in fixed-line, wireless and satellite communication, the country has the most developed telecom network in Africa (SouthAfrica.Info 2013a: 1).

Since 2000, the popularity of online learning has grown tremendously worldwide and this has radically changed the training industry (Gutierrez 2012: 1). For example: in 1995, only 4% of American corporations used e-learning as a training method. Research indicates that this grew to 77% by 2011 (Nicholas 2013: 1; Gutierrez 2012: 1; Marus 2013: 1). According to the Global Industry Analysts (GIA), corporate e-learning is a \$56.2 billion (approximately R601 billion) industry, and this is expected to grow to \$107 billion (approximately R1 146 billion) by 2015 (Gutierrez 2012: 1; Marus 2013: 1). The 2011 *Guidelines for Open Educational Resources (OER) in Higher Education*, compiled by the Commonwealth of Learning Forecasts, indicated that the current global enrolments of higher education students of 165 million will grow with another 98 million by 2025 (Commonwealth 2011: 1).

Online higher education in South Africa is especially booming (Nicholas 2013: 1). Nicolene Murdoch of Monash South Africa reported that South Africa's 23 public universities have in total 938 200 students, of which 59% are enrolled in contact programmes and 41% in distance education programmes. UNISA has over 160 000 online students from sub-Saharan Africa alone; more than half of the total student population in Africa (Ambient Insight 2013: 14). Traditional campuses and programmes in Africa cannot meet the demand for higher education, therefore many African countries

are adopting e-learning to accommodate students' learning needs (Ambient Insight 2013: 13; Nicholas 2013: 1; Laurillard 2008b: 524). According to Ambient Insight, e-learning in Africa will grow with a further 15% (measured across 16 African countries) by 2016 in order to accommodate the influx of tertiary students; especially if seen in the light of the increase in mobile access: 63.5% of Africans own smart phones or cell phones and these statistics increase daily (Fernholz 2014: 2).

During the course of the last decade, the use of social media and Web 2.0 technologies for teaching and learning enjoyed wide acceptance and social media platforms (e.g. Facebook and Twitter) form an important part of online learning. Both students and educators use social media to communicate with one another, to search for information, and for study purposes. Research found that 80 – 90% of educators have at least one social media account (Kolowich 2010: 1; Daly 2012: 2), and 52% use at least one social medium as a teaching tool (Phelan 2011: 42).

The growth seen in the use of CMC technologies at higher education level is an indication of the popularity of social media by especially the millennial generation. The popularity is also fuelled by the need for access to education, and by research reports indicating the advantages of the technologies for education in general, and for higher education specifically.

### **1.3 RESEARCH PROBLEM**

As a result of the continuous developments in technologies, research in the field of CMC in particular has exploded (Eden & Heiman 2011: 89). Social media, as one of the subareas of CMC, and because of their possible applications in HE, are also extensively researched (Merchant 2012: 4; Malesky & Peters 2011: 135). Unmanageable amounts of information such as published research literature, duplicate publications, and “grey literature” such as conference proceedings, reports, theses, and unpublished studies have become available. This explosion of available information makes it very difficult to keep up with primary research evidence about CMC technologies and social media and the way they may be utilised in an educational context (Glassziou, Irwig, Bain & Colditz 1981: 16; Tharyan 1998: 135).

In addition, studies that focus on the educational uses of CMC and social media do not show any uniform theoretical basis, and are often strengthened by perspectives from, *inter alia*, the social cognitive theory, the student engagement theory, constructivism, or connectivism (Eden & Heiman 2011). Furthermore, although an abundance of highly relevant theories in the field of Communication Science are available (see Sections 2.2 and 2.3), not many of these studies are based on communication theory, nor based on connections between communication and educational theories. Although many CMC theories were developed (or existing communication theories adapted) since the advent of the Internet, most of these theories are comparative; addressing how and why CMC is different from face-to-face communication (Whittaker 2003: 3; Walther 2011: 443), and do not indicate ways on how CMC technologies may be utilised in higher education. Research furthermore shows a lack of theoretical frameworks available for considering social media, in particular from a communication science or computer-mediated communication perspective, for use by higher education.

However, as already indicated, the use of social technologies for education is more appealing to millennial students than traditional learning arrangements. Research also shows that social media have a large potential for supporting and facilitating learning processes (Wilson 2004: 60; Crook & Harrison 2008; Heid, Fischer & Kugemann 2009). The educational potential of social media has, unfortunately, not been fully exploited by higher education staff in South Africa; a comprehensive search of databases found only a limited range of documents in this regard. Educational technologies play a key role in South African higher education (Jaffer, Ng'ambi & Czerniewicz 2007: 139). Many educators in South Africa experiment with social media as a means to accommodate large numbers of students and offsetting the lack of resources (Mtshali 2013: 1; Nicholas 2013: 1; Kruger & Fourie 2014: 1). The researcher, a lecturer teaching a social media course in the Department of Communication Science at the UFS, consulted literature to gain perspectives on the various ways lecturers world-wide use technologies to assist their teaching and students' learning. The abundance of publications available, as well as the numerous reports on conferences presented globally, were indicative of the growth of research in this regard. However, in addition to a lack of a theoretical foundation in many studies, the research was also found as largely varying in quality and in applicability to the higher education context. These observations convinced the researcher of the need to filter through the literature in a systematic way, first to search

for and select applicable studies of high quality, and secondly, to analyse the selected documents for global perspectives on the effective use of social media technologies in higher education. It would then be possible to apply the perspectives to the South African context, preferably presented as a set of guidelines for the optimal use of social media in higher education. Through an investigation like this, the existing but relatively limited knowledge base in South Africa in this regard would be extended and enriched.

The above-mentioned aspects, as well as uncertainties about the best choice of social media technology, the ways in which specific social media tools can effectively be used for teaching and learning, as well as the possible influence of circumstances related to specific groups of students, informed the research problem:

- A new generation of students exist who grew up with computer technology and social media. They experience technology as a normal part of their lives and want it to be part of their studies.
- There are, however, no clear perspectives, informed by global research, on the effective educational use of social media in higher education.
- There is a vast amount of unrelated and uncoordinated research reports available on the educational use of social technologies in higher education. The quality and nature of these vary considerably: duplication occurs, there are discrepancies in findings, and no categorisation of scholarly overview of recently completed research could be located.
- Theoretical and methodological foundations of studies on the educational application of social media in the higher education context are vague and not spelled out clearly, or are not generally recognised.
- Communication theory seldom forms the basis of the research focused on the ways to utilise communication technologies in the digital era, nor is it based on connections between communication and educational theory.
- South Africa higher education could therefore largely benefit from an analysis of suitable studies undertaken globally and contextualised directives informed by the research findings.
- There is a need for directives regarding the educational application of social media technologies in higher education in South Africa - also in regard to future research on the topic.

The problems mentioned above informed the decision to conduct a systematic review of studies selected from global research to summarise existing information about the use of CMC and social media in HE in a thorough and unbiased manner in order to reach general and usable conclusions (Kitchenham 2004: 4; Goldie 2011: 2). These conclusions can be used as a basis for the compilation of directives for the utilisation of CMC and social media in South African higher education.

#### **1.4 RESEARCH QUESTION**

The research problem described above led to the following research question:

*What are the most effective ways, as suggested by current research on CMC and social media undertaken globally, in which educational applications of social media can enhance the theory and practice of South African higher education?*

Secondary research questions are:

- 1. How do technological changes, especially the developments in CMC and social media technologies, influence theoretical perspectives of communication?*
- 2. What are the most influential changes that happened in the field of CMC and how do these changes impact on human communication?*
- 3. How can educational theory contribute to effective teaching and learning by means of social media in higher education?*
- 4. What are the most prominent perspectives from research undertaken world-wide on the use of social media in teaching and learning that can serve as a basis for the compilation of directives to apply social media as CMC in South African higher education?*

#### **1.5 RESEARCH AIMS AND OBJECTIVES**

Based on the research problem and research questions, the purpose of the study was therefore defined as follows:

*to undertake a systematic analysis of selected research reports on the educational applications of social media in higher education in order to establish research-based directives for the utilisation of CMC and social media in South African higher education.*

This purpose will be realised, and the research questions addressed, by pursuing the following objectives:

1. To undertake a comprehensive literature review focusing on (a) relevant Communication Theories and Models, (b) the advancements in CMC, the Web, and social media, and (c) relevant educational theories in order to establish a theoretical basis for a study directed towards the utilisation of CMC and social media in the South African higher education context.
2. To undertake a systematic review of all accessible but relevant research studies comprising the following steps: (a) collect and evaluate relevant research reports according to predetermined criteria for inclusion in a sample of documents; (b) to conduct a comprehensive systematic analysis on the selected documents; and (c) to categorise the research and the identified educational applications in order to identify key perspectives on the effective use of social media as applicable to the study.
3. To propose a set of directives for the educational application of social media in South African higher education (based on the set of key perspectives and informed by the features of South African higher education and the relevant users).

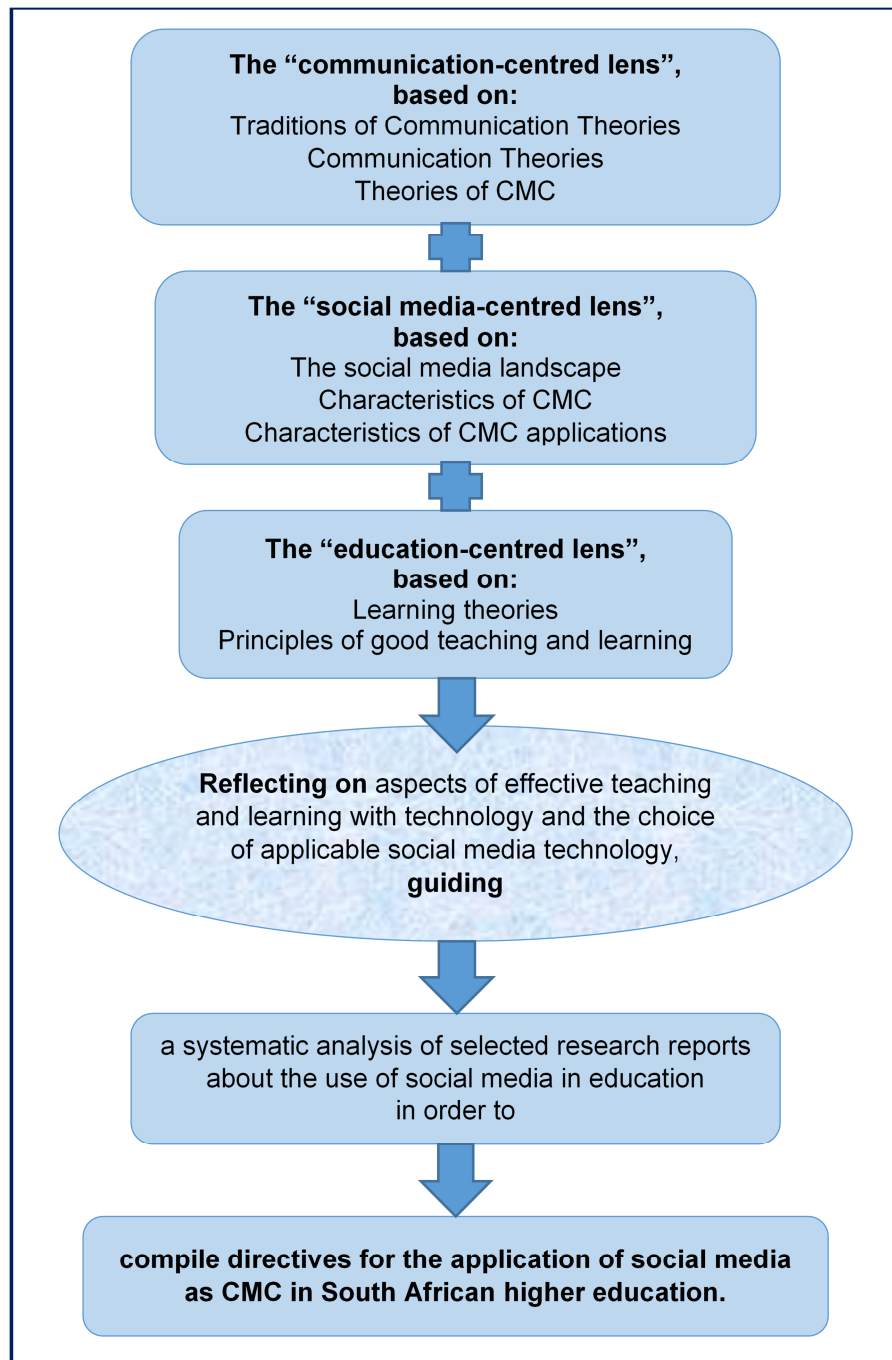
Demarcation of research is important to provide focus and direction to the study (Goddard & Melville 2001: 13). The context of the study is discussed in the next section.

## **1.6 THEORETICAL PERSPECTIVES AND CONTEXTS INFORMING THIS STUDY**

This study was conducted from the disciplinary context of Communication Science (CS) and more specifically, the subfield of Computer-mediated communication (CMC). Theoretical perspectives and contexts informing the study are the following:

- Central are Communication Science and the subfield of CMC with its traditions, models, and theories. This broad area of study provided important background and theoretical perspectives (principles) on effective communication, which also apply to communication by means of social media. Chapter 2 presents the Communication Science and Computer-mediated communication theory (the “communication-centred lens”) that serves as theoretical point of departure for the study.
- Social media not only act as “tools” that link CMC to the field of application in the study, but “social media” can also be seen as a context in its own right with remarkable developments, variants, and recipients in a fast-changing digital milieu. Through the focus provided by the “social media-centred lens”, the principles of effective communication could be applied to higher education. In Chapter 3 the broader context of social media is discussed on hand of the social media landscape and recent and predicted developments in technology and social media.
- The field of application is higher education and, specifically, the educational context of higher education (teaching and learning) with its specific users (learners and educators). It is in this context where CMC theory applicable to social media was applied. The educational context is, however, informed by its own set of learning theories and research-based principles which need to be taken into consideration (the “education-centred lens”). The many similarities and congruities between educational principles and the theories and principles derived from CS and CMC theories, provide a strong binding factor in the study. In Chapter 4, important perspectives on the educational context of higher education are presented, including reference to applicable educational theory and principles.

From the perspectives gained from social media as CMC, and effective educational practices in HE, a conceptual framework for the study was established. Figure 1.1 provides a graphical representation of how the various theoretical perspectives and contexts informed the pursuit of the aim of the study: namely to establish research-based directives for the utilisation of CMC and social media in South African higher education.



**Figure 1.1:** Steps followed in the search for directives.



Figure 1.1 illustrates the research process of this study. This process can be compared to the action of a set of converging “lenses” that narrows the theoretical light that illuminates aspects relevant and applicable to the study; focusing on aspects of effective teaching and learning identified from the theory and the systematic analysis. By following this process, it became possible to identify the most applicable aspects to include in a list of directives for the effective application of social media as CMC in South African higher education. In the next section, key concepts in the study are clarified.

## **1.7 CLARIFICATION OF CONCEPTS**

In order to provide a more concise understanding of the nature of the study, it is important to clarify the concepts computer-mediated communication (CMC), Web 2.0, social media, Millennials, and higher education (HE).

### **1.7.1 Computer-mediated communication (CMC)**

Computer-mediated communication (CMC) is the process by which people create, exchange, and perceive information using telecommunication systems (including hardware and software) to communicate by electronically transferring, storing, and retrieving information (Yilmaz 2011: 115; December 1996: 2; Thurlow, Lengel & Tomic 2005: 15). The characteristics of CMC, including the concepts synchronous, asynchronous, verbal, and textual communication, are explained in Section 2.4.1 and illustrated in Figure 2.6.

### **1.7.2 Web 2.0**

The term “Web 2.0” describes trends that happened in the design and use of the WWW since 1999 (Grodecka, Pata & Väljataga 2010: 10). Web 2.0 is, *inter alia*, described as the Social Web, the Read-Write Web, the Second Generation Web, and as “a personalised, communicative version of the WWW” (McLoughlin & Lee 2007: 665; Koohang, Floyd, Smith & Skovira 2010: 31). Some authors (Anderson 2007: 4; Hughes 2011: 15; Melville 2009: 15; Babu & Gopaldaswamy 2011: 85) focus on the characteristics of Web 2.0 in the context of the Internet and its applications: they define Web 2.0 as a space that allows users to manage, share, tag, link, and own data.

A key aspect of Web 2.0 is the opportunities that exist for users to not only create content, but also to contribute to the content of existing web pages (see Section 3.2.2.2). User-generated Content (UGC) can be described as all the different ways in which people can add pages of various kinds to Web 2.0 sites (Pillay & Maharaj 2010; Bell 2011: 100; Kaplan & Haenlein 2010: 61), and is encapsulated in services such as blogs, wikis, podcasts, SNSs, and many other web applications. UGT was the catalyst for the establishment of social content on Web 2.0 and for those Web 2.0 applications known as “social media”.

### 1.7.3 Social media

The term “social media” can be defined based on either 1) the tools or the devices social media use; 2) the web applications that enable communication; or 3) as Web 2.0 resources:

- Social media can be described as Internet and mobile-based *tools and devices* that integrate technology, telecommunications, and social interaction, enabling the construction, co-construction and dissemination of words, images, and audio (Dabner 2012: 69; Junco & Chickering 2010: 12).
- The term “social media” describes a range of user-centred, interactive *web applications* that facilitate the construction and dissemination of words, images, and audio on the WWW (ASTD 2011: 3; Dabner 2012: 69).
- Social media are characterised as a collection of *Web 2.0 resources* that emphasise active participation, connectivity, collaboration, and the sharing of knowledge and ideas among users (Rutherford 2010: 703; Dabbagh & Kitsantas 2012: 3).

In the context of this study, the term “social media” is seen as an umbrella term that embraces all three the above notions, and is defined as the computer-mediated tools and applications, using fixed or mobile computer technologies that allow people to create, share, or exchange information in various formats, and to communicate in both a social and professional manner over a variety of Web 2.0 platforms.

The features and characteristics of social media are described in Section 3.3.1 and illustrated in Table 3.2. As background to the use and possible use of social media, 15 social media tools and applications are discussed in Section 3.3.2.

#### **1.7.4 Millennials**

Most of the current learners aged roughly between 18 and 35 are grouped as belonging to Generation Y or the “millennials”. The Millennial generation is the first generation to grow up with technology in an “information society” and they expect technology to be part of how they live, study, and work (Fancott, Kamthan & Shahmir 2012: 45). Millennials rely more on electronic information than on any other form of information, and they create, produce, and use web content as part of their normal day. Millennials share in and contribute to the “collective intelligence” maintained by the Internet and WWW (Halavais *et al* 2004: 81), and use Web 2.0 for entertainment, for communicating with friends and family, and for studying (Jones & Fox 2009: 7; Allen & Naughton 2011: 52). In this study the terms “learner” or “student” refer to the millennial student.

#### **1.7.5 Higher education (HE)**

Although the term “higher education” broadly refers to post-school education provided by a university or institution for higher education leading to a qualification; in the context of this study the term refers to the teaching provided by educators and the learning of students beyond secondary school level. The theory of learning is discussed in Chapter 4.

The research design and methodology deemed most appropriate to investigate the educational application of social media in higher education context is described in the next section.

### **1.8 RESEARCH DESIGN AND METHODOLOGY**

The study is grounded in an interpretive constructivist philosophy (see Section 5.3.1 and Figure 5.2) and conducted using an explorative qualitative research method (see Sections 5.3 and 5.4).

### **1.8.1 Research design**

In order to investigate the most effective ways in which social media can be used, the author explored, interpreted, and analysed the research reports generated by other researchers in an effort to make meaning of their findings (Interpretivist paradigm), and construct new knowledge (Constructivist paradigm) that can be used to support the research objective of this study.

The study made use of an explorative qualitative research method as the purpose of the empirical investigation was to collect and evaluate research reports on the educational applications of social media in education with the aim of searching for trends, patterns of meaning, and relationships in the data that can answer to the purpose of the study (thus, a systematic review was conducted).

Systematic reviews are regarded as highly reliable research methods for objectively summarising, evaluating, and interpreting large volumes of research information about a specific topic (Petticrew & Roberts 2006: 266; Yuan & Hunt 2009: 1086; Carr 2002: 81) with many benefits for both theory and practice (Pickering & Byrne 2013: 538). By means of a systematic analysis, the results of a study sample of 220 carefully selected researched-based primary documents were investigated for findings from which conclusions, based on the research objective, could be drawn (Joanna Briggs Institute 2011: 34).

### **1.8.2 Data collection**

The systematic review conducted for this study (described in detail in Section 5.5) was built on an unbiased, comprehensive search of databases and websites to find applicable research (Crombie & Davies 2009: 2). Both an iterative and pragmatic approach to searching was followed.

The support of information officers of the SASOL library of the UFS was obtained to find as many as possible applicable documents related to the study objective in a search conducted between February 2012 and June 2013. Searches were conducted on numerous online and electronic databases, including Academic Search Complete,

Emerald, SAGE Journals, CiteULike, FirstMonday, Taylor & Francis Online, FindPDF, PlanetPDF, Sabinet, ProQuest Dissertations and Theses, Tandfonline (Taylor and Francis Online), Communication and Mass Media Database, ERIC (Education Research Information Centre, including Elsevier and Routledge), the KovsieCat system of the SASOL Library, Information Science and Technology Abstracts, PMC-NCBI Resources, and EBSCOHOST. Web searches were also performed using the Google and Google Scholar search engines.

Search terms and keywords used included, *inter alia*, “computer-mediated communication”, “CMC”, “social media”, “social networks & education”, “higher education”, “South Africa”, “higher education & social media”, “higher education & Facebook”, “higher education & Twitter” “higher education & YouTube”, “higher education & Web 2.0”, (etc.), “students & social media”, “millennial students”, “technology & higher education”, “CMC & education”, “communication technologies”, “Internet & education”, and various combinations of the above-mentioned words and terms. Note that “South Africa\*” was specifically included to locate relevant research-based studies conducted in or about South Africa.

In the context of this analysis, the population comprised seemingly relevant documents, reports, studies, articles, proceedings, etc. selected from online and electronic databases and web sites. Although it is difficult to indicate the precise number of possible relevant documents initially retrieved, an estimation indicates that more than 2 400 documents were evaluated for possible inclusion in the study sample. A stratified purposeful sampling approach was adopted in selecting documents from this population as the study sample for the review.

### **1.8.3 Sampling**

To identify or select the sample, a list of criteria was compiled with the intention to identify only those studies that serve the research objective and answer the research question. Selection criteria included both inclusion and exclusion criteria, and criteria were defined to limit bias in selecting relevant studies (see Section 5.5.1.2 for a detailed discussion of the selection criteria). To be included in this review, each article/document/report was evaluated against the defined criteria, including:

- The document had to report primary empirical research on the use of CMC and social media applications in an educational setting.
- Participants/Respondents of included studies had to be students, educators, and staff employed at universities or institutions of higher education.
- Studies found to focus on the marketing of an institution by using social media rather than on the educational applications of social media, were excluded.
- Duplicate publications were excluded, as well as separate publications by the same author(s) reporting on the same research.
- Unsuitable documents evaluated against predefined quality criteria, including poor writing or signs of mistakes in regard to the methodology followed, were excluded.
- The researcher strived to identify bias in selected documents, which were also excluded if bias was detected.

Based on the criteria listed above, the researcher evaluated 1 398 retrieved documents for possible inclusion in the study based on a thorough iterative evaluation process.

A selected 220 documents remained, documented in a bibliographical list according to the Harvard Referencing Method (see Appendix A). The list ensured that duplicate documents could be identified, that all document details were documented and identified immediately upon retrieval, and to ensure that an article or document could be easily located when needed. The availability of the list also adds to the trustworthiness of the study.

Qualitative data analysis is systematic, ongoing, and iterative; implying that data collection, processing, analysis, and reporting are mostly done at the same time, using a variety of data analysis procedures (Maree 2007: 99; Owens 2012: 1).

#### **1.8.4 Data analysis**

The constant comparative method was employed to analyse and extract selected information from the 220 documents in the study sample; using inductive category coding (Maykut & Morehouse 1994: 127; Hewitt-Taylor 2001: 39). Coding and data extraction were performed with NVivo Qualitative Data Analysing Software and the Dedoose web application.

Inductive coding refers to the development of codes by the researcher in the process of reading and examining data (Maykut & Morehouse 1994: 137). The researcher started the coding process by creating data sets according to themes identified during the scrutiny of the selected documents. Each data set went through various rounds of coding, depending on the complexity of the contents (see Section 5.5.2.2). Four final data sets remained:

- Data Set 1 consists of general and demographic information; including the name of the author(s); the title of the document; the year of publication; the name(s) of the institution(s) linked to the author(s); the address of the institution(s) (city and country); the source of the study (journal articles, reports, conference proceedings, etc.); and publication details: the name of the publication, including volume and publication numbers and page numbers. The information from this data set was used to sketch the general and demographic background of the study and to establish credibility for the study.
- Data Set 2 contains the specific features of each included document, including: the keywords listed by the author(s) or publisher(s); the aim(s) or objective(s) of each included study; the research methods and methodologies used in each of the studies; who and how many respondents/participants were involved; and the discipline or faculty involved in the study. Based on themes identified from the selected data, sub-codes (child-nodes) were created, consisting of the key themes: attitudes, expectations, possible impact, behaviour, access, skills/experience, use, benefits, and disadvantages. Figure 5.4 provides an indication of the way these themes were identified.
- Data Set 3 includes the reported findings of each study. This data set contained an immense amount of information and was finally divided into the following categories to make the information more manageable:
  - Access to, or use of, computers, social media or technology.
  - Attitudes of respondents with regard to the use of social media.
  - Benefits/Advantages and disadvantages/challenges of the use of social media as reported by respondents.
  - Needs reported for technologies, training, extra time, or experience.

- Skills in, familiarity with, and prior experience in using technology.
  - Responses related to time and associated with the use of social media.
  - Willingness to accept technology in teaching or learning.
  - Communication between educators, students, and groups of students.
  - Collaboration as a result of group activities using social media applications.
  - Active learning happening with or as a result of the use of social media.
  - Participating in learning activities due to the use of social media.
  - Student engagement related to learning and participating in online groups.
  - The extent to which social media use motivates students to learn.
  - Interaction related to learning, as well as student-educator and student-student interaction.
  - Providing or receiving feedback via social media.
  - Diverse teaching methods related to utilising social media technologies.
- Data Set 4 focuses on recommendations made in each of the documents and included the categories teaching and facilitation strategies; pedagogy 2.0/teaching with Web 2.0; learning styles; impact of social media on grades; assessment through technologies; staff capacities; collaborative learning environments; distance learning environments; various social media tools (SNS, blogging, Facebook, mobile learning, wikis, and YouTube); and new technologies that may emerge in the future. Data from this data set were used to support the findings from Data Set 3.

The aim of analysing extracted data is to find corresponding topics and to explore how they relate to one another (Burns 2000: 430; Maree 2007: 111). In the analysis process of this study sub-group analysis was used; meaning that data were analysed to look for patterns in order to make comparisons between them (Pai *et al* 2004: 91; Briner & Denyer 2012: 353; Tharyan 1998: 138), while also investigating the data for heterogeneity and homogeneity (Centre for Reviews and Dissemination (CRD) 2008: 275; Tharyan 1998: 143). The coding process also made use of enumeration (the process of quantifying data) of certain aspects of the study (for example: how many times certain words or keywords were used) to establish, for example, popularity.



The results of the analysis were categorised according to two main categories:

- Background information of included studies, including: bibliographical details of the publications; and
- The findings of the systematic analysis on the effective educational use of social media, presented in four categories (see Section 6.3):
  1. Factors impacting on effective use of social media in an educational context.
  2. The student and learning with social media (related to the attributes of effective teaching and learning with technology presented in Figure 4.4).
  3. The educator and effective use of social media.
  4. Choice of media: popular social media technologies measured against the aspects that influence the choice of media as listed in Table 2.7.

Key perspectives gained from the systematic analysis are listed in Table 6.7 in a summarised explanation of the use of CMC technologies in higher education. From this summary, supported by the literature in Chapters 2, 3 and 4, and recent statistical evidence applicable to or referring to South African higher education, core components of importance for the effective use of social media in higher education were identified and integrated into a framework for the effective use of social media in South African higher education. From this integrated framework (Figure 7.8), including the needs, characteristics, and diversities of the South African student (as identified in Sections 7.2.1 to 7.2.6); 12 possible directives for the utilisation of CMC and social media technologies in South African higher education were proposed (presented in Table 7.1).

Although no human subjects were directly involved in this study, the systematic review adhered to acknowledged ethical standards.

### **1.8.5 Ethical considerations**

The researcher is convinced that all possible measures were taken to ensure that the study complies with high ethical standards (Bergh 2004: 59, McMillan & Schumacher 2001: 144). In pursuing a study of the highest ethical standards, the researcher adhered to ethical principles applicable to a systematic review (see Section 5.5.3):

- The researcher strived to avoid bias in selecting research reports and documents for inclusion in the study.
- Predetermined inclusion/exclusion criteria were strictly followed.
- The original pool of documents was as representative as possible: all databases available on the UFS system, as well as electronic databases available via the Google and Google Scholar search engines were included in the search. The assistance of a professional information officer was also obtained.
- All sources were appropriately referenced.
- An audit trail was kept for possible external scrutiny.
- The work of researchers included in the analysis was treated fairly and reporting of their research findings was done as accurately as possible.
- Steps were taken to ensure that the study is free of any form of plagiarism or copyright infringement.

Systematic reviews also have to comply to high quality standards.

#### **1.8.6 Quality assurance of the study**

The trustworthiness of this study is ensured by adherence to acknowledged standards for internal and external validity, reliability, and objectivity. The validity of this study refers to the quality of the measurement process and on the objectivity of the researcher:

- The internal validity (credibility) of this study lies in following a thorough research process based on a predefined research protocol. The study is also built on an unbiased, comprehensive search of a wide range of databases and websites using predefined keywords and search terms. All steps taken and decisions made regarding the data selection and process of analysis were carefully documented. There is a high possibility that other researchers, searching for information with the same keywords, would retrieve all or most of the documents used in this review.
- External validity reflects transferability in the qualitative framework (Lincoln & Guba 1985: 86), and refers to the degree to which generalisations can be made from the data and context of research on the wider population or other settings

(Wimmer & Dominick 2006: 32; McMillan & Schumacher 2006: 261). In this study, the context is teaching and learning using social media in a higher education environment (as described in Section 1.7.5). The findings of the study are thus regarded as relevant to the context and are not meant to be generalised to other contexts or situations.

Reliability is defined as the precision and accuracy of a measurement procedure and the stability of the data (Babbie & Mouton 2002: 119; Guba 1985: 86). In order to increase the reliability of this study, each step followed was described in sufficient detail to enable another researcher to repeat the research and, if using the same procedures and criteria, to obtain similar results. This “audit trail” (Lincoln & Guba 1985: 316) will allow the reader to assess the extent to which proper research practices were followed in order to establish the credibility (internal validity) of the research.

Objectivity refers to the impartiality of the data that were collected and the analysis procedures followed (McMillan & Schumacher 2006: 9). As indicated in Section 1.3, the researcher of this study chose to conduct a systematic analysis of research documents to make sense of the unmanageable amounts of information about the use of CMC technologies and social media for teaching and learning. To establish objectivity, inclusion and exclusion criteria, described in the research protocol, were strictly followed to ensure that only relevant documents were retrieved. In the analysis, NVivo Qualitative Data Analysing Software and the Dedoose web application were used to further ensure a high level of objectivity.

Possible limitations of the study, as well as the significance of the study, are discussed in Chapter 8 (see Sections 8.4 and 8.5).

## **1.9 CHAPTER LAYOUT**

In order to answer the overarching research question, the different chapters address specific aspects of the study:

- Chapter 1 contains an introduction to the study and an explanation of the research design and methodology followed.

- In order to establish a theoretical foundation for the study, the focus of the discussion in Chapter 2 is on relevant communication theory and the changes in the communication process due to emerging technologies, aimed at answering the first secondary research question, namely: *How do technological changes, especially the developments in CMC and social media technologies, influence theoretical perspectives on communication?* To answer this question, a brief review of the Traditions of Communication Theories and applicable communication models was provided (see Sections 2.2 and 2.3). Four communication models; the Shannon and Weaver Model, the Cybernetic Theory, the Systems Theory and the Network Theory; are discussed to explain human communication processes of importance to this study (see Table 2.6). An overview of selected CMC theories, including aspects related to the way people select and use communication media (see Table 2.7), are provided in Section 2.5. Chapter 2 therefore provides the “communication-centred lens” for the study.
- In Chapter 3 the development of and advancements in CMC are discussed with special focus on the development of the World Wide Web (WWW), the Internet, and social media in order to address the second subsidiary question of this study, namely: *What are the most influential changes that happened in the field of CMC and how do these changes impact on human communication?* The chapter includes a discussion of aspects related to Web 2.0, social networking, the applications, and tools of the Social Web (Web 2.0), the use of the tools, as well as current trends and developments in computer-mediated technology (see Sections 3.2 to 3.4). This chapter provided the “social media-centred lens” for the study.
- In Chapter 4 the major learning theories and an influential set of principles for good and effective teaching and learning are reviewed and related to the use of social media as CMC in higher education in order to answer the third research question of the study, namely: *How can educational theory contribute to effective teaching and learning by means of social media in higher education?* Perspectives gained are used to filter theory through an “education-centred lens”. In Section 4.4 the perspectives gained by means of the three “lenses” are combined into a conceptual framework that directed the study and the ultimate

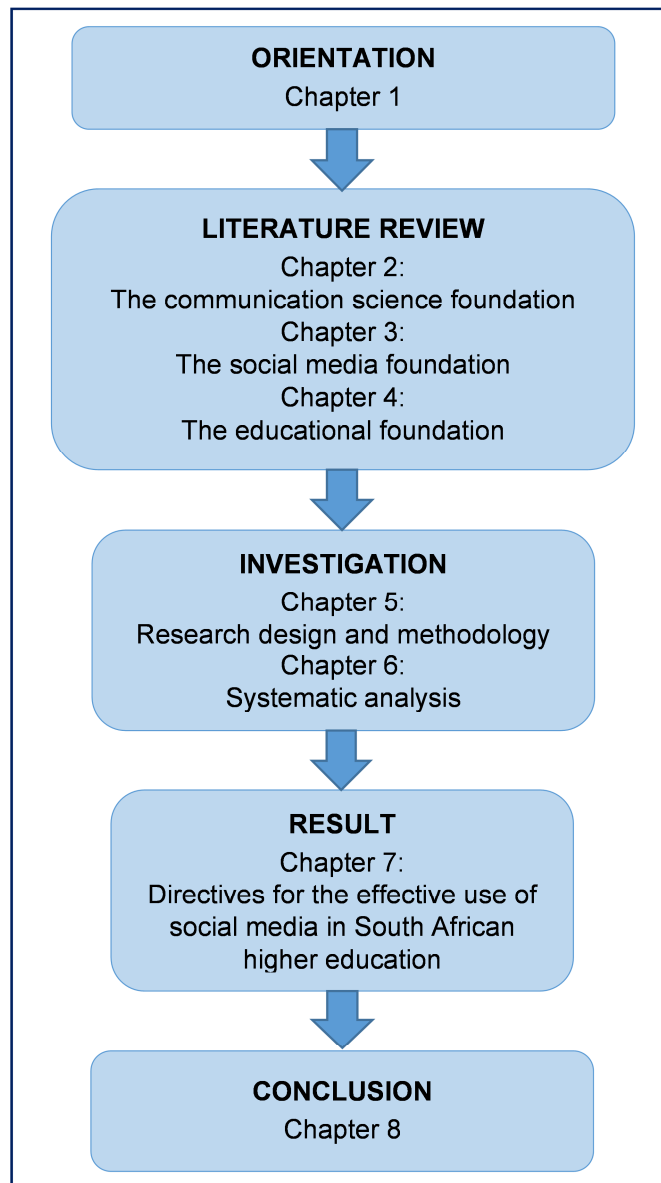
compilation of a set of directives for effective teaching and learning using social media in higher education.

- Chapter 5 describes the research design followed in pursuing the purpose of this study; namely to study current research reports on the use of social media in higher education in order to investigate the most effective ways in which educational applications of social media can enhance the theory and practice of South African higher education. The research design is discussed according to the selected research strategies, the philosophical paradigm, and the research methods used in conducting the study (see Sections 5.2 to 5.4). Special attention is given to the search strategies employed and the criteria used to select the sample (see Section 5.5). Section 5.5.2 provides an extensive discussion of the data analysis procedure, followed by an explanation of the measures taken to ensure reliability and validity (see Section 5.5.3).
- Chapter 6 presents the findings from the analysis of the data as extracted from the sample of 220 documents in order to answer the fourth subsidiary research question, namely: *What are the most prominent perspectives on effective teaching and learning that can serve as basis for the compilation of directives to apply social media as CMC in South African higher education?* The chapter includes a presentation of important background information related to each document to establish the broad context of the study (see Section 6.2). The rest of the chapter presents key findings relevant to the effective use of social media in the educational context, namely: factors impacting on the effective use of social media; the student and effective learning with social media; the educator and effective use of social media in teaching; and choosing the most effective social media tools in the educational context.
- In Chapter 7 the overarching research question is answered, namely: *What are the most effective ways, as suggested by current research on CMC and social media undertaken globally, in which educational applications of social media can enhance the theory and practice of South African higher education?* Key perspectives gained from the analysis and the literature review are presented in a framework containing six categories as components of a cyclic process using

social media for communication, teaching and learning, and knowledge creation. From this framework 12 possible directives for the utilisation of CMC and social media technologies in South African higher education were compiled; which are presented in Table 7.1.

- Chapter 8 presents a conclusion of the work by providing an overview of the study, the significance and limitations of the study, as well as suggestions for further studies and research.

The layout of the study is depicted in Figure 1.2.



**Figure 1.2:** Layout of study.

The empirical part of the study is illustrated as containing three consecutive sections: the literature review (consisting of the literature chapters: Chapters 2, 3 and 4), the investigation (consisting of Chapter 5 and 6), and the results of the investigation (consisting of Chapter 7).

## **1.10 CONCLUSION**

This chapter introduced and defined the study as an investigation of the use of CMC technologies, mainly social media applications, for use in an educational context by means of a systematic analysis of internationally published and researched studies about the topic.

Four key aspects can be highlighted:

- The problem statement and subsequent research questions that direct the study. The problem statement centres on a search for ways in which social media can be used effectively in higher education. The purpose of the study is therefore to establish research-based directives for the utilisation of CMC and social media in South African higher education.
- The theoretical foundation of the study is built on three pillars as seen through the perspectives or “lenses” relevant to the study, namely: a “communication-centred lens”, a “social media-centred lens” and an “education-centred lens”.
- An outline of the systematic review as research method for the study.
- The measures taken to ensure a study of high quality and acceptable ethical standards.

In the chapters that follow, the aspects addressed in Chapter 1 will be discussed further. The literature review commences with a review of the changes in the disciplinary field of Communication Science; especially in the field of Computer-mediated communication as a sub-field of Communication Science.

## CHAPTER 2

### HISTORICAL-THEORETICAL CONTEXT OF THE STUDY: THE COMMUNICATION SCIENCE FOUNDATION

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Although the printed book was the first invention to impact seriously on human communication, it was the invention of the computer that started a process of revolutionary changes in human communication. Since the invention of the telephone, many communication models and theories were designed that strived to explain the communication process, especially communication influenced by technology. Over the years existing theories and models were adapted, or new models created, to expose the features of the changing communication process and to explain the influence of computer-mediated communication on the ever-changing communication process.

#### 2.1 INTRODUCTION

In order to gain insight into the dynamic field of Communication Science and to establish a theoretical foundation for the study, the review in this chapter focuses on various approaches to communication and applicable theories and the changes to the communication process due to emerging technologies. This discussion addresses the first subsidiary research question, namely:

*How do technological changes, especially the developments in CMC and social media technologies, influence theoretical perspectives on communication?*

This discussion furthermore addresses part (a) of the first objective of this study, namely to undertake a broad literature review focusing on relevant approaches to communication and communication theories and advancements in CMC, the Web and social media in order to establish the theoretical basis for the study directed to the utilisation of CMC and social media in the South African higher education context.

Due to the importance of the communication background to this study, a brief review of the Traditions of Communication Theories and applicable communication models follow in Sections 2.2 and 2.3. The discussion of the Traditions of Communication Theories



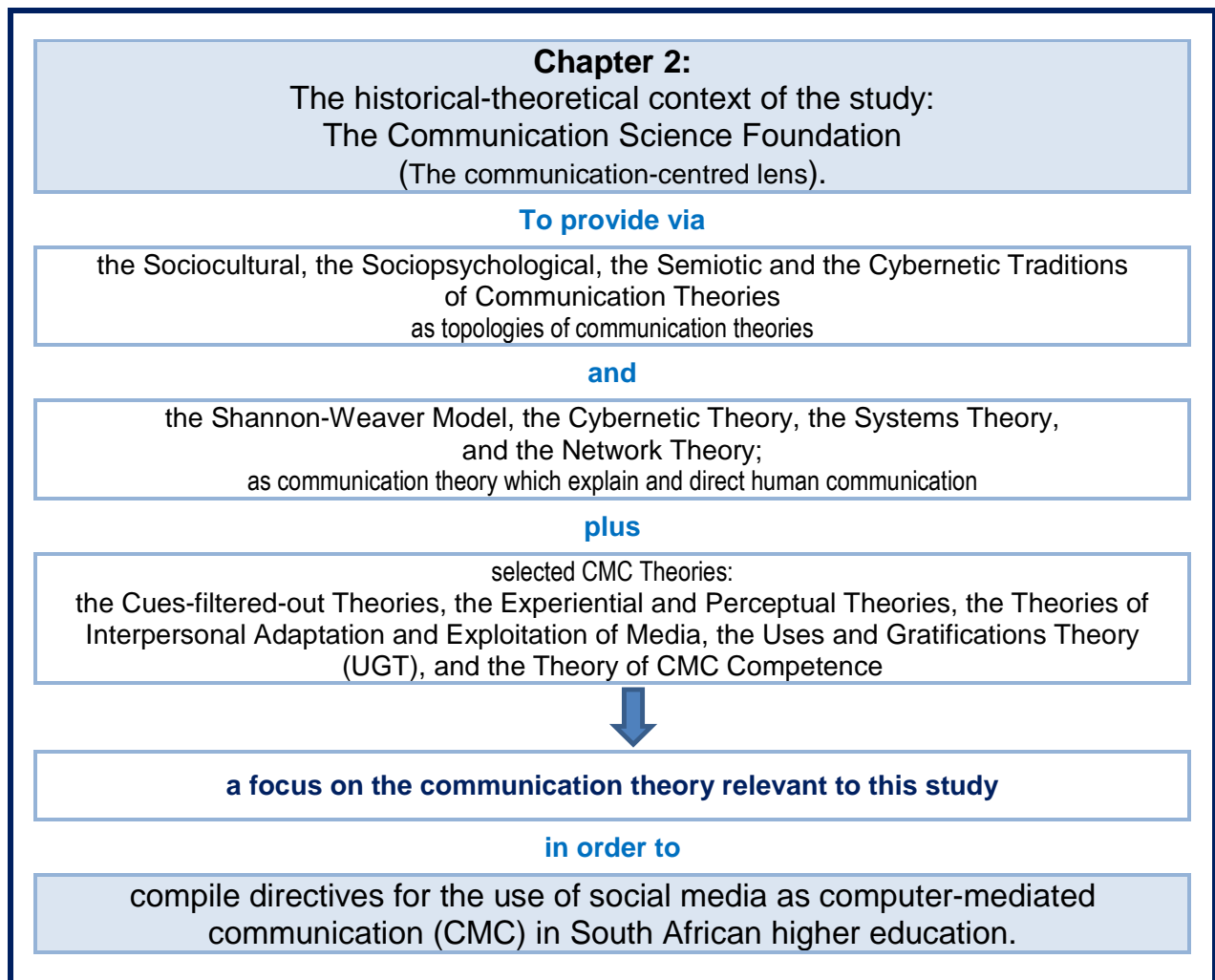
highlights important perspectives of the relationship between communication, culture and knowledge acquisition (summarised in Table 2.5) as applicable to this study. The communication models: the Shannon and Weaver Model, the Cybernetic Theory, the Systems Theory and the Network Theory explain and illustrate those processes of human communication of importance to a study of social media, and can be seen as foundational to the design and application of the CMC theories described in Section 2.4.2. The discussion of the communication theories and models exposes key concepts and understandings relevant to the communication process (see outline in Table 2.6).

Section 2.5 provides an overview of a range of purposefully selected CMC theories that includes aspects related to the way people select and use communication media. Careful comparison of the main aspects of the CMC theories reveals three aspects that are mentioned in each of the theories: 1) aspects that influence the choice of the communication medium, 2) positive aspects related to the use of the medium, and 3) negative aspects related to the use of the medium (see summary in Table 2.7). This information is highly applicable to the study, in particular when the large number of available social media tools and the varying nature of the application thereof in higher education are considered.

In concluding this chapter, aspects from Sections 2.2 – 2.4, which may influence effective communication when utilising social media in higher education, are condensed into Table 2.8.

As a whole, Chapter 2 provides the theoretical foundation for the study from the context of Communication Science and CMC. It helps to narrow the theory to guide the study towards attainment of its objectives and overall aim. The theory discussed in the chapter therefore serves as a first theoretical “lens” through which a focus on applicable theory can be established.

The layout of Chapter 2 is depicted in Figure 2.1.



**Figure 2.1:** Outline and goal of Chapter 2.

The discipline of Communication Science has grown enormously in recent decades due to the many developments in technology and social media. Researchers noted the different ways that technological developments have influenced human communication and have started to investigate the *process* of communication by depicting the process in various models or theories. A model provides the “what” and the “how”, while a theory adds the “why” of the system being studied (Halavais *et al* 2004: 6). The Traditions of Communication Theories is a framework designed to “understand the field of communication theory” (Craig 1999: 120).

## 2.2 TRADITIONS OF COMMUNICATION THEORIES

Communication is a process that happens between at least two people and may include sending information as words, visuals, writing, or behaviour to one another through a channel, which may include speech, gestures, signals, written materials, and so forth. The communication process is complete once the receiver receives, decodes and understands the sender's message (Kilgore 1998: 1; Foulger 2004: 2; Riva & Galimberti 1998: 3). It was on the basis of this supposition that many models and theories of communication were built.

Over the years many models to explain human communication were designed, and with the ever-changing communication environment, new models were regularly added. Very soon researchers needed a system or framework to enable a holistic view of the numerous communication models and theories (Smith 2013: 101). A framework developed by Craig and summarised by Littlejohn and Foss (2005: 34-54) groups the models and theories under the framework "The Traditions of Communication Theories".

Robert Craig divided 249 communication theories into a framework of "seven Communication Traditions" (Littlejohn & Foss 2005: 35; Maguire 2006: 89). Craig's purpose was to develop a system into which communication theories could be organised: a type of "meta-model" that can be used to understand and define communication (*ibid.*). Littlejohn and Foss (2005: 34-54) summarised these theories into a guide to assist researchers in understanding approaches to communication science. Of the seven traditions, the Phenomenological Tradition, Critical Tradition, and Rhetorical Tradition were found to be not directly applicable to this study.

Four traditions: the Sociocultural Tradition, the Sociopsychological Tradition, the Semiotic Tradition and the Cybernetic Tradition from Craig's framework of the Traditions of Communication Theories add to the theoretical background of this study and are discussed next.

### 2.2.1 The Sociocultural Tradition

The Sociocultural Tradition involves communication models where people are described in terms of their interaction with other people, their identity in a group, their place within a larger community, and their relationships with others (Griffin 2000: 41; Littlejohn & Foss 2005: 44-46). Research under this tradition also focuses on how people create realities in social groups, organisations, and cultures. Communication is described as something that happens between people and as something that is responsible for the production and reproduction of social order (Maguire 2006: 90; Littlejohn & Foss 2005: 45). Sociocultural theories conceptualise communication as a symbolic process that produces and reproduces shared meanings, rituals and social structures. Communication problems have become more difficult under modern conditions of societal diversity, complex interdependence, and rapid change: Craig (2000: 3) states that “communication seems to be at once the disease that causes most of our social problems, and the only possible cure”.

Theories under the Sociocultural Tradition explain that conversation creates common understandings, made possible by structures of meaning that emerge in talk. Talk establishes patterns of influence that affect who we are and what we do in a group or an organisation (Craig 2000: 3). Conversations over time give the group or organisation character: character is often called culture, and culture consists of shared rules, norms, values, and practices that are commonly used and accepted. In this tradition, context is crucial to the forms of communications and meaning that occur (Littlejohn & Foss 2005: 44-46). Theories in the Sociocultural Tradition include:

- Symbolic interactionism – people and society depend on social interaction, and social structures and meanings are created and maintained by common understandings.
- Constructionism – human knowledge is constructed through social interaction. How humans talk about a subject, the language they use, and the way in which social groups orientate themselves to their common experience creates meaning.
- Sociolinguistics – people use language differently in different social and cultural groups. Ethnography is the observation of how social groups build meaning through their linguistic and non-linguistic behaviours.

The main aspects of the Sociocultural Tradition of importance to this study are summarised in Table 2.1.

**Table 2.1:** Key aspects of the Sociocultural Tradition.

<b>Summary of the Sociocultural Tradition</b>
<p><b>People are described in terms of:</b></p> <ul style="list-style-type: none"> <li>• interaction with other people;</li> <li>• identity in a group;</li> <li>• place in a community; and</li> <li>• relationships with others.</li> </ul>
<p><b>Communication:</b></p> <ul style="list-style-type: none"> <li>• establishes individual identity, order and group rituals;</li> <li>• creates and maintains social structures and the culture of the group;</li> <li>• creates common understandings through structures of meaning in talk; and</li> <li>• is influenced by societal diversity, complex interdependence and change.</li> </ul>
<p><b>Culture:</b></p> <ul style="list-style-type: none"> <li>• depends on social interaction and social structures;</li> <li>• creates rules, norms, values and practices which determine individual development;</li> <li>• uses a specific language to establish patterns of influence and social positions; and</li> <li>• constructs meaning and creates human knowledge.</li> </ul>

Source: Compiled by researcher from Craig (2000), Littlejohn and Foss (2005) and Griffin (2000).

The role and place of the user of the communication, summarised from the Sociocultural Tradition, indicates in Table 2.1 the way communication influences social interaction and culture, and the way communication and social interaction adds to the construction of knowledge. Of particular importance to the study are references to the relationships between people, the creation and maintenance of social structures and group culture, which all play a role in the construction of meaning and development of knowledge.

The second tradition of communication theories of importance to this study is the Sociopsychological Tradition.

**2.2.2 The Sociopsychological Tradition**

The Sociopsychological Tradition focuses on the individual as a social being and the influence of interpersonal interaction and communication (Griffin 2000: 35). Scholars believe that communication truths can be discovered by observation of human behaviour. The psychological aspect of this tradition describes people having certain

characteristics and therefore act in independent ways. Judgements are biased by beliefs and feelings and people have obvious influence over one another, especially where behavioural and emotional factors play an essential role. The theories under this tradition share a common concern for behaviour and for the personal traits and cognitive processes that produce behaviour (Kayode 2013: 7; Littlejohn & Foss 2005: 42-44).

Scholars of the Sociopsychological Tradition view the human mind as the locus for processing and understanding information and study the effects of information on the unconscious mind (Griffin 2000: 36). Of interest are the inputs (information) and outputs (plans and behaviours) of the cognitive system. Researchers assume that information processing is internal and beyond our awareness. Communication involves individuals with personalities, attitudes, beliefs and emotions, and includes expression, interaction and influence (Maguire 2006: 89). The problem of communication from a sociopsychological perspective is how to manage social interaction effectively in order to achieve preferred and anticipated outcomes (Craig 2000: 2). Approaches to theories in the Sociopsychological Tradition include:

- The behavioural – looks at the relationship between communication behaviour in relation to personal traits, situational differences, and learning.
- The cognitive – centres on patterns of thought, how individuals acquire, store, and process information in a way that leads to behavioural outputs.
- The biological – many human traits, ways of thinking, and behaviours are wired in neurobiological influences.

The main aspects of the Sociopsychological Tradition of importance to this study are summarised in Table 2.2.

The way humans are influenced by thoughts and feelings and the unconscious processing of information, summarised from the Sociopsychological Tradition, are listed in Table 2.2. Information procession in turn influences the way humans communicate and interact. The focus on social interaction to attain preferred outcomes should be highlighted in a study of the use of social media in an educational context. One should, however, be aware that learning is influenced by the diversity in peoples' traits, behaviour and the situation they find themselves in.

**Table 2.2:** Key aspects of the Sociopsychological Tradition.

<b>Summary of the Sociopsychological Tradition</b>
<b>Humans:</b> <ul style="list-style-type: none"><li>• The individual is a social being with a personality.</li><li>• Behaviour and characteristics are based on neurobiological influences.</li><li>• Thinking is influenced by cognitive processes.</li><li>• People interact and influence one another based on beliefs and feelings.</li></ul>
<b>Information:</b> <ul style="list-style-type: none"><li>• Processing and understanding of information happens in the mind.</li><li>• Information influences the unconscious mind.</li><li>• Information processing is beyond human awareness.</li><li>• Behaviour is influenced by patterns of thought and information processing.</li></ul>
<b>Communication:</b> <ul style="list-style-type: none"><li>• Involves individuals with personalities, attitudes, beliefs, and emotions.</li><li>• Reveals truths by observation of human behaviour.</li><li>• Focuses on social interaction to achieve preferred outcomes.</li><li>• Behaviour, personal traits, situational differences and learning is interwoven.</li></ul>

Source: Compiled by researcher from Craig (2000), Littlejohn and Foss (2005), Kayode (2013) and Griffin (2000).

The next tradition of communication theories of importance to this study is the Semiotic Tradition.

### **2.2.3 The Semiotic Tradition**

The Semiotic Tradition includes those communication theories that explore the importance of signs, sign systems and symbols and the ways they are used (Griffin 2000: 39; Craig 2000: 1). The theories in this tradition investigate how signs represent objects, ideas, states, situations, feelings and conditions, and integrate theories dealing with language, discourse, and non-verbal actions (Littlejohn & Foss 2005: 35-38). Kryssanov, Okabe, Kakusho and Minoh (2006: 2) assert that a sign can have many different meanings depending on the socio-cultural context of the user. Communication problems may result if there is a difference in the understanding of the signs (such as spoken or written words, or graphic images) and their meanings, the structure of sign systems, and the ways of using (or misusing) signs (Craig 2000: 1; Maguire 2006: 89). The Semiotic Tradition is especially suited to address these gaps and misunderstandings in communication that can be bridged by using a common language (Littlejohn & Foss 2005: 35-38). Semiotics is divided into three areas of study:

- Semantics – addresses what signs mean or how signs relate to objects.
- Syntactics – refers to the study of relationships among signs, or how signs relate to other signs. Signs form part of a larger sign system that are organised in codes. Codes are organised by rules, meaning that certain signs will always refer to certain things and are only used in certain ways.
- Pragmatics – looks at the practical use and effects of signs and codes in everyday life. Humans must have a common understanding of words, grammar, society, and culture in order for communication to take place.

The main aspects of the Semiotic Tradition of importance to this study are summarised in Table 2.3.

**Table 2.3:** Key aspects of the Semiotic Tradition.

<b>Summary of the Semiotic Tradition</b>
<p><b>Signs:</b></p> <ul style="list-style-type: none"> <li>• represent objects, ideas, states, situations, feelings and conditions;</li> <li>• are codes organised by rules: certain signs refer to certain things, and are used in certain ways;</li> <li>• include both verbal and non-verbal signs and symbols; and</li> <li>• has meanings – depending on the socio-cultural context of the user.</li> </ul>
<p><b>Communication:</b></p> <ul style="list-style-type: none"> <li>• happens in a society and culture with a common language;</li> <li>• depends on the meanings of signs and the structure of sign systems;</li> <li>• takes place if humans know the ways signs are used; and</li> <li>• can also happen via verbal and non-verbal signs.</li> </ul>
<p><b>A common language:</b></p> <ul style="list-style-type: none"> <li>• (words and grammar) is needed for communication to take place;</li> <li>• bridges gaps and misunderstandings in communication;</li> <li>• is needed to understand the meaning of concepts; and</li> <li>• is needed to interact with and learn from others.</li> </ul>

Source: Compiled by researcher from Craig (2000), Littlejohn and Foss (2005) and Griffin (2000).

Table 2.3 indicates, summarised from the Semiotic Tradition, the way communication depends on common understanding of the signs and symbols that constitutes a common language in a culture or society. The Semiotic Approach is of importance to this study because it provides an understanding of the dynamics of verbal and non-verbal communication and also of online communication where people must mostly rely on



written signs. Craig (2000: 1) states that “we do not exist independently of signs: we use signs in order to communicate”. In this regard, the Semiotic theories illustrate the use of the signs and symbols in social media: the online languages used in various websites, the use of emoticons to illustrate emotions or feelings, or the use of signs instead of words to communicate (for example, hand signs and facial expressions).

The next tradition of communication theories of importance to this study is the Cybernetic Tradition.

#### **2.2.4 The Cybernetic Tradition**

The Cybernetic Tradition conceptualises communication as the processing of information. Griffin (2000: 36) explains that Norbert Wiener coined the word “cybernetics” to describe the field of artificial intelligence. Cybernetics is the tradition of systems in which communication is understood as a system with parts that influences, shapes and controls the character of the system and achieves balance and change (Littlejohn & Foss 2005: 40-42). All complex systems, including computers and telecommunication devices, process information, and in that way communicate (Craig 2000: 3). Systems are seen as sets of interacting components forming patterns of relationships. Any part of the system depends on the other parts, and every part needs input from the environment, processes these, and creates output back into the environment (Foulger 2004: 3; Kayode 2013: 6; Littlejohn & Foss 2005: 40-42). Because a system exists in a dynamic environment, a system must be adaptable and be able to change. Systems are embedded within one another, forming a series of levels of increasing complexity. In a complex system, a series of feedback loops exist within and among subsystems. These feedback loops are called networks (Littlejohn & Foss 2005: 40-42), and is crucial for the effective communication and the processing of information (Maguire 2006: 89; Griffin 2000: 36). Problems in communication can arise from conflicts among subsystems or problems in the processing of information (Craig 2000: 3).

Theories in the Cybernetic Tradition include:

- Basic System Theory – systems are actual structures that can be analysed and observed from the outside. Forces among parts of the system can be observed and measured, and inputs and outputs can be detected.
- Cybernetics – focuses on feedback loops and control processes, on how things impact one another in a circular way, on how systems maintain control, and on how balance is achieved to create change.
- General System Theory (GST) – shows how things in different fields are similar to one another, forming a common vocabulary for communication across disciplines.
- Second-order Cybernetics – shows that knowledge is a product of feedback loops between the knower and the known. What is observed in a system is determined in part by the methods of observation, which in turn are affected by what is seen.

The main aspects of the Cybernetic Tradition of importance to this study are summarised in Table 2.4.

**Table 2.4:** Key aspects of the Cybernetic Tradition.

<b>Summary of the Cybernetic Tradition</b>
<p><b>Systems:</b></p> <ul style="list-style-type: none"> <li>• are sets of interacting components forming patterns of relationships;</li> <li>• are embedded within one another, forming a series of levels of increasing complexity;</li> <li>• and parts of systems depend (and impact) on one another to achieve balance and create change; and</li> <li>• must be able to change because they exist in a dynamic environment.</li> </ul>
<p><b>Networks:</b></p> <ul style="list-style-type: none"> <li>• Information storage, transmission, feedback and self-organising processes occur in complex systems.</li> <li>• A network is a complex system with nodes (feedback loops) to control communication.</li> <li>• Feedback loops between knower and known manages information overload and creates knowledge.</li> <li>• Learning takes place via social interaction as basis of the network.</li> </ul>
<p><b>Communication:</b></p> <ul style="list-style-type: none"> <li>• is a system with parts that influences, shapes and controls the character of the system;</li> <li>• achieves balance and change by forming a common vocabulary across disciplines;</li> <li>• relies on feedback to process information and creates knowledge; and</li> <li>• is influenced by conflicts among subsystems or problems in the processing of information.</li> </ul>

Source: Compiled by researcher from Craig (2000), Littlejohn and Foss (2005) and Griffin (2000).

Table 2.4 indicates, summarised from the Cybernetic Tradition, the way communication functions as a system in a network of systems to process information and creates knowledge. The Cybernetic Tradition is highly applicable to this study. The communication theories under the Cybernetic Tradition mentioned above illustrate systems and networks in action, and focus on the differences between human communication and information-processing systems. The Cybernetic Tradition is closely linked to the Shannon and Weaver Model of Communication (Griffin 2000: 36), explained in Section 2.3.1. The theories under this tradition also illustrate the way information storage, transmission, feedback, network structures, and self-organising processes occur in complex systems (Craig 2000: 3). Furthermore, the theories illustrate communication in the modern technological society and the way the Internet, WWW and social media changed the communication landscape.

The four Traditions of Communication Theories described above provide the foundation for understanding the applicable communication theories (Section 2.3), the theories of CMC (Section 2.4.2), and enlightens in Chapter 4 how communication impacts on teaching and learning.

## **2.2.5 Summary of the Traditions of Communication Theories**

From the above discussion of the Traditions of Communication Theories, supported by the summaries of each tradition, the conclusion is drawn that when combined, the aspects of importance in the Traditions may be grouped into three distinctive categories:

1. The first category focuses on humans, their culture and the role of social interaction among them:
  - a. The individual is a social being on his/her own or as part of a group. Communication in the group influences human behaviour, feelings, beliefs, personality, personal traits and the human mind.
  - b. The individual lives in a culture with rules, norms and values which determine a person's personality, behaviour, development and learning. Culture creates and influences patterns of thought, shared meanings, and in the end, with feedback, constructs knowledge.

- c. The individual needs social interaction to establish a place in the community and build relationships with other people. Social interaction must be managed or controlled by social structures to function effectively.
2. The second category focuses on communication and the meaning of language and signs:
  - a. Language, signs, symbols, codes, etcetera, are important to formulate ideas and understandings, and are crucial in the processing of information and in creating meaning with various levels of complexity.
  - b. Language (as sign) includes the grammar, rules and concepts of a certain culture or group. Language influences patterns of thought, information processing and knowledge creation.
  - c. Communication, specifically talking, creates social structures, shared meanings and a common understanding of words (vocabulary), grammar and signs.
3. The third category focuses on the communication systems and networks in knowledge creation:
  - a. Communication as a system, network system, or information processing system includes feedback loops, interacting parts, control processes, inputs, outputs and patterns of meaning which create knowledge.
  - b. Knowledge is the product of the processing of information by the conscious or unconscious human mind supported by patterns of thought, common understandings, and learning.
  - c. In the system, problems like information overload, differences in understanding of signs, and changes in the environment must be managed.

The key findings as deduced from the preceding summary of the Traditions of Communication Theories are summarised in Table 2.5. The table illustrates the relationship between communication, knowledge and culture from both a horizontal and vertical level. For example, culture and social interaction impact on communication, knowledge creation and culture (horizontal level). Communication (vertical level) links with culture and social interaction, with the meaning of language and signs, and with systems and networks in knowledge creation.

**Table 2.5:** The relationship between communication, culture and the creation of knowledge.

Focus	Communication	Culture	Knowledge
<b>Humans: the role of culture and social interaction</b>	The individual is a social being, part of a group where communication impacts on behaviour, feelings, beliefs, personality, personal traits and the mind.	Social interaction establishes a place in the community, built relationships and creates culture. Social interaction is managed or controlled by social structures.	Knowledge: created as culture influences patterns of thought and shared meanings. Culture determines personality, behaviour, development and influences learning.
<b>The meaning of language and signs in communication</b>	Language, signs, symbols, codes, etc. impact on human conditions, ideas, understandings, and on the processing of information (in various levels of complexity).	Communication and talk in cultural groups create social structures, shared meaning and common understanding of words, grammar, signs and symbols.	Language includes the grammar, rules and concepts of a culture or group. Language influences patterns of thought, information processing and knowledge creation.
<b>The role of systems and networks in knowledge creation</b>	Communication: seen as a system, network system, or information-processing system with feedback loops, interacting parts, control processes, inputs, outputs and patterns of meaning.	In a system, problems like information overload, difference in understanding, and changes in the environment must be managed in order to create balance and order in the culture.	Knowledge is the product of the processing of information by the human mind supported by patterns of thought and common understanding.

In Table 2.5 aspects from the Traditions of importance to a study of social media and education, are listed: the individual is a social being in a specific culture using a common language for communication. Culture influences the being of the individual and the social interaction in the group, while communication depends on common understanding of the language of the culture. The language consists of shared meaning of words, rules, signs, symbols, etcetera, and influences patterns of thought, information processing and knowledge creation. Knowledge is therefore the product of the background (culture) of the individual, the communication and social interaction in the culture, and the processing of information supported by common understanding of the language.

The preceding discussion (Section 2.2) provides an overview of the Traditions of Communication Theories in order to establish the theoretical background for a discussion of the communication models of relevance to the study.

## **2.3 COMMUNICATION THEORIES**

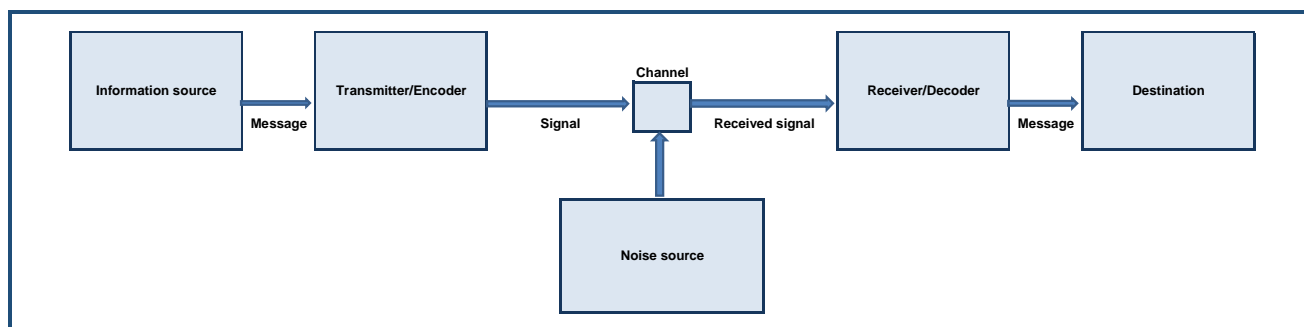
Models are tools which represent a system in an abstract way and lend themselves to the eventual construction of a theory (Halavais *et al* 2004: 6). According to McQuail and Windahl (1999: 2), a model “seeks to show the main elements of any structure or process and the relationships between these elements”. Communication researchers designed and redesigned many communication models in a quest to explain the influence of technology on the ever-changing process of human communication. The following four theories support the study in explaining and illustrating the process of human communication using technologies, and can be seen as foundational to the design and application of the CMC theories discussed in Section 2.4.2. The discussion of this section commences with an explanation of the Shannon and Weaver Model, which represents a first attempt to explain the communication process graphically, and on which most of the other communication models are based.

### **2.3.1 The Shannon and Weaver Model of Communication**

Claude Shannon and Warren Weaver focused their research in the 1940s on communication via electronic technologies, mainly the telephone (Chandler & Munday 2012: 248). They sought to identify the most efficient way to get a message from one point to another with the goal to discover how communication messages could best be converted into electronic signals (Foulger 2004: 2). Shannon and Weaver developed the *Mechanical and Mathematical Model of Communication* in 1948, also known as the “Shannon and Weaver Model of Communication”, or the “Information Theory”. Their model is generally seen as the first model of the communication process, and their model does not only explain how communication happens, but also why communication sometimes fails (*ibid.*).

Shannon and Weaver originally described the major parts of their model as follows: “The *sender* was the part of the telephone a person spoke into, the *channel/transmitter* was

the telephone, and the *receiver* was the part of the phone where one could hear the other person” (Chandler & Munday 2012: 248). Shannon and Weaver also recognised that there is often static that interferes with a telephone conversation, which they deemed “noise” (Steinberg 2007: 54; Riva & Galimberti 1998: 3). Their model is linear, and does not include feedback. The Shannon and Weaver model is depicted in Figure 2.2.



Source: Sketched by researcher based on McQuail and Windahl (1999: 17).

**Figure 2.2:** The Shannon and Weaver Model of Communication.

According to this model, effective communication has occurred if messages are decoded exactly as the sender has intended. Communication can be ineffective if the sender finds it difficult to encode the message effectively, or if the message was interrupted or influenced by any form of noise.

Shannon and Weaver’s Model breaks the process of communication down into eight discrete components (Foulger 2004: 3):

- An information source: presumably the person who creates the message.
- The message: that which is sent by the information source and received by the destination.
- A transmitter or medium: the instrument that captures an audio signal, converts it into an electronic signal, and amplifies it for transmission through the telephone network. The model depicts transmission from a transmitter to a receiver as the primary activity of a medium.
- The signal: the signal flows through a channel. There may be multiple parallel signals, as is the case in face-to-face interaction where sound and gesture involve different signal systems that depend on different channels and modes of

transmission. There may also be multiple serial signals, with sound and/or gesture turned into electronic signals, radio waves, or words or pictures in a book.

- A carrier or channel: the physical means by which the message is transferred and may include air, light, electricity, radio waves, paper, or postal systems.
- Noise: the information or secondary signals not related to the message that obscure or confuse the message.
- A receiver: according to the model – receiving telephone instrument: in face-to-face communication – ears and eyes: in television – an antenna and television set.
- A destination: presumably the person who consumes and processes the message.

Each of the above-mentioned components is applicable to communication through the use of computer technologies. As illustrated in the following sections (Sections 2.3.2, 2.3.3 and 2.3.4), the components of the Shannon and Weaver Model form the basis of most of the existing communication models. The Shannon and Weaver Model also includes some distinctive concepts of communication as listed by Kaminski (2006: 25), Steinberg (2007: 49) and Kilgore (1998: 2):

- Efficiency – the transmission and reception of bits of information per second.
- Accuracy – the extent to which signals of information can be understood. In this sense, accuracy refers more to clear reception than to the meaning of the message.
- Entropy – the measure of uncertainty in a system. Less uncertainty in a message means that more information is transferred (Halavais *et al* 2004: 52). Uncertainty also relates to predictability. When something is completely predictable, it is completely certain. Shannon and Weaver proposed that uncertainty existed in a given situation when there was a high amount of possible alternatives and the probability of their event was relatively equal. Individuals have a desire to reduce uncertainty and they are able to fulfil this need by increasing information through communication (*ibid.*).
- Redundancy – the degree to which information is not unique. Something that is redundant adds little, if any, information to a message. Redundancy is important



because it helps combat noise in a communicating system (for example, in repeating the message).

- Noise – any factor that works against the predictability of the outcome of the communication process. Noise is also described as “any stimulus that interferes with the transmission and reception of messages so that the meaning is not clearly understood” (Steinberg 2007: 49; Kilgore 1998: 2). Noise can be:
  - Psychological or internal noise (mechanisms within individuals restricting the communication process – thoughts, stress, feelings);
  - Physical or external noise (distractions in the environment that can inhibit communication – for example temperature, sounds from the environment, advertisements, and so on);
  - Semantic noise (variations in the meanings of words or unknown terms).
- Channel capacity – the maximum amount of information a channel can carry.

According to Riva and Galimberti (1998: 10), the Shannon and Weaver Model presents only a partial explanation of human communication because it is “too approximate and restricting” for current research into communication. Kryssanov *et al* (2006: 1) also mention the inability of the model to explain “(mis)understandings, lies, and the psychological effects of verbalising thoughts and emotions”. The model is, however, considered the most widely used of all existing communication models and still forms the basis on which many other models are developed (Foulger 2004: 2; McQuail & Windahl 1999: 2). When applied to the use of social media, valuable insights are gained into the way technologies, and especially social media applications, can be used to construct knowledge from the vast amount of information available today. Redundancy and noise may be linked to the flow of information between the nodes (for example: the thoughts, connections) and aspects that may influence the success knowledge creation.

### **2.3.2 The Cybernetic Theory**

In 1948, Norbert Wiener developed a theory of human/machine communication and control in which he elaborated on the theory of Shannon and Weaver by incorporating the idea that people send messages within a system in an effort to control their environment. He coined the term “cybernetics” from the Greek word for “steersman”, to illustrate the aspect of control directing a technology or system. Wiener argued that

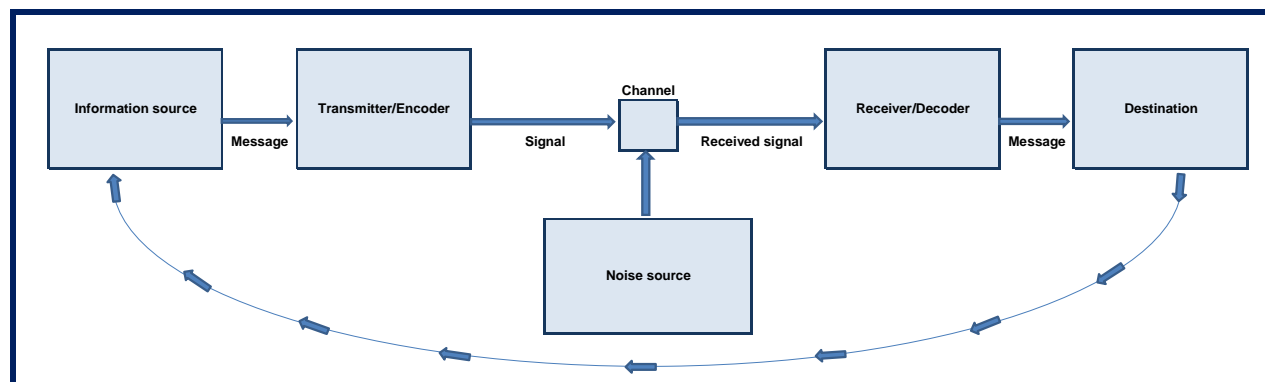
everything can be described as a system, broken into components with inputs and outputs, and then understood through information flow, communication, noise, feedback, and stability (Mindell 2000: 3). Wiener agreed with Shannon and Weaver in admitting that a system can malfunction within an environment due to entropy. Wiener also argued that systems are disorganised and not capable of organising themselves. If there are no means of control that forces a system to stay organised, the level of entropy will increase. Wiener argued that communication, as the processing of information, is the only tool to counteract this natural tendency for entropy within an environment (McGarry 2008: 1).

In his theory, Wiener illustrates how human communication, in the effort to control the environment and the people in the environment, functions in a way comparable to machines (McGarry 2008: 1). Wiener pointed out that there are two types of machines: simple machines, which are closed, and clockwork-based machines that do a certain task in a fixed pattern and do not require any communication from the outside world. On the other hand, more complex machines rely on outside information in order to act in a certain way (McGarry 2008: 2). Wiener classified these machines as “cybernetic systems,” which are able to sense feedback from the environment and change their behaviour accordingly in order to function.

The incorporation of feedback is an important element in Wiener’s theory, but also in most of the other communication theories. Wiener defined feedback as “the control of a machine on the basis of its actual performance rather than its expected performance” (Wiener 1989: 51). Negative feedback maintains structure by counteracting any change that takes place within a system. Positive feedback amplifies change and can even lead to the destruction of a system as the level of entropy accelerates to entirely destroy the function of the system (McGarry 2008: 2). This aspect of Wiener’s theory illustrates how humans function in order to find social acceptance as they send and receive messages about their actions and feelings. The Uses and Gratification Theory (UGT) (discussed in Section 2.4.2.4) underlines this aspect by explaining how a human uses a medium to fulfil self-perceived needs (Littlejohn & Foss 2005: 286).

Wiener’s Cybernetic Model also accentuates the interactive structure of communication by elaborating on Shannon and Weaver’s model with the concept of feedback (Wiener 1989: 51; Foulger 2004: 3). The key concept is that destinations provide feedback on the

messages they receive in time for the information source to adapt the next message (Foulger 2004: 3). Feedback is established to be the most important aspect in the context of good communication (see Table 2.6). The interactive version of the Shannon and Weaver Model as adapted by Wiener is depicted in Figure 2.3.



Source: Adapted from Foulger (2004: 2) based on Wiener (1989).

**Figure 2.3:** The Shannon and Weaver model as adapted by Wiener.

Cybernetics is relevant to the study of systems and is applicable when a system is being analysed regarding the change it creates in an environment. Computer Science directly applies the concepts of cybernetics in the control of devices and the analysis of information, while Communication Science studies the influence of network systems on communication between the members of the network. The Cybernetic Theory also applies to a study of Web 2.0 and social media in education. Feedback (as explained in Section 2.2.5 above) is the basis of the social interaction in which knowledge is created, and is one of the most important advantages of utilising social media in education (see Section 4.5.4).

### 2.3.3 The Systems Theory

Marshall McLuhan is best known for his claim “the medium is the message”. The Medium Theory was coined by McLuhan in 1962 (Heyer 2003: 66). McLuhan believed that each new medium reshapes social life, and that the medium became an extension of the human organism itself (Strate 2010: 10). McLuhan saw communication media as the essence of civilization and proposed that history is directed by the predominant media of each age: shaping behaviour and thought (Meyrowitz 2001: 10). McLuhan saw the medium as a system that enables the construction of messages using a set of

languages and signs. People use and develop media in order to enable the creation and consumption of messages (Foulger 2004: 3). McLuhan argued that as media change, so do the ways in which humans think, manage information, and relate to one another (Steinberg 2007: 274).

According to McLuhan, the oral tradition created a culture of community, literacy created a culture of class, and electronic media created a culture in which groups with special interests are formed. A new kind of public not bound to a specific place therefore comes into being (Littlejohn & Foss 2005: 279). Littlejohn and Foss summarised the arguments of McLuhan's Medium Theory as follows:

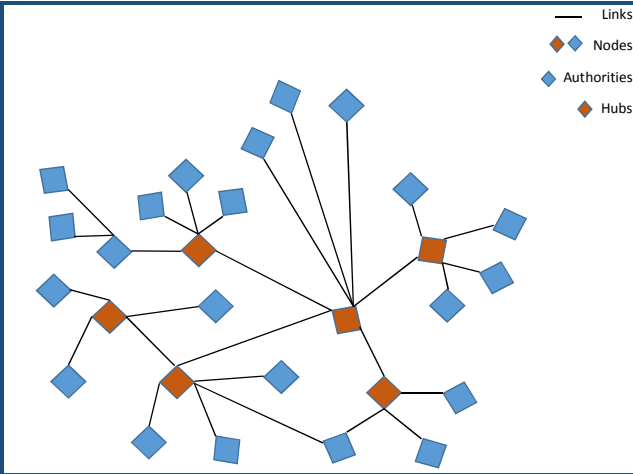
- While oral communication is the privileged medium, life and knowledge cannot be separated. Speech is immediate and ephemeral, and people have to organise their experiences to make what they say memorable. Narratives are the communication medium, and group memory the store of human knowledge. Speech requires knowledge and tradition, and supports community and relationship.
- A written message is separated from the moment and can be changed, edited or manipulated at any time. Knowledge becomes separated from the knower, and people are grouped into those who know and those who do not. Those who know usually become the educators of those who do not. Information can also be saved in written form, forming the collective knowledge (collective intelligence) of the community.
- Electronic media can be immediate and ephemeral (like oral communication), lasting (like written communication), can be broadcasted and stored, are readily available to anyone at any place, and change constantly. An information explosion (or information overload) is the result.

Many aspects of McLuhan's research are relevant to the current communication environment. McLuhan's Systems Theory explains how human knowledge was built and shaped throughout history by the technologies that developed. Electronic media and CMC can be seen as the current technology that influences not only the human mind, but society as a whole. The theory can be used to explain the use of languages to communicate and teach, and therefore links with semiotics, semantics and linguistics. It

is also of importance to this study because it illustrates the influence of electronic media (or networked systems) on society and culture. The model may be used to depict social media (such as Facebook or Twitter) as open systems which continuously interact with the environment. The Systems Theory is closely related to the Network Theory, explained next.

### 2.3.4 The Network Theory

As an emerging field of research, the Network Theory, coined by Castells in 2004, studies information networks (for example, the WWW), technical networks (railways, airline routes, the Internet), biological networks (the human genome), and social networks (human relationships, social groups) (Simon *n.d.*: 1). The Network Theory focuses on the connections, interconnections, and the nodes and links found in networks. Nodes are points in a network where a message can be created, received, or repeated. Hubs are nodes that have links flowing *out* from them, and authorities are nodes that have links flowing *into* them. Links transmit messages and connect nodes (Castells 2004: 59). Figure 2.4 illustrates the nodes and hubs of a network.



**Figure 2.4:** Hubs, nodes and links in a network.

Castells based his Network Theory on the technological changes that happened since the 1970s due to the transformation of information and communication technologies, especially the establishment of the Internet, and maintains that this current era is the “Information Age” (Castells 2004: 6). Human society is existing in the Information Age, with various information technologies (*i.e.* computers, the Internet, WWW and cellular

phones) managing and controlling the flow of information. The Information Age is characterised by terminology like information society, global village, digital society, wired society, post-industrial society, and the network society (Halavais *et al* 2004: 81). The generation group growing up in the information society, the Millennials, is characteristic of the young people of this era and they share in the “collective intelligence” maintained by the Internet and WWW.

In the information society social networks are created through communication among individuals and groups. As people communicate with others, new links are created. Monge and Contractor (2003: 39) define communication networks as “the patterns of contact that are created by flows of messages among communicators through time and space”. Emergent (and new) networks are the information channels that are constantly formed by daily contact among members or with new members (Munsayac 2013: 2). Advances in information and communication technology (for example: web collaboration software, remote communication systems, Web 3.0, and others), increased the capability to link with others and many new links are daily created (*ibid.*). In an “interconnected” universe, multiple networks can be used simultaneously: for example, social networks, information networks, technical networks, biological networks, and organisational networks (Simon *n.d.*: 1).

Castells defines the network society as a social structure which is characterised by network communication technologies and information processing (Halavais *et al* 2004: 82), a network society is a society “whose social structure is made of networks powered by microelectronic-based information and communication technologies” (Castells 2004: 1). Castells (2004: 61) further hypothesises that the culture of the global network society is “a culture of protocols of communication enabling communication between different cultures on the basis, not necessarily of shared values, but of sharing the value of communication”. This new culture is a culture of communication for the sake of communication through available electronic information and communication technologies (Castells 2004: 63).

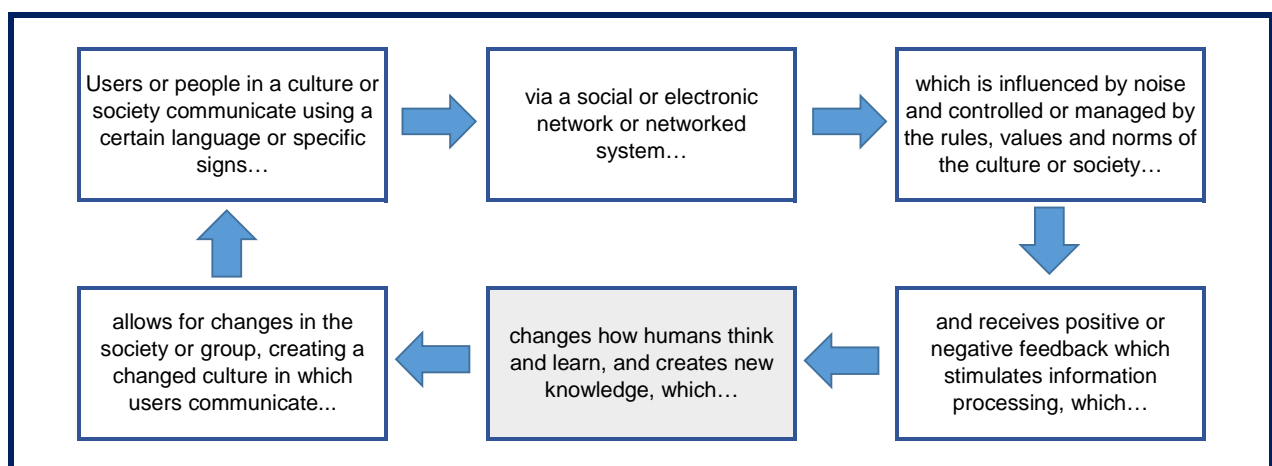
Castells (2004: 64) is of the opinion that the information and knowledge societies are no different from what they were in other historical periods. What changed are the networks that were created through technologies and which created the network society. The

concept of the network society shifts the emphasis to the emergence of a globally interdependent social structure, with its processes of domination and counter-domination. The concept of a network society “helps to define the terms of the fundamental dilemma of our world: the dominance of the programs of a global network of power without social control or, instead, the emergence of a network of interacting cultures, unified by the common belief in the use value of sharing” (Castells 2004: 66).

Castells (2004: 10) states that the new network society is dominated by “a new techno-economic paradigm based on information networks-informationalism” (Cabot 2003: 1148). Castells (2004: 10) defines informationalism as “a technological paradigm that constitutes the material basis of early 21<sup>st</sup> century societies” and “the augmentation of the human capacity of information processing and communication made possible by the revolutions in microelectronics, software, and genetic engineering” (Halavais *et al* 2004: 83). Grounded in informationalism, a new social structure has emerged: a structure of powered, social networks (Castells 2004: 64).

The Network Theory is important to this study because of its focus on the structure and behaviour of networks in a time of rapidly increasing technological developments. The Network Theory emphasises that CMC depends on communication networks such as the Internet, WWW, satellite technology and software programs.

The main aspects deduced from the four communication models are depicted as a cyclic communication process that focuses on the creation of knowledge (Figure 2.5), based on the communication model designed by Wiener (see Section 2.3).



**Figure 2.5:** Communication and the cyclical process of knowledge creation.

Figure 2.5 illustrates that people who communicate, or the users of the communication system, acting in a certain culture and/or society with certain rules, norms and values, communicate within a network or network system with a specified capacity. The communication is influenced by various forms of noise and controlled by the environment or social structures to maintain balance. Feedback is the response to the communication and allows information processing, change, learning and eventually, the creation of knowledge. If applied to communication using social media, these elements are also important for a study of social media in educational context (see Section 4.2.2.6 and Figure 4.2).

From the four Communication Theories (Sections 2.3.1 – 2.3.4) a list of important concepts and elements were compiled according to which the communication process may be described or measured (Table 2.6).

**Table 2.6:** Concept and elements important to the communication process.

<b>Features of the communication process</b>	
People / Users	People communicate via messages using a certain language (understandable to all in the culture or society), in the form of speech, writing, signs, symbols, signals, etc.
Culture / Society	Culture consists of the rules, norms, values, and practices of a social group or society. Society uses technologies to manage communication and the flow of information in order to keep balance and order.
Network / Network system	Communication happens via social or electronic networks or network systems. Capacity refers to the amount of information a channel of the system can carry.
Noise	Noise refers to anything that interferes with the transmission and reception of messages, or makes messages uncertain, inefficient or difficult to understand.
Control	Control is the way communication and messages are managed by the environment or social structures to ensure that a system will stay organised and not give in to entropy.
Feedback	Feedback refers to the response a person/user receives or gives in connection with a communication message. Feedback can be positive or negative, and can stimulate further communication.
Concepts to measure or describe effective communication	<ul style="list-style-type: none"> <li>• Effective: <i>messages are decoded exactly as the sender has intended.</i></li> <li>• Efficiency: <i>the transmission and reception of bits of information per second.</i></li> <li>• Accuracy: <i>the extent to which information can be understood.</i></li> <li>• Predictability: <i>the more certain a message is, the more predictable it is.</i></li> <li>• Redundancy: <i>the degree to which information is not unique.</i></li> <li>• Immediate or ephemeral: <i>oral communication is, for example, short-lived.</i></li> <li>• Lasting: <i>permanent or lasting communication, e.g. written communication.</i></li> <li>• Available: <i>to anyone at any place at any time.</i></li> </ul>



The concepts and elements listed in Table 2.6 show important similarities with the aspects deduced from the Traditions of the Communication Theories (see Tables 2.1 to 2.5):

- The role culture plays in the way people communicate, understand and create meaning is illustrated by the Sociocultural Tradition (see Table 2.1) and by all four the communication models discussed in Section 2.3.
- Control is explained by the Cybernetic Tradition as part of the feedback cycle (see Table 2.4) and is used to maintain balance in a system, social group, or culture. Culture influences behaviour and prior knowledge, which, according to Ambrose *et al* (2010: 16), can either help or hinder knowledge acquisition.
- The role of both people and technology in creating network systems or social networks are illustrated by the Traditions of Communication Theories (Section 2.2) as well as by the communication models (Section 2.3).
- The Semiotic Tradition (see Section 2.2.3) also emphasises the importance of signs, symbols, languages and codes in human communication.
- The impact of noise on uncertainty and inefficiency is also illustrated in the Cybernetic Theory (Section 2.2.4) and in the Sociocultural Tradition (Section 2.2.1).
- Feedback is again emphasised as one of the most important aspects of the communication process. Negative feedback may cause negative outcomes and may lead to stagnation. Positive feedback will lead to improved self-esteem, enhanced well-being, increased social skills, and greater cultural awareness (see Theory of CMC Competence, Section 2.4.2.5). In this regard positive feedback may create a “new” culture in which users use information processing to create new knowledge.

The Cybernetic Theory coined by Wiener, the Systems Theory of McLuhan, and the Network Theory written by Castells were developed in response to the changes brought about by CMC, although all of them show influences of the model of Shannon and Weaver. From the discussion of the Traditions of Communication Theories in Section 2.2 and the discussion of the communication models in Section 2.3, better understanding of the way human communication changed due to modern technologies is possible. This understanding paves the way to describe the various ways

communication can occur using computer technologies. The theories associated with CMC follows a description of CMC.

## 2.4 COMPUTER-MEDIATED COMMUNICATION (CMC)

Computer-mediated communication (CMC) is defined as the process by which people create, exchange, and perceive information using networked (or non-networked) telecommunication systems to communicate by electronically transferring, storing, and retrieving information (Yilmaz 2011: 115; December 1996: 2; Wruch 2010: 26; Thurlow, Lengel & Tomic 2005: 15).

Kerr and Hiltz (1982: 58) describe a computer-mediated communication system as “a *new form of enhanced human communication*”. They regarded CMC at the time (1982) as communication that took place through typing and reading, and emphasised that CMC may be both synchronous and asynchronous (Jackson 1996: 235). Kiesler, Siegel and McGuire (1984: 1124), as well as Philips, Santoro and Kuehn (1988: 38), define CMC as *computer networks* using technology that permit individuals to collaborate with others by sharing, editing, and storing written documents.

Defining CMC changed as computer technology evolved: according to Metz (1994: 4), Cloete (2010: 8), and Bubaš (2001: 2), CMC includes any form of communication exchange via a computer, and is comprised of computer hardware, dependent upon available software, and happens over telecommunication networks. Romiszowski and Mason (2004: 398) emphasised that it is the social aspects of the communication, rather than the hardware or software, which form the basis of CMC. Walther and Burgoon (1992: 51) focused on the functions of CMC, and defined CMC as a communication channel through which business and social interaction can take place.

CMC is also defined from the perspective of the *characteristics* thereof. Baym (2010: 51) highlighted several key characteristics central to CMC (which correspond directly with the features of social media listed in Section 3.5):

- *Interactivity*: CMC requires interaction and reciprocity among individuals or computers.

- *Temporal structure*: CMC can either be synchronous or asynchronous.
- *Social cues*: The lack of social cues leads to fewer clues about the meaning of messages and may allow for individuals to remain anonymous in CMC.
- *Storage and explicability*: Asynchronous CMC allows individuals to edit and refer back to messages in ways that synchronous CMC cannot.
- *Reach*: CMC can vary in how many individuals receive a message.
- *Mobility*: The ability to carry handheld communication technologies enables individuals to communicate with others at all times.

Describing CMC inevitably includes the terms synchronous, asynchronous and face-to-face communication. In the context of the study of social media as CMC, a clear conceptualisation of the meaning of each of these terms are necessary.

#### **2.4.1 Characteristics of CMC**

Computer-mediated communication (CMC) can broadly be divided into two major categories: synchronous and asynchronous communications.

Synchronous communication can be described as live, simultaneous, or real-time communication that happens when communication occurs simultaneously between two or more users (Riva & Galimberti 1998: 17; Romiszowski & Mason 2004: 398). This means that participants communicate with each other at the same time, or with a very short delay, over a network (Riva & Galimberti 1998: 17).

Asynchronous communication does not occur in real-time, communication is not simultaneous and not time or location dependent (Murage 2003: 31; Riva & Galimberti 1998: 17). Because users can participate at a time they prefer, asynchronous communication does not need a permanent link between the computers of the interacting subjects. Asynchronous communication can take place at any time, which allows users to craft and edit messages before communicating them (Baym 2010: 51; Romiszowski & Mason 2004: 403; Riva & Galimberti 1998: 18).

In the past, synchronous communication only referred to face-to-face interactions or telephone conversations. With today's communication technologies, people can communicate without ever having to meet face-to-face. Various researchers (Peter &

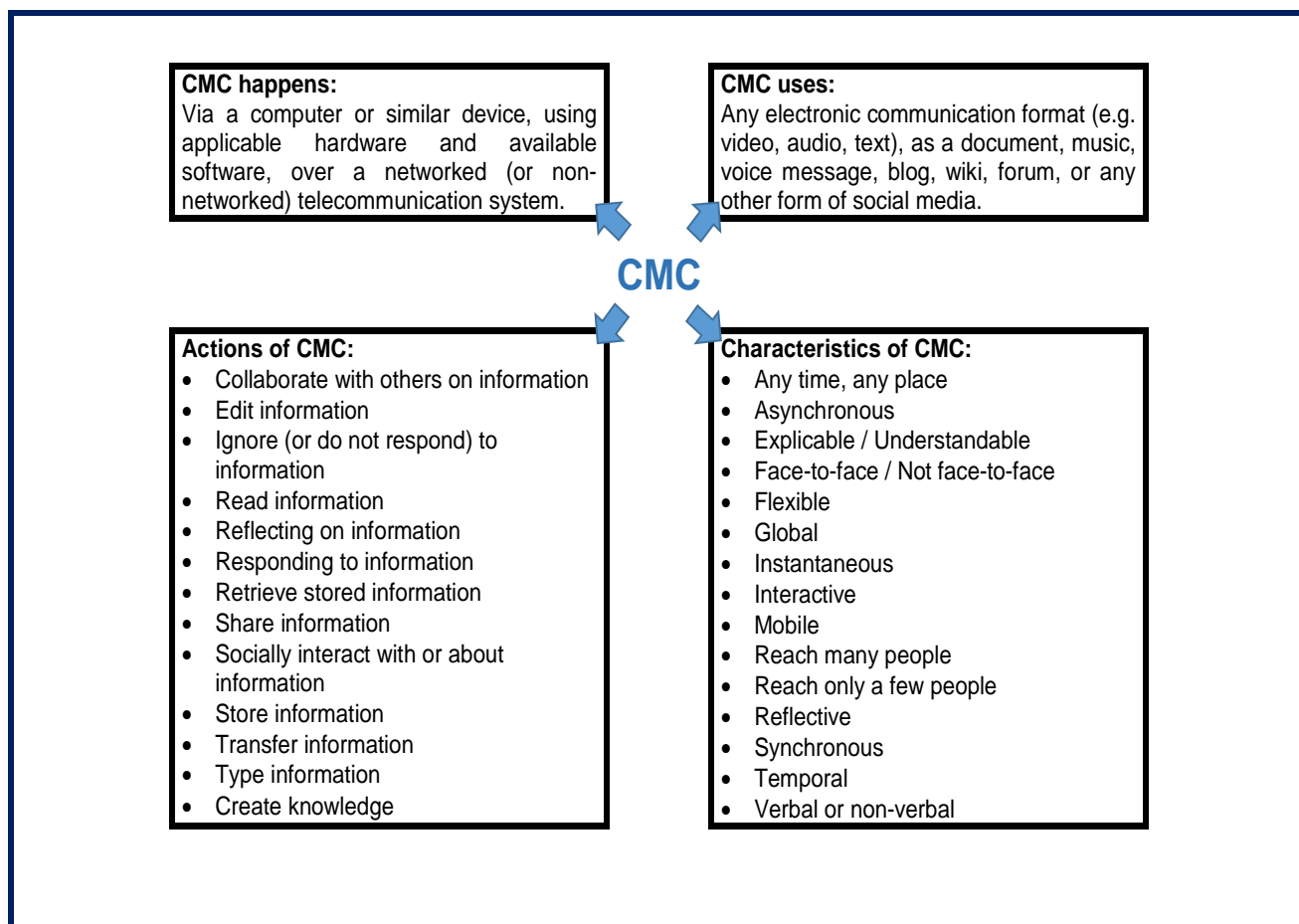
Valkenburg 2006; Shin & Song 2011; Walther & Burgoon 1992; Bordia 1997; Riva & Galimberti 1998; Moody 2001) investigated the advantages and disadvantages of the lack of face-to-face communication, especially without the support of non-verbal cues, in human communication. In order to compile directives for the application of CMC in higher education, the importance of face-to-face communication, or the lack thereof, should be taken into consideration as it may impact the effectiveness of the application of social media tools in education.

Verbal communication between people in a face-to-face conversation includes non-verbal cues like facial expressions, tone of voice, gestures and body language. Participants in face-to-face communication are not always aware of the non-verbal messages which they communicate, although most of the communication that takes place comes from non-verbal meta-communicative cues (Rambe 2011: 285; Cloete 2010: 12). If verbal communication is in conflict with non-verbal communication, people subconsciously rely on the non-verbal messages (Junco & Chickering 2010: 14). Riva and Galimberti (1998: 18) claimed that the absence of meta-communicative features in CMC encourages users to find other ways of making communication complete: CMC uses textual devices – abbreviations and emoticons – to reproduce non-verbal meta-communicative features like emotions and feelings.

Textual communication is more impersonal and task-oriented than face-to-face communication (Whittaker 2003: 28; Wrench & Punyanunt-Carter 2007: 355). The lack of non-verbal cues in CMC, and greater control over the construction of the message because of more time available, allow the communicator “selective self-presentation, partner idealisation, editing and attention advantages, and mutually enhancing feedback” (Tong & Walther 2011: 8), while face-to-face conversation, in contrast, allows mutual adjustment and correction of the message to suit all the parties of the communication.

Against the background of the above discussion and in the context of this study, CMC is depicted as comprising four components: 1) how CMC takes place, 2) the formats used through which CMC communicates, 3) the actions that may be involved using CMC and social media, and 4) characteristics applicable to various formats of CMC that makes

CMC usable. The features of CMC (as applicable to social media) are illustrated in Figure 2.6.



**Figure 2.6:** Features of CMC applicable to social media.

In Figure 2.6, the features of a communication medium that encompasses the features of both traditional communication media and communication media operating over modern technological networks, are sketched. It shows a medium that not only communicates in any way at any time and in any place, but a medium that is intensely involved in all aspects of information creation, storage, use and processing in order to create and communicate knowledge.

Against the background of the characteristics of CMC, selected CMC theories applicable to a study on the use of social media in education are discussed next.

## 2.4.2 Theories of CMC

As was illustrated in Section 2.2, long before computers became an important medium of communication, communication theorists like Shannon and Weaver were researching the effects communicating via technology had on meaning-making and understanding. Most of the theories developed since then are comparative, addressing how and why CMC is different from face-to-face communication (Whittaker 2003: 3; Walther 2011: 443). CMC theorists study and adapt traditional communication theories in an effort to make communication using computer technology more understandable (Bubaš 2001: 1). Three of these theories, called the deficit approaches, emerged from research performed to establish the effects of CMC.

The term “deficit approaches” suggests that CMC, and especially text-based communication via the Internet, lacks some of the qualities of face-to-face communication and will therefore always be inadequate (Henrickson 2000: 48; Walther 2011: 445). The deficit approaches include the Social Presence Theory, the Media Richness Theory, and the Cuelessness (or Lack of Social Context Cues) Model (Walther 2011: 445; Keller 2012: 12; Whittaker 2003: 3). The deficit approaches are not the only theories developed to explain CMC. Walther (2011: 445-469) classified 13 “major and minor” theories of CMC (including the deficit approaches) into three categories according to the characteristics of CMC systems and the way they differ from face-to-face communication. The categories are:

- The *Cues-Filtered-Out* theories, which assert that a systematic reduction of non-verbal cues by different communication systems lead to impersonal communication between users.
- The *Experiential and Perceptual* theories, which depict how characteristics of communicators, their interactions with others, and contextual factors affect the capacities of communication systems.
- The *Interpersonal Adaptation and Exploitation of Media* theories, which reflect the ways in which communicators adapt to or exploit the cue limitations of CMC systems to achieve or surpass face-to-face levels of affinity.

All 13 CMC theories in these three categories will subsequently be reviewed, although aspects of the theories regarded as more applicable to this study will be discussed in more detail, particularly the Social Presence Theory, the Media Richness Theory, The SIDE Model, the Signalling Theory, the Electronic Proximity Theory, the Social Influence Theory, the Hypersocial Model of CMC, and the Efficiency Framework. The Uses and Gratifications Theory and the Theory of CMC Competence, although not included in Walther's list of "major and minor" theories, are highly applicable to this study and are therefore also included in the following review.

#### 2.4.2.1 Cues-Filtered-Out Theories (Cuelessness Theories)

The Cues-Filtered-Out Theories describe a group of theories sharing the premise that CMC lacks non-verbal cues such as gestures, facial expressions, tone of voice or appearance (Walther 2011: 445). Non-verbal cues, for example identity markers such as age, gender, and interactive behaviours, provide socio-emotional feedback not visible in CMC (Whittaker 2003: 26; Henrickson 2000: 48; Chan 2011: 85). The Cues-Filtered-Out Theories include the Social Presence Theory, the Lack of Social Context Cues Theory, the Media Richness Theory, the Social Identity of De-individuation Effects Model, and the Signalling Theory.

##### a) *Social Presence Theory*

Social presence refers to interpersonal contact and feelings of intimacy experienced in communication (Henrickson 2000: 49): the higher the social presence, the larger the social influence that communication partners have on one another's behaviour (Kaplan & Haenlein 2010: 61). Nel and Ndereya (2011: 118) are of the opinion that social presence is "the sense of being affectively connected to another person in a way that opens up opportunities for communication".

Social presence theorists argue that some communication media differ in their capacity to transmit non-verbal communication, and that CMC media, other than face-to-face communication media, are impersonal, individualistic, and task oriented (Walther 2011: 445; Dunlap & Lowenthal 2011: 3). The Social Presence Theory implies that non-verbal cues such as gestures, facial expressions, tone of voice, eye contact and appearance

are absent from CMC, making it difficult to “read” emotion and establish roles (Shin & Song 2011: 127; Keller 2012: 16).

The level of social presence is related to the quality of the medium and to the temporal character of communication: different media formats provide different levels of interaction while asynchronous communication shows more social presence than synchronous communication (Wrench & Punyanunt-Carter 2007: 360). Another aspect is anonymity: anonymity may reduce social presence but increase social influence, or *vice versa* (see Section 2.4.2.1d). Face-to-face communication provides rich visual information afforded by gestures and facial expressions and therefore has a higher level of social presence than traditional CMC (Bubaš 2001: 2). Whittaker (2003: 26) emphasises that “using a technology that fails to communicate social presence will change the content and outcome of communication for tasks that require access to interpersonal information”.

Communication via social media is mostly asynchronous and needs cues like words, abbreviations and emoticons to reproduce non-verbal features showing emotions and feelings.

#### b) *Lack of Social Context Cues Theory*

The Lack of Social Context Cues Theory relates to the interpersonal and group impacts of CMC (Walther 2011: 445). According to this model, CMC users have become de-individuated and normless and CMC prevents users from attuning to others’ individual characteristics. The absence of non-verbal cues in CMC prevents users from detecting demographic, personality, and interpersonal characteristics of others, but causes communicators to become “self-focused and resistant to influence, disinhibited, belligerent, and affectively negative” (*ibid.*). Social media communicate over geographical boundaries and people may communicate anonymously. The receiver of the communication may be unaware of the true identity of the sender of the information, or from where the communication comes.



c) *Media Richness Theory*

The concept of media richness is based on the idea that different communication media have different capacities to process information (Keller 2012: 16). The term *rich media* signifies communication media that support multiple verbal and non-verbal cue systems, while the “richness” of the medium determines whether uncertainty and ambiguity are reduced or increased (Walther 2011: 448). Face-to-face communication is seen as the richest mode because it includes multiple cue systems, in contrast to telephone conversations and written communication, which offer less rich communication (Keller 2012: 16; Kaplan & Haenlein 2010: 61). Even though CMC can also be characterised as less rich, electronic media allow both verbal and non-verbal communication, with comprehensive transmission and reception of messages (Bubaš 2001: 3; Shin & Song 2011: 128). People choose communication channels with appropriate levels of richness for their specific purposes: “the more complex the communication task, the richer the medium that is needed” (Keller 2012: 16; Henrickson 2000: 50). In this regard the Media Richness Theory links to the UGT (see Section 2.4.2.4) in the selection of a specific medium for a specific purpose. Social media allow various methods through which a user may communicate feelings, emotions and meanings. Immediate feedback allows the user to positively or negatively react on the message, and in that way the message may be adapted to fit the intended idea.

d) *Social Identity of De-individuation Effects Model (SIDE)*

The Social Identity of De-individuation Effects Model (SIDE) is applicable to settings that appear to be interpersonal in nature and explains the effects of anonymity (mainly visual anonymity), social influence and identifiability on group behaviour. Walther (2011: 451) defines visual anonymity “as that which occurs when CMC users send messages to one another through text”. Because they cannot see one another, they do not focus on their differences. Identifiability, on the other hand, can increase accountability and therefore influence behaviour (see Section 2.4.2.3c). CMC allows people to remain anonymous (Baym 2010: 51), and anonymity influences group behaviour: according to the Social Influence Theory (Section 2.4.2.2b) anonymity encourages people to participate in online groups, but it may, however, weaken social bonds. The SIDE model suggests that the absence of non-verbal cues in CMC is an obstacle in expressing individuality and

establishing social identity, and negatively influences the development of online relationships (Walther 2011: 451; Postmes, Spears, Sakhel & De Groot 2001: 1244). Spending a lot of time online may also increase loneliness (WCER 2012: 1-2; Moody 2001: 399). The theory of CMC Competence (Section 2.4.2.5), on the other hand, indicates that loneliness may decrease because people meet and interact with others online and that even normally shy people can overcome their fears to interact over social media. Spitzberg (2006: 650), Ala-Mutka (2009: 18) and Ranney and Troop-Gordon (2012: 848) positively relate social media use to improved self-esteem, enhanced well-being, increased social skills, and greater cultural awareness.

e) *Signalling Theory*

According to Donath (1999: 30), the Signalling Theory focuses on CMC users' scepticism towards the legitimacy of other users' online self-presentations. Individuals may lie about themselves and can use either their real names or pseudonyms. Donath's approach provides a reasonable explanation for why people trust information that is communicated offline but tend to mistrust information people provide about themselves in CMC discussions. The Signalling Theory shows, in other words, why certain signals are considered reliable and others are not (Walther 2011: 453). According to the Hyperpersonal Communication Model (Section 2.4.2.3b) CMC users are able to present themselves as more friendly, social and intimate over CMC than they really are, and because of the lack of non-verbal cues, users may also choose to participate anonymously, which, as illustrated above, influenced group behaviour and interactivity.

The Cues-Filtered-Out Theories especially focus on the importance of face-to-face communication, and portray CMC as impersonal, without emotion, and without any form of intimacy. The main aspects of the Cues-Filtered-Out Theories are:

- CMC is seen as impersonal, individualistic, task oriented and lacking social interactivity skills;
- Users are de-individuated and normless and become resistant to influence, self-focused, argumentative, and affectively negative;
- Users prefer a medium with appropriate levels of media richness to either fit the specific purpose of the communication or the personal needs of the user;

- Anonymity and identifiability influence behaviour and online relationships may either decrease or increase social presence;
- Users mistrust information other users present about themselves online, because of the ease with which online signals can be manipulated.

The role of this set of theories is explained in Table 2.7. Table 2.7 includes all aspects relating to the choice and use of a communication medium as identified from the discussion of the theories of CMC. The second group of theories, the Experiential and Perceptual Theories, are discussed next.

#### 2.4.2.2 Experiential and Perceptual Theories of CMC

The Experiential and Perceptual Theories focus less on verbal and non-verbal cues, and more on the communicator and the communication system. This group of theories explains how the characteristics of communicators, their interactions with others, and certain contextual factors affect the alleged capacities of the communication systems (Walther 2011: 454). The theories indicate why users will choose certain media above others, and explain the reasons people participate in online situations. The Experiential and Perceptual Theories of CMC include the Electronic Propinquity Theory, the Social Influence Theory, and the Channel Expansion Theory.

##### a) *Electronic Propinquity Theory*

The Electronic Propinquity Theory focuses on the psychological closeness experienced by CMC communicators (Walther 2011: 454). Physical closeness is generally associated with interpersonal involvement in face-to-face communication: however, according to this theory, CMC communicators could also experience a sense of closeness, or “electronic propinquity” when communicating online. Korzenny (1978: 3) defines electronic propinquity as electronic proximity, electronic nearness, or electronic presence. Electronic propinquity allows for the possibility of communication, but is not communication. According to Walther (2011: 454) and Dickinson (2012: 31), complex information and strict communication rules restrain propinquity, while wide bandwidth, good communication skills, and a choice of communication channels can increase propinquity. A feeling of closeness or nearness may increase social interaction and

decrease loneliness (see Section 2.4.2.5), may support contact between communicators, and increase the value of feedback. The importance of social interactivity, group interaction and feedback via social media are highly applicable to this study and are explained in Sections 2.2.1, 2.4.2.1a, 2.6 and in Table 2.7.

b) *Social Influence Theory*

The Social Influence Theory focuses on the factors that change users' perceptions about CMC and their choice of a medium (Lee *et al* 2003: 51). CMC media depend on social interaction and the richness and utility of the medium are affected by the level of interaction between individuals in the social network, for example strong ties have more influence on the perception of CMC's richness than weak ties do (Walther 2011: 456). Postmes *et al* (2001: 1244) state in this regard that face-to-face interaction "strengthen the interpersonal bonds that transmit social influence, whereas isolation and anonymity could weaken them". Postmes *et al* stress that the lack of social cues reduces self-awareness, decreases attraction to the group, and decreases social influence. According to the SIDE model (Section 2.4.2.1d), on the other hand, anonymity intensifies social influence and decreases loneliness. Moody (2001: 398) indicates that social media use increases levels of loneliness, while Spitzberg (2006: 650) states that as CMC competencies increase, loneliness and depression decreases. The social influence of social media are important in the context of students' willingness to use social media for learning.

c) *Channel Expansion Theory*

The Channel Expansion Theory focuses on internal, experiential factors in a social network of communicators. The theory's central argument is that as individuals gain more experience with a particular communication medium, in their opinion, the medium becomes more capable to deal with their communication tasks (Walther 2011: 457). Through experience a user knows how to encode and decode messages over a particular channel, and is therefore more willing to use the medium (Carlson & Zmud 1999: 168). For example, experienced users of social media are willing to investigate the use of new social media applications, and are more willing to use social media in

educational context than inexperienced users (Vrocharidou & Efthymiou 2012: 615; Bennett *et al* 2012: 533).

The three Experiential and Perceptual Theories reflect on the role of the user in both face-to-face and online communication and on the importance of belonging to a group (both socially and professionally).

Aspects of importance in the Experiential and Perceptual Theories of CMC, are:

- Users of an online medium may experience closeness that may increase the possibility of communication.
- Anonymity can reduce social presence and decrease social influence and attraction to a group.
- Loneliness can either increase or decrease, while normally shy people will be more willing to participate online than face-to-face.
- The quality of the medium and the quality of the social interaction can influence the quality of the communication taking place.
- The more a person uses a medium, the more effective the medium seems to become.

The role of this set of theories is explained in Table 2.7. Table 2.7 includes all aspects relating to the choice and use of a communication medium as identified from the discussion of the theories of CMC. The Theories of Interpersonal Adaptation and Exploitation of Media are discussed next.

#### 2.4.2.3 Theories of Interpersonal Adaptation and Exploitation of Media

The third set of theories described by Walther (2011: 458-469) reflects the ways in which communicators adapt to or exploit the cue limitations of CMC systems to achieve or exceed face-to-face levels of affinity. This set includes the Social Information Processing Theory, the Hyperpersonal Model of CMC, the Warranting Construct Model, the Efficiency Framework and the ICT Succession Framework.

a) *Social Information Processing (SIP) Theory*

The Social Information Processing (SIP) Theory focuses on how people get to know one another online without non-verbal cues and how they develop and manage relationships in a computer-mediated environment. The theory proposes that whereas CMC results in a slower information exchange than face-to-face communication, it can still convey relational information and, over time, may demonstrate the same relational dimensions and qualities as face-to-face relationships (Shin & Song 2011: 127; Henrickson 2000: 50). Social media applications can build or strengthen relationships, even if people never meet each other face-to-face.

b) *Hyperpersonal Model of CMC*

The Hyperpersonal Communication Model explains how CMC users are able to present themselves as more friendly, social and intimate over CMC than they are in face-to-face communication. The model explains that CMC “surpasses normal interpersonal levels” and these “controlled self-presentations” become the manner by which online partners come to know one another (Walther 2011: 460; Henrickson 2000: 53). The better people may get to know one another, the greater changes are for effective collaboration and better interactivity. Walther *et al* (2011: 5) list four components of the Hyperpersonal Communication Model:

- *Sender-selective self-presentation*: Online partners can control messages constructed via language and text more deliberately than is afforded by face-to-face communication. CMC users are therefore able to present themselves in favourable or self-serving ways. This allows them to exaggerate certain characteristics and diminish unwanted ones (Walther *et al* 2011: 1; Gonzales & Hancock 2008: 169).
- *Receiver idealisation*: The receiver tends to exaggerate the perceptions about the sender by drawing on characteristics of group identities, personality stereotypes, or other projections (Walther 2011: 460). In the absence of face-to-face contextual cues, the likelihood of over-attributing information of the sender is increased, often creating an idealised image of the message sender (Tidwell & Walther 2002: 218).

- *Channel management*: Users may exploit media channels that allow engagement with many other users and can use the characteristics of the channel to deliberately construct favourable messages (Walther *et al* 2011: 4). Using an asynchronous channel, the sender has time to carefully construct messages and communicate one message to many receivers simultaneously (Bubaš 2001: 5).
- *Feedback*: Feedback among communicators of CMC is expected to reinforce, promote and intensify the effects of self-presentation, idealisation, and channel exploitation – “potentially shaping communicator characteristics to the point of affecting the participants’ own attitudes and perceptions” (Walther 2011: 460).

Aspects of this theory relate to social media use: the social image of users sketched by social media influence other users to collaborate and interact in group context. Feedback received on the interaction strengthens participation online. The model links with the Signalling Theory (Section 2.4.2.1e) and the Electronic Propinquity Theory (2.4.2.2a), which also focus on the way people view themselves or others online. These two theories correspond also with the Warranting Construct Model.

#### c) *Warranting Construct Model*

“Warranting pertains to the perceived legitimacy and validity of information about another person that one may receive or observe online” (Walther 2011: 466). The Warranting Construct Model emphasises that an individual is less likely to distort self-presentation when the receiver may have access to other members of the sender’s social circle. Receivers are expected to be more confident about the information about the sender if the receiver knows the real-life person or other people in the group that know the receiver (Utz 2010: 316).

#### d) *Efficiency Framework*

The Efficiency Framework holds that users will choose a medium that predicts success, even if it requires more effort and spending more time than using one requiring less effort and time. Nowak, Watt and Walther (2005: 3) note that there is a distinction between media satisfaction and the perceived and actual success of online interactions. Users are likely to exaggerate their impressions of CMC tools: enjoyment or frustration

responses override a person's objective assessment of the tools' effectiveness. Compared to face-to-face communication, CMC is more effortful and requires more time and understanding before a user is a fluent user thereof. The Efficiency Framework attempts to explain how CMC may be rated as socially unsatisfactory but, nevertheless, may offer benefits that attracts users (Walther 2011: 468).

The Efficiency Framework corresponds with the Media Richness Theory (Section 2.4.2.1c) and the Social Influence Theory (Section 2.4.2.2b). The UGT (Section 2.4.2.4) may also be linked to the Efficiency Framework in that the UGT illustrates why users prefer to use a specific medium when other communication media are also available. Using a medium that requires more effort will increase the challenge and therefore the expectation of success, even if more time will be spent using the medium. People would, for example, learn to use certain social media tools even at the cost of time and effort, because the tools offer benefits like social interaction and effective communication (Bangert 2004: 26).

e) *ICT Succession Framework*

This framework involves the strategic sequencing of messages across multiple communication channels using traditional media, face-to-face channels, new forms of CMC, or combinations of all of these to communicate effectively (Walther 2011: 469). The model proposes that the repetition of a message across different types of communication channels causes the greatest communication effectiveness and efficiency for certain types of tasks (Stephens 2007: 496).

The main features of the theories of Interpersonal Adaptation and Exploitation of Media are:

- People can get to know other people online and may develop relationships;
- People can control the message and exploit the features of the channel and in that way create favourable images of themselves online;
- Influenced by members of the group known to the user, the individual is forced to be honest about him/herself;
- A user will choose a medium that will increase success, even at the cost of effort and time; and



- The user will use more than one medium to correspond the same message to many users in order to increase the effectiveness of the message.

The role of this set of theories is explained in Table 2.7. Table 2.7 includes all aspects relating to the choice and use of a communication medium as identified from the discussion of the theories of CMC. Another theory of importance to the study of CMC is the Uses and Gratifications Theory.

#### 2.4.2.4 The Uses and Gratifications Theory (UGT)

The theories of the Sociopsychological Tradition (Section 2.2.2) focus on how humans behave in specific communication situations. The Uses and Gratification Theory (UGT) relates to this Tradition in that it focuses on the human (rather than on the message), who uses a medium discriminately to fulfil self-perceived needs (Littlejohn & Foss 2005: 286). The UGT illustrates why users prefer to use a specific medium when other communication media are also available (Vrocharidou & Efthymiou 2012: 610; Bubaš 2001: 6, 28). More specifically, the UGT focuses on “the social and psychological origins of needs, which generate expectations of the mass media or other sources, which lead to differential patterns of media exposure (or engagement in other activities), resulting in need gratifications and other consequences, perhaps mostly unintended ones” (Vrocharidou & Efthymiou 2012: 610). The user is active and goal directed in the choice of media, and always chooses media to gratify needs (Littlejohn & Foss 2005: 286).

Most theorists today believe that media fulfil a variety of functions in society (Littlejohn & Foss 2005: 279). Vrocharidou and Efthymiou (2012: 611) argue that as some media content may gratify different needs for different individuals, media types compete with one another to satisfy users, and that adds to users’ choice of a suitable media channel. There are many ways in which people use media. Basic needs, social situation and background (such as experience, interests, and education), affect people’s ideas about what they want from media and which media is the best option to meet their needs (Halavais *et al* 2004: 34). Bubaš (2001: 28) adds the ability to facilitate friendship development, the possibility to personalise communication, the sense of connectivity in the community, ease of use, and the usefulness of the communication technology to the list of influences on the users’ choice. The personal motivations for media use also

suggest that media offer gratifications which can be thought of as “experienced psychological effects” which are valued by individuals (Halavais *et al* 2004: 35). The popularity of a social media tool or a social networking site and the amount of time users spend on the medium or site is an indication that the user’s personal and social needs are satisfied (Bubaš 2001: 28).

The UGT corresponds with the Media Richness Theory (Section 2.4.2.1c), the Signalling Theory (Section 2.4.2.1e), the Electronic Proximity Theory (Section 2.4.2.2a), and the Hyperpersonal Model (Section 2.4.2.3b).

The main aspects of importance of the UGT are:

- The user is active and goal directed in choosing a medium;
- The user will choose a medium to satisfy specific self-perceived needs.

The UGT adds to the list of aspects relating to the choice and use of a communication medium as deduced from the discussion of the theories of CMC, listed in Table 2.7. The last CMC theory of importance to this study is the Theory of CMC Competence.

#### 2.4.2.5 The Theory of CMC Competence

The Theory of CMC Competence focuses on motivation, knowledge, skills, context, and the outcomes of communication as aspects of importance to the user of CMC. The theory proposes that motivation stimulates a search of available media: certain motivations are served by certain media features and messages, while knowledge of the medium and CMC skills support the media selection (Saritas 2006: 55; Murage 2003: 37). Receivers have certain expectations of the selected media, which are influenced by culture, relationships, and environment, but may also be influenced by receivers’ previous experiences with CMC (see also Section 2.4.2.2c). The importance of culture and background in communication is also emphasised by the Traditions of Communication Theories (see Table 2.5).

The Theory of CMC Competence includes most of the main aspects of importance listed by the other theories:

- The Media Richness Theory (Section 2.4.2.1c), in the selection of a medium to fit specific needs;
- The Social Identity of De-individuation Theory (SIDE) (Section 2.4.2.1d), in the value of anonymity and group interaction in communication;
- The Electronic Propinquity Theory (Section 2.4.2.2a), in the role of closeness experienced by users or group members;
- The Social Influence Theory (Section 2.4.2.2b), in the belief that users will communicate more openly online;
- Social Information Processing Theory (Section 2.4.2.3a), about the ability of people to form and maintain online relationships;
- The Efficiency Framework (Section 2.4.2.3d), in the selection of the media type; and
- The Uses and Gratifications Theory (UGT) (Section 2.4.2.4), in the way the chosen medium will support the user's needs and meet the user's expectations.

The theory of CMC Competence illustrates the importance of expectations about selected social media: positive expectancies lead to positive outcomes, while if negative expectancies are fulfilled, outcomes are mostly negative. The theory also indicates that as CMC competencies increase, loneliness, depression, and computer-based stresses may decrease because people meet and interact with others online, and that even normally shy people can overcome their fears to interact over social media (Spitzberg 2006: 650). This is in contrast to the view of the Social Identity of De-individuation Effects Model (SIDE), which stands for an increase in loneliness if people spend a lot of time online. As discussed in Sections 2.4.2.1d and 2.4.2.2b, Moody (2001: 398), on the other hand, indicates that the Internet can decrease well-being and increase feelings of loneliness.

Aspects of importance in the Theory of CMC Competence are:

- Media selection depends on the motivation of the user, knowledge of the medium, previous experience of using the medium, CMC skills and competencies, and expectations of the medium.
- Media selection may be influenced by context, culture, background, environment, and expected outcomes.



- Positive aspects linked with the use of the medium are increased well-being, improved self-esteem, better social skills, greater cultural awareness, increased social interaction, collaboration, and involvement in learning.
- Negative aspects linked with the use of the medium are depression, feelings of stress, decreased feelings of well-being, and loneliness.

The researcher does not claim that the theories summarised above represent a comprehensive list of all CMC theories, as new and adapted theories are constantly being developed by researchers striving to illustrate the ways the ever-changing field of CMC influences human communication. By carefully comparing the main aspects of the 13 CMC theories discussed above, three aspects came to the fore that are mentioned in each of the theories: 1) aspects that influence the choice of the communication medium, 2) positive aspects related to the use of the medium, and 3) negative aspects related to the use of the medium. These aspects are listed in Table 2.7.

The summary of the features of CMC and the CMC theories in Table 2.7 illustrates that a person will select a medium influenced by personal communication needs and expectations regarding the outcomes of the use of the medium. The choice may be fuelled by culture, background, skills, prior knowledge of CMC and experience with using social media. When using a specific medium, users may either experience feelings of social and individual well-being, or may become lonely and socially isolated. Use of a specific social medium may lead to extra effort and a loss of time, but also to ease of information processing and knowledge creation.

The goal of Section 2.4.2 is to analyse the CMC theories applicable to the main objective of this study, namely to compile directives for the use of social media as CMC in higher education. From the CMC theories discussed above (Section 2.4.2) and Table 2.7, together with the features of the Traditions of Communication Theories (Section 2.2 and Table 2.5), and the features of Communication Models (Section 2.3 and Table 2.6), a holistic view of communication is sketched that can be used as “lens” to focus on those features that the researcher regards as highly applicable to the use of social media in higher education.

**Table 2.7:** Aspects relating to the choice and use of a communication medium.

<b>Aspects that influence the choice of a medium</b>	
<b>The medium must:</b>	<b>The choice is influenced by:</b>
<ul style="list-style-type: none"> <li>• achieve or surpass face-to-face levels of affinity and communication;</li> <li>• have appropriate levels of media richness to fit a specific purpose;</li> <li>• fulfil expectations about the ability and capacities of the medium;</li> <li>• increase chances for success;</li> <li>• be of efficient quality to ensure quality interaction and communication; and</li> <li>• satisfy the user's self-perceived needs.</li> </ul>	<ul style="list-style-type: none"> <li>• the character and needs of the user;</li> <li>• the possibility of social interaction and forming new relationships;</li> <li>• knowledge of, previous experience with, and skills in using CMC media;</li> <li>• contextual factors, e.g. culture, background, environment, motivation, etc.; and</li> <li>• the possibility to reach goals, e.g. to get media exposure; for enjoyment; and to meet people with the same interests.</li> </ul>
	
<b>Positive aspects related to the choice of a medium</b>	<b>Negative aspects related to the choice of a medium</b>
<ul style="list-style-type: none"> <li>• Users may experience closeness, which allows for effective communication.</li> <li>• Anonymity and identifiability can increase social presence and positively influence group behaviour and online relationships.</li> <li>• Normally shy people may be motivated to participate online.</li> <li>• Influenced by known members, the user is forced to be honest about him/herself.</li> <li>• Using a variety of media, the effectiveness of a message is increased.</li> </ul>	<ul style="list-style-type: none"> <li>• Cue limitations lead to impersonal, task-oriented communication.</li> <li>• Anonymity can reduce social presence and may negatively influence group behaviour and online relationships.</li> <li>• Users may exploit cluelessness and create favourable images of themselves.</li> <li>• Users mistrust information presented by unknown people.</li> <li>• Users may become de-individuated, normless, self-focused and negative.</li> </ul>
<b>Positive aspects related to the use of a medium</b>	<b>Negative aspects related to the use of a medium</b>
<ul style="list-style-type: none"> <li>• increased well-being;</li> <li>• improved self-esteem;</li> <li>• better social skills;</li> <li>• greater cultural awareness;</li> <li>• increased social interaction;</li> <li>• feeling less isolated and lonely;</li> <li>• better group collaboration;</li> <li>• increased possibilities for information processing; and</li> <li>• knowledge creation.</li> </ul>	<ul style="list-style-type: none"> <li>• depression;</li> <li>• stress;</li> <li>• decreased feelings of well-being;</li> <li>• feeling de-individuated;</li> <li>• becoming self-focused;</li> <li>• feeling lonely and isolated;</li> <li>• becoming argumentative;</li> <li>• feeling and acting negative;</li> <li>• leads to procrastination; and</li> <li>• a waste of time.</li> </ul>

## 2.5 COMMUNICATION FEATURES MOST RELEVANT TO THE STUDY

In order to identify elements that can focus the study, a list of communication features regarded as most relevant to the study were deducted from Tables 2.1 to 2.7. Selected features clearly belong to one of two categories: 1) the *user* of the communication or 2) the *communication process*. Background information about the user is directional in the way a person communicates, learns from communication and uses technology. Background information about the communication process sheds light on the use of social and electronic networks for communication. The selection of the elements or features can be explained as follows:

1. Applicable *user-centred features* are compiled from the elements described in the Traditions of Communication Theories (Section 2.2), the Communication Models (Section 2.3), and the discussion and Theories of CMC (Sections 2.4 and 2.4.2), and consist of the following aspects: the user, the culture (background) of the user, the language the user prefers/uses for communication (see Tables 2.1 to 2.5), and the social well-being of the user as result of the use of CMC media (Table 2.7):
  - a. The user as individual may be part of a specific social group or more than one group, and may belong to a certain culture or more than one culture. Both the social group and the culture may also exist online. The user is influenced by the culture to host certain beliefs, act in certain ways, and communicate in a communal language. In the context of the culture or social group, the user creates or exchanges information in order to create knowledge.
  - b. The social well-being of the user as a result of the use of CMC media may be experienced as either positive or negative. The user can experience closeness, increased social interaction and build online relationships to combat loneliness and isolation. Users may, however, also become de-individuated, normless, self-focused and negative. Users may develop better social skills and may feel comfortable to communicate online. On the other hand, false online personalities can be sketched which result in communication which cannot always be trusted.
  - c. Culture refers to the culture the user either grew up in or lives in, and which creates and influences patterns of thought, shared meanings, and constructs the user's knowledge. In the culture the user must live according to the rules and norms of the social group in order to socially interact and find a place in the

social structure. Culture also determines personality, behaviour, development and learning.

- d. People communicate via messages using a language for talking or writing, or specific signs in the form of symbols, gestures, signals, and so on that is known to all the people in the culture or group. Language includes the grammar, the rules and concepts of a culture or group. The meaning and use of the language impact on ideas, conditions, patterns of thought, understandings, the processing of information and on knowledge creation.
2. The characteristics and key features of the *communication process* are deduced from the Traditions of Communication Theories (Section 2.2), the Communication Models (Section 2.3), and the discussion and Theories of CMC (Sections 2.4 and 2.4.2), and focuses on the communication process, the social and electronic networks used for communication, and the knowledge created by the processes of information processing and use (Figure 2.5 and Tables 2.5 and 2.6):
    - a. Communication in a cultural group creates different social structures, and shared meanings and common understandings of words, grammar and signs. As established in Section 2.4, communication via social media can happen either synchronously or asynchronously, and either face-to-face or online. The absence of non-verbal cues may both positively or negatively influence the communication process. The communication process is influenced by a certain level of interference, called noise (see Table 2.6) and depends on a certain capacity to transmit the communication (see Table 2.7). Communication uses language to manage or control the social system, and is in turn controlled by social interaction. The communication process might be measured or evaluated on the hand of certain elements important for effective communication (see Table 2.6).
    - b. Communication using a social network (see Tables 2.5 to 2.7): Communication happens in a social network against the background of a culture of shared values. Communication itself is seen as a network system, or information-processing system with feedback loops, interacting parts, control processes, inputs, outputs, and patterns of meaning. In a system, problems like information overload, difference in understanding, and changes in the environment must be managed in order to create balance. Control is the way in which communication

and messages are used to ensure that a system will stay organised and not give in to entropy.

- c. An electronic communication network consists of computer hardware, applicable software, and telecommunication networks. In the network are hubs, nodes and links with feedback loops which ensure the flow of information in and between the system and the environment (see Figure 2.4). The system has a certain capacity that refers to the amount of information a channel can carry, and may also be influenced by noise and managed by control (see Table 2.6).
- d. Electronic and social networks enable effective processing of information. Various types of information can easily be created, stored, shared, edited or transferred to one or many users at the same time. Information procession leads to the creation of knowledge which allows for changes in a society, creating a culture in which users learn and communicate with various technologies.

The most prominent features in communication, as identified from Sections 2.2 to 2.4.2, are narrowed down to provide a focus on the communication theory relevant to this study. A synopsis of these features are provided in Table 2.8.

Table 2.8 thus provides an important focus on the most prominent features and characteristics of communication as highlighted by the review of relevant Communication Science literature and theory in this chapter (also referred to as the “communication-centred lens” in the study) which forms the theoretical foundation for the observation and appraisal of the effective use of social media as CMC in higher education. Based on these features, the communication process may be analysed to establish, for example, if the background of the user, his/her culture with its specific language, and the way in which communication happens has any influence on the effectiveness of the communication. The medium can be analysed to establish, for example, if it increases social interaction and social well-being, and if it can be used effectively to process information and create knowledge.



**Table 2.8:** Communication features relevant to the study.

<b>Prominent Communication Features</b>	
<b>User</b>	The user as individual may be part of one or more social groups, and may belong to one or more than one culture. The user has a unique personality and certain characteristics, feelings, beliefs, norms, values and behaviours that influence the way the user communicate and interact with other people.
<b>Social well-being</b>	The use of media for communication may impact the user positively or negatively. The user can experience closeness, increased social interaction and better social skills while building online relationships to combat loneliness and isolation. Users may also become de-individuated, normless, self-focused and negative.
<b>Culture</b>	Culture impacts on the way a user communicates. Culture determines personality, behaviour, development, patterns of thought, meanings, and constructs the user's knowledge. The user is influenced by the culture to hosts certain beliefs, acts in certain ways, and communicates in a communal language.
<b>Language</b>	People communicate using a specific language with words and signs that is known to the people in the culture. The language of a culture has specific rules, codes, grammar, etc. and impacts on ideas, conditions, patterns of thought, understandings, the processing of information, and on knowledge creation.
<b>Communication</b>	Communication relies on common understandings of the words, grammar and signs of a language. Communication can happen synchronously, asynchronously, face-to-face or online. CMC is influenced by the absence of non-verbal cues and noise, and relies on the capacity of the communication channel and on feedback.
<b>Social network</b>	Communication in a social network is based on crowd-sourced, open projects to process information, create meaning and construct knowledge. The network has interacting parts, control processes and patterns of meaning, and survives on collaboration, active participation, social interaction and feedback.
<b>Electronic network</b>	Communication over an electronic network uses computer hardware, software and telecommunication networks with hubs, nodes and links, Feedback loops ensure the flow of information. The network functions on input, output and interaction between the parts of the system and the environment.
<b>Knowledge creation</b>	Communication networks enable effective processing of various types of information. Information can be created, stored, shared, edited or transferred. Information procession leads to knowledge creation, which in turn leads to a culture in which users learn and communicate with various technologies.

## 2.6 CONCLUSION

This chapter aimed to address the first part of the research objective, namely *to undertake a comprehensive literature review focusing, in the first place, on relevant communication theories and models, in order to establish a theoretical basis for a study directed to the utilisation of CMC and social media in the South African higher education context.*

Through purposeful consideration of the Traditions of Communication Theories (Tables 2.1 to 2.4), the Communication Models (Tables 2.5 and 2.6), and CMC and CMC Theories (Figure 2.6 and Table 2.7), a list of key features of the communication process was compiled that indicates the aspects which may influence effective communication when utilising social media in higher education. These features provide the Communication Science foundation for the study. As a whole, the review in the chapter served as the first of three important “lenses” through which applicable theory could be illuminated and narrowed down to a conceptual framework (see Section 4.5 and Figure 4.3) that directs the study towards attainment of its objectives and ultimate aim.

In Chapter 3, the social media “lens” contributes to instituting a social media foundation for the study.

## CHAPTER 3

### SOCIAL MEDIA CONTEXT: SOCIAL MEDIA AS TOOL OF COMPUTER-MEDIATED COMMUNICATION (CMC)

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In Chapter 2, the communication science “lens” provided the theoretical communication science foundation for this study by investigating the key features of communication on hand of relevant Traditions of Communication Theories, applicable Communication Theories, and relevant types of CMC Theories. A discussion of CMC added valuable background to the study. The perspectives gained have thus illuminated the key features and other important traits and principles underlying the communication process of relevance to this study.

Chapter 3 provides the theoretical foundation for the study from the context of social media as tool of CMC.

#### 3.1 INTRODUCTION

In this chapter the development of, and advancements in CMC are discussed with special focus on the development of the World Wide Web (WWW), the Internet and social media. This discussion addresses the second subsidiary question of this study, namely:

*What are the most influential changes that happened in the field of CMC and how do these changes impact on human communication?*

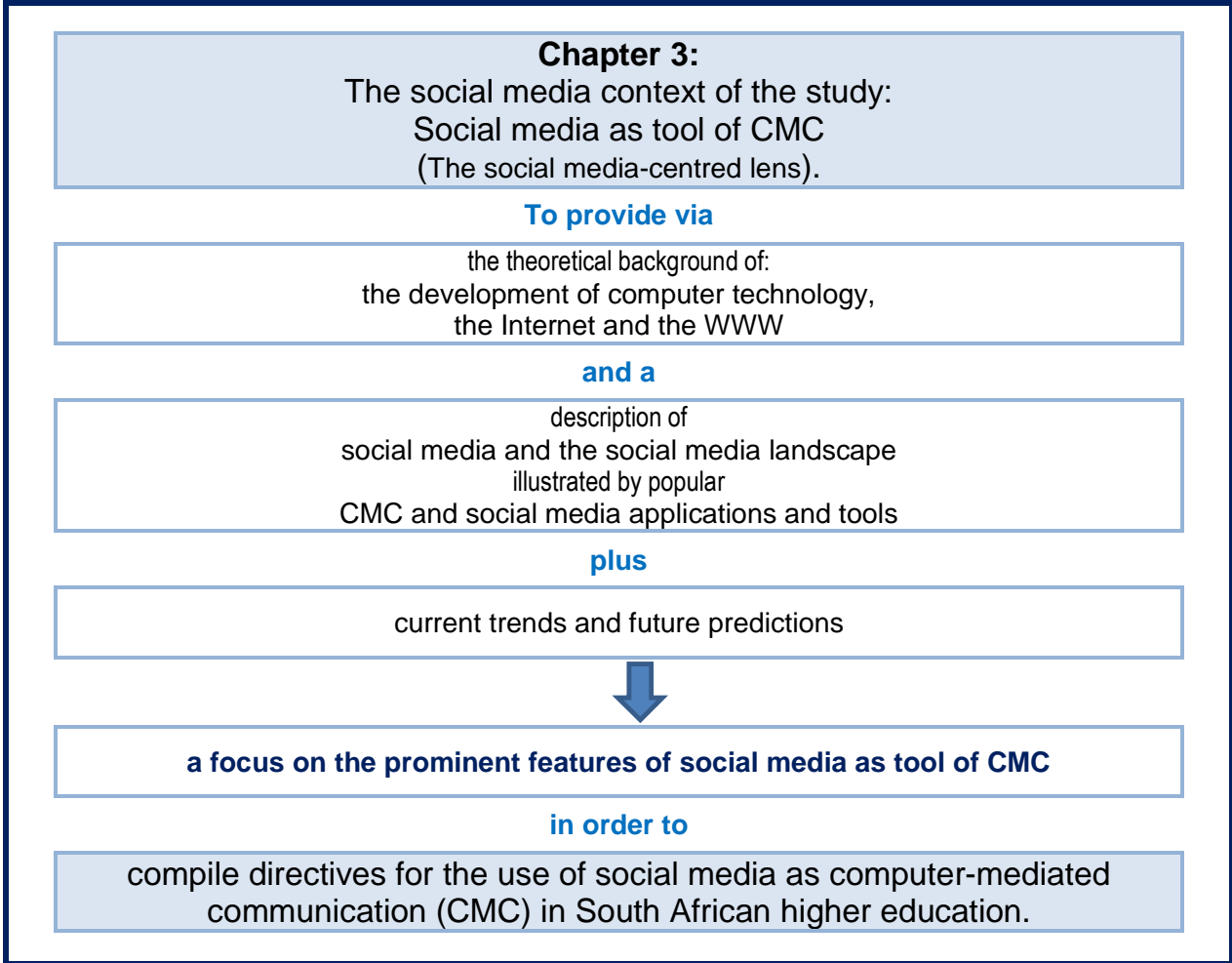
As background to the study, the developments in computer technology are sketched from the early 1940s until the development of the Internet in 1983. This is followed by a discussion of the evolution of the Internet and the WWW in order to lay a foundation for understanding the utilisation of the various social media applications and tools of importance to this study.

The focus of this study, however, is on communication using social media in higher education. Therefore, the chapter will include a discussion of aspects related to Web

2.0, social networking, the applications and tools of the Social Web (Web 2.0), the use of the tools, as well as current trends and developments in computer-mediated technology. The chapter also includes a discussion of the possible future of the WWW and a summary of predictions about social media technologies. Africa, and especially South Africa’s ability to accommodate social media developments are mentioned. The chapter concludes with a profile summarising the key features of social media as suggested in the literature studied and of special relevance to the study.

As a whole, this chapter provides important background information and contributes to the theoretical basis of the study. The review of the social media context of CMC thus serves as a second “lens” through which the perspectives gained could be narrowed down to aspects relevant and applicable to the study.

The layout of Chapter 3 is depicted in Figure 3.1.



**Figure 3.1:** Outline and goal of Chapter 3.

Early humans communicated using sounds, gestures and body language (De la Sola Pool 1984: 33; Steinberg 2007: 3). Anthropological research found that humans developed the skill to communicate through speech about 60 000 years ago (Tubbs & Moss 1991: 4). Language is predicted to have developed out of this early form of speech about 20 000 years later, about the same time humans started living together in small communities where communication became imperative (Steinberg 2007: 5). After the development of formal writing systems about 5 000 years ago, humans were able to study recorded and stored information and with the knowledge gained, they were able to develop new technologies, most of the time resulting in the obsolescence of previous technology. The development of the printed book had an immense impact on human communication and the growth of knowledge. Information was recorded and multiple copies of books made knowledge available to almost all. Human intelligence thrived and new technologies were increasingly developed. Technologies like the telegraph and the telephone enabled communication to happen over vast distances, but the communication technology with the most influence, however, was the computer.

### **3.2 FROM COMPUTERS TO WEB 2.0: A HISTORIC OVERVIEW**

The development of the computer since 1930 had a slow, but serious impact on human communication. The establishment of ARPAnet, the first network of the US Defence Department's Advanced Research Projects Agency (ARPA), in the early 1960s triggered many computer-related developments in CMC technologies and networking (Murage 2003: 39). ARPAnet very soon became a large, international collection of networks and in 1970 grew into the Internet.

#### **3.2.1 The Internet**

The word "Internet" is defined as a "vast global system of interconnected computer networks", sometimes called the Global Information Infrastructure (Howe 2012). In 1971 the first e-mail message was sent, making researchers aware of the value of online communication. They realised that a protocol would allow all computers and all networks in the world to communicate with one another (Campbell 2002: 1-2; Howe 2012). The key concept behind the protocol was an open-architecture network called Internetworking (Leiner *et al* 2012: 6). In 1982 the Transmission Control Protocol/Internet Protocol

(TCP/IP) was standardised and commercial Internet Service Providers (ISPs) began to emerge (Leiner *et al* 2012: 12; Howe 2012). By 1985 the first Internet was well established, supporting, among others, the US Defence force, researchers, the education community, and many network developers. Increasing amounts of data were transmitted at higher and higher speeds over more and more networks to more and more people (Leiner *et al* 2012: 8).

The Internet was officially commercialised in 1995. After that, the Internet became a worldwide network of unimaginable proportions (Weston 1997: 197). The Internet spread faster than any technological innovation in the history of humankind, overcoming all physical and spatial distances (Pillay & Maharaj 2010: 2), fundamentally changing the way people learn, play, create and communicate (Leiner *et al* 2012: 12).

The Internet enabled near-instant communication by means of electronic mail, instant messaging, discussion forums, Voice over Internet Protocol (VoIP), two-way interactive video calls, and Internet conferencing. In 1989 Tim Berners-Lee developed the Hyper Text Markup Language (HTML) using specifications such as Uniform Resource Locator (URL) and Hyper Text Transfer Protocol (HTTP). This system allowed geographically dispersed people to work together by combining their knowledge in a global web of hypertext documents on computers linked by servers (Computer History Museum 2008: '90). Berners-Lee called this system the World Wide Web (WWW).

### **3.2.2 The World Wide Web (WWW)**

The World Wide Web (WWW) is a system of Internet servers that supports documents linked to other documents, graphics, audio, or video files on the Internet. The term WWW is often wrongly used as a synonym for the Internet, but is in fact only a service of the Internet (Leiner *et al* 2012: 12). High-speed Internet connections, low connectivity charges, broadband access and online companies allowed the WWW to grow into Web 1.0.

### 3.2.2.1 Web 1.0 (The Basic Web)

Web 1.0 can be regarded as the follow-up of the WWW, mostly because of expanded access to information (Cormode & Krishnamurthy 2008: 1). Web 1.0 contained “read-only” material, allowing users to view web pages but not contribute to the content. Web pages were static, not interactive and were rarely updated. News was provided by a handful of large corporations such as Yahoo and Microsoft, and users could not comment on, or reply to content on websites (Bansal *et al* 2012: 1; Riva & Galimberti 1998: 17-19; Baym, 2010: 51). However, Web 1.0 developed a few tools users could use to communicate with one another online. These include, *inter alia*, video and audio conferencing tools, discussion forums, bulletin boards, chat rooms, newsrooms, usenet groups, e-mail, listservs, instant messaging, Internet Relay Chat (IRC), Internet telephony and, eventually, Social Networking Sites (SNSs) (Yilmaz 2011: 115; Saritas 2006: 74; Lo 2009: 206; Baird & Fisher 2005: 17).

These tools were immensely successful and the public, businesses and educational institutions were increasingly looking for similar, but faster technologies. Since 2002 new ideas for sharing and exchanging content rapidly gained acceptance and many new technologies emerged from previous ones (Baird & Fisher 2005: 16). Technological developments, such as improved broadband access and faster browsers, initiated the shift from Web 1.0 to Web 2.0 (Cormode & Krishnamurthy 2008: 6).

### 3.2.2.2 Web 2.0 (The Social Web)

The term “Web 2.0” became a common denominator in 1999 to describe new trends in the design and use of the WWW, a web in which users can collaborate and participate (Grodecka, Pata & Våljataga 2010: 10; Rodriguez 2011: 2). Tim O’Reilly, inventor of the WWW concept, emphasises that Web 2.0 is a platform on which Web 2.0 applications run as services (not as products) that provide users with control over content and that facilitate collaboration between individuals and groups (O’Reilly 2007: 17).

Web 2.0 is, *inter alia*, described as the Social Web, the Read-Write Web, the Second Generation Web, and as “a personalised, communicative version of the WWW” (McLoughlin & Lee 2007: 665; Koohang, Floyd, Smith & Skovira 2010: 31). Some

authors (Anderson 2007: 4; Hughes 2011: 15; Melville 2009: 15; Babu & Gopaldaswamy 2011: 85) focus on *the characteristics of Web 2.0 in the context of the Internet and its applications*: they define Web 2.0 as a space that allows users to manage, share, tag, link, and own data. Or as Evans (2011) summarises it: “Web 2.0 is user-centred, user-generated, and user-controlled”. Users do not only view or download content from web pages, but actively contribute and shape the content, comment on it, or publish their own web pages through blogs, wikis, or photo and video-sharing sites.

Web 2.0 is also defined in the context of *the web platforms and technologies* that support the content and functionality of websites. These platforms consist of various technologies that promote social networking, the forming of online communities, user interaction, collaboration, and the sharing of knowledge (Cormode & Krishnamurthy 2008: 1; Koohang *et al* 2010: 31). Users obtain access to Web 2.0 sites through a web browser (for example: Firefox, Internet Explorer or Google Chrome) which provides the user with a user interface, software, and storage facilities (Hughes 2011: 15; Cullen, Cullen, Hayward & Maes 2009: 17).

A key aspect of Web 2.0 is the opportunities that exist for users to not only create content, but to contribute to the content of existing web pages. User Generated Content (UGC) can be described as all the different ways in which people can add pages of various kinds to Web 2.0 sites (Pillay & Maharaj 2010; Bell 2011: 100; Kaplan & Haenlein 2010: 61). UGC is encapsulated in services such as blogs, wikis, podcasts, SNSs, and many other web applications, and was the catalyst for the establishment of social content on Web 2.0 and for those Web 2.0 applications known as “social media”.

### **3.3 SOCIAL MEDIA**

Kaplan and Haenlein (2010: 61) define social media as “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allows the creation and exchange of user generated content”. The discussion that follows elaborates on this definition and includes a variety of perspectives. This is followed by a discussion of a selection of tools and applications belonging to the extensive social media landscape. Perspectives gained in this section culminates in a list of key features of social media (Table 3.2).



### 3.3.1 Defining social media

From the researched literature, it was concluded that the term “social media” can be defined with focus on either 1) the tools or the devices social media use, 2) the web applications that enable the communication, or 3) as Web 2.0 resources:

- Social media can be described as Internet- and mobile-based *tools and devices* that integrate technology, telecommunications and social interaction, enabling the construction, co-construction and dissemination of word, image and/or audio messages (Dabner 2012: 69; Junco & Chickering 2010: 12).
- The term “social media” describe a range of user-centred, interactive *web applications* that facilitate the construction and dissemination of words, images and audio on the WWW (ASTD 2011: 3; Dabner 2012: 69).
- Social media are characterised as a collection of *Web 2.0 resources* that emphasise active participation, connectivity, collaboration, and the sharing of knowledge and ideas among users (Rutherford 2010: 703; Dabbagh & Kitsantas 2012: 3).

Social media may also be defined according to *specific features*:

- Social media allow instantaneous communication, two-way interaction and feedback over vast networks to engage enormous numbers of people in networking, sharing, and collaboration (Huwe 2011: 26; Kent 2010: 645; Churchill *et al* 2009: 142).
- Social media represent a dynamic, free and user-centric information infrastructure that uses improved web technologies to involve users in informal, professional, educational or blended crowd-sourced, open projects (Conole & Alevizou 2010: 12).
- Social media emphasise participation, focused conversation, innovative explorations and experimentations (Brown & Adler 2008: 30; Koohang *et al* 2010: 31). The power of social software lies in content personalisation and remixing with other data to create useful information and knowledge (Grodecka, Pata & Väljataga 2010: 10).

Mayfield (2008: 5) describes social media as “a group of new kinds of online media” with the following *characteristics* that all social media should share:

- Participation: social media encourage contributions and feedback from everyone participating in the communication between creator and audience.
- Openness: most social media services encourage users to vote about one or other item on the site, leave comments, and share the site with other people.
- Conversation: whereas traditional media is about content transmitted or distributed to an audience, social media is seen as a two-way conversation.
- Community: social media allows communities of interests to form and allows groups of people in these communities to communicate effectively.
- Connectedness: most kinds of social media thrive on their connectedness, making use of links to other sites, resources and people.

Thousands of social media applications and tools exist on the web, creating a vast social media landscape from which users can choose media that suit their needs. The social media landscape is evolving with increasing acceleration (Solis 2013): new applications are added daily while existing applications are improved and adapted motivated by user preferences and needs, although many just as quickly disappear or become obsolete. The current social media landscape is discussed next, with focus on the most popular applications and tools of importance to this study.

### **3.3.2 The social media landscape**

The social media landscape comprises social networks, blog platforms, wikis, niche networks, social bookmarks, virtual worlds, gaming sites, forums, message boards, and many other social media applications each with vast numbers of social media tools. To discuss all available applications and tools will be impossible, therefore a list of current popular applications are selected from the literature studied, supported by statistical information on the use and popularity of these applications. Where important to this study, applicable or popular tools of a specific application are mentioned or described. Applications are discussed in alphabetical order as listed in Table 3.1.

**Table 3.1:** CMC and social media applications discussed.

<b>Popular CMC and Social Media Applications and Tools</b>		
Applications		Example of tools
1	Blogs	Blogger, Wordpress
2	Bulletin boards and Message boards	Pinterest, Flipboard
3	Conferencing services	Adobe Connect
4	E-mail	Various
5	Forums and Discussion forums	Google Groups
6	Media Manipulation Tools and Mashups	Mashable
7	Microblogging	Twitter
8	Multi-media and File sharing	Flickr, Instagram, YouTube, iTunes
9	Online chat	WhatsApp, MXit, 2Go, Snapchat
10	Online games	MMOGs, MMVWs
11	Podcasting and Vodcasting	iTunes, YouTube
12	Social bookmarking	Delicious, Diigo
13	Social networking services (SNSs)	Facebook, LinkedIn, MySpace, Google+
14	Virtual Worlds	MySpace
15	Wikis	Wikipedia, Google Docs

The applications and tools listed in Table 3.1 are discussed next, illustrated by current statistics about the use of the application/tool worldwide and, where available, in South Africa.

### 3.3.2.1 Blogs

Blogs are “an extremely powerful form of computer-mediated communication” (Baird & Fisher 2005: 17). The term “blog”, a contraction of “web log”, refers to a web page consisting of an opinion, information, event description or personal diary entries, arranged chronologically with the most recent entry first, in the style of an online journal (Anderson 2007: 7; Armstrong & Franklin 2008: 7). A blog is usually maintained by an individual with regular entries on which readers can comment. The posting and commenting process entails a conversation between an author and a group of secondary contributors who communicate to an unlimited number of readers (Benkler 2006: 217; Harris & Rea 2009: 138). Blogs can include digital material, graphics, and

visual, audio or video content (Cullen *et al* 2009: 18; Bates 2011: 25; Conole & Alevizou 2010: 49; Green & Hannon 2007: 12).

There are a variety of web services available that offer users storage space and tools to create their own blogs, for example: Blogger and Word Press. Blog software also facilitates syndication, in which entries or key words can be “tagged” so that related items can easily be brought together, or to form links to other blogs or websites. Blogs can also be published using RSS feeds which allow readers to see when new postings have been made (Armstrong & Franklin 2008: 7). RSS is a process of aggregating web content according to an individual’s preferences and choice (Anderson 2007: 8; Pillay & Maharaj 2010: 3). The user subscribes to a particular RSS feed, the client software periodically checks for updates, and displays the content in the user’s feed reader via an aggregator (Baird & Fisher 2005: 15). Statistics show that 12.7 million people regularly write blogs, while 46 million people worldwide regularly read and/or comment on blogs (Napier Marketing 2014).

### 3.3.2.2 Bulletin boards and Message boards

The terms “bulletin board”, “online bulletin board”, “message board”, “pinboard” or “online notice board” are used interchangeably to refer to applications that allow people to post articles, pictures, photos, messages or comments on the postings of other people (Rambe 2011: 284). Each board is hierarchical in structure and can contain a number of sub-boards. Currently the most popular pinboard worldwide is Pinterest with 70 million users (MediaBistro 2014: 5). With 930 000 users, it is the fastest growing network in South Africa (Meier 2013: 2). Flipboard, also a highly popular board, focuses on providing news items and discussions on popular topics. Flipboard has 90 million users who flip 7 billion pages a day (Kantrowitz 2013).

### 3.3.2.3 Conferencing services

Computer conferencing services (for example Adobe Connect) enable groups of people to hold discussions by reading and posting text messages on a computer system (Feenberg 1987: 169; King 2008: 49). It allows participants to contribute and communicate simultaneously on different topics, and participation can be anonymous.

Asynchronous computer conferencing is used in contrast to synchronous conferencing, which refers to various chat systems in which users communicate simultaneously in real-time using text (Hewitt 1997: 2; Baird & Fisher 2005: 18).

Another popular type of computer conferencing is videoconferencing – a means by which geographically distant people can hold discussions or meetings in real-time during which they are able to hear and see each other, using dedicated computer equipment as well as telephone connections (Baird & Fisher 2005: 18; King 2008: 61; Murage 2003: 28). Educational institutions and geographically dispersed businesses are frequent users of computer conferencing services.

#### 3.3.2.4 E-mail

E-mail is not only the oldest form of CMC, but also the most well-known, and one of the largest network applications on the Internet (Leiner *et al* 2012: 3). E-mail allows a message to be sent to one or to many people, with the choice of attaching documents, pictures, videos, or any other electronic item (Baird & Fisher 2005: 17). Users can also send a message to an electronic mailing list. An electronic mailing list is used for widespread distribution of information to many Internet users simultaneously (PCMag.com. Encyclopaedia 2009). There are two types of mailing lists: announcement lists and discussion lists:

- An *announcement list* is mainly used as one-way communication from the creator of the message to the recipients on the electronic list. Announcements are also known as online newsletters. Promotional e-mailing lists are employed in various sectors as part of direct marketing campaigns.
- On a *discussion list*, a subscriber uses the mailing list to send messages to all subscribers simultaneously, who may then answer in similar fashion. Discussion lists are usually topic oriented.

Napier (2014) reports that e-mail accounts worldwide are predicted to grow from just over 4.1 billion in 2014, to over 5.2 billion at the end of 2018. The predicted number of e-mail users will increase from over 2.5 billion to an estimated 2.8 billion. E-mail is also a popular form of communication in South Africa: the Digital Media and Marketing

Association (DMMA 2013) reports that South Africans use 90.26% of their online time to send and read e-mail. Worldwide, 196.3 billion e-mails are sent and received each day (Radicati 2014: 3-4).

#### 3.3.2.5 Forums and discussion forums

“The central features of a discussion forum are a means of posting messages, a repository for storing them, and an interface for navigating through the ‘threads’ of messages and replies” (Kear, Woodthorpe, Robertson & Hutchinson 2010: 218). The terms “discussion forum”, “message forum” or “Internet forum” are used interchangeably to refer to applications that allow people to hold conversations in the form of posted messages or comments on the messages of other people (Rambe 2011: 284). Each forum is hierarchical or tree-like in structure and can contain a number of sub-forums or discussion groups, each of which may have a separate topic. Within a forum’s topic, each new discussion started is called a thread, and can be replied to by as many people as so wish (Bigley 2012: 41; Greenhow & Robelia 2009: 128).

Threaded discussions on these applications are very much like e-mail, except that everyone subscribed can see all the messages. There are many threaded discussion programs available, and they vary widely in their features (Schroeder & Greenbowe 2009: 3). Some allow users to attach documents, graphics or videos to posts (Bigley 2012: 50). A sense of virtual community often develops around forums.

#### 3.3.2.6 Media manipulating tools and Mashups

The terms “digital media manipulation” and “data mashup” refer to web applications that mix and combine the data and functionality of multiple web sources into one (Armstrong & Franklin 2008: 9; Lamb 2007: 13). The characteristics of a mashup include combination, visualisation, and aggregation in order to make existing data more useful for personal and professional use (Crook *et al* 2008: 72). Lamb (2007: 13) distinguishes between remix and mashup in the following way:

- *Remix* refers to the reworking or adaptation of an existing or of any number of digital media sources, to either create a totally new work, or to provide an alternate version of the original.
- A *mashup* involves the combination of the data and functionalities of two or more totally different web applications.

Mashable, with 4.4 million users worldwide, is the leader in this category of social media applications. Mashable connects various social media sites (for example Facebook, Twitter, Pinterest, Instagram, YouTube and others) into one, easy to read blog with news, information and interesting facts.

### 3.3.2.7 Microblogging

A microblog is a type of blog that allows users to publish short text updates. The posts are called micro-posts, while the act of using these services is called microblogging (Kaplan & Haenlein 2011: 106). Most social networking sites use microblogging features, for example Facebook allows users to post messages on their profiles called “status updates”. Twitter, the most famous microblogging service, calls its posts “tweets”: tweets are micro-posts or short messages limited to only 140 characters. Communication over Twitter is in real-time and the exchange of information is immediate (Dunlap & Lowenthal 2009: 131). Users are able to reject the requests of anyone wishing to be a follower, allowing the user to define his or her own audience (Tong & Walther 2011: 8; Preece & Schneiderman 2009: 14).

In addition to short messages, Twitter users can share web links, photos, videos and other media content. Tweets may also be combined with longer blog posts, which allow it to be used successfully in both educational contexts and in journalism (Crook *et al* 2008: 13). Twitter also allows users to make tweets exclusively available to only those followers to whom they want to give access (Rockinson-Szapkiw & Szapkiw 2011: 360).

Twitter has 284 million registered users globally, sending 500 million tweets a day. Twitter use in South Africa is up from 2.4 million in 2013 to 5.5 million in 2014 – a 129% growth in 12 months – South Africans send on average 120 000 tweets a day (Horn 2012).

### 3.3.2.8 Multi-media and File sharing

Multi-media sharing allows people to upload photos, videos (vodcasts), podcasts, and other audio files on third-party websites. The websites are open to all users, and any user can upload or download, mostly free of charge, media objects from these sites (Crook *et al* 2008: 18). There is a wide variety of websites available for multi-media sharing: for example: Flickr and Instagram for photos, Dropbox for documents, YouTube for videos, iTunes for podcasts and vodcasts, Slideshare for presentations, DeviantArt for art work, Scribd for documents, and so forth. These websites allow users to post content and to tag them with keywords. Viewers may also post comments or reviews, or rate the uploaded content from other users (Armstrong & Franklin 2008: 8; Cullen *et al* 2009: 18; Green & Hannon 2007: 14).

YouTube – with one billion monthly users – is the largest and fastest growing web service for multi-media and the second largest search engine in the world. YouTube content can be produced, stored, shared or downloaded (Pillay & Maharaj 2010: 3). Millions of people participate in the sharing and exchange of multi-media on YouTube, either by producing their own podcasts and videos, or by uploading movies and videos from other media sources (Anderson 2007: 10). MediaBistro (2014: 7) reports that YouTube users watch an average of six billion hours of video each month and upload hundred hours of video every minute. The popularity of YouTube, combined with the increasing availability of high-speed connections, has made video content a very popular social medium on the web (Armstrong & Franklin 2008: 8). World Wide Worx (2014) reports that South Africa currently has 4.7 million active YouTube users.

File sharing is the practice of providing access to digitally stored information such as multi-media, computer programs, documents or electronic books. It may be implemented through centralised servers on computer networks, Web-based hyperlinked documents, or the use of distributed peer-to-peer networking. Users can use peer-to-peer software to search for shared files on the computers of other users. Files of interest can then be downloaded directly through the network (Farwell & Waters 2010: 10). Instagram, a photo sharing and special effects application popular on Android phones, has 300 million active monthly users worldwide and 680 000 users in South Africa (World Wide Worx



2014; MediaBistor 2014: 4). Nearly two billion photos have been uploaded on Instagram since its launch in October 2010.

### 3.3.2.9 Online Chat

Synchronous chat refers to real-time, text-based communication between one-to-one or one-to-many users via a computer. Once a chat has been initiated, a user enters text on a keyboard and it will immediately appear on the other user's monitor. Most networks and online services offer a chat feature (Conole & Alevizou 2010: 48).

Instant Messaging (IM) is a type of communication service that enables a person to communicate ("chat") in real-time over the Internet using text. An IM program allows the user to create a list of people to talk to. The program will indicate who of these people are online and a chat can be initiated by anyone of the people online. If a person is not online, a message can be posted to the person's inbox. IM also allows one to include more than two people in a conversation by creating a chat room (Baird & Fisher 2005: 17). Mobile phone short messaging service (SMS) is also an example of online chat. SMS enables the user to use instant messaging clients through their mobile device (Vyas 2011: 38).

Internet Relay Chat (IRC) is a web service that allows users to chat online, or to use IM. IRC allows the instant exchange of text messages between any two users – they do not need to belong to a specific chat group to participate (Green & Hannon 2007: 13). To join an IRC discussion, the user needs an IRC client and Internet access. The IRC client is a program that runs on computers and sends and receives messages to and from an IRC server.

WhatsApp, Mxit, 2Go and Snapchat are four of the most popular chat applications currently. South Africa has 6.2 million registered users on Mxit, who send 750 million Mxit messages a day. In Africa 7.2 million people are using Mxit. WhatsApp has over 350 million monthly users worldwide, handles 10 billion+ messages a day, and shares 400 million photos each day (D'Monte 2013). WhatsApp is presently the most popular application in South Africa, with just over 10.6 million users. 2Go has 10.5 million active users in South Africa, and is becoming increasingly popular, especially among the youth.

Snapchat has five million active monthly users who send 350 million messages (mostly photos) each day (Olson 2013: 36).

#### 3.3.2.10 Online games

Being able to interact with other users is also possible using online game websites. Alexa, the Web Information Company, listed 37 664 online games in 24 categories in the 2013 List of Most Popular Games (Alexa 2014: Gaming). The two most popular games worldwide are MMOGs and MMVWs:

- Massively Multiplayer Online Games (MMOGs) are games that take place in a computer generated imaginary world with live interaction between Internet users (Green & Hannon 2007: 13; Conole & Alevizou 2010: 49).
- Massively Multiplayer Virtual Worlds (MMVWs) are complex digital environments that allow participants to project a non-physical presence of themselves, using a custom-designed character (Avatar) in a three-dimensional (3D) reality, and within that reality, to interact with other players (Bates 2011: 27; Green & Hannon 2007: 13).

#### 3.3.2.11 Podcasting and vodcasting

Podcasting allows a user access to online audio or video content through RSS feeds (see Section 3.3.2.1) (Cullen *et al* 2009: 18; Green & Hannon 2007: 13; Harris & Rea 2009: 138). Originally called audio blogs, podcasts developed from efforts to add audio streams to blogs. Audio podcasts are audio recordings of conversations, talks, interviews or lectures, usually in MP3 format, which can be played either on a computer or on a wide range of handheld devices and smartphones (Pillay & Maharaj 2010: 3; Harris & Rea 2009: 138). Video podcasts (called vodcasts), are online video clips that can be played on a computer or handheld device, mostly in MP4 format.

In October 2001, Apple introduced the commercially successful iPod MP3 player to be used with iTunes software – software that converts audio CDs into compressed digital audio files. Since then, the process became known as podcasting, named after the iPod (Anderson 2007: 10). iTunes is a popular Apple application for accessing music, videos

and other forms of multimedia content. Podcasts and vodcasts are freely available for download from the Internet using software that can handle RSS feeds. YouTube is currently the most popular site to upload and download both podcasts and vodcasts (Pillay & Maharaj 2010: 3; Anderson 2007: 10).

#### 3.3.2.12 Social bookmarking

Social bookmarking, tagging and folksonomies allow the recording (bookmarking) of web pages, tagging them with keywords (called tags), and organising the tags into folksonomic metadata (Cullen *et al* 2009: 18; Pillay & Maharaj 2010: 3). Social bookmarking sites (for example Delicious and Diigo) allow people to gather web pages they are interested in into a set of bookmarks (or favourites). Bookmarks are held on a server instead of on the user's computer, and are available either for later use by the person or to be shared with other users (Pillay & Maharaj 2010: 3). Bookmarks also allow entries to be tagged.

A tag may be added to any digital object (Anderson 2007: 9). Tagging refers to the use of keywords to describe the pages being recorded, and thus allow the bookmarked pages to be grouped together by topic or subject. Many social bookmarking sites will suggest appropriate tags based on the tags that other people used when bookmarking the same site. The process of tagging is essentially the classification of knowledge and this process is termed folksonomy (Pillay & Maharaj 2010: 3).

Some sites (for example Delicious) collect and aggregate the tags on bookmarks that users have shared, while other sites (for example Diigo) incorporate user annotations with the tagging (Green & Hannon 2007: 12) to create tag clouds. Tag clouds are groups of tags (tag sets), which indicate the frequency with which particular tags are used. This frequency information is sometimes displayed as a "word cloud" in which tags are displayed according to their frequency of use in different sizes of text, with those most frequently used in the largest text (Anderson 2007: 9).

Delicious is the most popular bookmarking tool with more than 5.3 million users and 180 million unique bookmarked URLs. However, it has shown a steady decline since 2013 (Alexa 2014: Delicious).

### 3.3.2.13 Social Networking Services (SNSs)

Social networking consists of interactive web-based applications that facilitate social interaction among members in a virtual environment. Social Network Sites (SNSs) are specifically designed to allow members to form subgroups of “friends” and online communities of people with common interests. SNSs enable users to connect to family, friends and colleagues, but also to meet new people and develop new friendships (Conole & Alevizou 2010: 48; Tong & Walther 2011: 12; Merchant 2012: 7).

Users interact with one another through online messages or mails, or post personal information in which they describe themselves and their interests, and then display these messages (called status updates) to the people on their friend list (Cullen *et al* 2009: 17; Tong & Walther 2011: 12; Ghosh, Chawla & Mallott 2012: 105). Personal information profiles may comprise photos, videos, images, audio content, links to other websites, and/or user-generated content (Armstrong & Franklin 2008: 8; Cullen *et al* 2009: 17).

There are currently hundreds of SNSs on the Web, supporting a spectrum of different practices, interests, niche groups and user groups (Steinfeld, Ellison & Lampe 2008: 434). Facebook, LinkedIn, Google+ (or Google Plus), MySpace, Twitter, Pinterest and Bebo are some of the more popular SNSs (Ghosh, Chawla & Mallott 2012: 105), although Facebook is by far the largest. Facebook has 1.19 billion active monthly users worldwide, which means that 50% of all Internet users has a Facebook profile (Facebook.com), 100 million in Africa and 9.6 million in South Africa (Mochiko 2013; Horn 2012). Google+, with 550 000 active users (only marginally higher than a year ago), is the fifth largest SNS (DeMers 2013).

### 3.3.2.14 Virtual worlds

A virtual world is a computer-simulated environment that enables users to navigate in a virtual space and interact with others through avatars. The avatar may be a generic representation of the user, and may or may not resemble the user. Within the virtual simulation, a user can explore, socialise and solve collaborative challenges (Harris & Rea 2009: 138). Virtual worlds are enjoyed as networking forums for individuals to meet and socialise, as marketing or training platforms for businesses, and as educational and

research environments for schools and higher education institutions (Dreher, Reiners, Dreher & Dreher 2009: 212).

Second Life is probably the best known virtual world application with more than a million registered users, of which 600 000 are active monthly users. Second Life is an online environment in which users have avatars that live simulated “real lives”. Users can go to school, college or church, can own a business, build buildings, host parties and even indulge in virtual sex (Armstrong & Franklin 2008: 9).

### 3.3.2.15 Wikis

Wikis (for example Wikipedia) and collaborative editing tools (for example Google Docs), are web-based services that allow users unrestricted access to create, edit and link web pages (Conole & Alevizou 2010: 52; Armstrong & Franklin 2008: 9).

A wiki (a Hawaiian word for “quick”) is a web page or collection of web pages designed to enable any number of people to interactively create collaborative websites, or to contribute to or modify content by using a simplified Online Markup Language (OML). Wikis use basic file-sharing and content-editing tools to create navigable pages with hypertext-style linking between the pages (Harris & Rea 2009: 138; Armstrong & Franklin 2008: 8).

Wikipedia is probably the best known wiki. O’Reilly (2007: 24) considers Wikipedia an excellent example of UGC by stating that Wikipedia is “revolutionary in executing the User Generated Content concept”. Wikipedia has become the most famous, and at the same time the most disparaged, encyclopaedia in the world. Wikipedia has more than 470 million monthly users viewing more than 18 billion pages (Alexa 2014: Wikipedia). The English Wikipedia alone (one of 200 Wikipedias) hosts over 4.6 million articles which are edited by 73 000 people worldwide (Wikipedia Statistics 2014).

The Web 2.0 applications and tools discussed above illustrate the current social media landscape with those tools currently the most popular, although the included tools should only be seen as the tip of the iceberg. The popularity of these applications and tools indicate that they answer to the needs and preferences of users because they

show certain characteristics or features users are looking for when choosing a social medium (see Table 2.7). Careful comparison of the main aspects of the definitions of social media in Section 3.3.1 and the features of each of the applications listed in Section 3.3.2, reveals a list of features of social media which can be grouped into six categories:

1. The technology and resources needed to use social media;
2. The way social media allows information processing and knowledge creation;
3. The characteristics of social media content;
4. The ways of communication possible via social media;
5. Aspects of the communication process possible via social media; and
6. The variety of content that can be shared using social media applications.

The features of social media as deduced from Sections 3.3.1 and 3.3.2, are summarised in Table 3.2.

In Table 3.2, it is shown that social media enables users to participate in crowd-sourced, open projects through the sharing and processing of information that constitute online content and allow knowledge creation. Social media allows online communities of interests to form and motivates social interaction and collaboration. Social media can answer in business and educational needs, but also in the needs of the individual who wants to share a wide assortment of information with family and friends, or form new friendships and build new relationships. The key features listed in Table 3.2 relate closely with the aspects which influence the choice of a medium illustrated in Table 2.7. As illustrated in Table 2.7, a user selects a medium according to personal communication needs and expectations. When using a specific medium, users may either experience feelings of social and individual well-being, or may become lonely and socially isolated. Popular social media applications enable users to participate in online communities, or participate in online projects of their own choice.

**Table 3.2:** Key features of social media.

<b>Features of social media</b>	
<b>1. Social media depends upon:</b>	
Telecommunication networks; computer hardware; computer and network software; interactive web applications; high-speed Internet connections; broadband access; links between websites; user-centric infrastructure; mobile tools and devices.	
<b>2. Social media allows knowledge creation:</b>	<b>3. Social media content is/can be:</b>
<ul style="list-style-type: none"> <li>• Access to digital information</li> <li>• Bookmark, tag web sites</li> <li>• Classification of knowledge</li> <li>• Contribute to existing information</li> <li>• Create knowledge</li> <li>• Create folksonomic meta-data</li> <li>• Disseminate, exchange information</li> <li>• Download information</li> <li>• Produce and process information</li> <li>• Remix, rework, adapt data</li> <li>• Storing of data and information</li> </ul>	<ul style="list-style-type: none"> <li>• Asynchronous</li> <li>• Business centred</li> <li>• Crowd-sourced</li> <li>• Educational</li> <li>• Informal</li> <li>• Personalised</li> <li>• Professional</li> <li>• Synchronous</li> <li>• User-centred</li> <li>• User-controlled</li> <li>• User-generated</li> </ul>
<b>4. Social media enables effective communication:</b>	<b>5. Social media encourages:</b>
<ul style="list-style-type: none"> <li>• Anonymous participation</li> <li>• Communities of interests</li> <li>• Focused conversations</li> <li>• Instantaneous communication</li> <li>• Online discussions and conferences</li> <li>• Personal audience selection</li> <li>• Personalised web-sites</li> <li>• RSS feeds</li> <li>• Social networking</li> <li>• Two-way interaction</li> </ul>	<ul style="list-style-type: none"> <li>• Active participation</li> <li>• Collaboration</li> <li>• Connectivity</li> <li>• Engagement</li> <li>• Explorations/experimentations</li> <li>• Feedback</li> <li>• Networking</li> <li>• Openness</li> <li>• Social interaction</li> <li>• Communication</li> </ul>
<b>6. Social media can share:</b>	
Articles, Audio content, Comments, Digital material, Documents, Games, Graphics, Messages, Metadata, News, Photos, Pictures, Podcasts, Sound clips, Text updates, Video content, Visual content, Web links, etc.	

Source: Compiled by researcher from Sections 3.3.1 and 3.3.2.1.

The applications and tools described above may be highly popular now, but because new applications and tools are constantly developed or improved, users may move to other, newer media which may offer more or better features. In the context of this study

it is necessary to look at current trends and developments, as well as predictions about the future of social media.

### **3.4 SOCIAL MEDIA TRENDS AND DEVELOPMENTS: THE FUTURE**

As indicated in Sections 1.2 and 2.3.1, there are thousands of social media applications and tools available. Thousands more are developed each year, but most of them never reach the extent of success enjoyed by the media described in Section 3.3. Many disappear, or develop a small niche following on which it survives for a time. Newer developments are based on specific preferences of users, and on the successes of predecessors. New and successful social media applications stimulate research in the usability of the tools in many fields, for example business, health and education. Added to the immense amounts of information already on the web, new research results only add to the problem of finding applicable information.

To illustrate how much information may currently be available on the Internet, Schilling (2013) indicates that since the beginning of 2013, human knowledge, on average, doubles every 13 months (see also Section 4.2.2.6). Schilling explains that the Internet is estimated to hold five million terabytes (TB), or five Zettabytes (ZiBs), of information of which Google has indexed roughly only about 200 TB (0.004%) of its total size. Based on current trends, by 2020 the world will generate 50 times the amount of information and 75 times the number of information containers (storage facilities with information) it uses now (Bilbao-Osorio, Dutta & Lanvin 2013: 105).

Developments in social media applications necessitate advancements in web technologies to manage and access information. As explained in Section 3.2.2.1, Web 1.0 was all about gathering and finding information. Web 2.0 is about social media and user-generated content: Web 2.0 allows users to load and generate huge amounts of data – to such an extent that it became difficult to find needed information even with keyword-based search engines (Fowler & Rodd 2013). Already in 2001, Tim Berners-Lee predicted that a new type of WWW was needed: he posited that “if the past was *document* sharing, the future is *data* sharing” (Morris 2011: 44). Berners-Lee calls this new web “Web 3.0”, or the “Semantic Web”, a web “in which computers become capable of analysing all the data on the web”.



### **3.4.1 Web 3.0, Web 4.0 and Web 5.0**

Due to the enormous growth of information on the web, and because of perpetual developments of technology, the web is gradually changing into the web Berners-Lee envisioned. The development of the Semantic Web is led by the W3C, with the aim to convert the current web into a “web of data” that allows computers to understand the meaning of information and in that way, enable users to easily find, share, and combine information (Ohler 2008: 7; Morris 2011: 44; Bradwell 2009: 27). Web 3.0 will, in other words, interpret the meaning of data in a similar fashion as a human will. To be able to do that, software programs are needed to convert data into an understandable format (Gylfason 2010: 4; Ohler 2008: 7).

The Semantic Web publishes data in Resource Description Framework (RDF), a computer language which makes it possible to convert information into metadata (data about data), enabling computers to understand it (Gylfason 2010: 5; Hendler 2010: 77). RDF uses the Uniform Resource Identifier (URI) to identify the subject of information and describe the relationships between the data, using Extensible Markup Language (XML). Web Ontology Language (OWL) is a logic-based, Semantic Web language able to represent complex knowledge structures understandable by computer programs. Combined, OWL and XML provide knowledge maps that supplement or replace the content of web documents to make information more accessible. Morris (2011: 42) describes the semantic search engines of Web 3.0 as search engines that “utilise[s] semantics and knowledge coded into vocabulary sets which are interpreted by ‘smart agents’ to conduct intelligent searches”.

Nova Spivack (quoted in Gylfason 2010: 6) is of the opinion that Web 1.0 developed between 1990 and 2010, and that Web 3.0 will develop somewhere “between 2010 and 2020”. Web 2.0 is gradually changing into Web 3.0 due to increased processing power, improved bandwidth and greater storage facilities (Fowler & Rodd 2013), coupled with major hardware and software developments and new technologies that will change the landscape of social media totally over the next few years. Web 3.0 is supposed to lay the groundwork for Web 4.0, which is, according to Spivack, scheduled for 2020 – 2030. Web 4.0 will be the “Intelligent Web”, functioning on interaction between humans and machines in symbiosis (Aghaei, Nematbakhsh & Farsani 2012: 9).

Web 4.0 may be described as “the Ultra-Intelligent Electronic Agent” (Fowler & Rodd 2013), or the “Read-Write-Execution-Concurrency Web” (Aghaei, Nematbakhsh & Farsani 2012: 9). Kurzweil (quoted in Gylfason 2010: 6) is of the opinion that Web 4.0 will function like the human brain: “Intelligent machines will combine the subtle and supple skills that humans now excel in (essentially our powers of pattern recognition) with ways in which machines are already superior, such as remembering trillions of facts accurately, searching quickly through vast databases, and downloading skills and knowledge”. Computers running Web 4.0 will be parallel to the human brain with a massive web of highly intelligent interactions and mind-controlled interfaces (Aghaei, Nematbakhsh & Farsani 2012: 9).

Although Web 5.0 (the “Emotional Web”) is still many years away, signals are that Web 5.0 will be about emotional and intellectual interaction between humans and computers with computers able to communicate with us like we communicate with each other (Benito-Osorio, Peris-Ortiz, Armengot & Colino 2013: 286). Otis Kimzey (in Wellons 2014), states that “communication in the future will be built on the foundation started by what is today called social media, but it will look much different”.

### **3.4.2 Trends and predicted short-term developments in social media**

M.C. Wellons of NCBC (an American-based news and television channel), predicts that in just four years, 2.44 billion of the world’s population will be on social networks (Wellons 2014). This will be made possible with developments in technology affordable and accessible to many more people worldwide. Next, a few of the predicted developments for 2015 of importance to this study, are provided.

The masses of information (see also Section 3.4.2) will soon be more accessible. Natural language search would continue to overtake keyword-based, typed searches. Ray Kurzweil, director of engineering at Google, predict that Google’s *Hummingbird* algorithm will enable computers to read: “We want [them] to read everything on the web and every page of every book, then be able to engage an intelligent dialogue with the user to be able to answer their questions” (DeMers 2014). Kimzey (in Wellons 2014), predicts that personalised content, supported by “extremely speedy mobile wireless

broadband built into even the most affordable devices” will become the norm to manage the huge amounts of data available.

Affordable mobile devices will become the norm. Ownership of tablet computers increased by 25% among all socio-economic groups during 2013, with the age of tablet owners decreasing (OfCom Communications Report 2013: 3; Johnson *et al* 2013: 51). Along with tablets and wearable technologies, smart-phones will offer always-on, affordable access (DeMers 2014). With Google's *Project Ara*, users will be able to build their own, personalised smart phones with only the applications they prefer, at a much lower price than current phones. Google plans to launch these phones, called “mod-phones”, early in 2015 (Briden 2014).

Wearable technology refers to the integration of devices and related electronics into clothing and accessories (Wellons 2014). A growing collection of wearable technology has appeared, for example Google Glasses, Samsung Smart Watch, Samsung Galaxy Gear, Niki's FuelBand, etcetera (Lednyak 2014; Johnson *et al* 2013: 5). It is expected that social media will become more integrated into these wearables, and it will be able to track our habits, health, business, and recreational activities. One million users are already using Google Glass, but smart watches seem to be the “wearable” accessory of choice for 2015.

Other trends and developments regarding specific social media applications of importance to this study, include the following:

- Facebook is still the most used social platform, even if younger people seem to be moving away to other social media applications. Lednyak (2014) reports that Facebook recently bought Oculus, the company behind the Oculus Rift virtual reality headset, and plans to incorporate virtual reality into the social media experience. Lednyak quotes Mark Zuckerberg (founder of Facebook), in defining virtual reality as “the platform of tomorrow”, with the possibility to “change the way we work, play and communicate”.
- Ello, a social media application, has been launched as the “next” Facebook and according to predications will show much growth during 2015 (Ross 2014).

- Instagram has become *the* network when it comes to image-based social media marketing (DeMers 2014), and will become even more important in education (Hart 2014). Instagram's micro-video feature is highly popular and will continue to grow.
- Twitter plans to continue expanding, both by increasing its own user base and by delivering advertisements to users. Twitter's plans for 2015 include video advertising and an e-commerce service with which users can buy items via Twitter (Economist 2014).
- Since 2012, Pinterest users have created more than 750 million boards made up of more than 30 billion individual pins, with 54 million new ones added each day. In the words of Jeff Bercovici of Forbes Magazine: "If Facebook is selling the past and Twitter the present, Pinterest is offering the future" (Bercovici 2014).

Trends in the educational use of social media are available on the global list "The Top 100 Tools for Learning 2014", which provide the results of the 8<sup>th</sup> Annual Learning Tools Survey, representing the votes of 1 038 learning professionals from 61 countries worldwide (Hart 2014). Important findings on the 2014 list regarding the use of Web 2.0 technologies in higher education list Twitter for the sixth year running as the most important tool, Google Drive/Docs as the second, and YouTube as the third most important tool. Evernote and Kindle are amongst the list of highest movers. There are also a few new tools in the top list: Instagram, PowToon (for creating animated video explainers), ExplainEverything and Nearpod.

There are many other developments in the pipeline that will impact on the way we live, work and play. But important to this study, are those social media technologies that will impact on education in South Africa, especially higher education. In the context of this study, it is important to provide a short overview of the current situation in South Africa regarding access and availability of Internet access. As indicated in Section 1.2, thousands of students from countries in Africa are studying in South Africa. Therefore an overview of Internet availability in Africa is also provided. Statistics regarding the use of specific social media applications in Africa and South Africa are provided in Section 3.3.2 above and will not be repeated in the next session.

### **3.4.3 Trends in Africa and South Africa supporting social media use**

As indicated in Section 1.2, South Africans are embracing the advantages of CMC technology: 6.7 million South Africans read real-time news online (DMMA 2013), 29 million use mobile phones (Nielson Company 2011), 75% in low-income groups (15 years or older) own a mobile phone (Peyper 2013), and South Africa has the most developed telecom network in Africa (SouthAfrica.Info 2013b). South Africa has five mobile operators providing service to over 30 million subscribers, namely Cell C, MTN, Vodacom, 8ta/Telkom Mobile, and Virgin Mobile, as well as hundreds of Internet Service Providers (Peyper 2013).

SouthAfrica.info, an online platform focused on South African information and statistics, reports that, according to the 2013 State of Broadband Report released by the UN Broadband Commission, 41% of South Africans use the Internet, placing the country 5<sup>th</sup> in Africa and 92<sup>nd</sup> in the world, and well above the world average of 35.7% for individual access (SouthAfrica.info 2013a). The report finds that just over a quarter (25.5%) of South African households have Internet access, placing the country 5<sup>th</sup> in Africa and 44<sup>th</sup> among developing countries for household Internet access, and just above the 24% average for the 128 developing countries measured in the report.

Over 60% of Internet traffic generated on the African continent originates from South Africa. Although sub-Saharan Africa improved its broadband infrastructure and mobile network coverage during 2012, there is still a sharp digital divide between sub-Saharan economies in terms of ICT-driven economic and social impacts (Bilbao-Osorio, Dutta & Lanvin 2013: 25). Low levels of ICT skills, shortage of electricity, low educational attainments and unfavourable business conditions are hindering Africa's capacity to fully leverage the potential of the ICT infrastructure (AfricaFocus Bulletin 2013). Less than 27% of Africans have access to the Internet, representing only 9.8% of the global Internet access. Horn (2013: 17) reports, however, that 3G coverage in Africa is spreading faster than wired broadband, and 4G LTE deployments (a standard for wireless communication of high-speed data for mobile phones and data terminals), are expected to reach 11 million customers across the African continent this year.

Most Africans (including South Africans), use cell phones for access to the Internet. “Mobile phones [in Africa] are used for absolutely everything and used to the extreme by everyone,” states Bruce Krogh, professor at Carnegie Mellon University (Horn 2013: 16). South African Info (2013), reports that there are six billion mobile phones in the world, of which 75% are used in developing countries. In 2001, only about 25 million people in Africa had a mobile phone subscription: by 2012 this number had increased to about 650 million. From 2012 to now that number has increased to 720, one out of three people now own a cell phone (Mochiko 2013). According to a 2012 report by GSMA, a trade association that represents 800 mobile operators across the world, there are 475 million mobile connections in sub-Saharan Africa alone; compared to just 12.3 million fixed line connections (Parr 2013). Although there are still many obstacles, both South Africa and most of the countries in Africa can utilise the advantages offered by social media to the full extent, especially in the context of access to education.

The preceding discussion sketches the background, tools, uses and future of social media as CMC. The most prominent features of social media identified from the discussion are narrowed down to provide a focus on the social media theory relevant to this study. An outline of these features are summarised in Table 3.3 as a profile of social media as tool of CMC.

### **3.5 PROFILE OF SOCIAL MEDIA AS TOOL OF CMC**

By extending the key features of social media (Table 3.2), with the characteristics of the social media tools and applications discussed above (Section 3.3.2), enhanced by the features of new and coming technology (Section 3.4), a profile of social media as tool of CMC is compiled. The profile is presented in Table 3.3.

**Table 3.3:** Profile of social media as tool of CMC.

<b>Prominent Social Media Features</b>	
<b>Computer hardware</b>	Users need computers, phones, tablets, or other mobile, personalised, wearable and affordable tools and devices to access data and participate on social media.
<b>Computer and network software</b>	Social media runs on telecommunication networks, interactive web applications, high-speed Internet connections, broadband access, user-centric infrastructure.
<b>Access to information</b>	Social media must allow users to produce and edit information, find information easy, and to access, download, disseminate, exchange and store information.
<b>Create knowledge</b>	Users want to bookmark and tag information to create folksonomic meta-data, and to classify, remix, rework and adapt data in order to create knowledge.
<b>Characteristics of content</b>	Content must either be personal, formal or informal focused, and must be user-centred, user-controlled, and either user-generated or crowd-sourced.
<b>Communication</b>	Users want SNSs with communities of interests where they can select the audience with whom to have conversations, online discussions or conferences.
<b>Characteristics of the communication process</b>	Social media must allow active participation, social interaction, instantaneous communication, engagement, anonymity, collaboration, feedback, openness.
<b>Content that can be shared</b>	Articles, audio clips, comments, documents, games, graphics, messages, news, photos, pictures, podcasts, text updates, video clips, movies, web links, etc.

The profile shows that users prefer mobile, wearable and affordable technology with fast access to the Internet and user-centric infrastructures. Social media applications must support users in their search for applicable information, and must allow users to create or edit online content in order to create new knowledge according to their personal or professional needs. Users are looking for social interaction with people of similar interests, and they want communication that encourages interaction, participation, engagement and openness. Users do not only want instantaneous access to all forms of content, but they also want to share a wide variety of content with others.

The prominent features of social media listed in Table 3.3 relate closely with some of the prominent communication features illustrated in Table 2.8. As illustrated in Table 2.8, communication is supported by computer and network hardware and software that

allows for interaction, participation, collaboration, social interaction and feedback – prominent features of social media as well. The positive and negative features of CMC media guiding the choice of users in selecting communication media (as listed in Tables 2.7 and 2.8), echo in the aspects that define social media (see Section 3.3.1), and in the features of the popular social media applications and tools discussed in Section 3.3.2. Another parallel feature is in the way information is edited, used and processed in order to create knowledge.

The profile of social media presented in Table 3.3 above summarises the key features of social media as CMC which must be considered when utilising social media in higher education. These features provide the social media foundation for the study. As a whole, the review in the chapter serves as the second “lens” – the “social media-centred lens” through which applicable theory could be illuminated and narrowed down to a conceptual framework that directs the study towards attainment of its objectives and ultimate aim.

### **3.6 CONCLUSION**

Chapter 3 provides background information about the evolution of technology since the invention of the computer. The background adds to the understanding of the development of various theories and models that explain how communication happens (Chapter 2). By applying the theories to the context of CMC technologies, understanding is created for the effective use of social media for communication.

As the aim of this study is to research the use of CMC and social media in higher education, Chapter 4 focuses on the influence of technology on education, applicable educational theories, and aspects of effective teaching in order to filter the perspectives gained so far through an “education-centred lens”. The focus provided by this (third) “lens” can lead to the compilation of a conceptual framework for the study as a whole. Such a framework can guide the empirical investigation and aid the ultimate compilation of a set of directives for effective teaching and learning using social media in higher education.



## CHAPTER 4

### THE EDUCATIONAL FOUNDATION: EFFECTIVE TEACHING AND LEARNING USING SOCIAL MEDIA IN HIGHER EDUCATION

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Chapters 2 and 3 sketched the historical-theoretical background of communication, computer-mediated communication (CMC) and social media as CMC:

- Chapter 2 provided a theoretical communication science background by investigating various major concepts related to the communication process, focusing on four of the Traditions of Communication Theories (Section 2.2), four applicable Communication Theories (Section 2.3), and five types of CMC Theories (Section 2.4). By looking through this “communication-centred lens”, perspectives gained could be narrowed to focus on the key features of communication using social media relevant to the study.
- Chapter 3 described the development of CMC technologies and social media. A profile of social media as CMC was sketched (Section 3.5 and Table 3.3) by comparing the features of social media (Section 3.2), the characteristics of popular social media tools and applications (Section 3.3), and features of new and improved social media applications and tools (Section 3.4). This “social media-centred lens” provides further focus on the features of communication through social media.

Through the focus provided by the two previous chapters, the important communication and social media principles have been exposed and can now be applied to higher education.

#### 4.1 INTRODUCTION

Chapter 4 extends and concludes the literature review envisaged in the first objective of the study, namely:

*To undertake a comprehensive literature review focusing on: (a) relevant approaches to communication and communication theories, and (b) the*

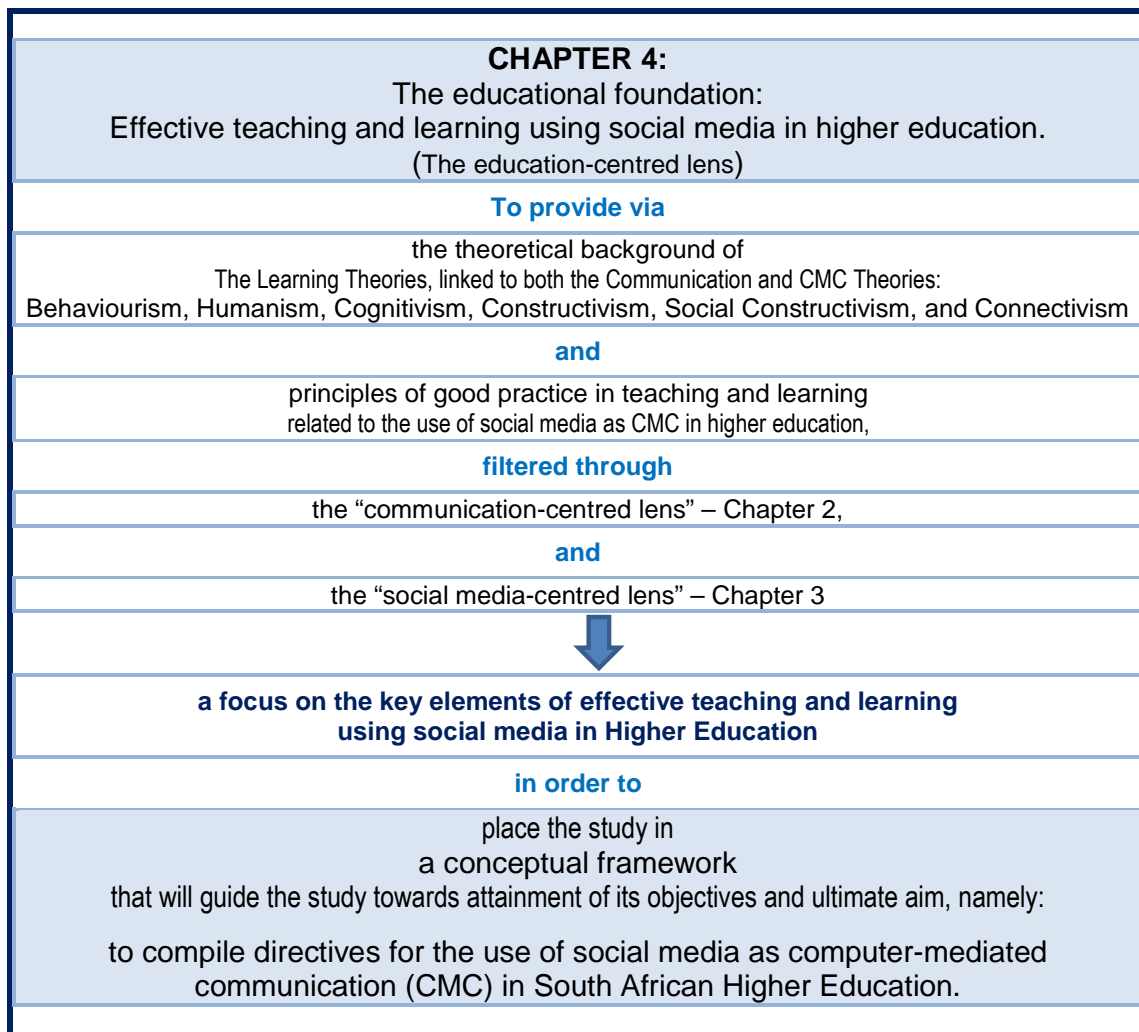
***advancements in CMC, the Web and social media in order to establish a theoretical basis for a study directed to the utilisation of CMC and social media in the South African higher education context.***

This chapter must also be seen in the context of the third research question of the study, namely:

*How can educational theory contribute to effective teaching and learning by means of social media in higher education?*

The goal of this chapter is therefore to develop a conceptual framework for this study as suggested by the perspectives gained in Chapters 2 and 3 and filtered through the “lens” of education theory and principles. The major Learning Theories and an influential set of principles for good and effective teaching and learning are reviewed and related to the use of social media as CMC in higher education.

Figure 4.1 illustrates the aspects that are discussed in Chapter 4, and the way each of these aspects relates to the goal of the study.



**Figure 4.1:** Outline and goal of Chapter 4.

Access to information and learning materials over the WWW transformed learning in a way no other technology had before (Greenhow, Robelia & Hughes 2009: 246; Armstrong & Franklin 2008: 12), while CMC technologies made the process of research, the collection of data, the finding of information, communication with other learners, and sharing knowledge easier, faster and much more accessible (Nasseh 1997: 1-7).

Computer technology powered paradigmatic shifts in education (Bigley 2012: 4; Wild & Grodecka 2010: 6). Educators were among the first to embrace the technological revolution and the increased educational opportunities by using and researching the use of CMC technologies like e-mail, chat rooms, video-conferencing, forums, and so forth (Harasim 2000: 59). Laurillard (2008a: 34 and 2008b: 525) describes these new technologies as “digital versions of all the educational technologies developed over the centuries” which present education with many opportunities, “... something akin to the

Gutenberg revolution". Currently, many educational institutions offer full programmes through the Internet (Rutherford 2010: 703; Bigley 2012: 5; Harasim 2000: 59), making use of Learning Management Systems (LMSs) such as Blackboard, Moodle, WebCT and similar applications, and/or the use of various social media applications to communicate with students.

To accommodate the changes in education since the development of the Internet, and especially since the WWW came into being, many of the major Learning Theories had to make way for new perspectives on teaching and learning. In order to understand the current perspectives on learning, the major Learning Theories are discussed next.

## **4.2 FOUNDATION OF LEARNING: THE MAJOR LEARNING THEORIES**

Learning Theories developed and evolved over the ages as a result of changes in teaching methods, while teaching methods changed because of the application of new technologies in teaching and learning. Philosophies since the time of Plato have been built on perceptions that the written word, organised into disciplines and subjects, contain the "truth" and must be taught in formal education (Lankshear, Peters & Knobel 2000: 34). These philosophical beliefs about the nature of knowledge (epistemologies) are organised into theories of learning and describe the basis on which something is believed to be true (Bates 2011: 30). It is important to understand the main schools of thought on which the traditional Learning Theories are based, as each of these perspectives influenced, to a certain extent, current theories on learning and, consequently, teaching and learning practices.

### **4.2.1 Epistemological Frameworks**

Learning Theories can be divided into three broad Epistemological Frameworks, namely Objectivism, Pragmatism, and Interpretivism (Siemens 2005: 4; Kop & Hill 2008: 5):

- **Objectivism** – according to followers of this epistemology, reality is external and objective, and knowledge is gained through experience. Knowledge in the first instance comes from the senses and is developed through perceptions and concepts experientially acquired (Siemens 2005: 4; Kop & Hill 2008: 5). The

Learning Theories of Behaviourism and Humanism rely on Objectivist Epistemology (Thompson 2012: 1).

- **Pragmatism** – according to followers of this epistemology, knowledge is negotiated through experience, thinking, inquiry and action (Kop & Hill 2008: 5). Shields (1998: 197) describes pragmatism as the philosophy of common sense, while Goldkuhl (2004: 14) states that pragmatism means that “proper action is knowledgeable action, and proper knowledge is actable knowledge”. The Learning Theory Cognitivism falls under the Pragmatism Epistemology.
- **Interpretivism** – according to followers of this epistemology, knowledge is informed through socialisation and cultural cues (Kop & Hill 2008: 5; Saritas 2006: 11). Interpretivists claim that the structure of reality relies on perceptions, and that knowledge is internally constructed in a variety of contexts by individual interpretation of the world stimulated by experiences and interactions with others. Constructivism and Social Constructivism fall under the Interpretivist Paradigm.

Each of the epistemological frameworks described above provides partial insight into a specific aspect of learning and gaining knowledge. However, an epistemology does not in itself address issues of teaching and learning, but rather influences different theories of learning. Learning Theories are applications of epistemological beliefs about the nature of knowledge and learning (Bates 2011: 30; Siemens 2005: 4; Kop & Hill 2008: 5). The following section addresses a selection of the major Learning Theories applicable to this study.

#### **4.2.2 Major Learning Theories**

Behaviorism, Cognitivism, and Constructivism were developed when learning was not yet influenced by CMC technologies (Romiszowski & Mason 2004: 400). The speed at which technologies are currently changing makes it difficult for advances in pedagogy to keep up with providing new theories (International Communication Association 2011: 3; Laurillard 2008a: 8). Although theories of learning are not static, Web 2.0 tools and the ways in which they are used to support learning are eroding the distinction between the pedagogical approaches, which implicates that many of the “older” theories may just be as applicable in the current educational environment as the newer theories (Conole & Alevizou 2010: 13; Baird & Fisher 2005: 14; Harasim 2000: 54; Bell 2011: 100). Siemens

(2004: 1) emphasises, however, that learning must evolve constantly to adapt to the changing environment, and therefore it is inevitable that learning theories will adapt over time as well.

In the context of this study, six Learning Theories are discussed, namely: Behaviourism, Humanism, Cognitivism, Constructivism, Social Constructivism, and Connectivism. All six theories are applicable to learning in the technology era, although not all to the same extent. Aspects of importance to this study are accentuated and their role in learning with technology is described and explained.

#### 4.2.2.1 Behaviourism

Behaviourism can be regarded as one of the first Learning Theories. Behaviourist thinkers hypothesise that learning is a change in observable behaviour caused by external stimuli in the environment (Ashworth *et al* 2004: 4). Darrow (2009: 11) describes the key principle of Behaviourism as the “carrot and stick” approach to learning, referring to the “reward or punishment” of new behaviour. Behaviourist thinkers state that rewarding a learner for a particular behaviour encourages him/her to behave in the same way in a similar situation in the future. Conversely, if behaviour is punished, the person is less likely to repeat the behaviour in the future.

The Objectivist Learning Theory is based on the Behavioural Approach. According to Enonbun (2010: 19) and Bates (2011: 30), the Objectivist Learning Theory has the following characteristics:

- The expert is the source of knowledge and teaching is the transfer of knowledge from those that know (the educators) to those that do not know (the learners).
- The learner’s task is to understand and memorise, reproduce accurately what has been learned, and to apply the knowledge learned to specific, well-defined contexts.
- Good teaching is authoritative, correct, well-organised, clear, and not to be questioned.
- The educator uses a predetermined curriculum to aid the transference of knowledge to learners, with minimal input from the learner.

- Learning is assessed by the production of correct answers and efficient reasoning according to the facts and concepts taught.

Learning in the era before the printed book was guided by Objectivism and Behaviourism, and controlled by the rules of the church. Behaviourism eventually began to falter because aspects of learning such as memory, language and other mental abilities could not be explained within the theory. World War II also brought a shift away from Behaviourism, when human performance and propaganda were given a great deal of attention by academics (Ashworth *et al* 2004: 4). However, many of the principles of Behaviourism are still applicable today: for example, setting of measurable goals (learning outcomes), measures to determine whether goals have been met (assessment), and in providing feedback to students (Ally 2004: 8), and are just as applicable in teaching and learning online as in face-to-face teaching and learning. The way the principles are used in teaching and learning changed as theories adapted to new learning paradigms. Behaviourism was followed by the Humanism school of thought.

#### 4.2.2.2 Humanism

Humanism followed Behaviourism as a protest against the portrayal of the person as a being or object for scientific enquiry by Behaviourists (Tennant 1997: 12). Humanists rejected the Behaviourist idea that behaviour is determined by the environment, and believed that humans are in control of their own decisions (Merriam, Caffarella & Baumgartner 2007: 281-282).

Humanism is defined as a learner-centred approach in which the development of the individual is seen as following from the free choice of the individual in the learning process (Merriam & Brockett 2007: 40). The educator's role is to encourage and enable the learner to learn by providing access to appropriate resources in order for personal development and the construction of meaning to take place.

The Objectivistic view of learning, as reflected in Behaviourism and Humanism, was surpassed by the pragmatic idea that knowledge is influenced by both experience and thinking (Kop & Hill 2008: 5). *Cognitivism*, based on the Pragmatism Paradigm,

substituted *Behaviourism* as the dominant Learning Theory in the 1960s and provided new perspectives to learning.

#### 4.2.2.3 Cognitivism

Cognitivists propose that learning comes from mental activities such as memory, motivation, thinking and reflection (Thompson 2012: 2). Where Behaviourists believe that learning is the result of a change in behaviour, Cognitivists believe that learning is demonstrated through a change in knowledge and understanding (Thompson 2012: 2). Cognitivists (in agreement with Objectivists) focus on the transmission of information from the educator who knows, to learners who do not know, and the cognitive changes that take place when learning occurs (Siemens 2004: 2; Thompson 2012: 2). Cognitivist theorists are further interested in how information is interpreted by humans and therefore focus on aspects such as memory, motivation, thinking, metacognition, and individual learning styles (Ally 2004: 14). Learning is seen as the acquisition or reorganisation of the cognitive structures through which humans acquire, process, and store information in a way that leads to behavioural outputs (Ally 2004: 8; Ashworth *et al* 2004: 7; Merriam, Caffarella & Baumgartner 2007: 284-285). The term “information processing” explains the development of thinking and argumentation. Information processing also includes reflection of one’s own thinking, and the outward articulation of different types of learning activities; for example, attention, selection, reasoning, prediction, and reviewing (Conole & Alevizou 2010: 14).

Over the last 20 years, partially because of technological developments and partially because of developments in educational philosophies, a shift to a Constructivist view of learning took place (Romiszowski & Mason 2004: 400).

#### 4.2.2.4 Constructivism

Constructivism can be described as an approach to instructional design based on the assumption that learners use their own interpretation of knowledge, a situation, previous experience, or the application of similar knowledge in relevant contexts, to mentally construct new knowledge (Saritas 2006: 11; Harasim 2000: 54; Hazari, North & Moreland 2009: 189; Koohang *et al* 2009: 92). Constructivism shows influences from



both Behaviourism and Cognitivism and is influenced by the Interpretivist Paradigm. Unlike Cognitivism and Behaviourism in which learners are seen as uninvolved in the learning process, Constructivists are of the opinion that the learner plays an active role in constructing knowledge, while learning is viewed as a process of “meaning creation” (Enonbun 2010: 19; Ashworth *et al* 2004: 8; Darrow 2009: 16). Learners are seen as responsible for their own learning and will learn better when they discover knowledge for themselves (Enonbun 2010: 19; Wruch 2010: 19), or when they work together in groups to interpret information and create knowledge.

From a Constructivist perspective, collaborative learning is seen as a pedagogical method that enables learners to work together to accomplish shared learning goals and to co-construct knowledge, while the educator only guides or facilitates the process (Veldhuis-Diermanse & Biemans 2001: 2, 3; Harasim 2000: 53; Dixon 2012: 6). Collaborative activities allow students to communicate, interact, ask questions, discuss answers, and evaluate learning topics. Collaboration with other students makes learning more realistic, students can share and learn from one another, they can engage in critical discussions and thus motivate one another. Students can discuss problems from different perspectives, can propose various solutions, and evaluate information in a group context to reach conclusions (Preece & Schneiderman 2009: 20; Veldhuis-Diermanse & Biemans 2001: 2; Harasim 2000: 53). Though collaboration differs slightly from cooperation and coordination, in general all three aspects refer to doing things together to reach better results (Rheingold 2010: 20; Romiszowski & Mason 2004: 412). Collaboration involves different activities that can only be performed by a group, and require the input of all group members to be successful.

Constructivism also incorporates the concept of the formation of communities of practice which allow collaborative learning (Conole & Alevizou 2010: 15). Because humans are social beings, learning best takes place within a sociocultural context where knowledge can be developed through the active engagement of learners and educators in a “learning community” (Kop & Hill 2008: 6; Saritas 2006: 2; Brady, Holcomb & Smith 2010: 15). Using CMC technologies to enhance interaction also increases collaboration among students and therefore students are more involved or engaged in learning.

Astin (1984: 292) describes student involvement (which he later coined “student engagement”) as “the amount of physical and psychological energy that the student devotes to the academic experience”. Astin describes an involved student as one who “devotes considerable energy to studying, spends much time on campus, participates actively in student organisations, and interacts frequently with faculty members and other students” (Astin 1984: 297). Barkley (2010: 6, 8), conversely, also accentuates the interaction between motivation and active learning which result in student engagement. Barkley suggests that learners must be motivated and actively engaged in meaningful tasks for effective learning to take place (Romiszowski & Mason 2004: 401; Barkley 2010: 39, 41).

Student engagement activities include time spent interacting with other students and educators, as well as time spent engaged in collaborative learning activities. Kuh (2009, in Junco, Heiberger & Loken 2010: 2) defines engagement as “the time and effort students invest in educational activities that are empirically linked to desired college outcomes”. Student engagement is enhanced when students have the opportunity to share ideas and resources with other students, talk and write about what they are learning, relate it to their own experiences, and apply their newly acquired knowledge to their daily lives (Chickering & Gamson 1987: 4; Rutherford 2010: 706; Junco, Heiberger & Loken 2010: 2). Barkley (2010: 39) emphasises that students and educators should consider themselves partners in the teaching/learning process to achieve engagement. Barkley also emphasises that when students *want* to learn, “most of the typical teaching and learning challenges” disappear (Barkley 2010: 41).

Expansions in the field of Constructivism include Individual, Cognitive, Postmodern, and Social Constructivism (Biggs 2003: 12; McInerney 2005: 592).

#### 4.2.2.5 Social Constructivism

The Russian psychologist Lev Vygotsky is regarded as the father of Social Constructivism. According to this theory, the learner attempts to make sense out of the world while actively constructing knowledge through interaction with others in a specific social environment (Hamid, Wayott, Kurnia & Chang 2010: 1420; Laurillard 2002: 67; Bonzo & Parchoma 2010: 915). The social environment is learner-centred, learner-

directed, collaborative, and supported by cooperative learning (Cardona-Divale 2012: 38).

Vygotsky asserts that knowledge is constructed through dialogue and interaction using language as a tool to create meaning. The use of language as an “interpsychological tool” is central to the Social Constructivist thought (Freeman 2010: 3; International Communication Association 2011: 5). Vygotsky explains that humans gain knowledge from the people around them and therefore must facilitate meaningful relationships with other more experienced people (Freeman 2010: 2; Bonzo & Parchoma 2010: 915).

While Individual or Personal Constructivism views the construction of knowledge as a personal endeavour incorporating the learner’s own experience, Social Constructivists see knowledge creation as a product of social interaction where knowledge is exchanged with other learners to create a higher level of understanding of information. The Constructivist Learning Theory, on the other hand, explains how knowledge is constructed when information comes into contact with existing knowledge that had been developed by experience (Kim 2001: 2).

Social interaction is essential to effective and efficient learning. According to the Social Constructivism Theory, interactions in a learning environment should be designed to enhance understanding and meaning making (Cardona-Divale 2012: 34). Social Constructivists assume that knowledge is constructed by active learners engaged in learning.

The Learning Theories Behaviourism, Cognitivism and Constructivism are often regarded as outdated in the era of technology and social media and therefore a new theory for learning was proposed (Nobles 2011: 21). This new theory is Connectivism.

#### 4.2.2.6 Connectivism

In his ground-breaking paper, “*Connectivism: A learning theory for the digital age*”, George Siemens (2004) suggests Connectivism as a more applicable Learning Theory for the digital age. According to proponents of Connectivism, knowledge and intellect are distributed across modern networks which consist of people and technology. Learning is

seen as the process of connecting, growing, and navigating these networks (Siemens & Tittenberger 2009: 10; Mix 2010: 35). Siemens (2005: 4) explains that, in contrast to the established views of learning, Connectivism presents learning as a “connection/network-forming process”. Siemens (2004: 10) proposes that Connectivism as a Learning Theory is required because of the growth in and complexity of information on the Internet, the new possibilities available for people to communicate via networks, and for the ability to use different information streams simultaneously.

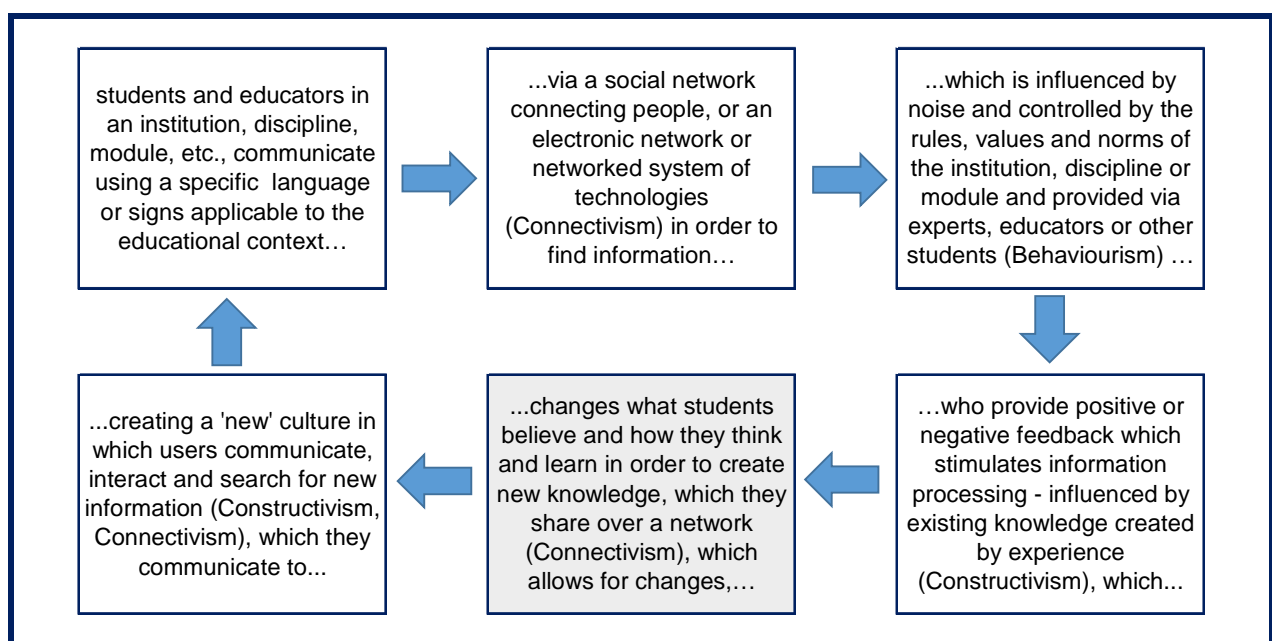
Siemens (2004: 6) refers to the 2004 prediction of the American Society of Training and Documentation (ASTD), that knowledge doubles every 18 months (compared to the prediction of Schilling (2013: 1) in Section 3.4 that knowledge currently doubles every 13 months). The overload of information created in this way negatively affects learning. Siemens states that as knowledge continues to increase and evolve, access to the right information is more important than the knowledge the learner possesses (Siemens 2005: 21). Knowledge is distributed as information across networked connections of people and technology and is stored in a variety of digital formats (Siemens 2006: 10; Kop & Hill 2008: 2). In other words, it is more important to know where to find information and what knowledge to use, than knowing the knowledge itself.

In this regard, Connectivism is in agreement with the view of Levy (1994) that technology enables the forming of a collective memory or collective intelligence that allows people to access specific knowledge when it is needed. Participating on the Internet, Web 2.0 and social media, people contribute to this “shared memory” (Heylighen 1999: 8) or collective memory (Levy 1994: 13) which allows people to “know more than what is known” (Siemens 2004: 4). Levy defines collective intelligence as “a form of *universally distributed intelligence*, constantly enhanced, coordinated in real time, and resulting in the effective mobilisation of skills”. People add to this intelligence by discussing, elaborating, providing alternatives and reflecting on the stored information – and in that way create knowledge. Levy (2001: 255) states that collective intelligence is dependent on technologies, language, culture, conventions, representations, and emotions, and is motivated by the rules of social interaction to create more knowledge.

Connectivism further focuses on the forming of networks which comprise of nodes and connections (Bell 2011: 103). Nodes can be thoughts, feelings, interactions with others,

new data, or new information (Siemens 2005: 5). Connections are the links between nodes allowing the flow and sharing of information (Nobles 2011: 21). Collections of nodes create networks and networks can be combined to form larger networks (Siemens 2005: 5; Darrow 2009: 17). Siemens asserts that connections between nodes are the key to network learning, and learning happens when patterns in the network are recognised. The environment that the network occurs in is defined as an ecology. The ecology in which the learner exists influences the “health” of the network (Siemens 2005: 6). Connectivism follows the design of Castells’ Network Theory (discussed in Section 2.3.4 and illustrated in Figure 2.4) in the design of nodes and networks. Within social networks, as described in Connectivism, hubs are well-connected people who are able to foster and maintain the flow of knowledge.

All the Learning Theories discussed above describe how knowledge is gained or constructed from information users obtain from experience, interaction, learning, or by actively looking for information. Building on the cyclical process of communication focused on knowledge creation (Figure 2.5), the creation of knowledge, as described by the Learning Theories, can be illustrated by using the same processes (see Figure 4.2). The process is cyclical and indicates that as long as people communicate and use and search for information, they will learn and create new knowledge.



**Figure 4.2:** The cyclic process of knowledge creation.

Figure 2.5 (Section 2.3.4) illustrates that communication models focus on people, their society or culture and the language of the society, and on the networks in communication which are influenced by noise, control and feedback to create knowledge. Figure 4.2, extending Figure 2.5, illustrates that, if applied to social media, the same elements are important for a study of social media in an educational context. People (students and educators) work in a culture or society (the institution, discipline, module, etcetera) and communicate using electronic or social systems (face-to-face or online). Communication between the people/users in education are influenced by inputs from other students, other educators, study material, distractions (noise), etcetera, which necessitates control supplied by the institutional rules, values and culture. Feedback from the educator or other students stimulates communication, motivation, interaction, engagement, participation, information processing and, eventually, knowledge creation.

#### **4.2.3 Summary of key aspects of the Learning Theories**

The discussion of the Learning Theories provided valuable background for understanding learning processes. Against the background of the discussion of the selected Learning Theories, it has become clear that although there are both differences and similarities among the theories, each theory contributed to an extent to the current perspectives of teaching and learning. In the following table, Table 4.1, the key aspects of each of the Learning Theories are summarised into three categories: 1) the way learning happens according to the specific theory, 2) the role of the educator and, 3) the role of the learner as described by each theory.

**Table 4.1: Key aspects of Learning Theories.**

<b>Learning Theory</b>	<b>Learning process</b>	<b>Role of educator</b>	<b>Role of learner</b>
<b>Behaviourism</b>	Learning is a change in behaviour based on influences from the environment and the teaching of experts. Social interaction depends on culture/society and language.	The educator is the source of knowledge: transferring prescribed information to learners. Feedback is based on right or wrong answers to specific questions.	The learner learns what the educator teaches, based on a reward and punishment system.
<b>Objectivism</b>	Learning depends on a prescribed curriculum and the teachings of experts. The learner memorises and applies what is taught.	The educator is the source of knowledge and transfers prescribed information to learners. Feedback is based on right or wrong answers.	The learner must understand and memorise, reproduce accurately what has been taught, and apply the knowledge gained.
<b>Humanism</b>	Learning is self-directed, learner-centred, supported by the educator and influenced by previous experience.	The educator provides learning resources, supports learning, and encourages and assesses learning.	The learner has a choice in learning: learning is self-directed, on own time, supported by assessment and feedback.
<b>Cognitivism</b>	Learning comes from mental activities based on experience, meaning making, student engagement, collaboration, representations of reality and motivation. Learning is supported by collaboration, social interaction, and student engagement. Cognitive development and processing of information leads to knowledge construction.	The educator is the expert and the source of knowledge who facilitates and guides learning activities, and motivates and encourages learners.	The learner learns through thinking, argumentation, reflection, reasoning, prediction, and reviewing. Learners communicate, interact, collaborate and share learning material while engaged in discussions. They motivate each other and evaluate information together to reach collective conclusions.
<b>Constructivism</b>	Learning is based on interpretation, experience and prior knowledge. Collaboration, cooperation and feedback in learning communities support learning and create knowledge. Learning takes place via engagement in studies, campus life, and working with other students and educators.	The educator is the facilitator of learning activities designed for groups, encourages learners and provides guidance. The educator interacts with students, shares ideas, motivates students, and plans active learning tasks.	Learners evaluate information and find answers via critical reflections, collaboration, interactive discussions, cooperation and feedback. The learner is engaged, involved, motivated, devoted, participates in learning, shares ideas and resources, interacts with others, talks and writes about learning and actively applies knowledge gained.
<b>Social Constructivism</b>	Early learning based on social interaction and dialogue supports learning and constructs knowledge. The social environment is learner-centred, collaborative, and supported by cooperative learning.	The educator interacts with students, provides guidance, facilitates learning and provides feedback.	The learner makes sense of the world while constructing knowledge through social interaction. The social environment is learner-centred, learner-directed, collaborative, and supported by cooperative learning.
<b>Connectivism</b>	Learning depends on social interaction and collaboration over networks of connected people and technology. Learning is a cyclical process of connecting and navigating networks.	The educator is the facilitator and supporter, helps learners find information and connect with other learners and other educators.	The learner must know where to find information and what knowledge to use. Technology enables collective intelligence – built by people discussing, elaborating, and reflecting on information.

Table 4.1 provides a holistic view of the Learning Theories discussed in Section 4.2. Ally (2004: 7) argues that the Behaviourist principles can be used to teach basic facts, Cognitivist principles to teach processes and principles, and the Constructivist strategies can be used to teach higher-order thinking – the “why” of teaching. Behaviourism and

Cognitivism provide valuable insights in the learning process and many of the concepts are still applicable. Constructivism, on the other hand, presents a much more contemporary perspective for the changing learning environment. Social Constructivism can be added to this group of theories in allowing the construction of knowledge using Web 2.0 technologies. Siemens' Connectivism, however, provides the most options for teaching and learning in a changing educational environment. The concepts of collaboration, communities of practice, interactivity, and student engagement, each with emphasis on social interaction, learning in groups, constructing knowledge, the role of personal experience, and finding and using information, provide pedagogies applicable for teaching a new generation of students in a digital environment. These and other commonalities between Communication Theory and the Learning Theories are further elaborated on in the next section.

#### **4.2.4 Commonalities between Learning Theories and Communication Theory**

In many aspects the Learning Theories correspond with the Traditions of Communication Theories (Section 2.2), the Communication Theories (Section 2.3) and the CMC Theories (Section 2.4). In the context of this study certain commonalities were identified, which are illustrated in Table 4.2.



**Table 4.2:** Commonalities between Learning Theories and CS/CMC Theories.

Learning theories vs. Traditions of Communication Theories, Communication Theories and CMC Theories.			Behaviourism	Humanism	Cognitivism	Constructivism	Collaboration	CoP	Interactivity	Student engagement	Social constructivism	Connectivism	
Communication	Applicable Traditions of Communication Theories	The Sociocultural Tradition	X	X		X	X	X	X	X	X	X	
		The Sociopsychological Tradition	X		X		X	X					
		The Semiotic Tradition	X	X	X							X	
		The Cybernetic Tradition	X	X			X	X	X	X			X
	Applicable Communication Theories	The Shannon-Weaver Model of Communication											X
		The Cybernetic Theory	X										X
		The Systems Theory				X						X	
Computer-mediated communication (CMC)	Cuelessness Theories	The Network Theory	X			X					X	X	
		Social Presence Theory					X		X	X	X	X	
		Lack of Social Context Cues Theory											
		Media Richness Theory	X		X								
		Social Identity of De-individuation Effects Model	X		X								
	Experiential and Perceptual Theories	Signalling Theory											
		Electronic Proximity Theory				X						X	X
		Social Influence Theory								X			
	Interpersonal Adaptation and Exploitation Theories	Channel Expansion Theory				X						X	X
		Social Information Processing Theory							X	X			
		Hyperpersonal Model of CMC				X	X			X			
		Warranting Construct Model										X	X
		Efficiency Framework											X
		ICT Succession Framework											X
		The Uses and Gratifications Theory (UGT)	X	X								X	X
The Theory of CMC Competence		X	X	X						X	X		

Examples of important connections and commonalities between Communication-related Theories and the Learning Theories (as indicated in Table 4.2) are the following:

- Theories in the Sociocultural Tradition allege that culture is the prime determinant of individual development which corresponds with Connectivism, Constructivism and Social Constructivism, which explain how students learn in the era of electronic media and the cultural changes brought about by technology.
- Theories under the Sociopsychological Tradition explain how personality and neurobiological characteristics influence a person's choices. Educational researchers, for example followers of Cognitivism, want to know how media affect people's choice of social media and whether film, videos, pictures, and television programmes can be used for teaching. Cognitivists, just as the theorists of the Sociopsychological Tradition, assert that learning comes from mental activities such as thinking and reflecting, based on the information stored in the human brain.

- The Learning Theories Constructivism and Social Constructivism strongly relate to the Semiotic Tradition. In any culture there are certain words, signs or symbols that have meaning to only the people of that culture. Language is therefore of great importance in understanding the meaning of concepts, and to interact and learn from others.
- The main concepts of Connectivism, for example learning via social interaction, the forming of networks, the flow of information, and the management of information overload, fit into the theories grouped under the Cybernetic Tradition. In Connectivism, the network (the system) and the nodes (feedback loops) are described as the basis of the social interaction in which learning takes place and knowledge is constructed. The role of information processing and feedback are also important aspects in Behaviourism.
- The Network Theory illustrates the functioning and growth of social groups and social networks. Connectivism relates to the network model in the context of the use of networks to manage information overload, to engage students in study groups, to create online learning environments, and to enable the flow of information between educators and students.
- Constructivism, Connectivism and Social Constructivism correspond with the Theories of Interpersonal Adaptation and Exploitation of Media in the context of how students learn in social groups, how they represent themselves online, and how students learn by experience to work with other students in online groups.
- The aspect of gratification (UGT) may be linked to the Learning Theories Humanism, Behaviourism, Connectivism and Social Constructivism in that students will strive to meet the expectations of their educators.
- The CMC Competence Theory shows connections with Humanism (fulfilling basic needs), Cognitivism (transfer of knowledge between people), Constructivism (the role of interaction), Social Constructivism (the role of social interaction, sense making and the use of language), and Connectivism (using networks to communicate and learn).

The epistemologies and learning theories discussed above provide an understanding of teaching and learning in various contexts. As technologies change, theories change and adapt. But it is not only theories and paradigms that influence learning: teaching must be effective in order for learning to be effective. Against the background of the different

theories and the changing educational environment, a highly rated set of principles of good practice for effective teaching and learning are discussed next.

### **4.3 THE SEVEN PRINCIPLES OF GOOD PRACTICE IN TEACHING AND LEARNING**

One of the most influential perspectives regarding effective teaching and learning on undergraduate level flowed from a meta-analysis of decades of educational research by Art Chickering and Zelda Gamson in 1987. Bangert (2004: 221) explains that the principles they identified “support deep learning and student-centred approaches, and reflect a constructivist paradigm”. In a follow-up to the research, Chickering and Ehrmann (1996) expanded upon this research by releasing the article “*Implementing the Seven Principles: Technology as lever*”. In this article, Chickering and Ehrmann describe ways to use telecommunications technologies to advance the Seven Principles. The principles they list as good teaching and learning with technology, are discussed and applied to this study in the section that follows.

#### **4.3.1 Principle 1: Promote contact between student and educator**

Contact between educator and student both in and out of the classroom keeps students motivated and committed to learning (Chickering & Ehrmann 1996: 2). When educators are devoted to teaching, they assist students in developing non-cognitive skills through emotional support, which in turn results in better learning. In the Conversational Framework, Laurillard (2008a: 12) emphasises the importance of contact between educator and learner. According to Laurillard, learning takes place when educator and student debate and discuss learning materials. Bangert (2004: 222) describes the educator interested in building relationships with students as friendly, accessible to students, focused on student learning, enthusiastic, and with good communication skills. When educators show these characteristics, even shy students will approach the educator with questions or comments. Shy students may, however, still be inhibited to talk in class, but not while using social media technologies (Cardona-Divale 2012: 146). The theory of CMC Competence (Section 2.4.2.5) indicates that normally shy people can overcome their fear of interacting by using social media.

The importance of contact in communication is illustrated in other communication theories. Henrickson (2000: 49), and Kaplan and Haenlein (2010: 61), in describing the Social Presence Theory (Section 2.4.2.1a), describe the value of contact in communication: the higher the social presence (contact), the stronger the influence that communication partners have on one another's behaviour. Social presence also depends on the richness of the communication medium: Walther (2011: 448), in defining the Media Richness Theory (Section 2.4.2.1c), explains that the richer the communication medium, the more opportunities there are for contact between the users of the medium. Whittaker (2003: 26) emphasises that using a technology that fails to communicate social presence changes the outcome of the communication process. The role of social interaction is also emphasised in Constructivism (including collaboration and student engagement), Social Constructivism, and in Connectivism.

Large classes and distance education make interaction between student and educator difficult (Chickering & Ehrmann 1996: 3). CMC technologies can play an important role in enhancing contact and communication in formal learning and informal contact between students and educators (Ericson 2011: 2; Johnson *et al* 2011: 23). The choice of the communication medium is therefore of utmost importance (see also the Social Influence Theory, Section 2.4.2.2b). In Table 3.2, the ability of CMC technologies to enable social interaction, two-way communication, and feedback is illustrated. Cochrane (2011: 258) lists blogs, Twitter, YouTube, Wordpress, Flickr, Ning, and others as social networking sites that support collaboration, interaction and engagement.

#### **4.3.2 Principle 2: Develop reciprocity and cooperation between students**

Chickering and Ehrmann (1996: 3) describe good learning, also in the technology environment, as “collaborative and social”, not competitive, and something that does not happen in isolation. Working with others will increase a learner's involvement in learning, will improve thinking skills and will deepen understanding of learning materials. Wilson (2004: 60) states that Millennial students (see Section 1.7.4) have grown up “working in groups and playing on teams”, therefore they are more likely to collaborate with peers to enhance learning. The communication that happens between learners in study groups can strengthen collaborative learning, group problem solving, and promote effective discussions (Chickering & Ehrmann 1996: 3). Through social interaction and

collaboration, students may form communities of learning (Chickering & Gamson 1987: 4; Chickering & Ehrmann 1996: 3). Burgstahler (2012: 2), in explaining the Universal Design for Learning (UDL), advises that educators should purposefully encourage collaboration and interaction between students and between students and educators by, for example, designing activities where students must work in groups or activities that enable students to get to know one another (Wilkinson, Wilkinson & Nel 2001: 137).

The role of social interaction, collaborative learning, student engagement and group communication is supported by both Communication Theory and Educational Theory (see Tables 2.8 and 4.1):

- The Electronic Proximity Theory (Section 2.4.2.2a) focuses on the role of closeness experienced in communication among groups;
- The Social Information Processing Theory (Section 2.4.2.3a) places emphasis on the ability of people to form and maintain relationships;
- The Social Identity of De-individuation Theory (SIDE) (Section 2.4.2.1d) accentuates the value of group interaction in communication;
- Constructionism, as a theory in the Sociocultural Tradition (Section 2.2.1), focuses on the way human knowledge is constructed through social interaction and shared experiences of groups;
- Both the Systems Theory and the Network Theory (Section 2.3.3 and 2.3.4) focus on the abilities of electronic media to allow groups with special interests to form; and
- Both Constructivism (Section 4.2.2.4) and Social Constructivism (Section 4.2.2.5) stand for the construction of knowledge through social interaction and collaborative learning in communities of practice.

Janssen and Bodemer (2013: 40) emphasise that combining the use of CMC technology and collaborative learning can be “effective, efficient, and enjoyable”. Social media tools allow students to work together in ways that were impossible in the past (Rheingold 2010: 20; Zainuddin, Abdullah & Downe 2011: 42), and this interactivity lends itself to the development of specific learning communities in which learners can gain knowledge, build skills and share experiences (Grodecka, Pata & Våljataga 2010: 11; Chanda 2011: 26; Minocha 2009: 247; Wise, Skues & Williams 2011: 1332). Technology makes

participation in group projects and communication between students easier: they can engage in online communication with fellow students from any place and at any time, and are able to collaborate in learning projects that happen entirely online (Hazari, North & Moreland 2009: 189; Bangert 2004: 225; Chickering & Gamson 1991: 51).

### **4.3.3 Principle 3: Encourage active learning**

Chickering and Gamson (1987: 4) propose that active learning occurs when students talk and write about what they are learning, relate it to their past experiences, and apply what they learnt to their daily lives. Meggs, Greer and Collins (2011: 389) describe active learning as process-driven learning that assists in the development of self-directed and independent learners. The experiences of students and the knowledge they already possess (prior knowledge) may differ considerably from student to student (Barkley 2010: 39) and may be influenced by various aspects, for example: ethnic and racial backgrounds, age, home language, beliefs and attitudes (Burgstahler 2012: 2; Ambrose *et al* 2010: 15). Culture determines individual development: a child develops in the context of a specific culture, and the child's learning development is affected by that culture. Bigley (2012: 54) therefore advises that learning content should be adapted to the framework of a learner's culture and prior knowledge for effective learning to take place. This is in agreement with theories in the Sociocultural and Semiotic Traditions (Sections 2.2.1 and 2.2.3), and the Learning Theories Constructivism (Section 4.5.2.4) and Social Constructivism (Section 4.5.2.5).

Social Constructivism is especially valuable in examining education in the era of electronic media and the cultural changes brought about by technology. The theory may be used to explain how learners and learning fit into the virtual environment and how the Internet, the Web, web-based learning environments, and social media support learning in online social environments where people also learn from one another (Makkonen, Siakas & Vaidya 2011: 362; Freeman 2010: 1; Cardona-Divale 2012: 37).

Barkley (2010: 16) uses active learning as an umbrella term that includes engagement, motivation and cooperative and collaborative learning: aspects described by Vygotsky in Social Constructivism (see Section 4.2.2.5), and emphasised in the Social Influence Theory (Section 2.4.2.2b), the ICT Succession Framework (Section 2.4.2.3e), and

Constructivism. Active learning also takes place when students are engaged in their studies: Barkley (2010: 6, 15) emphasises the relationship between active learning, motivation, and student engagement. Motivated students will actively seek information and understanding which constitute engaged learning. Ambrose *et al* (2010: 69) argue that the motivation of students determines what they are willing to do in order to learn. Barkley (2010: 39) warns, however, that what may be motivating to one student, may not be motivating to another.

Active learning also depends on active participation, attentiveness in class activities, and on engagement with and interest in learning material (Ally 2012: 1). Rose and Gravel (2010: 8), in describing the guidelines of the UDL, warn that students differ in what attracts their attention and engages their interest, therefore it is important to use various learning methods to keep students interested. Teaching practices such as debates and discussions, reflective writing, group projects, and team work assignments may enhance students' understanding of the learning material and develop their critical thinking skills (Wilson 2004: 61; Chickering & Gamson 1987: 2; McMahon 2005: 41; Kassens-Noor 2012: 9). Using social media offers many opportunity for active learning.

Chickering and Ehrmann (1996: 3) state that there are a “staggering amount of technologies that support active learning”, and divide them into three groups: tools and resources for learning by doing, time-delayed exchange, and real-time conversation. The asynchronous and synchronous nature of online learning environments thus enables active learning (Harasim 2000: 53; Veldhuis-Diermanse & Biemans 2001: 3; Makkonen, Siakas & Vaidya 2011: 401) and facilitates constructivist learning (Wheeler 2010: 105; Grodecka, Pata & Våljataga 2010: 11). Using social media for learning enables learners to control the time they want to learn, and enables them to construct knowledge through active engagement with other learners and with the learning material (Romiszowski & Mason 2004: 398, 401; Ashworth *et al* 2004: 7). The Theory of CMC Competence (Section 2.4.2.5) links the use of social media to social interaction, collaboration, and active involvement in learning. Connectivism (Section 2.2.2.6) relates to the Network Theory (Section 2.3.4) in the context of the use of networks to engage students in study groups, to create online learning environments, and to enable the flow of information between educators and students to enable active learning (Siemens 2006: 10; Kop & Hill 2008: 2).

#### 4.3.4 Principle 4: Provide prompt feedback

Students must “know what they know and know what they don’t know” (Chickering & Gamson 1987: 4; Chickering & Ehrmann 1996: 3). Feedback assesses a student’s knowledge and assists the student in monitoring his/her own progress (Bradford & Wyatt 2010: 3). According to Barkley (2010: 104), learners need to know what they are doing right and what they are doing wrong to enable them to adjust and improve their efforts and become self-regulated learners. Behaviourists explain that positive or negative feedback strengthens or discourages actions that will enable learning to take place (see Section 4.2.2.1).

Chickering and Ehrmann (1996: 3) state that feedback helps students to reflect on their learning and helps them diagnose the areas where development is needed. Ambrose *et al* (2010: 121-152), in the fifth principle for smart teaching, state that students learn better when they learn towards a specific goal, when there is a challenge in meeting the goal and when they receive feedback about their performance relative to the goal. Feedback must, however, be given at a time and frequency that allows the feedback to be useful; preferably during the learning process and not at the end thereof (Chickering & Ehrmann 1996: 3; Wilson 2004: 61; Lai & Ng 2011: 16).

Laurillard (2008a: 11) defines feedback as the “revision of students’ actions” by both the educator and by other students. Students present their ideas or concepts to the educator and other students, put new knowledge thus gained into practice, and in turn comment on the ideas or work of other students. The learning experience therefore includes social learning, experimenting, practicing, collaborative learning, and social interaction. Feedback from the educator and other students enables the student to learn better and to develop practical skills.

Feedback is listed as a prominent feature in both the “Features of effective communication” (see Table 2.8) and in “The profile of social media as CMC” (see Tables 3.2 and 3.3). Connectivism focuses on aspects such as learning via social interaction, the forming of networks, the flow of information, and feedback via “feedback loops” that allows the construction of knowledge. Theories under the Cybernetic Tradition also play an important role in understanding the communication in networks and the importance of



feedback in effective communication. The Electronic Propinquity Theory and the Channel Expansion Theory as theories listed under the Experiential and Perceptual Theories of CMC (see Section 2.4.2.2), as well as the Hyperpersonal Model of CMC (Section 2.4.2.3b), also emphasise the importance of feedback.

Feedback can be given electronically in a timely and effective manner. Technology not only enables faster communication, it also allows for the provision of faster, more specialised feedback than what is sometimes possible in face-to-face situations (Chickering & Ehrmann 1996: 3). Computer technology provides access to students' writing efforts, which allows for effective evaluation of the learning process. Social media allow instantaneous communication, two-way interaction, and feedback over vast networks to engage enormous numbers of people in networking, sharing, and collaboration (Huwe 2011: 26; Kent 2010: 645; Churchill *et al* 2009: 142).

#### **4.3.5 Principle 5: Spend time on task**

Using time efficiently is critical for both students and educators. Chickering and Gamson (1987: 4) state that “time plus energy equals learning”: there is no substitute for the time a student spends on learning activities. Students must devote adequate time and effort to their studies in order to improve the quality of their learning. There must also be a balance between workload and time: when students perceive the workload as too high, they resort to surface learning, which will lead to lower results (Wilson 2004: 62). If students are interested in a subject or a learning activity, they will spend more time on it, will be more motivated and will therefore also be more engaged in studying (Barkley 2010: 6). Wilson (2004: 62) advises educators to schedule learning activities using time management programmes in supporting students to study more self-directed and time-efficiently.

New technologies can dramatically improve time on tasks: technology provides access to information and therefore helps students spend less time searching for information, while having more time available for studying (Chickering & Ehrmann 1996: 4). Internet-based learning environments allow students to participate in courses at any time and from any place, increasing the time available for completing tasks and/or participating in learning activities (Bangert 2004: 26). Technology also supports interaction between

educator and student because online contact is not dependent on office hours (Lai & Ng 2011: 19). Both the Channel Expansion Theory (Section 2.4.2.2c) and the Efficiency Framework (Section 2.4.2.3d) refer to the time saved if a user initially spends enough time to master the skills needed to use the medium effectively, thereby increasing the possible effectiveness of the medium and the expectation of success.

#### **4.3.6 Principle 6: Create high expectations**

When educators have high expectations, students will strive to meet those expectations and in that way learning will be enhanced (Wilson 2004: 63). According to Chickering and Gamson (1987: 5), setting high expectations for students develop their metacognitive skills because it forces them to evaluate their own learning. One way to inform students of such expectations is by communicating learning outcomes.

Educators' faith in their students and their commitment to support students' efforts contributes strongly to students' motivation and success. Educators should expect students to succeed (Barkley 2010: 81; Mix 2010: 34): educators who believe in their students are more likely to see students succeed than those educators who doubt students' ability (Barkley 2010: 91). Setting high expectations, providing clear learning objectives and giving corrective, positive feedback encourage students to learn more successfully (Ziaeehezari 2010: 41). Ambrose *et al* (2010: 153) argue that although educators cannot control the developmental process of learners, they can shape the classroom climate: a negative climate may impede learning and performance, but a positive climate can strengthen students' learning.

The Efficiency Framework holds that users will choose a medium that predicts success, even if using it requires extra effort and more time (Nowak, Watt & Walther 2005: 3). The Uses and Gratifications Theory (UGT) and the Media Richness Theory may also be linked to this principle in that educators will purposefully select media to increase students' success. The richer the medium, the more opportunities there are for contact between educator and student, for constructive feedback, and for effective learning.

Technology can be used effectively in setting high expectations. Chickering and Ehrmann (1996: 4) point out that technology communicates high expectations "explicitly and efficiently" through learning activities that test higher-order thinking skills.

Technology enables the fast communication of results and students can try to improve immediately on results obtained. Technology also supports peer evaluations: enabling students to learn from one another.

#### **4.3.7 Principle 7: Respect diverse talents and ways of learning**

The focus of Principle 7 is on the differences among students regarding, *inter alia*, talents, backgrounds, learning styles, ethnicity, gender, abilities, experience, and prior knowledge. Bangert (2004: 226) links students' prior knowledge to their individual cognitive processing levels, their individual personalities, and each student's specific beliefs about learning (see key features of communication listed in Table 2.8). The UDL, developed to support the diverse needs of learners with disabilities, shares many similarities with Chickering and Ehrmann's Principle 7. The UDL is based on the notion that each student learns in a unique way and that teaching must accommodate these differences.

To be effective in a classroom with a cohort of diverse learners, the curricula must present information in ways that are perceptible to all groups of learners (Rose & Gravel 2010: 4). Chickering and Gamson (1991: 62) advise that the learning environment has to be designed to include various approaches and styles of learning to provide students with opportunities that work for them specifically. By using different ways to teach, by allowing each student to express his/her own ideas, and by allowing students to base their learning on their prior knowledge, educators can engage students in active learning and meet each student's individual needs (Rose & Gravel 2010: 2; Burgstahler 2012: 2). If learning requires attention and effort, and if students feel as if their presence and participation in the course matter, they may be motivated to sustain the effort and concentration that such learning requires (Rose & Gravel 2010: 7; Barkley 2010: 38).

It is also important to provide information resources with which all students can interact and which are engaging, flexible, and accessible to all students (Burgstahler 2012: 2; Rose & Gravel 2010: 6). Educational researchers, for example followers of the theory Cognitivism (Section 4.2.2.3) and the theories under the Sociopsychological Tradition (Section 2.2.1), want to know how media affect students and whether film, videos, and television programmes can be used for teaching. They also study the educational uses

of social media applications and tools such as, *inter alia*, Facebook, Twitter, wikis, virtual worlds, forums, and gaming.

Rose and Gravel (2010: 5) warn that inequalities will arise when information is presented to all students through a single form of representation. Wilson (2004: 64) argues that by allowing students to use different types of learning in different situations, they can develop into critical thinkers and adaptive learners. Students using online education can work at their own pace and complete tasks and assignments using methods or strategies that are more effective for their individual learning styles. Aided by technologies, students with similar motives, backgrounds, and talents can work together in study groups (Chickering & Gamson 1991: 62). Students who are familiar with the work, who work faster, or with more knowledge of the work, should be allowed to move on without having to wait for students unfamiliar with the work, or for students experiencing learning difficulties (Chickering & Ehrmann 1996: 4).

Diverse learning is also important to develop students' intrinsic abilities for self-regulation (Rose & Gravel 2010: 9). Ralabate (2011: 3) states that the UDL focuses on learners who can assess their own learning needs, monitor their own progress, and regulate and sustain their own learning. Social media technologies accommodate diverse student groups by allowing different methods of learning through tasks that encourage self-reflection and self-evaluation, for example tasks that require analysis, synthesis, and evaluation (Chickering & Ehrmann 1996: 6).

#### **4.3.8 Overview of the seven principles as applicable to this study**

A summary of the seven principles is presented in Table 4.3. In the table the implicated roles of the educator and the learner, as well as the role social media and CMC technologies can play in effective teaching and learning, are also listed.

**Table 4.3:** Overview of the seven principles as applicable to this study.

<b>Principle</b>	<b>Effective teaching and learning</b>	<b>Role of educator</b>	<b>Role of learner</b>	<b>Role of technology and social media</b>
<b>Principle 1: Contact between student and faculty</b>	Learning takes place when the educator and learners debate or discuss learning material.	Contact with educators keeps learners motivated/committed. Support from educators help learners develop non-cognitive skills.	Learners, even shy learners, can approach educators with questions and comments.	Social media enhance contact, communication, assist in creating good relationships, and allow social interaction.
<b>Principle 2: Cooperation between students</b>	Communication in study groups increases involvement, improves thinking skills, and deepens understanding of learning material.	Educators must encourage interaction by the design of activities where learners must work in groups and/or support each other.	Social interaction enables students to form communities of learning and supports group problem solving and collaborative learning.	Social media tools allow cooperation and group activities which enable learners to work together from any place and at any time.
<b>Principle 3: Active learning</b>	Active learning includes cooperative learning and student engagement. It also depends on interest in learning material and participation in learning activities.	Teaching practices: debates, discussions, reflective writing, team work – develop critical thinking skills, enhance understanding, and keep students interested.	Motivated students seek engaged learning which supports development of self-directed and independent learners – influenced by experience and prior knowledge.	Most social media tools – asynchronous and synchronous tools – support active learning.
<b>Principle 4: Feedback</b>	Feedback includes collaborative learning, experimenting, social interaction. Feedback must be given at a time and frequency that allows it to be useful.	Feedback from the educator (or other students) assesses a student's knowledge, monitors progress, and indicates what students are doing right or wrong.	Feedback helps students reflect on their learning and diagnose areas where attention is needed. Students learn better when learning towards a goal.	Social media tools and CMC technologies enable fast and immediate feedback.
<b>Principle 5: Spending time</b>	There must be balance between workload and time: if the workload is too high students resort to surface learning with lower results.	Educators should schedule learning activities to support students to study self-directed and time-efficiently.	Students must devote time, energy, and effort to their studies in order to learn effectively. Interest motivates self-directed learning.	Technology supports interaction, improves time on tasks, provides access to information, and allows students to participate.
<b>Principle 6: High expectations</b>	High expectations and support for learning develop students' metacognitive skills: teaching them to think critically, and helping them reach their goals.	Educators' faith in students contributes to students' motivation and success.	Clear learning objectives and corrective, positive feedback encourage students to learn better.	Social media tools can communicate high expectations through activities that test thinking skills, enable feedback, and support peer evaluations.
<b>Principle 7: Diverse talents and ways of learning</b>	Teaching should develop critical thinkers and adaptive learners. The curricula must be flexible, accessible, engaging and interacting.	Educators should create engaging classes to challenge and support students at different cognitive and developmental levels.	Students differ and they learn in different ways, therefore they should develop the ability for self-regulation.	Social media tools accommodate diverse student groups and different methods of learning.

In Table 4.3, the seven principles of good teaching and learning applicable to this study, including reference to the users and the social media learning environment, are summarised. The user, coming from a specific culture and speaking a specific language, is central in the communication-centred situation (see Table 2.8). In the context of this

study, the user is either the learner (student) or the educator. The environment consists of the social and electronic networks used for teaching and learning. As a whole, table 4.3 illustrates effective teaching and learning using social media and CMC technologies.

Based on the summary in Table 4.3, and supported by the background information provided in Chapters 2 and 3, these core “elements” – the learner, the educator, the learning environment, and effective teaching and learning – are briefly described.

- In the effective learning situation, the modern learner, although influenced by, *inter alia*, ethnical and racial background, culture, language and age, is an independent student who learns what is of interest to him/her. The learner is also engaged and motivated, participates actively in learning projects, and constructs knowledge through engagement with learning material and with other learners. The effective learner learns through thinking, argumentation, reflection, reasoning, prediction, discussions, and the review of information to construct knowledge. Using social and electronic networks, learners communicate, interact with other learners and with educators, and share learning material while actively learning. Social interaction enables students to form communities of learning that support collaborative learning and group problem solving. Students are motivated and encouraged by feedback from educators and other students.
- The effective educator in the context of this study is a co-user of the communication process. The educator is the expert and the source of knowledge, providing information and learning material to learners. The educator facilitates and guides learning activities, and encourages interaction by the design of group activities. The educator helps students connect with other learners through debates, discussions and reflective writing projects. Learning activities are designed to enhance students’ understanding, develop critical thinking skills, and keep students interested. The committed educator interacts with students and keeps them motivated and in that way contributes to the student’s success. Feedback from the educator assesses the student’s knowledge, monitors the student’s progress, and indicates what the student is doing right (or wrong). Because the educator wants to create engaging classes to support a diverse

group of students at different cognitive and developmental levels, various forms of media and technologies are investigated for use in educational context.

- The learning environment (as illustrated in Table 4.3), is influenced by technology and by social and electronic networks. An environment conducive to effective teaching and learning using social media is learner-centred, learner-directed, collaborative, and supported by cooperative learning and social interaction. Although the successful use of computer technology and social media is influenced by prior knowledge and experience, CMC technologies allow all students to actively learn at their own pace, to collaborate in group projects and activities, and to have access to unlimited information. Social media applications enable students to form learning communities where they can interact with one another, share resources, create content, and participate in group learning projects. CMC technologies can also be utilised to accommodate diverse student groups and different methods of learning.
- With the above descriptions in mind, effective teaching and learning in the context of this study also takes shape. It has been indicated that learning is a cyclical process that happens over networks of connected people and technology and is dependent on social interaction and collaboration between learners and educators (see Figure 4.2). Learning leads to a change in behaviour based on influences from the environment and the teachings of experts. Learning is self-directed, learner-centred and influenced by previous experience. Learning comes from mental activities like meaning making, the representation of reality, cognitive development, the processing of information, and knowledge construction.

In effective teaching and learning, collaboration and cooperation supported by social interactivity creates knowledge. Social interaction happens in an environment with culture, language and society. Active learning occurs when students are engaged, talk and write about what they learn, debate and discuss learning material, and relate it to experience and prior knowledge. Communication between students, and between students and educator increases involvement in learning, improves thinking skills, and deepens understanding of learning material. Participation in learning groups enhances students'

attentiveness and interest in learning, and engages them in their studies and in campus life. Feedback supports learning: feedback must be given at a time and frequency that allows it to be useful.

Key concepts from this chapter as related to the Learning Theories, principles of good teaching and learning, the cyclic process of knowledge creation, and the elements of communication and learning, are summarised in Table 4.4 as a list of key attributes for effective teaching and learning with technology.

The key attributes listed in Table 4.4 include aspects also included in the features of effective communication (Table 2.8), and in the profile of social media as CMC (Table 3.3). In Table 4.4, the focus provided by the “education-centred lens”, which has filtered the focuses provided by the “communication-centred lens” and the “social media-centred lens” to provide an amalgamated set of theoretical perspectives on the use of social media as CMC in higher education, are summarised.

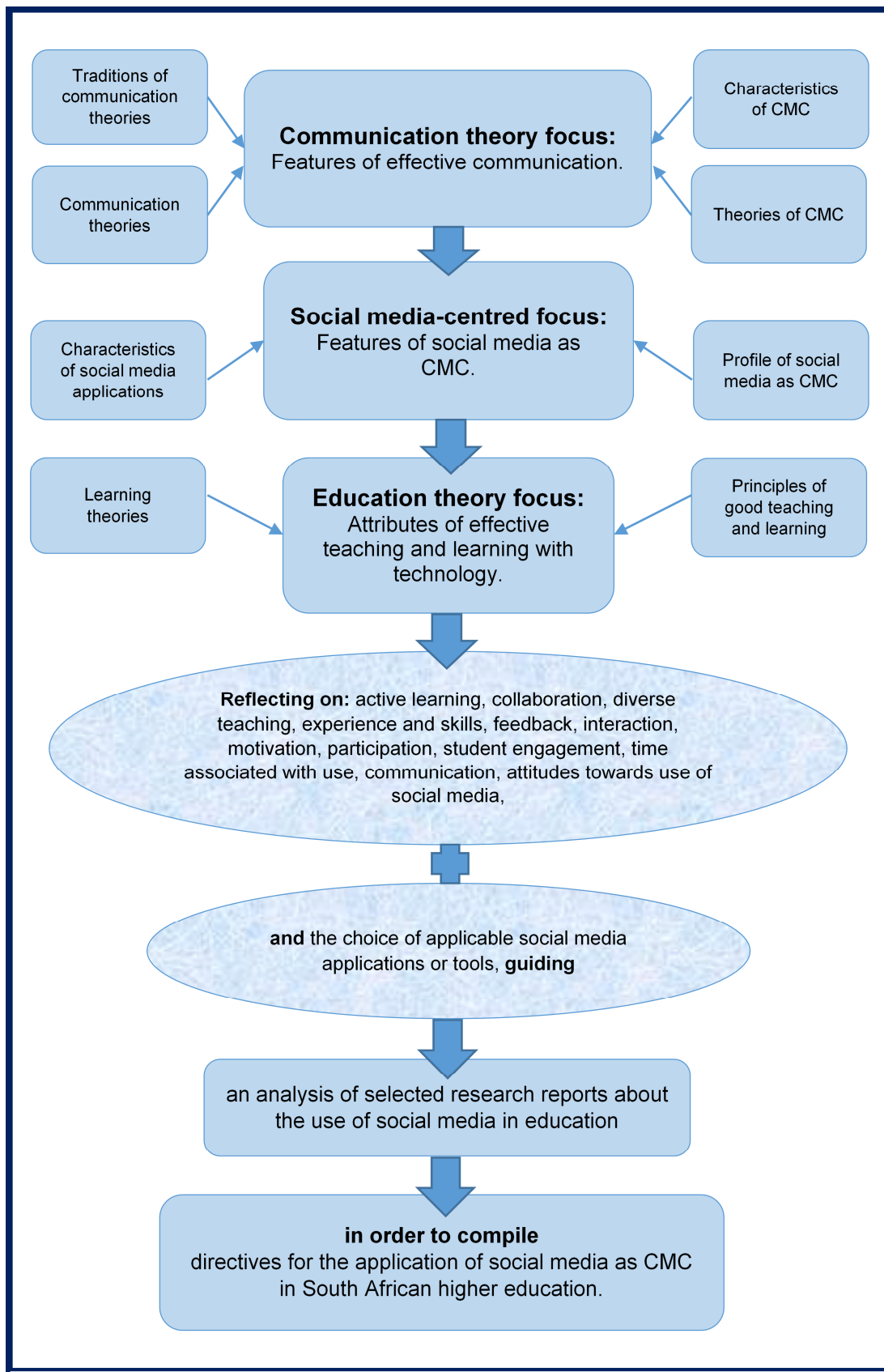


**Table 4.4:** Attributes of effective teaching and learning with technology.

<b>Attributes for effective teaching and learning with technology</b>	
<b>Active learning</b>	Active learning is process-driven and depends on participation, social engagement, collaboration, motivation, and engagement with learning material. Social media enable active learning by engaging students in online learning groups.
<b>Collaboration</b>	Collaboration involves activities performed by a group who learn from one another, engage in discussions and motivate one another to reach better results. Social media enhance collaboration, two-way communication, and feedback between learners in groups.
<b>Diverse teaching</b>	Teaching must accommodate students from diverse backgrounds, students with different needs and abilities, and students that learn in different ways. Social media accommodate diversity by allowing various methods of teaching and learning through online projects.
<b>Experience</b>	Past experiences related to learning and learning material enable information processing and the construction of new knowledge. Prior experience with technology and skills in using social media influences the way a student learns, uses technology and perceives teaching.
<b>Feedback</b>	Timely feedback assesses knowledge, monitors progress, and strengthens actions that enable learning and knowledge creation. Social media technology enables fast, timely and specialised feedback through networks with “feedback loops” between users.
<b>Information processing</b>	Information processing as a learning activity is stimulated by feedback and includes thinking, argumentation, reasoning, prediction, and reviewing. Social media allow users to create, store, edit, find, combine, retrieve, and process information in various formats.
<b>Interaction</b>	Social interaction happens between students in collaborative learning groups in which learning takes place and knowledge is constructed. Social media technologies enable social interaction through two-way communication and feedback between users.
<b>Knowledge creation</b>	Knowledge creation is a cyclical process that comes from information processing and through dialogue, interaction, collaboration, and cooperation. Social media technologies enable users to process information and to classify and adapt data to create knowledge.
<b>Motivation</b>	Motivated students will actively seek information and understanding that constitute learning. Motivation depends on feedback, engagement, and support. Social media offer opportunities for a variety of learning activities that interest and motivate students.
<b>Participating</b>	Participation in learning groups enhances students’ attentiveness and interest in active learning, and engage them in their studies and in campus life. Social media allow students to participate in online learning activities and online group projects.
<b>Student engagement</b>	Students are engaged if they interact with other students in collaborative learning activities which enable active learning and knowledge creation. Social media engage students in study groups and online learning projects from any place and at any time.
<b>Time</b>	Students must devote enough time to their studies to improve the quality of their learning while keeping a balance between workload and time. Social media improve time on task, provides any-time any-place access to information, and control over learning time.

#### **4.4 A CONCEPTUAL FRAMEWORK FOR THE STUDY**

The goal of this study is to compile directives for the application of social media as computer-mediated communication (CMC) in South African higher education. The three “lenses” complement one another in centring the learner and educator as users of social media in a CMC environment using social and electronic networks for teaching and learning. The lens model used for this study is illustrated in Figure 4.3. The “lenses” are presented sequentially, as discussed in Chapters 2, 3 and 4: first the “communication-centred focus”, representing the disciplinary context of the study, followed by the “social media-centred focus” as the focus of the research, and lastly the “education-centred focus” through which the theory has been narrowed to systematically retain aspects crucial for both communication and for teaching and learning, setting the final focal point on the use of social media via CMC. In its entirety, Figure 4.3 provides a conceptual framework for the study.



**Figure 4.3:** Conceptual framework for this study.

Rocco and Plathotnik (2009: 126) state that a conceptual framework is made up of theoretical and empirical work relevant to the purpose of a study, and “relates concepts, empirical research, and relevant theories to advance and systematise knowledge about related concepts or issues”. The conceptual framework (Figure 4.3) includes aspects from Chapters 2, 3 and 4:

- In Chapter 2 a holistic view of communication from the context of Communication Science and CMC provided the theoretical foundation for the study. The Traditions of Communication Theories, applicable Communication Models and Models of CMC served as the “communication-centred lens” which were used to narrow theory and place focus on prominent features and characteristics of communication applicable to the study. The features include the background of the user, his/her culture with its specific language, the influence of communication on the social well-being of the individual, communication through social and electronic networks, and knowledge creation (see Table 2.8).
- In Chapter 3, important background information related to social media has provided focus on the key features of social media as tools of CMC. The features include aspects related to the hardware and software needed for communication, aspects of the communication process and communication content, and the way social media provide access to information and support knowledge creation (see Table 3.3). These features summarise the focus of the “social media-centred lens”, through which the effective use of social media as CMC in higher education may be regarded.
- In Chapter 4, perspectives gained from a study of the influence of technology on education, applicable Learning Theories, and aspects of effective teaching, supported by theory from Chapters 2 and 3, were used to filter theory through an “education-centred lens” into a set of characteristics or attributes of effective teaching and learning (Table 4.4). These attributes focus on the important aspects of active learning, social interaction, collaboration, participation, motivation, feedback and student engagement, as well as information processing and knowledge creation, while the role of previous experience, the effective use of time and diverse teaching methods, are also included.

The perspectives gained from the three chapters consequently acted as three “lenses” that focused the theory into the conceptual framework that directs the study as a whole (Rocco & Plathotnik 2009: 126), and aid the ultimate compilation of a set of directives for effective teaching and learning using social media in higher education. The framework also guides the empirical investigation, a systematic analysis of selected research reports about the use of social media in education, where aspects relevant to the study are focused on, in particular, the elements of effective teaching and learning using social media (Chapter 5). The conceptual framework also guides the interpretation of findings and the relationships among them (Chapter 6), and the conclusions made (Chapters 7) (Rocco & Plathotnik 2009: 122).

#### **4.5 CONCLUSION**

The aim of Chapter 4 was to partially address the research question of this study, namely:

*What are the most prominent perspectives from research undertaken world-wide on the use of social media in teaching and learning that can serve as basis for the compilation of directives to apply social media as CMC in South African higher education?*

Chapter 4 was devoted to a discussion of the major Learning Theories and principles of good practice in teaching and learning using social media. The perspectives gained were used to filter theory through an “education-centred lens” which, combined with the perspectives from Chapter 2 and 3, were summarised into key elements for effective teaching and learning (Table 4.4). The conceptual framework plays an important role in the study as a whole, including the systematic analysis of research reports and interpretation of results.

In the next chapter the research design and methodology employed in the empirical investigation are discussed. This investigation builds directly on the literature review of Chapters 2, 3 and 4 and in particular the attributes of effective teaching and learning and related aspects highlighted in the conceptual framework. These aspects come to the fore in, for example, the method of selecting research articles, in the coding of the information applicable to this study, and in the systematic analysis that follows.

## CHAPTER 5

### RESEARCH DESIGN AND METHODOLOGY

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The previous three chapters addressed the first objective of the study, namely to present a comprehensive literature review of relevant communication and CMC theory (Chapter 2), background information related to CMC technologies and social media (Chapter 3), and of major Learning Theories, as well as a set of principles for good and effective teaching and learning (Chapter 4). The purpose of the literature review was to provide the necessary historical and theoretical background for this study. From the perspectives gained, a conceptual framework for this study was developed (Figure 4.3), reflecting the focuses provided by the three “lenses”: the “communication-centred lens”, the “social media-centred lens” and the “education-centred lens”. Through these “lenses” the theory was narrowed to an amalgamated set of theoretical perspectives on the use of social media as CMC in higher education, which will guide the compilation of directives for the application of social media as CMC in South African higher education.

#### 5.1 INTRODUCTION

Chapter 5 describes the research design followed in pursuing the purpose of this study, namely to study current research reports on the use of social media in higher education in order to investigate the most effective ways in which educational applications of social media can enhance the theory and practice of South African higher education (see Section 1.8). In this chapter an overview of the research design and methodology is provided. The research design and methods were selected to address the second objective of this study, namely:

*to undertake a systematic review of relevant research comprising the following steps: (a) collect and evaluate relevant research reports according to predetermined criteria for inclusion in a sample of documents; (b) to conduct a comprehensive systematic analysis on the selected documents; and (c) to categorise the research and the identified educational applications in order to identify key perspectives on the effective use of social media as applicable to the study.*

The research design is discussed according to the selected research strategies, the philosophical paradigm, and the research methods used in conducting this study. Special attention is given to the search strategies employed and the criteria used to select the sample of documents. This selection process, which took place in several phases, can be regarded as key to a valid and reliable systematic review. The detailed descriptions provided in this regard adds to the trustworthiness of the study. Quality assurance measures and the limitations of the study are discussed and the ethical considerations are taken into account. In this chapter it will become clear how the literature review, and in particular the conceptual framework, is reflected in all actions, including the search strategies followed, the inclusion/exclusion criteria adhered to, and in the ultimate refinement of categories. The discussion commences with describing the type of research used, namely applied research.

## **5.2 TYPE OF RESEARCH**

The research undertaken in this study falls in the category of applied research. Applied research was deemed highly suitable in pursuing the aim of the study as explained below:

- Applied research focuses on the application of scientific knowledge in a given field, rather than on the pursuit of new knowledge (Jupp (ed.) 2006: 1; McMillan & Schumacher 2001: 18, 19; Patton 1990: 160). This study is based on a systematic analysis of the research findings of 220 carefully selected scientific articles/reports/documents about the use of social media in education.
- Applied research is aimed at answering practical questions or solving practical problems by designing practical applications of research-based knowledge (Gravetter & Forzano 2009: 41; McMillan & Schumacher 2001: 14; Fox & Bayat 2007: 10). The practical problem is the vast body of research-based but uncoordinated knowledge available on the use of social media in higher education. A systematic analysis of selected studies can yield insight into the application of CMC technology in education, while the results from the systematic analysis will form the basis of the directives compiled for the application of social media in higher education in South Africa.

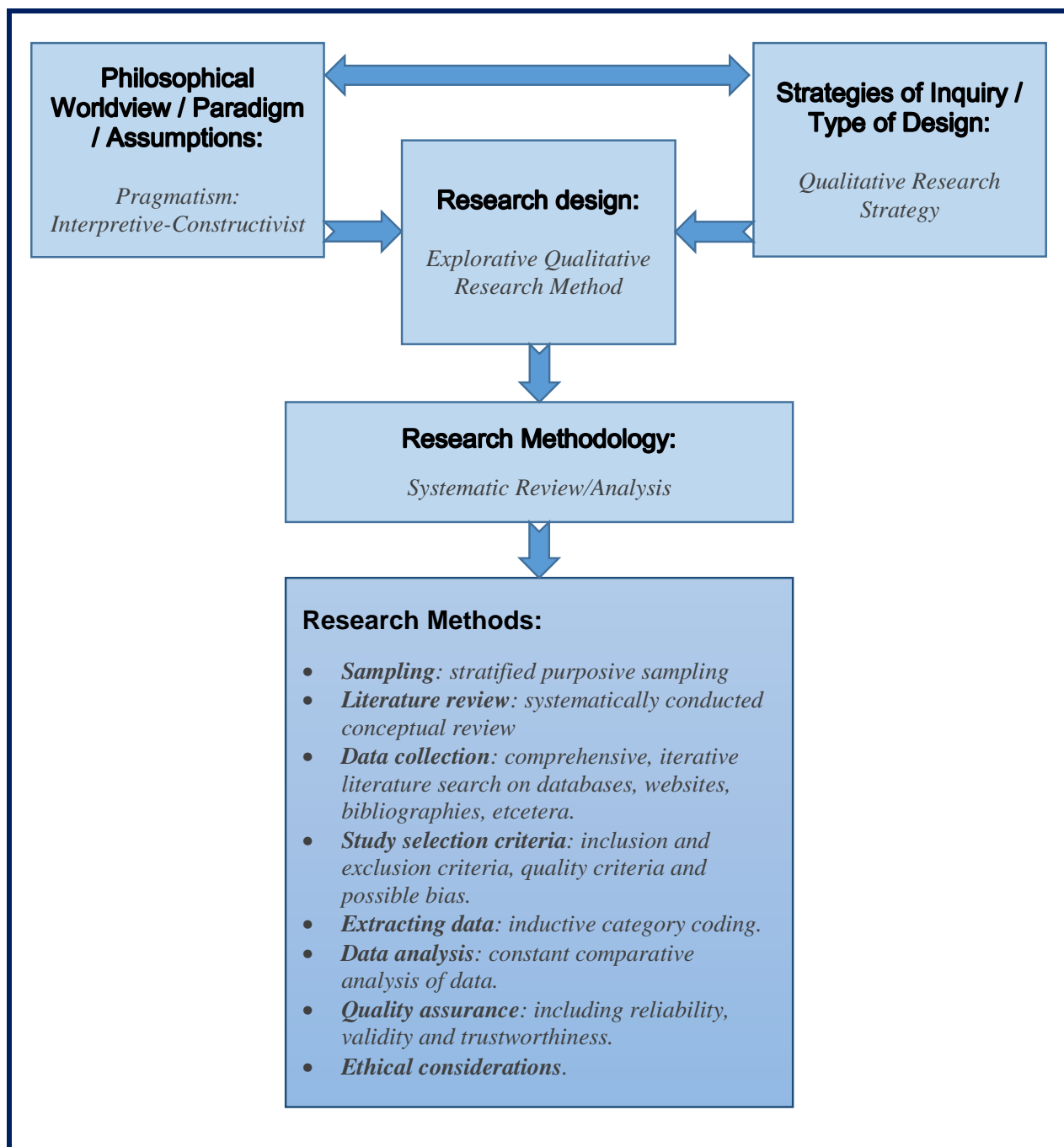
- Applied research tests the usefulness of scientific theories rather than compile new theories, and searches for empirical relationships and generalisations within a given field (McMillan & Schumacher 2001: 18). The Communication and CMC Theories described in Chapter 2, and the Learning Theories discussed in Chapter 4, provide the theoretical background against which the suitability of various social media applications for teaching and learning are evaluated. The combined findings of the 220 selected studies also provide the reader with an overview of the current use of social media in education, which can be valuable for application purposes, as well as further research.

Applied research is based on a research design planned for a specific study. The research framework used in this study is explained in the next section.

### **5.3 FRAMEWORK FOR RESEARCH DESIGN**

A research design is the planned procedure for conducting research, therefore, the framework for the research design should include all the decisions about the research approach: the underlying philosophical assumptions, the selection of respondents, the methods of data collection and the data analysis (Burns 2000: 145; Alves, Azevedo & Goncalves 2012: 627; Maykut & Morehouse 1994: 64; Maree 2007: 70). According to Creswell (2009: 3), the nature of the research problem, the researcher's personal experience, and the audience for which the study results are intended, influence the research design. The research design framework as depicted by Creswell (2009: 5) and adapted by the researcher for this study, is illustrated in Figure 5.1.





Source: Compiled by researcher according to the design of Creswell (2008: 5).

**Figure 5.1:** Framework for research design.

In the following section each aspect of the framework as applied by the researcher in this study, is discussed.

### 5.3.1 Philosophical underpinnings

The term “worldview” may refer to paradigms, epistemologies, ontologies or research methodologies (Creswell 2009: 5). A worldview is a set of theories, procedures, assumptions or beliefs about fundamental aspects of reality which explains how the researcher understands the nature of reality (ontology), experiences the relationship between knower and known (epistemology), and the researcher’s assumptions about research methodologies (Maree 2007: 47; Maykut & Morehouse 1994: 4; De Vos, Strydom, Fouché & Delpont 2005: 39). The worldview or paradigm is also described as a logical framework for observation and for understanding aspects that are universally accepted as true (Wimmer & Dominick 2006: 113; Babbie 2007: 31; Krauss 2005: 758). The researcher’s worldview therefore influences the selection of research methods and the way the research is practiced (Wimmer & Dominick 2006: 113; Creswell 2009: 5).

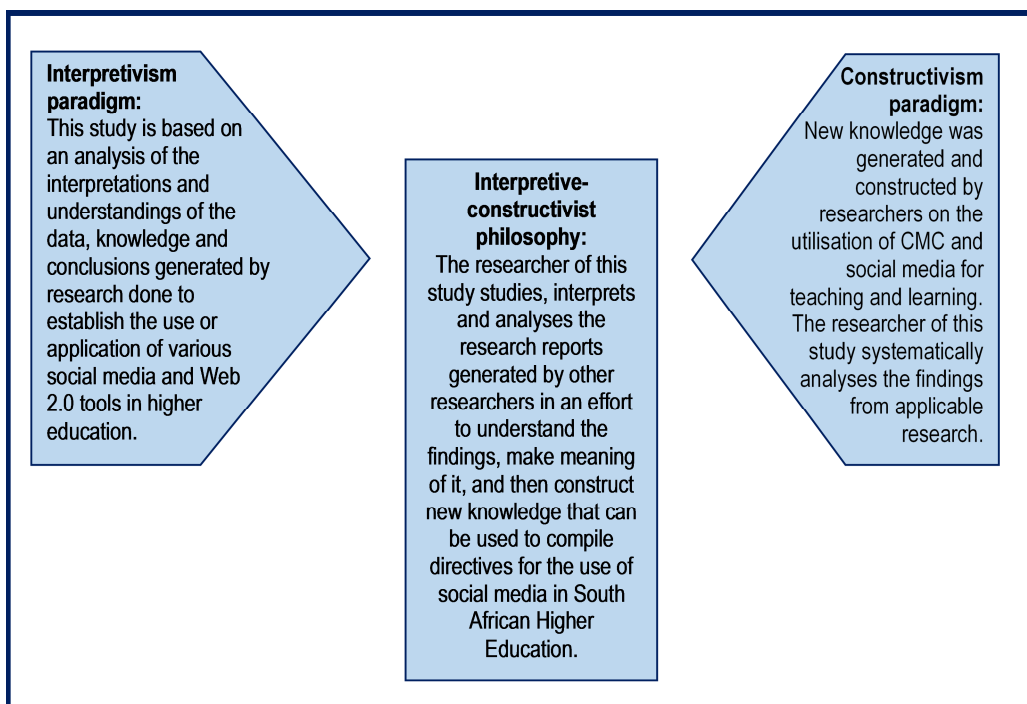
In this study the researcher operates from a pragmatic worldview. In pragmatism, truth is seen as absolute and knowledge is grounded on experience, thinking, inquiry, and action (Kop & Hill 2008: 5; Creswell 2008: 11). Pragmatism embraces multiple research methods and different worldviews, as well as different forms of data collection and analysis (Shields 1998: 197; Creswell 2008: 11). When it comes to the gaining of new knowledge, the present study is designed to systematically analyse the findings of research from selected primary research reports on the utilisation of social media and CMC in higher education. Epistemologically, the study can therefore be described as interpretive-constructive in nature.

Interpretive researchers try to understand the interpretations or understandings of other people about certain phenomena (Cohen, Manion & Morrison 2003: 22, 23; Maree 2007: 59), and try to explain how they created meaning out of their understanding (Wimmer & Dominick 2006: 113). For this study, the researcher uses systematic analysis methods to create meaning from the findings of studies conducted by multiple researchers and to develop theories based on data generated by the research (Wimmer & Dominick 2006: 114; Cohen, Manion & Morrison 2003: 23).

Constructivist philosophy is based on the premise that knowledge is established through the meanings attached to the phenomena studied: a researcher interacts with data,

gradually reaching insight into the meanings attached to the data by previous researchers, and constructs new knowledge based on this understanding (Lowenthal & Muth 2008: 1; Krauss 2005: 759; Rovai 2004: 80). The researcher's intent is to interpret the findings, meanings, and conclusions of the included studies and from the condensed data, compile a comprehensive set of directives about the use of social media in higher education.

Hart and Gregor (2006: 1) state that interpretivism and constructivism can be seen as related approaches to research. To the constructivist, interpretation is crucial for meaning making, and understanding the knowledge gained from the interpretation may be regarded as the purpose of interpretative constructivist research (Alves, Azevedo & Goncalves 2012: 627). Figure 5.2 illustrates the epistemology the researcher adhered to in this study, namely an interpretive-constructivist philosophy.



**Figure 5.2:** The interpretive-constructivist philosophy underpinning this study.

Figure 5.2 illustrates that, in order to investigate the most effective ways in which social media can be used, the researcher of this study has explored, interpreted and analysed the research reports generated by other researchers in an effort to understand their findings, making meaning of it (Interpretivist paradigm), and then constructed new

knowledge that can be used to compile directives for the use of social media in South African Higher Education (Constructivist paradigm).

The worldview also influences the strategy of inquiry: the strategy of inquiry deemed most suitable for this study was qualitative in nature; specifically, the explorative qualitative research method of inquiry.

### **5.3.2 Research design: Explorative qualitative research method of inquiry**

The purpose of the empirical investigation in this study was to collect and evaluate research reports on the educational applications of social media in education with the aim of searching for trends, patterns of meaning, and relationships in the data that can answer to the purpose of the study. Various definitions of qualitative research describe the goal of qualitative research as an approach to explore and investigate selected data, definitions, descriptions, and meanings (Burns 2000: 388; Hewitt-Taylor 2001: 39) in order to find possible relationships, causes, effects, or processes that emerge from data (Burns 2000: 13; Maykut & Morehouse 1994: 13), and then add to existing literature by describing complex situations and by giving directions for future research (McMillan & Schumacher 2001: 397; Maree 2007: 51; Berg 2007: 9).

Qualitative studies are also defined as descriptive and exploratory (McMillan & Schumacher 2001: 397). The word “exploratory” indicates that limited or no prior information exists about a topic, and that an exploratory study is needed to investigate the topic and develop new knowledge (Babbie 2007: 87; NetTOM 2008: 1; Cengage Learning 2012: 119). The objective of an exploratory qualitative design is to describe behaviours, themes, trends, attitudes, needs or relationships that are applicable to the units analysed (Du Plooy 2009: 88).

The qualitative methodology used for this study is a systematic analysis, also called a systematic review. In the following sections, systematic review as methodology is discussed and the methods utilised in this study are described and explained.

## **5.4 RESEARCH METHODOLOGY: SYSTEMATIC REVIEW**

As indicated in Section 1.2, literature on the use of social media in higher education has increased dramatically since 2002, making it difficult to keep up with primary research evidence about how social media and CMC may be utilised for communicating with students and for application in teaching and learning. Due to technological advances, unmanageable amounts of information and a mass of published literature and grey literature, e.g. conference proceedings, reports, theses and unpublished studies, are available that make it difficult to find applicable information about the use of social media in education (Glassziou, Irwig, Bain & Colditz 1981: 16; Tharyan 1998: 135).

Systematic reviews are reliable research methods for objectively summarising, evaluating and interpreting large volumes of research information about a specific topic, highlighting similarities or differences between studies, and exploring the reasons for the variations (Petticrew & Roberts 2006: 266; Yuan & Hunt 2009: 1086; Carr 2002: 81). A systematic approach is therefore deemed the best method to employ for conducting this study.

This study is also built on an unbiased, comprehensive search of databases and websites (Crombie & Davies 2009: 2) to find applicable, existing research focusing on the use of CMC technologies and social media in higher education.

In the following section the research methods used and the steps followed in conducting this systematic review are described.

## **5.5 RESEARCH STEPS AND METHODS**

Creswell (2009: 15) asserts that the term “research methods” involves the forms of data collection, analysis, and interpretation that researchers propose for their studies. A systematic analysis or systematic review involves several methods or activities that may appear to happen sequentially, but most of the time involve iteration (Kitchenham 2004: 3). Yuan and Hunt (2009: 1086) assert that meticulous research methods should be used when conducting a systematic review, and that each step in a systematic review must be planned beforehand for generating validated evidence. Furthermore, Petticrew

and Roberts (2006: 44) emphasise that a systematic review needs a detailed protocol that describes the processes and methods applied, and that it must be developed prior to any data collection. According to Wright, Brand, Dunn and Spindler (2007: 24), a well-planned protocol increases the efficiency of the review and limits the time needed for identifying and obtaining relevant literature. In other words, the protocol serves as a “road map of sorts” (Schuerholz-Lehr 2007: 181) in describing the steps necessary for conducting the review. A protocol also allows the reader to see how findings and recommendations were arrived at (Joanna Briggs Institute 2011: 27; Briner & Denyer 2012: 348).

Kitchenham (2004: 3) summarises the steps in a systematic review into three main phases: planning the review, conducting the review, and reporting the review, while Goldie (2011: 3), Hemingway and Brereton (2009: 4), ResearchCore (2012: 1), and Pai *et al* (2004: 87) list between four and eight iterative phases, not necessarily sequential. The methods used and the steps the researcher followed in conducting this review can be summarised in four phases: 1) planning the review, 2) searching for literature, 3) analysing selected documents, and 4) reporting the findings. Planning the review (Phase 1) is linked to the research problem and formulating the research question, and is described in Chapter 1. The search strategy the researcher followed, Phase 2, is described next.

### **5.5.1 Search strategy**

Systematic reviews must follow a pre-defined, unbiased search strategy; using clear and reproducible criteria in order to find relevant, internationally published or conducted research reports within a specified time frame (Kitchenham 2004: 7; Pai *et al* 2004: 86; Centre for Reviews and Dissemination (CRD) 2008: 20). The search strategy comprises the methods and steps followed in the search for relevant literature to form the population of the study, the selection of a sample of documents/articles for inclusion in the review from the population, and the specific criteria according to which the sample was selected.

### 5.5.1.1 Search for relevant literature

Glassziou *et al* (1981: 16) suggest that the strength of a systematic review is in searching and finding the documents which form the basis of the systematic review. It should be clear from the search strategy what types of studies need to be identified and how studies will be searched for (Petticrew & Roberts 2006: 81). Ankem (2008: 98) emphasises that an incomplete search means omitted results can overturn the outcome of the review, therefore the search strategy should list in advance keywords and search terms, databases to be searched, and the time frame of documents to be included in the study (Kitchenham 2004: 7; DeCoster 2004: 7; Joanna Briggs Institute 2011: 25). As the search is conducted, more keywords, search terms, and additional databases will be identified and added to assist the researcher in retrieving a comprehensive set of documents/articles to form the population of the study.

Fox and Bayat (2007: 30) and Gravetter and Forzano (2009: 128) caution that the population of qualitative research should be carefully selected because each unit of the population will expand the variability of the sample. In the context of this study, the term “population” should not be taken to include every document/article in every database or on the Web (Joanna Briggs Institute 2011: 157). Instead, the population comprises those documents, reports, studies, articles, proceedings, etc. selected from the databases and search engines which seem to support the research objective of this study.

The researcher followed both an iterative and pragmatic approach to searching to ensure that all relevant documents were retrieved (Amunden & Wilson 2012: 91). There were no restrictions placed on the types of research (qualitative or quantitative), the disciplines included, or the type of documents retrieved (journal articles, theses, reports, proceedings, etc.). A preliminary literature search was conducted during February and March 2012 with the objective to establish the nature and the scale of the research available (Glassziou *et al* 1981: 16; Petticrew & Roberts 2006: 48), to test selected keywords and search terms (Kitchenham 2004: 8), and to establish the most relevant databases to use to find documents and reports for the study (Petticrew & Roberts 2006: 48).

In the first round of searches, elements searched for included: computer-mediated communication, social media tools/applications/technologies, the use of CMC and social media in education, and the advantages/disadvantages of using social media. Specific criteria for this first round of searches included the following:

- documents were only scanned for inclusion if dated 2006 or later;
- only documents published in English were considered for inclusion;
- no publications based on non-research accounts were evaluated; and
- news items were not considered.

Searches were performed on the following electronic databases: Academic Search Complete, Emerald, SAGE Journals, CiteULike, FirstMonday, Taylor & Francis Online, FindPDF, PlanetPDF, Sabinet, ProQuest Dissertations and Theses, Tandfonline (Taylor and Francis Online), Communication and Mass Media Database, ERIC (Education Research Information Centre, including Elsevier and Routledge), the KovsieCat system of the SASOL Library, Information Science and Technology Abstracts, PMC-NCBI Resources, and EBSCOHOST.

Web searches were performed using the Google and Google Scholar search engines. According to Petticrew and Roberts (2006: 100), purposive searching of specific websites, or general searches using search engines or meta-search engines, may uncover unpublished literature or other relevant information not published in journals or available via databases. By using the same keywords and combinations of keywords mentioned, many more studies were retrieved.

Randolph (2009: 6) emphasises that a researcher must document the data collection procedure with sufficient detail so that “other reviewers following the same procedures under the same conditions would find an identical set of articles” (thus adding to the reliability of the study). The researcher used several data-collection methods in the search for relevant documents for this analysis:

- Snowballing refers to an iterative process in which documents or studies are identified based on earlier searches. Keywords listed by other authors, the bibliographies of possible applicable documents, and paragraph and subject



headings in applicable research documents were scrutinised for more search terms or keywords in order to extend the search for relevant documents (Petticrew & Roberts 2006: 87; Brettle 2003: 3; Glassziou *et al* 1981: 20).

- Reference lists or bibliographies of seemingly applicable documents were examined to search for other possible relevant studies (DeCoster 2004: 9; Hemingway & Brereton 2009: 3; Randolph 2009: 7).
- Specific authors, identified from earlier retrieved studies, who appear to be prominent researchers on the topic, or authors who have done work on the same topic, were identified and searches were conducted to find more publications of these authors (Barroso *et al* 2003: 158).
- Links to websites from web pages on which relevant research documents were found, were also followed and investigated to find more applicable studies.
- The term “grey literature” refers to literature not formally published, e.g. institutional or technical reports, conference proceedings, theses and dissertations, blogs, reports or documents produced and published by government agencies, academic institutions and non-academic organisations (Hemingway & Brereton 2009: 3; DeCoster 2004: 9; Joanna Briggs Institute 2011: 26; Petticrew & Roberts 2006: 80). Such sources were retrieved using the same search engines, databases, websites or indexes used for the rest of the investigation.
- The researcher, with the support of staff from the SASOL library at the University of the Free State, undertook searches using a wide set of keywords and free text searching techniques on electronic databases and websites. Although search strategies varied depending on the database used, generally, search terms and keywords included: “computer-mediated communication”, “CMC”, “social media”, “social networks & education”, “higher education”, “higher education & social media”, “higher education & Facebook”, “higher education & Twitter” “higher education & YouTube”, “higher education & Web 2.0”, (etc.), “students & social media”, “Millennial students”, “technology & higher education”, “CMC & education”, “communication technologies”, “Internet & education”, and various combinations of the above-mentioned words and terms. Note that “South Africa\*” was specifically included to locate relevant research-based studies conducted in or about South Africa.

- Keywords and terms were combined with the Boolean operators “OR”, “AND” and “NOT” (Pai *et al* 2004: 89; Kitchenham 2004: 8). Search techniques like truncation, wildcards or parentheses were also used, for example “educat\*”, to search for “education”, “educator”, “educate”, “educational”, etc. It appeared after the first few searches that it is also important on some databases to change the sequence of the keywords, e.g. using “students & social media”, and then “social media & students”.
- The researcher used synonyms, abbreviations, text words, index terms and alternative spellings (compiled and identified during the search) to search for studies (Kitchenham 2004: 8). The researcher found that different terminology quite often referred to the same concept (e.g. scholar, learner and student), that abbreviations were used in some documents (for example: FB or Facebook; SL or Second Life; F2F for face-to-face), or that differences in writing styles or differences in the layout of studies influenced the search results. Certain words were also found to have different ways of spelling, e.g. “YouTube” and “You Tube”, “E mail”, “email” and “e-mail”, etc.

There is no ideal number of articles for a review. At the beginning of a review it is unclear how much literature will be retrieved and how many of those retrieved will be relevant. Petticrew and Roberts (2006: 81) emphasise that the aim of a literature search is not to retrieve everything, but “to retrieve everything of relevance”. Qualitative researchers use many ways to collect and analyse data and can be overwhelmed by the amount of data that can accumulate (Wimmer & Dominick 2006: 115; Fox & Bayat 2007: 71). Petticrew and Roberts (2006: 101) emphasise, however, that reasonable measures should be taken to identify all relevant literature, even if this means including many studies that will not be used in the analysis. DeCoster (2004: 7) and Viswanathan *et al* (2012: 2) state that it is possible to discard over 90% of the articles originally found, but the effect of missing relevant studies can negatively influence the review, and therefore all measures should be taken to find as many applicable sources as possible.

Cooper (1998, in Bowman 2007: 172) indicates that the number of studies in a review is not as important as the insights that a review might bring. Bowman (2007: 172) states that there should be a small enough number of articles that they can be analysed in a reasonable amount of time but the sample must also be large enough that the findings

can be synthesised in a meaningful way. Even in a very extensive search, one can never know whether all the relevant studies have been found, because of the difficulty of proving otherwise (Petticrew & Roberts 2006: 100).

It is, however, reasonable to say that there must be a cut-off point for each search, otherwise the search would never end and the analysis will never commence. A stopping point may be when the search has covered all the relevant databases (Randolph 2009: 7), or when no new or relevant information is being uncovered, a process described as reaching redundancy or saturation (Lincoln & Guba 1985; Glaser & Strauss 1967: 61; Maykut & Morehouse 1994: 121). The criteria mentioned were used to identify a group of possible relevant documents/articles as the population of the study from which a sample representing all criteria relevant to the study could be selected.

#### 5.5.1.2 Sampling

A *sample* is a subset of the elements of the population that is representative of the entire population to be studied (Wimmer & Dominick 2006: 88; Burns 2000: 83; Gravetter & Forzano 2009: 128). *Sampling* is the process by which representative elements are drawn from the population (Fox & Bayat 2007: 54; Babbie 2007: 180), and from which observations and generalisations are made (Burns 2000: 82).

Stratified purposive sampling techniques were used in this study to purposefully select a sample according to pre-selected criteria relevant to the research question. Stratified sampling involves dividing the population into homogenous groups; each group containing subjects with similar characteristics (Cohen, Manion & Morrison 2003: 102). Patton (2002: 174) describes these as “samples within samples” with the purpose of selecting major variations from a homogeneous sample.

Because the researcher, with the support of the staff of the SASOL library, performed a thorough search over 17 months on all the databases and search engines described, starting in February 2012 and continuing with intervals until June 2013, a total of 1 398 documents were selected from an estimated 2 400 or more that were screened for possible inclusion in the study.

To identify or select the sample, a specific list of predetermined criteria were compiled to use during the process of re-evaluating the list of 1 398 documents/articles. These selection criteria are discussed next.

#### 5.5.1.3 Selection criteria

Study selection criteria are determined by the reviewer with the intention to identify only those studies that answer the research question and which therefore should be included in the review (Kitchenham 2004: 10; Joanna Briggs Institute 2000: 3). Study selection criteria should explicitly indicate the focus, goals, and limits of the review and should include enough detail to enable other researchers doing the same review to identify the same studies (Randolph 2009: 9; Joanna Briggs Institute 2000: 3). Study selection is a multistage process; starting during the initial search for information when titles, keywords, abstracts, and the year of publication are scanned to determine if a study is applicable or not, and continue until the final list of relevant studies are selected using strict inclusion/exclusion criteria. Tharyan (1998: 140) cautions that criteria should not be defined too narrowly because relevant studies may be excluded and not too broadly, otherwise it will be difficult to compare and synthesise the information.

Selection criteria include both inclusion and exclusion criteria, and criteria defined to limit bias in selecting relevant studies.

##### a) Inclusion and exclusion criteria

The researcher compiled an initial list of inclusion/exclusion criteria during the early phases of the search for relevant studies. The criteria were used to sift through the mass of literature available, and to evaluate the nearly 2 400 documents that were the results of the searches on databases and search engines. For the duration of the study, the criteria were constantly updated and adapted as other relevant criteria were identified (Viswanathan *et al* 2012: 4; Briner & Denyer 2012: 350). Briner and Denyer (2012: 350) advise that final inclusion and exclusion decisions should only be made after the full texts of studies in the selected population have been retrieved and evaluated. And, as with all other steps in a systematic review, the inclusion or exclusion of studies must be

thoroughly documented to enable the reviewer to keep track of all selected studies, and of the reasons specific studies were excluded (Pai *et al* 2004: 89).

To be included in this analysis, each article/document/report had to meet the following criteria:

- All documents had to report primary empirical research on the use of CMC technology, Web 2.0 tools, or social media applications or tools in educational settings. Technologies were not limited to a specific application, but the document included must be a report of a technology specifically tested for its use in an educational context.
- No limitations were placed on the level of higher education, type of institution, or the discipline involved but every document was carefully reviewed to ensure that the focus is on the educational applications of social media, or the use thereof to communicate in educational context with students.
- Participants/respondents of included studies must be students, learners, educators, educational administrators, tutors, mentors, etc., and they must be employed at or studying at universities, tertiary institutions or schools (if research could be applied to HE).

Exclusion criteria for this study included the following:

- Studies found to focus more on the marketing of an institution by using social media than on the educational applications of social media, were excluded.
- Research with the focus on online or blended learning, and not on using social media for online or blended learning, were excluded.
- Studies based on research among primary and secondary schools were only included if findings were applicable to education in general, or to higher education specifically.
- Duplicate publications were excluded, as well as separate publications by the same author reporting on the same research.
- Studies with inadequate information to establish the quality of the research, or studies with unclear or vague research results, were also excluded.

Selection criteria also include criteria defined to limit bias in selecting relevant studies.

b) Bias in selecting studies

“Bias” (systemic error) refers to prejudice in favour of a specific outcome, language or author, by mistakes in the collection, analysis, interpretation, publication or review of data, or by a lack of critical assessment criteria (Kitchenham 2004: 7; Centre for Reviews and Dissemination (CRD) 2008: 33; Petticrew & Roberts 2006: 271).

Petticrew and Roberts (2006: 9) state that a systematic review should adhere to a specific scientific method and an objective and transparent research approach with the aim to reduce the likelihood of bias and subsequent errors. Petticrew and Roberts (2006: 126) note that the list of potential research biases in quantitative studies is long. The same is, however, true for qualitative studies, therefore the researcher focused on biases applicable to qualitative reviews, and specifically on sampling bias, selection bias, and data extraction bias:

- Sampling bias refers to errors in the data-collection process. The following are examples of sampling bias:
  - Publication bias: Unpublished studies remain unpublished because they contain findings which authors did not submit to journals, or which journal editors did not wish to publish (called the file drawer effect) (Tamim *et al* 2011: 412; Petticrew & Roberts 2006: 231; Egger *et al* 1997: 629). Research shows that studies with statistically significant (or positive) results are more likely to be published than those with statistically non-significant (or negative) results (Larwin & Larwin 2011: 259; Kitchenham 2004: 9). Following the criteria listed in the review protocol, the researcher included 21 conference proceedings, 21 reports as well as ten articles published online in the analysis. The researcher did not establish beforehand if the findings of a study are positive or negative, only if the study fits the inclusion and exclusion criteria.
  - Retrieval bias refers to the inability to retrieve relevant research reports. Retrieval bias occurs because researchers may either not be experienced users of databases or not skilled in searching techniques. Another reason for retrieval bias is because many studies or journals are not indexed in databases and are difficult to get hold of (Tharyan 1998: 139). To combat

retrieval bias, the researcher, even though she is skilled at using various databases, asked assistance from information officers at the SASOL library of the UFS to retrieve as many studies as possible.

- Language bias refers to bias resulting from the exclusion of items not written in a particular language (Centre for Reviews and Dissemination (CRD) 2008: 268). The ideal is to include all studies related to the research question, as well as studies conducted in other parts of the world and published in different languages. The researcher found non-English language references under-represented in electronic databases (Tharyan 1998: 138; DeCoster 2004: 7) difficult to access and use, and therefore decided to exclude all non-English documents but to include all relevant studies without any geographical boundaries.
- Multiple publication bias refers to duplicate publications of the same data. If duplicate publications represent several updated versions of the same data, the most recent publication were used (Glassziou *et al* 1981: 26; Kitchenham 2004: 17), except in cases where different aspects of the same research project were reported in more than one publication.
- Quality criteria bias: critical appraisal (the process of evaluating studies based on quality) is a key part of any systematic review. Not all studies retrieved are of equal quality and some studies contain flaws that can negatively influence the results of an analysis (Lane 2009: 1). In the context of the selected documents included in this review, quality criteria were based on the validity, reliability and trustworthiness of the selected studies:
  - Poor writing, poor spelling or grammatical errors were taken as an indication of unfavourable quality and were excluded.
  - A study was excluded if there was no indication of the methods used for data collection, or if the method(s) described did not match the type of study described or the results obtained.
  - Studies were excluded if obvious mistakes in regard to the statistics or percentages reported were noticed, and if the reported results did not correspond with the objectives described.

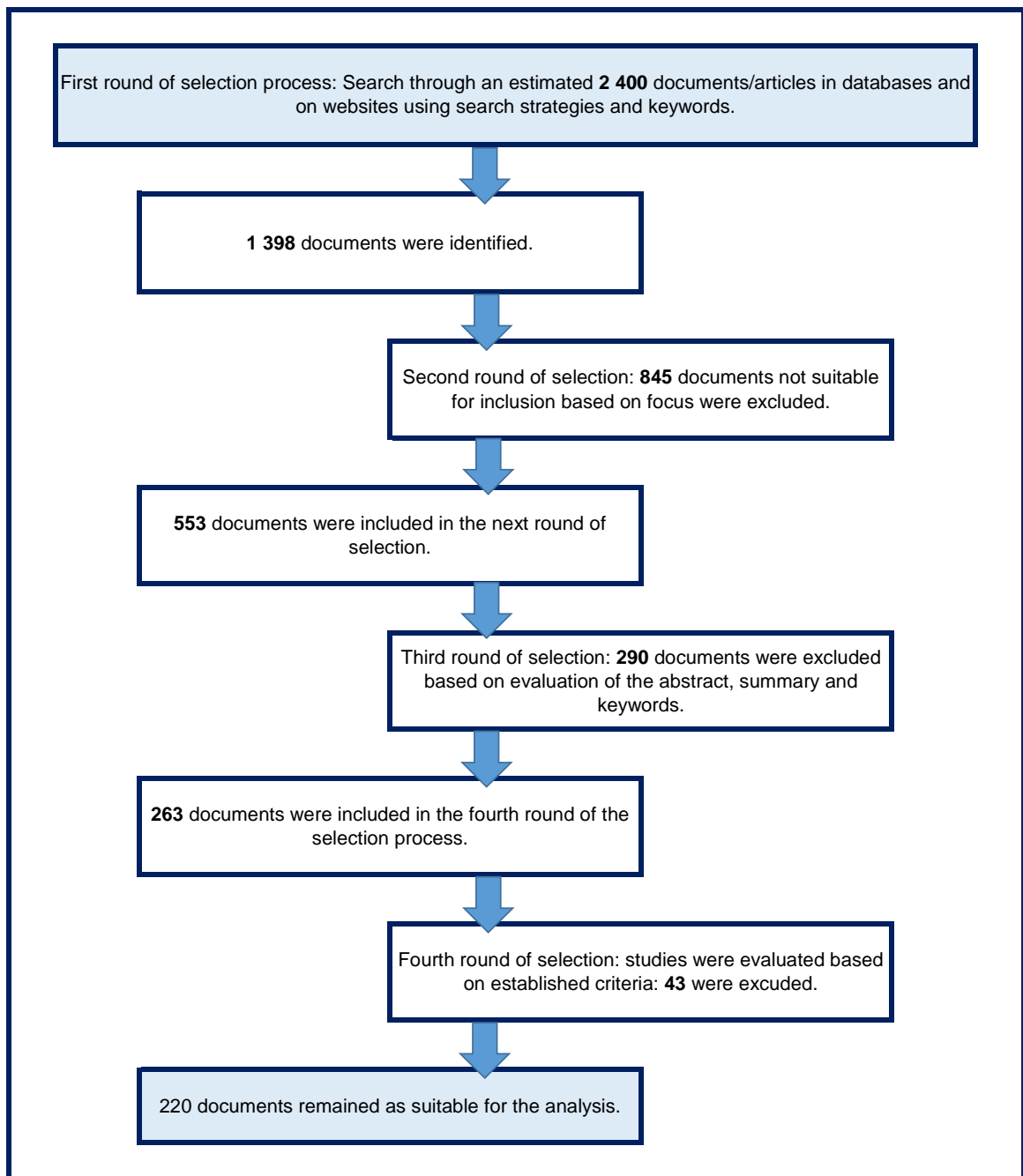
Based on the criteria listed above, the researcher evaluated each of the 1 398 documents for possible inclusion in the study. The documents were evaluated electronically, and were not downloaded, saved or printed. If a document seemed relevant, the researcher scanned the document for keywords indicating the focus of the content, and for obvious signs of the inclusion and exclusion criteria. During this phase, 845 documents were found not relevant and immediately discarded. The rest of the documents were downloaded onto the researcher's computer.

The next step involved a more intense evaluation of the remaining 553 documents during which the researcher read the abstract and/or summary and studied the key words listed by the author or publisher of the specific document. Documents were evaluated according to the inclusion/exclusion criteria, and 290 more documents were identified as not relevant and were discarded, which left the researcher with 263 documents to evaluate in the next round.

During this (fourth) round, the first page of each of the 263 documents were printed and filed alphabetically. This was done to enable the researcher to study and read the title, keywords, and abstract of each article and make notes of other relevant information based on an (electronic) evaluation of the full text of the document. (It was mainly during this phase that the researcher identified alternative search terms to look for more possible relevant documents – see process called “snowballing” described in Section 5.5.1). During this phase, the researcher also realised that the time frame should be adapted to only include studies published after 2008 and not 2006 as initially planned (see Section 5.5.1.1), the reason being that very few applicable studies published before 2008 were found, and the few found were considered outdated. During the final round of evaluation, 43 more documents were excluded.

A bibliographical list of the 220 remaining documents was recorded, listed alphabetically in a spreadsheet according to the Harvard Referencing Method (see Appendix 1). The list ensured that duplicate documents could be identified, that all document details were documented and identified immediately upon retrieval, and to ensure that an article or document could be easily located when needed.





**Figure 5.3:** Flowchart showing selection process.

Figure 5.3 illustrates the selection process as a flowchart indicating the steps through which documents were reduced from 1 398 to the selected 220 included in the systematic analysis as study sample.

Qualitative data analysis is systematic, ongoing and iterative, implying that data collection, processing, analysis and reporting are mostly done at the same time, using a variety of data analysis procedures (Maree 2007: 99; Owens 2012: 1).

## 5.5.2 Data analysis procedure

This study made use of the constant comparative method of analysing and extracting selected information using inductive category coding (Maykut & Morehouse 1994: 127; Hewitt-Taylor 2001: 39). Constant comparative analysis is a method of analysing qualitative data during which selected data are coded into emergent themes or codes. As Taylor and Bogdan (1984, in Owens 2012: 1) summarise: “In the constant comparative method the researcher simultaneously codes and analyses data in order to develop concepts: by continually comparing specific incidents in the data, the researcher refines these concepts, identifies their properties, explores their relationships to one another, and integrates them into a coherent explanatory model.” Analysing data starts with data extraction.

### 5.5.2.1 Data extraction

Data extraction refers to the process of locating and recording relevant data from selected primary research studies in order to summarise the findings of these studies into a single document (Joanna Briggs Institute 2011: 28). Data extraction needs to be objective, unbiased and reliable (Tharyan 1998: 141; Kitchenham 2004: 17), tailored to the review question and based on the quality criteria formulated during the review protocol (Sander & Kitcher 2006: 8; Wright, Brand, Dunn & Spindler 2007: 26). Data extraction depends on a thorough coding process.

### 5.5.2.2 Coding process

For this analysis, the researcher used NVivo Qualitative Data Analysing Software and the Dedoose Web application to aid in the process of data extraction. NVivo is a qualitative data analysis (QDA) computer software package designed with the purpose of analysing qualitative and mainly text-based data, while Dedoose is a web application for mixed methods research. NVivo allowed the researcher to classify and sort information into nodes and child-nodes in order to find relationships in the data.

Saldana (2009: 2) describes coding as the transitional process between data collection and data analysis. Saldana defines a code as “a word or short phrase that symbolically

assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data”. Coded data are constantly revisited, until it is clear that no new themes are emerging (Hewitt-Taylor 2001: 39).

Inductive category coding entails carefully reading through each selected document and dividing it into meaningful units, categories and themes, marking segments of the data with symbols, descriptive words or unique identifying names (Maykut & Morehouse 1994: 137; Marshall & Rossman: 1999; De Vos *et al* 2005: 338; Maree 2007: 105). Thomas (2006: 238) explains that the primary purpose of the inductive approach is to “allow research findings to emerge from the frequent, dominant, or significant themes inherent in raw data”. Categories are mostly created from phrases, text segments or key terms used in the documents (Thomas 2006: 241-242). A coding scheme might change several times during the extraction process as new understanding of data emerge (De Vos *et al* 2005: 338), and more nodes are created or some are either renamed or deleted. Coding and the relating of concepts are imperative to the discovery of patterns among data (Babbie 2007: 384) because it reduces information by clustering responses into categories from which conclusions may be drawn.

In this study, coding took place after the selected documents were prepared for analysis; meaning the researcher converted all documents to PDF format to create one format for all documents imported into NVivo. All 220 documents were then saved as one dataset on NVivo, with a uniform way of naming the document, namely the name of the author/authors and the publication date.

The researcher read each of the selected 220 documents a few times, made notes and looked for patterns and commonalities that reflect categories or themes (Johnson & Christensen 2007: 19/4). This, although it was a very time-consuming process, enabled the researcher to become familiar with all aspects of the selected studies and to recognise themes and topics, as well as repetitive elements and processes used by the researchers and authors (Maree 2007: 105). From this process, the first set of categories (or nodes) was created. The researcher started the coding process by creating four datasets: 1) general and demographic information, 2) features of included documents, 3) findings from selected studies, and 4) recommendations made in included documents.

a) Data set 1: General and demographic information

The first data set contains the general and demographic information of each study, including:

- the name of the author or authors;
- the title of the document;
- the year of publication;
- the name(s) of the institution(s) linked to the author or authors;
- the address of the institution(s) (city and country);
- the source of the study (journal articles, reports, conference proceedings, etc.); and
- publication details: the name of the publication, including volume and publication numbers and page numbers.

The information from this data set was used to sketch the general and demographic background of the study and to establish credibility for the study.

b) Data set 2: Features of included documents

The second data set contains specific features of each included document, including:

- keywords listed by the author/s or publisher;
- aims or objectives of each study;
- research methods and methodologies used;
- who and how many respondents/participants were involved; and
- the discipline or faculty involved in the study.

The list of keywords was created for coding purposes, but also to look for trends and popular practices. The aim of the category “Research methods and methodologies” was to investigate if any specific trends could be established. Focusing on the respondents/participants of each study was aimed at establishing if the results of the

findings are applicable to use in a higher education context, and to create a profile of respondents indirectly involved in this study.

The category “Aims or objectives” as a node included the description of the aims of each study by the author(s) of the document. In a second round of coding, child-nodes were created from trends, similarities, ideas, relationships, and commonalities appearing in the objectives of the studies. The selection was built on patterns and trends recognised from the purpose descriptions of analysed studies, and guided by the attributes listed in the conceptual framework for this study (Figure 4.3). Nodes in this category included:

- Attitudes – of educators, students, leaders/management and participants towards using social media in an educational context.
- Expectations – of students and educators regarding possible success after using social media.
- Impact – of using social media on learning, relationships, learners, staff, participants, grades, etc.
- Behaviour – of learners and educators after being exposed to social media in the educational context.
- Access – including ease of access to and ownership of technology.
- Skill/Experience – how skilled or experienced learners, staff or participants are in using technology and social media technology.
- Experiences – positive and negative experiences of learners and staff with using social media in educational context.
- Use – frequency of use of technology for evaluation, communication, interaction, engagement, learning, teaching, etc.
- Benefits – of the use of social media for staff and learners.
- Disadvantages – challenges experienced by staff and learners.

Figure 5.4 illustrates an example of the codes (nodes and child-nodes in NVivo) as analysed using Dedoose in the follow-up coding process.

<i>Social Media</i>	<i>Familiarity with or skills in social media</i>
<b>Experiences</b>	
<i>Learner/Student Experiences</i>	
Experiences with Technology	Student experiences with technology
Interaction	Student/s experience of interaction
Staff-Student interaction	Student/s experience of staff-student interaction
Student-student interaction	Students' experience of interaction amongst their peers
Internal/Psychological Experiences	Student/s psychological/internal experiences
Learning Experiences	Student learning experiences
Active Learning	Student active learning experiences
Experiential Learning	Student experiences of/with experiential learning
Social Experiences	Student social experiences
Sense of Community	Student/s experiencing a sense of community
<i>Staff/Teacher Experiences</i>	
<i>Unspecified/General Experiences</i>	
Group Cohesion	Group cohesion experienced generally or by unspecified group / individuals
Learning Experiences	General learning experiences of unspecified individual/s
<i>Participant Experiences</i>	
Participant satisfaction	Participant/s experiencing satisfaction
Satisfaction with Content	Participant/s experiencing satisfaction with content
Satisfaction with Format/Design	Participant/s experiencing satisfaction with format/design
Group Cohesion	Participant/s experiencing group cohesion
<b>Use</b>	
<i>Use - By Unspecified</i>	
Campus Social Interaction	Use by unspecified groups/individuals for campus social interaction
Collaboration	Use by unspecified groups/individuals for collaboration during campus social interaction
Communication	Use by unspecified groups/individuals for communication
Convey Information	Use by unspecified groups/individuals to convey information during communication

Source: Compiled by external analyst using Dedoose.

**Figure 5.4:** An example of the NVivo nodes coded using Dedoose.

As example, the category “Experiences” is illustrated in Figure 5.4. By using the Dedoose program, the NVivo nodes and child-nodes were coded into additional levels, e.g. learner/student experiences were divided into: 1) experiences with technology, 2) interaction, 3) internal/psychological experiences, 4) learning experiences, and 5) social experiences.

c) Data set 3: Findings of included documents

A third data set was created for the findings reported in each study. Even though the researcher extracted only findings of specific relevance to this study, the data set still contained an immense amount of information. By working carefully through the extracted data a few times, creating and re-creating nodes using NVivo, repetitive themes and categories were identified. The themes/categories identified were used to establish the following categories in this data set:

- Access to, or use of, computers, social media or technology – levels of access, levels of use by staff and/or students, use in education, use based on prior experience or knowledge, and ownership of technologies.
- Attitudes – of respondents, staff/educators and students with regard to using social media technologies in an educational context.
- Behaviour – of learners, educators and respondents after being exposed to social media in an educational context for some time.
- Benefits/Success/Advantages – general benefits of the use of social media tools and applications as reported by staff, educators and learners.
- Disadvantages – negative responses in regard to the use of social media in an educational context, as well as obstacles/challenges experienced by staff, educators and learners.
- Experiences – the responses of learners, staff, educators or participants with regard to the use of media or a medium studied for either teaching or learning.
- Impact – of the use of social media on education in general, teaching and learning, on staff, educators or on students.
- Needs – reported by respondents for technologies, training, extra time or experience by education, staff and of students in general.
- Skills – familiarity with, skills in, and prior experience in using technology measured among students or educators.
- Time – responses related to time and associated with the use of social media for communicating, teaching and learning.
- Willingness to accept technology in teaching or learning – with focus on the following technologies or categories of technologies: Web 2.0 technologies, Facebook, blogs, Twitter, wikis, and various other social media tools and applications. The list of social media tools varies from well-known to unknown technologies (coded under the category Web 2.0 technologies).
- Communication – including communication via Facebook, Twitter, SNSs, blogs, wikis and various other technologies, coded into the nodes: communication between educators and students, and between students and students.
- Collaboration – as a result of group activities using social media applications (including cooperative learning and coordination).

- Active learning – aspects related to active learning happening with or as a result of utilising social media.
- Participating – impact of social media on students’ participation or willingness to participate in learning activities.
- Student engagement – the role of social media in motivating students into engagement in learning or in participating in online groups.
- Motivation – the extent to which social media usage motivates students into active learning, engagement or participating in online groups.
- Interaction – divided into student-educator interaction, student-student interaction, and interaction and learning due to the use of social media technologies.
- Feedback – the advantages or disadvantages of providing or receiving feedback via social media in the context of teaching and learning.
- Diverse teaching – using a variety of teaching methods to accommodate students with different learning needs or from different backgrounds.

The first round of coding for this data set produced a vast amount of information, therefore Dedoose software was utilised to breakdown each code into sub-categories. Figure 5.5 illustrates how each category was coded into additional levels from which similarities, patterns or trends were identified.

<b>Impact in/on Education</b>	
<i>Shifts Power Relations</i>	<i>Impact in/on education i.t.o. shifting power relations amongst staff and students</i>
<i>Reinforces Assymetrical Power Relations</i>	<i>Impact in/on education of reinforcing assymetrical power relations between students and staff</i>
<i>New Technology Adopted</i>	<i>Impact on/in education i.t.o. new technology being adopted</i>
<i>Transformative</i>	<i>Impact in/on education that is transformative in relation to pedagogy and/or curriculum</i>
<i>Still Requires Good Course Design</i>	<i>Impact/effectives in/on education still requires good course design, not just reliance on the technology itself</i>
<i>Significant Impact</i>	<i>Significant impact in/on education</i>
<b>General Impact</b>	
<i>Significant Impact</i>	<i>Significant general impact</i>
<i>Media / Advertising</i>	<i>Significant general impact on media / advertising</i>
<i>Younger Generation Impacting on Older Generation</i>	<i>Significant general impact i.t.o. the educational expeirences / aspirations of younger generations in a network having a significant impact on the perceptions of older generations in that network</i>
<i>Changing Definitions: Private vs Public</i>	<i>General impact i.t.o. changing definitions of concepts like private information versus publicl information</i>
<b>Experiences</b>	
<b>Student Experiences</b>	
<i>Social Networking/IT: way of life</i>	<i>Students experiencing social networking and use of information technologies as a way of life</i>
<i>Learning Community</i>	<i>Student experiences of being part of a learning community</i>
<i>Preferred Technology</i>	<i>Experience of students i.t.o. preferring the technology in question over others</i>
<i>Increased Confidence in Communication</i>	<i>Student experience of having increased confidence in communication via this technology</i>
<i>Positive Experience / Enjoyment</i>	<i>Student enjoyment / positive experience of</i>
<i>Easy to Use</i>	<i>Student positive experience of a technology being easy to use</i>
<i>Sharing Information</i>	<i>Positive Experience/enjoyment on the part of students because of being able to share information</i>
<i>Aids Connection / Interaction</i>	<i>A positive student experience i.t.o. connection / interaction being enhanced</i>
<i>Increased Motivation</i>	<i>Positive student experience/enjoyment in the form of increased motivation</i>
<i>Broadening of Experiences</i>	<i>Students having a positive experience/enjoyment i.t.o. their range of experiences being broadened i.e. exposure to new things</i>

Source: Compiled by external analyst using Dedoose.

**Figure 5.5:** An example of the coding of findings using Dedoose.



According to Thomas (2006: 242), only about 50% of the text of a document may initially be coded, as much of the text may not be relevant to the purpose of the study. On the other hand, some of the information may be coded in two or more categories or nodes. In this study, where necessary information was coded under more than one node, for example, aspects related to motivation, engagement or active learning overlapped in most cases and were coded in all three categories. The same happened where specific social media tools were studied, e.g. information regarding the use of blogs, wikis and Facebook in the context of motivation, was coded under each of the tools with the focus on motivation.

The category “Access to, or use of, computers, social media or technology” is an amalgamation of two categories: 1) access to computers and technology, and 2) the use of computers and technology, because the findings were found to overlap to a great extent. The category “Skills” was originally coded under the categories “Familiarity with computers, social media and technology”, “Skills/Skilled in use of social media and technology”, and “Prior experience in using technology”. These three categories were also found to overlap and were amalgamated.

The 20 categories were revisited and revised, and guided by the attributes listed in the conceptual framework of this study (Figure 4.3), the nodes were condensed into 14 categories of relevance to this study: familiarity/skills/experience, access/use, willingness to accept technology, Web 2.0 technologies, time, communication, collaboration, active learning, participating, student engagement, motivation, interaction, feedback, and diverse teaching. Advantages and disadvantages, previously listed as separate nodes, were incorporated into categories where applicable.

d) Data set 4: Recommendations made in included documents

The fourth and last data set created with NVivo focused on the recommendations made by the author/s of the selected studies. The conclusions of all the studies were scrutinised for noteworthy recommendations about possible further research. After re-reading and re-coding information under this node, the following themes/categories were identified:

- Teaching and facilitation strategies;
- Pedagogy 2.0/Teaching with Web 2.0;
- Learning styles;
- Impact of social media on grades;
- Assessment through technologies;
- Staff capacities;
- Collaborative learning environments;
- Distance learning environments;
- Various social media tools: including SNS, blogging, Facebook, mobile learning, wikis, and YouTube; and
- New technologies that may emerge in the future.

Categories under data set 4 were based on recurring themes from the recommendations made by the author(s) of the included documents/studies.

The coding for this study was also supported by enumeration: the process of quantifying data (Johnson & Christensen 2007: 19/4). The researcher used NVivo's "word frequency" function to count the number of times certain words appear in the documents. For example: the most frequently used word was "learning" (used 14 127 times), and Facebook was the social medium most referred to (9 983 times). Using these statistics, the researcher investigated the relationship between concepts, e.g. how many times the word "interaction" was used in relation to each of the social media tools studied in order to establish the medium most suited for interaction among students.

The aim of analysing the extracted data is to combine the results of all selected studies to find corresponding topics and to explore how they relate to one another (Burns 2000: 430; Maree 2007: 111). The analysis process of this study used sub-group analysis, meaning that data are analysed to look for patterns in the data in order to make comparisons between them (Pai *et al* 2004: 91; Briner & Denyer 2012: 353; Tharyan 1998: 138), while also investigating the data for heterogeneity and homogeneity (Centre for Reviews and Dissemination (CRD) 2008: 275; Tharyan 1998: 143). Heterogeneity refers to the variability, inconsistency or incompatibility in results across studies (Joanna Briggs Institute 2011: 140; Pai *et al* 2004: 91). Homogeneity refers to "how *similar* or *consistent* studies are: how mathematically compatible with the results of the other

studies” (Greenhalgh 1997: 673). The results of the data analysis are presented in Chapter 6, and the interpretation thereof in Chapter 7. In the next section the steps taken to ensure quality in the study, are explained.

### **5.5.3 Quality assurance**

Golafshani (2003: 601) states that “the most important test of any qualitative study is its quality”. Lincoln and Guba (1985: 290) ask in this regard: “How can an inquirer persuade his or her audiences that the research findings of an inquiry are worth paying attention to?”.

Quality assurance in qualitative research relies on validity and reliability. Both reliability and validity concern trustworthiness and “help readers determine how much confidence can be placed in the outcomes of the study and whether they can believe the researcher’s conclusions” (Wimmer & Dominick 2006: 120). The interdependence of validity (rigour) and reliability (trustworthiness) are illustrated by Lincoln and Guba (1985: 316) when they remark that “there can be no validity without reliability, a demonstration of the former [validity] is sufficient to establish the latter [reliability]”.

The meaning of these concepts and the steps taken to ensure trustworthiness in the study, are discussed below.

#### **5.5.3.1 Trustworthiness**

Qualitative research requires the use of various strategies to increase trustworthiness, and the examination of trustworthiness is crucial (Golafshani 2003: 601). Trustworthiness, according to Guba (1981: 75), answers the question: “How can the researcher persuade others that findings are worth paying attention to?”. Guba argues that the trustworthiness of qualitative inquiry can be established by addressing internal and external validity (called credibility and transferability), reliability (dependability), and objectivity (confirmability).

### 5.5.3.2 Validity

Validity (rigor) is an important requirement for effective research; invalid research is worthless (Cohen, Manion & Morrison 2003: 105). Validity refers to the quality of the measurement process: are the results of the study based on what the researcher is trying to measure? (Gravetter & Forzano 2009: 76; Burns 2000: 390; McMillan & Schumacher 2001: 407). In qualitative research, validity is influenced by data collection and by the techniques used in analysing data (McMillan & Schumacher 2001: 407). Cohen, Manion and Morrison (2003: 105) emphasise that data validity also depends on “honesty, depth, richness and scope of the data achieved”, and on the objectivity of the researcher. Validity refers to the credibility and the transferability of research results.

#### a) Internal validity (credibility)

Internal validity deals with the extent to which the research design can account for all the factors that may affect the outcome of the research (Cohen, Manion & Morrison 2003: 107; Barroso *et al* 2003: 90). In other words, can the conclusion drawn by the researcher be sustained by the analysed data, or are there any factors that may have influenced the outcomes of the research? Internal validity is reflected by the credibility of a study: the researcher’s ability to convince the reader of the “truth” of the findings (Babbie & Mouton 2002: 122; Patton 2002: 546; Guba 1981: 84). The credibility of this study lies in following a thorough research process based on a pre-defined research protocol (described previously in this chapter).

An important aspect of the validity of a systematic review relies on access to an extensive range of electronic databases in order to retrieve as many relevant primary studies as possible (Tharyan 1998: 138; Joanna Briggs Institute 2011: 26). This study is built on an unbiased, comprehensive search of a wide range of databases and websites using predefined keywords and search terms. The researcher, even though skilled in using various databases, asked assistance from information officers at the SASOL library of the UFS to retrieve as many studies as possible. The documentation of search strategies is a key element of the validity of a systematic review (Joanna Briggs Institute 2011: 36), therefore all steps taken and decisions made regarding the data selection are carefully documented. These include the databases searched, terminology utilised and

decisions to retrieve or discard an article/document. Other researchers, searching for information with the same keywords, even if searching other databases, are sure to retrieve most of the documents used in this review.

Patton (2002: 566) points out that it is important that researchers should “report any personal and professional information that may have affected data collection, analysis or interpretation”. The researcher of this study has been an educator at the UFS for the last 13 years, teaching Social Media and Communication (see Section 1.8.5). The researcher therefore has knowledge of social media, educational and communication theory, and is skilled in using CMC and social media technologies. The prior knowledge of the researcher did, however, not in any way influence the outcomes of the study, as the researcher had no prior knowledge of any of the selected studies, and has no preference or personal gain regarding the outcomes of the study.

b) External validity (Transferability)

External validity reflects transferability in the qualitative framework (Lincoln & Guba 1985: 86; Guba 1981: 86; Patton 2002: 546), and refers to the degree to which generalisations can be made from the data and context of research on the wider population or other settings (Wimmer & Dominick 2006: 32; McMillan & Schumacher 2006: 261).

A qualitative study in general aims at the understanding of a specific phenomenon in a specific context with specific respondents/users, rather than at the generalisation of results (Cohen, Manion & Morrison 2003: 109; Patton 2002: 546). Guba (1981: 86) advises, however, that a researcher should indicate if findings may have applicability in other contexts or settings.

The meaning of the discussion on external validity or transferability is that although the findings of this study apply to a specific context, there is a possibility that these findings may be applicable to similar contexts or settings. In this study the context is teaching and learning using social media in a higher education environment (as indicated in Section 1.6). The findings of the study is thus regarded as relevant (generalisable) to a specific context and are not meant to be generalised to other contexts or situations. For

example, the study defines types of CMC technology or types of social media according to the context of this research, and focuses on the use of social media for teaching and learning in higher education. Furthermore, stratified purposive sampling techniques were used to purposefully select documents/articles relevant to the objective of this specific study (see Section 5.5.2.1). However, according to Babbie and Mouton (2002: 274), the generalisability of findings often depends on the reader, which implies that many aspects of the findings may also be applicable to other contexts.

#### 5.5.3.3 Reliability (Dependability)

Reliability is defined as the precision and accuracy of a measurement procedure and the stability of the data (Babbie & Mouton 2002: 119; Guba 1985: 86), in other words, a study is considered reliable if it can be repeated with the same/similar participants in a similar context, and similar findings are obtained (Lincoln & Guba 1985: 86).

Patton (2002: 546) states that reliability is used in quantitative research, and dependability is used in qualitative research. De Vos *et al* (2005: 346) indicate that dependability and reliability refer to two separate but related aspects utilised by the researcher “to account for changing conditions in the phenomenon chosen for study as well as changes in the design created by increasingly refined understanding of the setting”.

In order to increase the reliability of this study, each step followed was described in sufficient detail to enable another researcher to repeat the research and, if using the same procedures and criteria, to obtain similar results. This “audit trail” (Lincoln & Guba (1985: 316) will also allow the reader to assess the extent to which proper research practices were followed in order to establish the credibility (internal validity) of the research.

#### 5.5.3.4 Objectivity (Confirmability)

Measures to ensure objectivity in qualitative research are very important and is regarded as part of the trustworthiness of a study (Babbie & Mouton 2001: 276). McMillan and Schumacher (2006: 9) indicate that objectivity refers to the objectivity of the data that

has been collected and the analysis procedures followed. De Vos *et al* (2005: 347) indicate that the objectivity of data refers to the question of whether the “findings of the study could be confirmed by another”. Guba (1985: 87) describes confirmability as the degree of neutrality or the extent to which the findings of a study are not shaped by bias, or the motivation, interests, or preferences of the researcher.

As indicated in Section 1.3, the researcher of this study chose to conduct a systematic analysis of research documents/studies/reports to make sense of the unmanageable amounts of information about the use of CMC technologies and social media for teaching and learning. As stated before, the researcher had no prior knowledge of any of the selected studies, and has no preferences regarding the outcomes of the study.

To establish objectivity, inclusion and exclusion criteria described in the research protocol were strictly followed to ensure that only relevant documents were retrieved. Where aspects were later identified which should also form part of the inclusion/exclusion criteria, e.g. the exclusion of research done before 2008, the decision was defended (see Section 5.5.1.3b).

The quality of documents included in a systematic analysis can influence the results of the systematic review. Therefore, the researcher evaluated each document according to the criteria described to establish the quality of the retrieved documents (see Section 5.5.1.3b). Studies found to contain signs of unacceptable quality, or signs of bias of any kind, were excluded. There may, however, be inaccuracies in included studies unknown to the researcher. Also, it is possible that the researcher did not recognise bias in included studies, although all possible steps were taken to ensure confirmability.

The researcher acknowledges that there are limitations to the search strategy followed. Although the researcher attempted to ensure a valid search for information, there were aspects over which the researcher had no control. For example, most electronic database systems are compiled by people who can make mistakes, e.g. spelling or typing errors, when entering information into a database. Also, keywords and terms used are not infallible: studies may have been overlooked because the search terms used do not appear in the title or in the list of keywords of the journal articles (Petticrew & Roberts 2006: 101), or may not be listed in the thesaurus of the database. The vastness

of the information available in databases and websites also made it impossible to find all the documents on a topic, even with the help of professional information officers.

Quality assurance of qualitative design also involves issues of ethics and feasibility (McMillan & Schumacher 2001: 407).

#### **5.5.4 Ethical considerations**

A systematic analysis of published research does not work directly with people, but that does not mean that there are no ethical aspects involved. The Economic and Social Research Council (1999) warns that certain ethical questions must be adhered to when carrying out a systematic review:

- The researcher must ensure that the work of existing researchers are treated fairly and that reporting of research findings are done accurately. The researcher of this study used the statistics and findings exactly as reported in selected studies;
- The researcher must ensure that there are no ethical questions linked to the studies included in the review – working with students, institutions and educators may raise ethical problems if research is not reported accurately. Weingarten (2004: 1013) strongly advises that ethics be included in the checklist of systematic reviews in order to increase awareness about the need for high ethical standards. The researcher states in Section 5.5.1.3 that the quality of the retrieved studies were evaluated before being selected for the study. Studies found to report inaccurate data were excluded; and
- A systematic review should be undertaken in such a way that integrity and quality is ensured. The steps in the research process were described in an honest and open manner to ensure the integrity of this study.

Wimmer and Dominick (2006: 82) warn against research conducted online because of the wide variety of settings not addressed in existing ethical guidelines. The researcher is, however, convinced that all possible measures were taken to ensure that the study complies with high ethical standards (McMillan & Schumacher 2001: 144). To prevent misinterpretation of the results, an external data analyst was contracted to assist in the



analysis of the data, and steps were taken to ensure that the study is free of any form of plagiarism or copyright infringement.

## **5.6 Summary**

In this chapter an overview was given of the research design and methodology employed in this study in addressing the research question:

*What are the most effective ways, as suggested by current research on CMC and social media undertaken globally, in which educational applications of social media can enhance the theory and practice of South African higher education?*

The research design was discussed according to the research strategies, philosophical worldview and research methodology applied. By means of the discussion, the researcher also dealt with the methods used in the systematic review. The provision of detail is a requirement of a systematic review and adds to the validity and reliability of such a study, therefore a detailed discussion was provided on the steps followed to search and find literature and the criteria used to select relevant literature. The data analysis procedure was described by elaborating on the data extraction process and the way coding was done. The discussion also included references to the steps taken to ensure the trustworthiness of the study. The chapter concluded with a look at the possible limitations of the systematic review and ethical considerations related to the study.

The results of the analysis are presented in Chapter 6. This is followed, in Chapter 7, by a discussion and interpretation of the findings in the context of the study as a whole.

## CHAPTER 6

### KEY FINDINGS AND PERSPECTIVES GAINED IN THE SYSTEMATIC ANALYSIS

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In chapter 5, the research design and the methodological approach of this study is discussed, including an explanation of the data collection methods and the procedures followed in the extraction of the data. Chapter 6 presents the results of the systematic analysis of the 220 selected documents or articles. The analysis was qualitative in nature and was based on coding done using NVivo Qualitative Data Analysing Software and the Dedoose web application. The coding process led to identifying the key themes and related findings which are discussed in this chapter.

#### 6.1 INTRODUCTION

The main purpose of this study was to collect and evaluate research reports about the use of computer-mediated communication (CMC) technologies and social media tools in higher education. A comprehensive systematic analysis was conducted on the selected studies in order to partially answer fourth subsidiary research question of this study, namely:

*What are the most prominent perspectives on effective teaching and learning that can serve as basis for the compilation of directives to apply social media as CMC in South African higher education?*

Chapter 6 presents key findings and important perspectives gained from the systematic analysis of the data retrieved from the 220 documents (the study sample) included in the review as a decisive step in the process to establish the most effective ways in which educational applications of social media can enhance the theory and practice of South African higher education. The analysis was guided by the conceptual framework of the study presented in Figure 4.3, and more specifically, by the attributes of effective teaching and learning indicated in the framework. These attributes also played a determining role in the planning of this chapter, as illustrated in the outline presented in Figure 6.1.

<p><b>CHAPTER 6:</b></p> <p><b>KEY FINDINGS AND PERSPECTIVES GAINED FROM THE SYSTEMATIC REVIEW ON THE MOST EFFECTIVE USE OF SOCIAL MEDIA IN EDUCATIONAL CONTEXT</b></p>
<p><b>To sketch the context of the findings via</b></p>
<p>the demographic and background information of the studies in the sample,</p>
<p><b>and to present the findings, including</b></p>
<p>the factors impacting on the effective use of social media,</p>
<p>the aspects focusing on the student and effective learning using social media,</p>
<p>the aspects focusing on the educator and effective teaching using social media, and</p>
<p>the most effective social media tools to use in an educational context</p>
<p><b>as</b></p>
<p>Key perspectives from the systematic analysis of importance to the study.</p>

**Figure 6.1:** Outline and goal of Chapter 6.

As a result of the enormous amount of data produced in the systematic analysis, only key findings relevant to the effective use of social media in the educational context were selected for presentation in this chapter. The chapter commences with a presentation of important background information related to the demographics and publication details of the studies in the sample, as well as background information related to the features of the research undertaken in each study. This information helped to establish the broad context of the study. The rest of the findings, those related to the educational use of social media, are presented under four headings, namely: (1) factors impacting on the effective use of social media (including aspects like access to technology, users' familiarity with, and skills in using social media, attitudes towards technology use, and the impact of time and communication); (2) the student and effective learning with social media (including active learning, collaboration, participation, student engagement and interaction); (3) the educator and effective use of social media in teaching (including

feedback, motivation, and diverse teaching methods); and (4) choosing the most effective social media tools in the educational context.

## **6.2 BACKGROUND INFORMATION OF INCLUDED STUDIES**

This section provides the reader with general information about specific features of the included studies, namely bibliographical details of the publications, the geographical distribution of institutions represented in the sample, the types of documents in the study sample, the respondents, faculties and disciplines represented in the studies, and the methods, methodologies and keywords/terms used by the author(s) of the included documents.

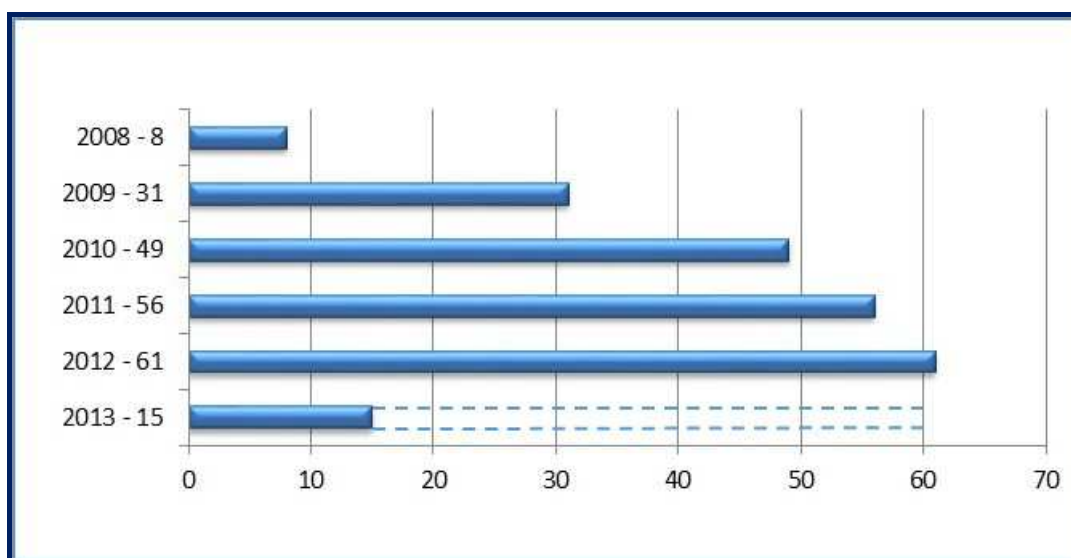
### **6.2.1 General and demographic information**

General and demographic details retrieved from the 220 studies included in the review (see Data set 1, Section 5.5.2.2a), portray an image of this study as a whole in regard to the authority of the publications (journals, publishers, etc.), and of the institutions linked to the included studies, and provide an indication of the worldwide demographic distribution of the origins of the documents in the study sample.

A list was compiled of all relevant bibliographic information: the name(s) of author(s), year of publication, title of the document, and bibliographic publication details. The purpose of this list (attached as Appendix A), is to provide proof of the trustworthiness of the study, to ensure that no duplicate documents were included in the study, and to provide a detailed reference list to the reader.

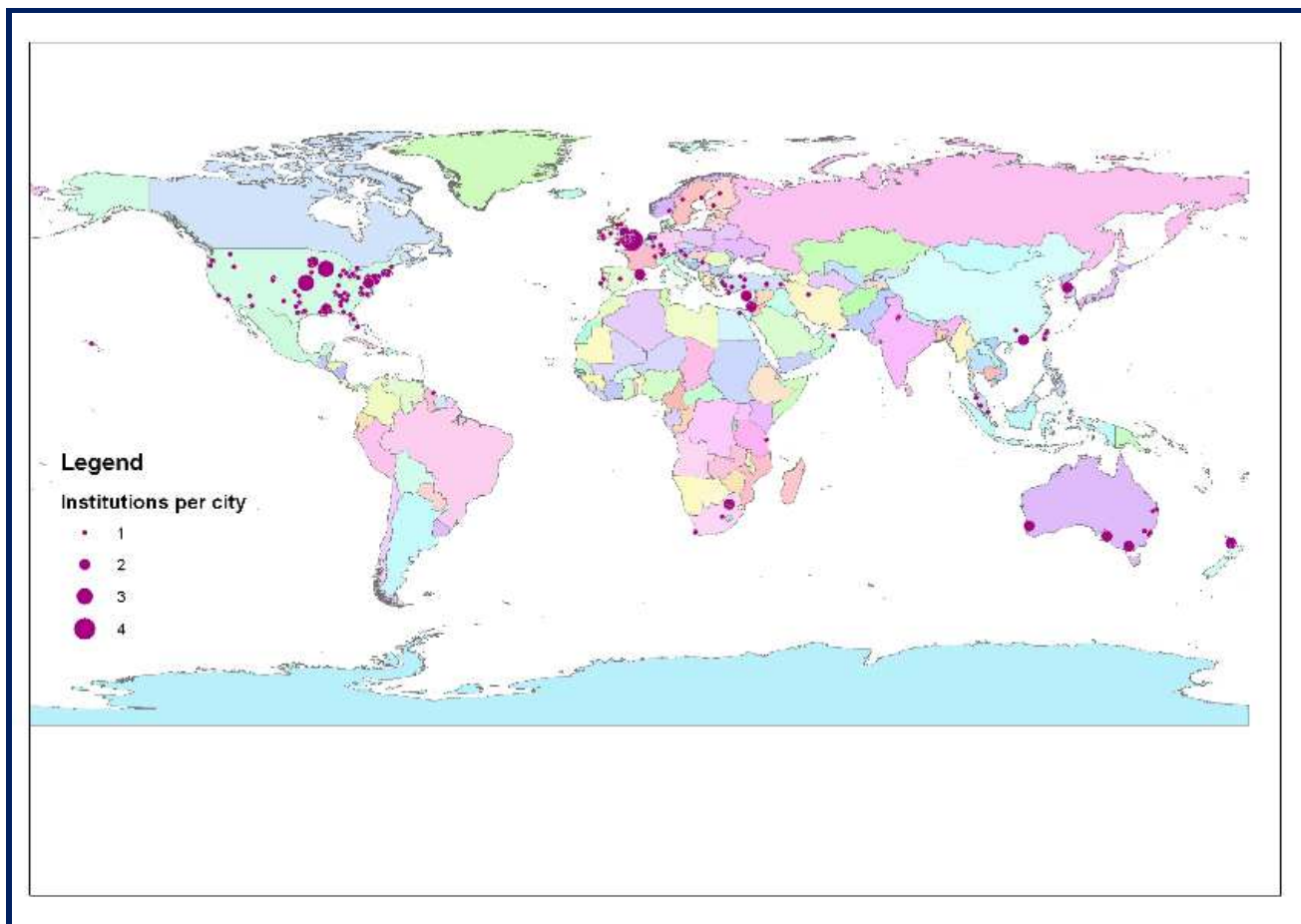
From the category “Year of publication” from Data set 1, a graph was created indicating the year of publication of each of the 220 studies in the study sample. Since 2008 social media was accepted worldwide and concurrently research in the use of social media related to the higher education context sharply increased, resulting in an increase in publications since 2009. The timeframe for this study was set to only include documents published since January 2008 and before March 2013, therefore only 15 studies were selected from the first term of 2013 for inclusion in this analysis. One can but speculate if the number of publications increased, stayed the same or decreased during 2013. The

increase in research relating to the use of social media since 2008 is clearly reflected in Figure 6.2.



**Figure 6.2:** Distribution of documents in sample per year of publication (N=220).

From the next two categories in Data set 1: “Name of institution(s)” and “Address of institution(s)” the researcher compiled a list in order to indicate the worldwide distribution of the included studies. In this list the location/address of the first author was listed as Location 1, the location/address of the second author as Location 2, etc. From the list, 220 first locations, 56 second, 13 third, and three fourth locations were identified: meaning that the study sample represents 292 geographical locations worldwide. Of these, 77 appear more than once on the list. Of the 292 locations, 215 are the locations of universities, while the rest (77) are either locations of companies or government agencies. Most of the studies in the review (140) were conducted by authors located in the USA, 42 in the UK, while the rest were located in (in alphabetical order): Africa, Australia, Austria, China, Cyprus, Finland, Guyana, India, Iran, Ireland, Israel, Korea, Malaysia, Netherlands, New Zealand, Norway, Oman, Portugal, Scotland, Serbia, South Africa, Spain, Sweden, Taiwan, Tanzania, Texas, and Turkey. A world map compiled from the geographical list (Figure 6.3), illustrates this distribution.

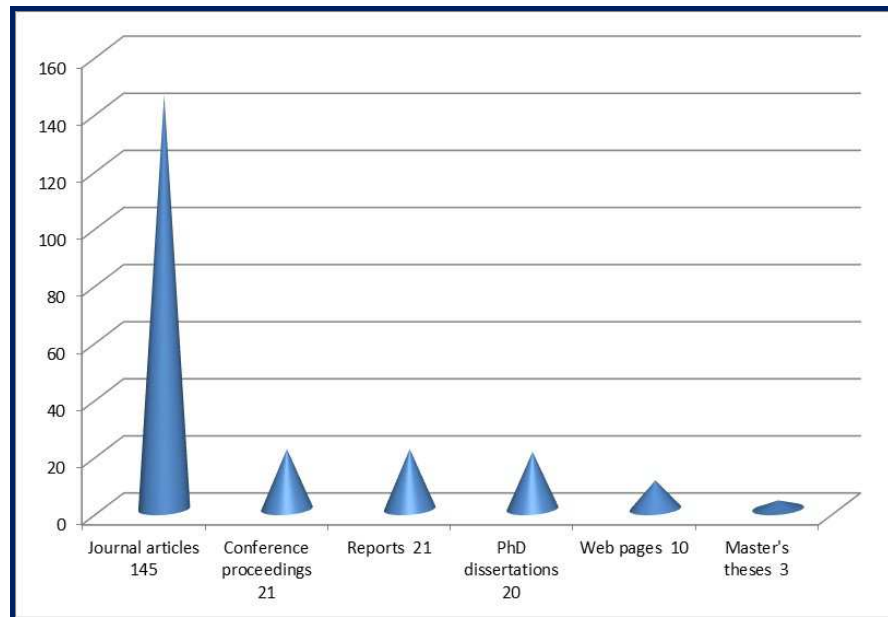


Source: Compiled by dr. C. Baker, UFS, from data supplied by the researcher.

**Figure 6.3:** Geographical distribution of institutions represented in the sample.

The worldwide distribution of the studies must be interpreted according to the inclusion and exclusion criteria used in the selection of the sample (see Section 5.5.1.3). The fact that only documents published in English were considered, undoubtedly contributed to the lack of relevant publications from many areas in the world. Furthermore, the locations indicated are mostly situated in developed parts of the world, the lack of infrastructure and availability of Internet and other technology in less developed parts of the world could be assumed as another contributing factor to the lack of relevant publications from those countries.

The sixth category in Data set 1: "Source of study", listed 145 journal articles (59.91% of the total of 220 studies in the sample), 21 reports (9.55%), 21 conference proceedings (9.55%), 20 PhD dissertations (9.09%), three Master's theses (1.36%), and 10 articles published on websites (4.54%). Figure 6.4 illustrates the representation of publications included in the review.



**Figure 6.4:** Types of documents included in the study sample.

Journal articles represent publications in accredited journals, retrieved via electronic or online databases. The grey literature (e.g. conference proceedings, reports, PhD dissertations, Master's theses), included in the review (representing 40.9% of the study sample), are research-based and were selected according to the criteria spelled out in Section 5.5.1.1.

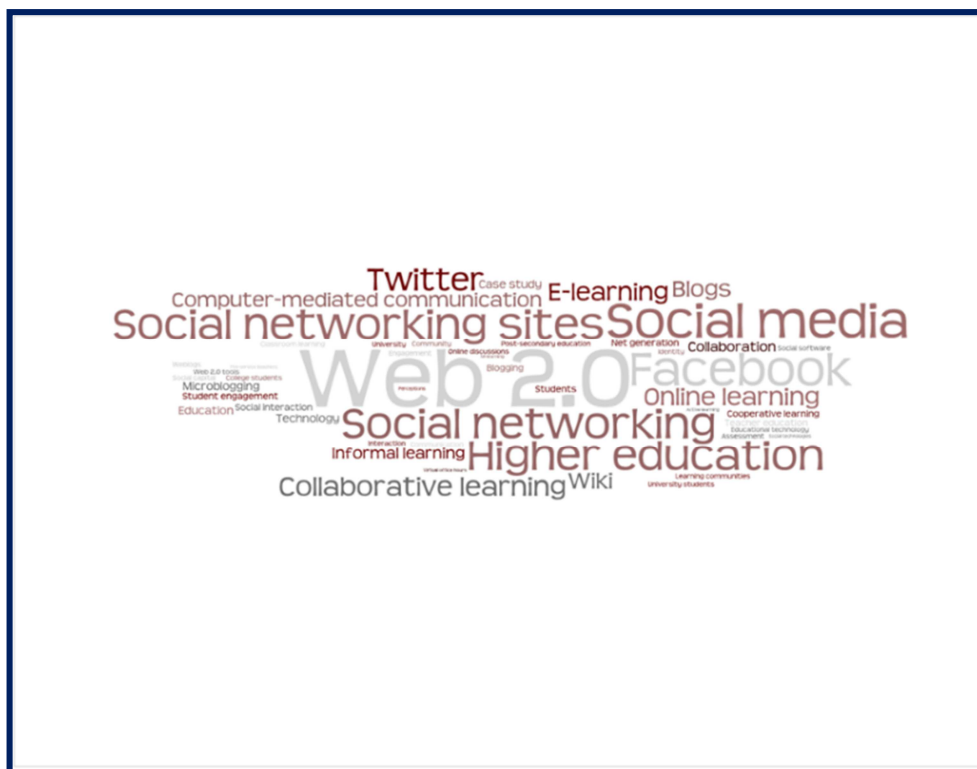
The next set of data, Data set 2, contains background information related to the features of the research undertaken in each of the studies in the sample.

### 6.2.2 Features of the research undertaken in the study sample

Data set 2 (Section 5.5.3.2b) includes the following information retrieved from the sample of documents reviewed: keywords as listed by authors or publishers, research method(s) or methodologies used, information about the respondents of each included study, and the faculties or disciplines involved in the research.

The list of **keywords/terms** were evaluated for coding purposes, to obtain an indication of the words most frequently used by the authors and to establish if any trends regarding popularity/use existed. The “Word frequency” feature of NVivo was used to list the keywords according to the words/terms most frequently used (see the Wordcloud,

Figure 6.5). In a Wordcloud, the size of the fonts indicates the frequency of occurrence: the larger the font, the more times the specific word/term was used. For example, the term “Web 2.0”, the ‘largest’ term in the Wordcloud, was listed more than any other keyword or term, while the words/terms “social networking”, “Facebook”, “higher education”, and “social media” were also regularly listed. Figure 6.5 visually displays the focus of the studies as represented by keywords/terms in the sample in its totality.

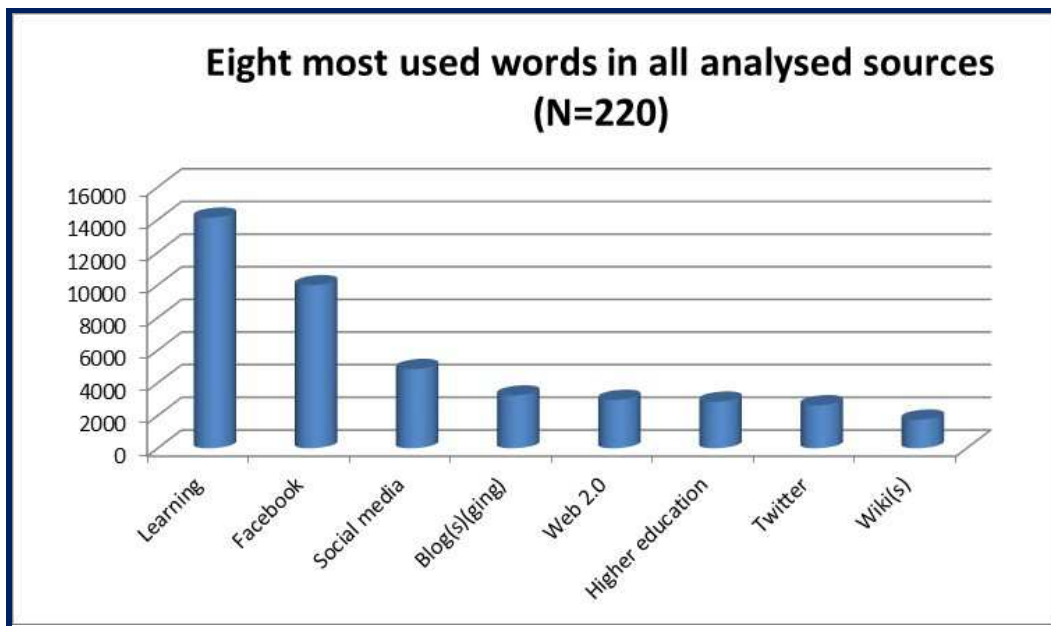


Source: Compiled by researcher using the social media program Wordle.

**Figure 6.5:** Wordcloud of **keywords and key terms** used in the sample.

The enumeration feature of NVivo was used to also establish the **word frequency in general** of the 220 documents, excluding words with less than 4 letters. Figure 6.6 illustrates the occurrence of the eight most used (and applicable) words in all the included studies. This list provides an indication of the overall focus of the documents in the review, but also indicates the popularity of certain social media tools.





**Figure 6.6:** Words most used in analysed documents.

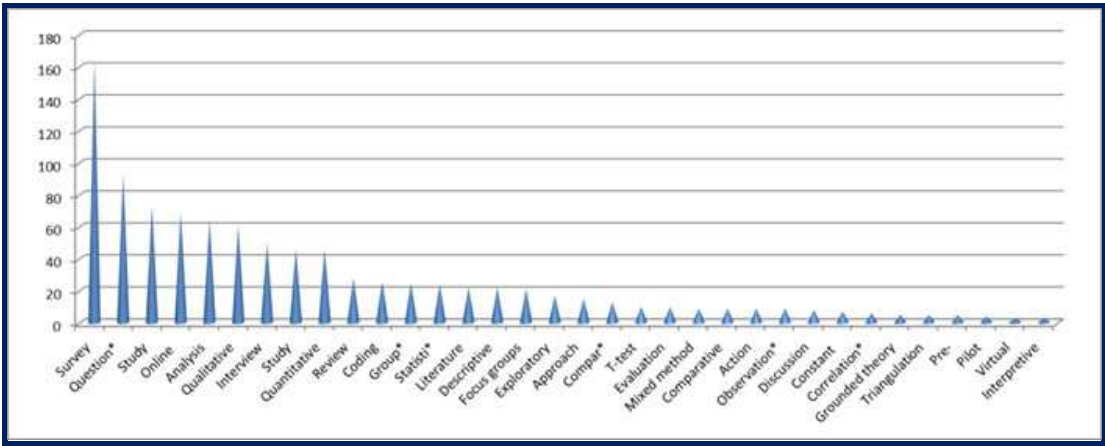
By comparing the **keywords** used by the authors/publishers of the selected studies against the **words most frequently used** in the studies (see Table 6.1), it was found that “learning” is the word most used in general and used most times as keyword, followed by the word “Facebook”, and the term “social media”. The term “Web 2.0” is the second most used keyword, while the term “higher education” and the word “Facebook” were used less as keywords than the word “blog”.

**Table 6.1:** Words most used in general and used as keyword(s).

Most used word/term	Times used in general	Times used as keyword
Learning	14127	109
Facebook	9983	21
Social media	4850	24
Blog(s)(ging)	3227	26
Web 2.0	2956	43
Higher education	2852	21
Twitter	2629	14
Wiki(s)	1746	10

Figure 6.6 and Table 6.1 serve to confirm that the documents/studies selected for the review focused on the use of social media for learning in higher education, and also indicate the most popular and researched social media applications.

By analysing the category **Research methods and methodologies used** from Data set 2, it was found that most studies were only described as surveys, or that the only indication of the research design was the method used to collect data. No specific trend could be established. By using the “Word frequency” feature of NVivo, the researcher compiled a list of the methods/methodologies mentioned, and from this, created a graph (Figure 6.7) indicating how many times a specific method or methodology was mentioned in the studies in total. Figure 6.7, however, only shows the more significant part of the relevant data: many more methods, methodologies or research designs appeared on the list, used once only, and is not included here.



**Figure 6.7:** Methods and methodologies used.

The graph illustrates the huge variety when it comes to the description of the research designs/methodologies/methods used in the documents reviewed. The large variety in description and inherent overlapping among many of the methods/methodologies clearly show why it is not possible to identify trends or make significant deductions about the frequency of use of the methods and methodologies mentioned.

The fourth category in Data set 2 focused on the **participants/respondents** in each selected study. Two child-nodes were created in NVivo: the first listed who the participants/respondents were, and the second how many participants/respondents were involved in each study.

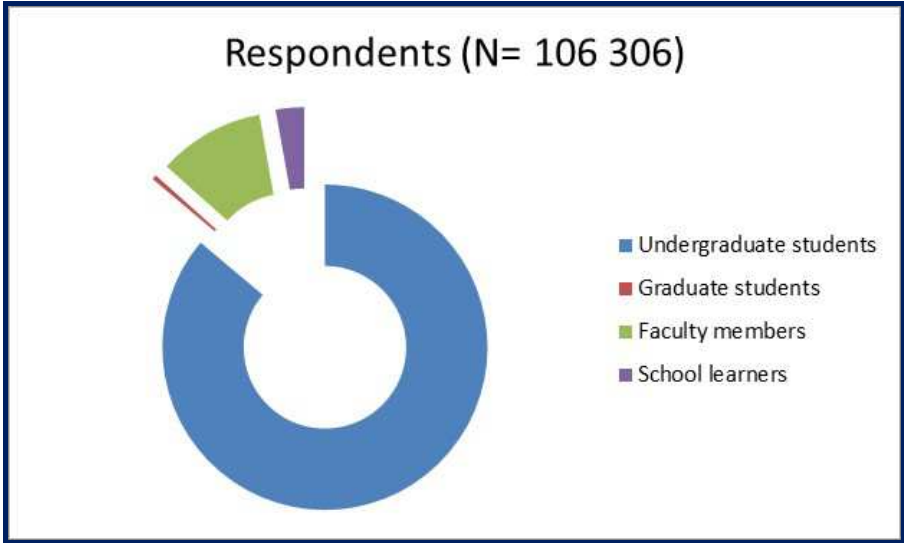
Not all the studies gave an indication of either who the participants/respondents were or how many were involved. In some studies, ambiguous descriptions were found, (e.g. “10

groups of students” or “a group of academic bloggers”), with no indication of how many respondents were involved, or of who the “bloggers” were. The researcher therefore used only the information clearly stating how many participants/respondents were involved/noted in the categories: undergraduate students/learners, graduate students/learners, faculty members (including educators, tutors, teachers, professors), and high school learners in order to obtain an indication of who most of the participants/respondents were (see Table 6.2).

**Table 6.2:** Respondents in the selected studies.

Undergraduate students	Graduate students	Faculty members	School learners	Total
91557	500	11252	2995	106 304
86.13%	0.47%	10.58%	2.82%	100%

As illustrated by Table 6.2, were most of the respondents in the study sample undergraduate students. Of a total of 106 304 participants/respondents listed, 91 557 (86.13%) were found to be undergraduate students, while 11 252 were faculty members. Only 4.7% represented postgraduate students, while 2.82% were school learners. As stated in Section 5.5.1.2a, research done in schools was only included if the research could directly be applied to higher education. Figure 6.8 illustrates the distribution of respondents in the selected studies.



**Figure 6.8:** Distribution of respondents in the selected studies (illustrated).

The last category in the second data set focused on the **discipline or faculty** involved in the selected studies. Although most studies indicated in one or other way a discipline, it was not always possible to establish if the discipline involved was related to the respondents or to the author(s). It was also not possible to distinguish between a faculty (which can include a range of disciplines), and an academic department. The researcher therefore compiled an alphabetical list of the 161 faculties/departments mentioned in the studies, and grouped them according to disciplines/subjects. The alphabetical list was compiled to assist the researcher in the search for trends or other significant information related to the analysis.

For example: the disciplines or subjects which were grouped as “information-related subjects”, included: information systems, technology, computer science, information management, information technology, management information systems, computing, instructional technology, business information systems, digital communication, hypermedia, industrial technology, information and communication technologies, instructional design, instructional message design, Internet commerce and consumers course, telecommunication, web management, computers in education, educational technology, science computer, and others. A list of the groups compiled from the data is presented in Table 6.3.

**Table 6.3:** Faculties and disciplines involved in selected studies.

<b>Groups of subjects, disciplines or faculties</b>	<b>Subjects / disciplines / faculties included in the group</b>	
Information Technology	44	27.3%
Humanities	37	23.0%
Education	28	17.4%
Medical Sciences	15	9.3%
Natural Sciences	14	8.7%
Business Sciences	12	7.5%
Construction Sciences	8	4.9%
Agriculture Sciences	3	1.9%
<b>Total</b>	<b>161</b>	<b>100%</b>

Most studies were conducted in Information Technology-related disciplines or subjects, although most respondents involved were found to be from education-related subjects, e.g. teacher education, e-learning, educational statistics, learning and development, mobile learning, trainee teachers, etc. Information Technology is not only the higher education context in which social media are used the most for educational purposes, but it is also a context where research is mainly published in English (as the unofficial language of the Internet). Information Technology is also presented in an environment where infrastructure (including the Internet), suitable for the distribution of research, is available, and where the use of technology has been accepted and implemented.

It is also interesting to note that this study has connections with the three disciplines/fields best represented in the study sample: it emanated from the field of Communication Science (Humanities), has computer-mediated communication as subfield (related to the Information Technology grouping), and also links to Education/Higher education as discipline/field (see demarcation of the study in Chapter 1, Section 1.6).

In this study the demographic and background data discussed above provides proof of the trustworthiness of the study and in particular the extent to which the sample fits the criteria stated for inclusion and exclusion, and thus the purpose of the study. The data also formed an important part of the systematic review in the sense that it helped to further highlight the context of the study. In this sense the data represents the context to which the results of the study, as discussed in the rest of the chapter, can be generalised.

### **6.3 RESULTS OF THE SYSTEMATIC ANALYSIS ON THE EFFECTIVE USE OF SOCIAL MEDIA IN HIGHER EDUCATION**

The second category of Data set 2 (Aims of selected studies), and Data sets 3 and 4 (Findings of selected studies, and Recommendations made in selected studies), contain the information most applicable to the purpose of this study, namely research related to the use of social media in higher education. Although separately coded, the results from the three data sets mentioned above are discussed concurrently, under the same

headings in the sections that follow, according to the categories determined in Data set 3. In Table 6.4, the categories discussed in the following sections are listed.

**Table 6.4:** Categories discussed in Section 6.3 of this chapter.

<b>Categories discussed in Section 6.3</b>	
Factors impacting on the effective use of social media	Access to computers or technology
	Familiarity/skills/experience
	Attitudes towards social media
	Time
	Communication (in educational context)
The student and active learning with social media	Active learning
	Collaboration
	Participation
	Student engagement
	Interaction
The educator and effective use of social media	Feedback
	Motivation
	Diverse teaching methods

The relationship between the categories and the list of attributes in the conceptual framework can clearly be recognised in Table 6.4 above.

**6.3.1 Factors impacting on effective use of social media in an educational context**

In this section factors related to the user of social media (in the context of this study the learner and educator) that impact on the effective use of social media, are presented (see Chapter 2, Table 2.5). These factors include: 1) the level of access to computers or technology the user had or has, 2) how familiar the user is with using technology (including the skills/experience of the user in this regard), 3) the attitude of the user towards social media and the willingness of the user to use social media, 4) the user’s experience of social media in the context of time gained or saved, and 5) how communication using social media (in an educational context) is experienced.

### 6.3.1.1 Access to or use of computers or technology

Access to computers and skills in using CMC technologies determine the influence thereof on communication between people, and also on teaching and learning (see Table 2.7 in Chapter 2, and Sections 4.2 and 4.6.3).

In 65 of the 220 analysed studies, the levels of access to computers, and the subsequent use of CMC technologies or social media in education were researched. Scrutiny of the results revealed that although there are countries where students have no or low levels of access, research from most of the geographical areas included in this study showed high levels of access to CMC and to social media technologies. Most of the studies confirmed that (student) respondents had efficient or frequent access to computers and/or social media technologies – on average 94% of respondents indicated access to computers or other technologies with which to access social media. In four studies, 100% access was reported – mostly using smart phones, computers or tablets. The analysis also revealed that most of the respondents owned technological devices like computers, tablets, laptops, mobile phones, cell phones or smart phones.

Three of the studies included in the analysis refer specifically to the access of students to either technology or social media in South Africa. According to the study of Bosch (2009), “many South African higher education institutions do not have access to the resources that enable widespread computer-based teaching and learning”, while the study by Brown and Czerniewicz (2010) found that 65% of South African higher education universities/institutions have a high social use of ICTs. This finding may be an indication of increased access to CMC technologies since 2009, but still implies a low social use at 35% of the institutions. In a third study, Laughton (2011) concludes that “the use of social media among students may be nearing a saturation point because it is nearing 100% of users.”

Only two (2) studies specified the effect of income on access to CMC or ICT. These studies found that low income students had the least access, but also that it was not a total limiting factor. It was pointed out that most students accessed the Internet and social media via affordable technologies, e.g. cell, mobile or smart phones, and that they also used their phones for access to information and class notes. One study clearly

stated that disparities between affluent and disadvantaged institutions were augmented by low income students' limited access to the Internet.

Findings of the 65 studies pointed out that the increased access to CMC, ICT and social media have advantages in the sense that technological tools (mostly used on portable devices), enable students and educators to have any-time, any-place access to, *inter alia*, a support network on campus, resources and study material, entire recordings of lectures via podcasts or video, information and knowledge needed for studying, news feeds and class discussions, and supplementary study materials.

### **Access to or use of computers or technology: Key perspectives**

Access to computers, technological devices, and social media tools influences communication between people. Access to CMC, IT, and social media seems to be sufficient at most institutions. Low-income students most probably have the least access. Increased access to technologies enables students and educators to have any-time, any-place access to support networks, study material, information, news feeds and class discussions.

Access to CMC technologies determines students' familiarity with using these technologies, and has a direct impact on the skills/experience students have in this regard, as indicated in the section below.

#### **6.3.1.2 Familiarity with, skills in, and prior experience with technology**

Students' skills in using social media, based on the experiences and knowledge they already have of using computers and CMC technologies, may differ considerably from student to student (Barkley 2010: 39). As explained in Sections 3.5, 4.3.8, 4.5.3 and 4.5.7, both prior knowledge and experience are influenced by ethnic and racial background, age groups, home language, beliefs, income level, etc. (Burgstahler 2012: 2; Ambrose *et al*/2010: 15).

Of the 220 studies in the study sample, 91 studies investigated or referred to the experience, skills, or familiarity students and educators have with using CMC tools and social media. Eight of these studies specifically investigated the skills students had



*before* they used/utilised social media in their studies (*i.e.* prior knowledge), while 81 of the studies reflected on the skills students developed *after* having used technology in an educational context.

In five of the eight studies it was confirmed that prior to using social media in an educational context, undergraduates had already been familiar with Web 2.0 tools and social software. Students reportedly had texting, e-mail and instant messaging skills, and were skilled in participating in online discussions. Callaghan and Bower (2012) pointed out that student respondents were able to effortlessly transfer their skills of using social media into an educational context. Williams and Chinn (2009), however, caution that despite students' skills and familiarity with online tools, they may still need guidance to participate in online educational programmes. Brown and Czerniewicz (2010) found that within South African higher education, and depending on access to computer technology, the range of CMC skills and the experience of students in using social media were diverse.

The majority of studies found that the educational use of Web 2.0 applications allowed for new and diverse learning and teaching experiences. Student respondents in general expressed positive experiences with the use of social media during class-related activities. Wagner and Ip (2009) reported that virtual worlds, for example, "provide a rich environment for learning and exploration that engages students' imagination, draws their interest, and leads to positive learning experiences". Findings of the 91 studies further pointed out that social networking sites offered ways for students to stay connected, to be updated on campus activities, and to communicate with peers and educators.

The study of Bennett *et al* (2012), conducted across three universities in Australia, determined however, that student respondents showed limited skill / prior experience in using computer technologies or social media tools, with a direct negative influence on their motivation to use – and consequently the usability of – Web 2.0 technologies in educational environments.

Of the 220 studies, 81 referred to the skills students developed *during* or *after* having used social media in an educational context. Scrutiny of the findings found that students experienced the skills and knowledge they developed while or after using Web 2.0 tools

as relevant to their studies and that they acquired skills they might need later in their social and professional lives. Using Web 2.0 technologies in an educational context, enabled students to acquire the following skills:

- Communication skills: the majority of responding students reported an improvement in their communication skills and in their ability to use online mass communication and marketing platforms.
- Critical thinking skills: most students experienced an increased ability to think critically, and an increased insight into course content.
- Learning skills: the use of social media improved students' learning skills and the development of their subject-specific knowledge. As a result their grades improved, and fewer students dropped out.
- Social skills: student respondents affirmed that their social skills and their ability to work in teams improved after using social media in class context.
- Technology competency skills: computer and multimedia technology skills of students improved. Reports indicated, however, that most students felt they needed more technological training before they would be fluent in the use of some of the social media tools.
- Writing skills (written communication skills): students experienced an improvement in their reading and writing skills after using social media tools. One study, however, uncovered concerns from a group of respondents that Twitter created poor writing skills in students.
- Language proficiency skills: in two of the studies an improvement in students' second language speaking and pronunciation skills was found.

Both students and educators commented that they need training in order to become fluent users of social media in the educational context. Educators, mostly older educators, might need training in the use of a variety of social media technologies, and in the way these technologies can be implemented in teaching and learning.

### **Familiarity with, skills in, and prior experience with technology: Key perspectives**

Familiarity, skills, and experience may be influenced by culture and background. Students' skills in using social media differ considerably from student to student; also among South African students. Most students are familiar with social media and they

can potentially transfer these skills into the educational context, although guidance will still be important. Limited skills/prior experience in using social media may negatively influence students' use of Web 2.0 technologies in educational environments. The use of social media may possibly increase many other social and professional skills of both students and educators, especially if enhanced by applicable training.

During the course of the last decade, e-learning and the use of social media and Web 2.0 technologies for teaching and learning enjoyed worldwide acceptance. More students are therefore using CMC technologies, or are comfortable to accept CMC technologies as part of their daily lives. Consequently, the attitude towards acceptance and use of technologies in learning has greatly improved.

#### 6.3.1.3 Attitudes toward use of social technologies in learning

Users are influenced by their expectations and knowledge of CMC and social media and by the benefits such a medium offers or may offer, e.g. social interaction and effective communication (see Table 2.7 in Chapter 2). Of the 220 studies analysed, 86 studies investigated, or referred to the attitude or aspects related to attitude, of students, educators and universities/institutions to accept and use of social media in educational context.

From the findings of these studies it was observed that **universities/institutions** were accepting, willing to accept, and/or using social media for communication, marketing, general administration, and for teaching and learning. The results of the analysis indicated that staff involved in marketing, admissions, and alumni relations expressed mostly positive experiences of using social media technologies and were increasingly adopting social media to communicate with prospective students, alumni and other stakeholders.

Overall, **educators** mostly held positive attitudes towards using CMC and social media technologies: educators were increasingly joining social networks and were using a variety of content-sharing tools for personal, professional, and classroom use. Educators were of the opinion that Web 2.0 technologies had added to their personal and professional satisfaction, and that it had broadened their networking with peers. Some

educators, however, indicated that their lack of training in the use of Web 2.0 technologies added to their work pressure.

Most educators experienced Web 2.0 applications as useful to promote students' learning. Educators experienced better communication with students, although some found it difficult to monitor students' participation in some applications, e.g. wikis. The analysis revealed, however, that educators' actual use of Web 2.0 tools for teaching and learning differed from their reported perceptions of, and attitudes towards social media: although most study results indicated that educators were using social media and were positive towards using social media, in six studies recommendations implied that educators should exploit and adopt online learning technologies to a greater extent.

Most **students** perceived ICT as useful in the academic environment: they found technologies easy to use and were attracted to courses and programmes that utilised social media applications. Because students were more positively inclined towards their studies while using CMC technologies, they were willing to share information and knowledge with other students and they were in general more creative and innovative in their exploration and adoption of Web 2.0 tools for learning. Many students indicated that they also viewed social media as a means for communication and social interaction: being part of an online study community enabled them to form relationships with other students who could work and study with them, and they experienced working in online groups as satisfactory.

### **Attitudes toward use of social technologies: Key perspectives**

Attitudes toward use of social technologies are influenced by expectations, prior knowledge, benefits offered, as well as level of training/skills in the use of social technologies. Universities/institutions are accepting and/or using social media for communication, marketing and administration. Educators utilise Web 2.0 technologies for personal and professional communication and for teaching, but may need training in the use of Web 2.0 technologies to exploit and adopt online learning technologies to a greater extent. Students find technologies easy to use and are generally attracted to courses and programmes that utilise social media applications. Students tend to share information and knowledge with other students, and are creative and innovative in using Web 2.0 tools for learning, communication and social interaction.

Users will choose a medium that predicts success, even if it requires more effort and spending more time than using one requiring less effort and time.

#### 6.3.1.4 Time associated with use of social media

In Chapter 2 the possible waste of time when using social media is indicated as a demotivating aspect in choosing a medium, and in the profile of social media as tool of CMC (Table 3.3 in Chapter 3), high-speed connections, fast, timely feedback and instantaneous communication were accentuated as positive features of social technologies. In the list of the attributes of effective teaching and learning with technology (see Table 4.4 in Chapter 4), the importance of time as prerequisite for quality learning to take place was emphasised, as well as the advantages of using social media to save or gain time.

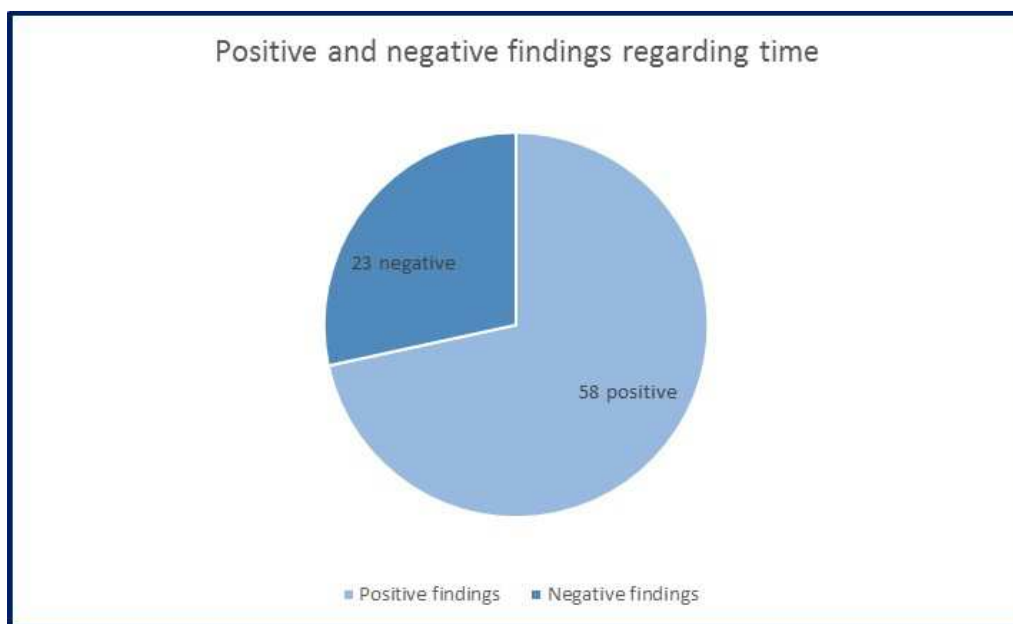
From the 220 studies, 46 were found to study or to mention the influence of social media use on time. The research aims of some of these studies focused on either the time students actively use social media, or on the relationship between time spent on social media and academic achievement.

Most students spend a lot of time on social media, mostly on Facebook. In one study it was noted that students underestimated the time they spend on social media by at least an hour a day. In relation to this, in another study research showed that 58% of students logged into, and/or checked Facebook at least 13 times a day. Findings indicated that neither language nor gender had an effect on the time spent on Facebook, while findings from two studies suggested that Net Generation students (Millennial students) spend more time per day using social media tools for social and leisure purposes than non-Net Generation students.

Most studies indicated that students used social media to fill leisure time, or to combine study and leisure time. It was found that students who spent a lot of time on social networking sites (SNSs) scored higher in subjects presented on or with social media than those who were not using social media or not using it regularly. Most student participants indicated that the educational use of social media sites like Facebook and Twitter allowed them more learning time, and more time to effectively reflect and

respond to other students' comments. Students also indicated that they preferred to use social technologies as a means to communicate, collaborate or interact with other students because they did not experience the time constraints of traditional forms of communication. A study by Salaway, Caruso and Nelson (2008) suggested that time spent online varied according to subject: e.g. in their study, students majoring in engineering were using the Internet the most, while students majoring in education were using the Internet the least.

In the 46 studies referring to or studying time in the context of this study, a total of 81 comments about time in regard to the use of social media were found. By listing positive and negative findings separately, 58 comments (60.4%) were found which suggested that social media allows positive use of time, while 23 (39.6%), reflected negatively about social media and the use of time. Figure 6.9 illustrates that respondents regarded time use in the context of using social media for communication and education more positive than negative.



**Figure 6.9:** Positive vs. negative findings about social media use and time.

Negative findings mostly refer to the time it takes to learn to use social media, and the time it takes to text or type compared to the time it takes to talk. Most of the older respondents and educators regarded social media use as a waste of time, and perceived it as time unproductively spent. They also indicated that they lacked the time

to learn how to use social media, or found using social media as too time consuming. Contradictory findings, however, suggested that it was more beneficial to stay up to date and current with developments of interactive technology than to invest time and energy into personal or face-to-face communication.

While most research findings indicated that there was no correlation found between the time students spent using social media and their grades, findings of one study implied that Internet and Facebook use negatively impacted on students' grades and created too many opportunities for distraction and procrastination.

#### **Time associated with use of social media: Key perspectives**

The choice to use social media is influenced by the user's opinion regarding time saved or time gained by the use. Students, mostly millennial students, spend a lot of time on social media for social and educational purposes. Enough time is a prerequisite for effective learning. Social media tools seem to allow students more time to learn, but also to communicate, collaborate and interact with other students. Use of social media may, however, create opportunities for distraction and procrastination and as a result, may negatively impact on students' grades. Older users may regard the use of social media as a waste of time and as too time consuming, possibly because they do not have time to learn how to use social media effectively.

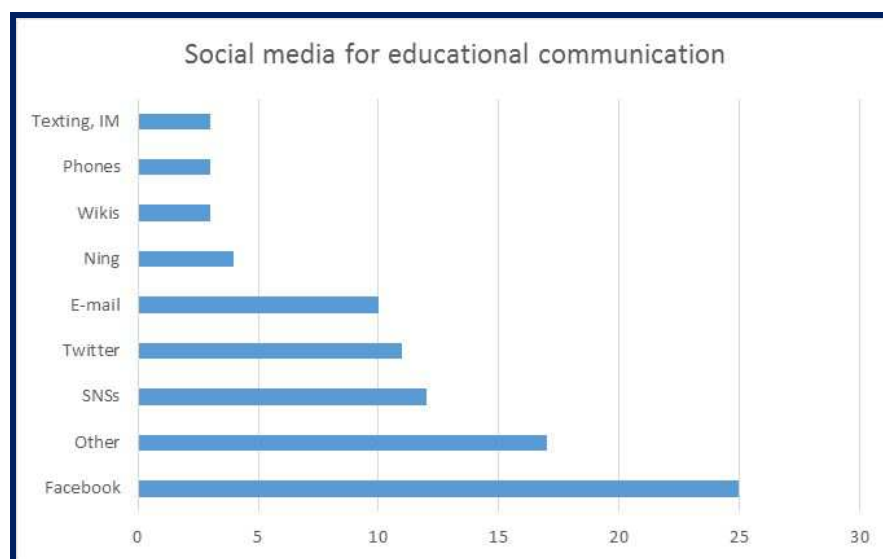
The use of social media tools allow students more time to communicate, collaborate and interact with other students (see Principle 5, Section 4.3.5).

#### **6.3.1.5 Social media and communication in an educational context**

Perspectives related to the fields of Communication Science (CS) and computer-mediated communication (CMC) as applied in an educational context, form the key focus of this study. In previous chapters the relationship between communication, learning and culture, and the role of communication using CMC-technologies were discussed (see Tables 2.5, 2.7, 2.8 and 3.3, and Figures 2.5 and 4.2). The systematic analysis focused on the communication aspect of CMC and communication via Web 2.0 technologies in an educational context.

Findings from 88 of the 220 studies indicated that Web 2.0 tools allowed students, educators, and universities/institutions to communicate more often and with more ease than before. Students reported increased communication with peers, educators, and/or students; they also experienced more confidence in communicating about class-related or social aspects. Only one study's findings indicated that students found social media not conducive for effective communication.

A variety of social media technologies was investigated for their possible application in educational communication. Figure 6.10 illustrates the social media tools used most in the 88 documents to investigate educational communication.



**Figure 6.10:** Social media tools used for educational communication.

Of the 88 studies, 25 (29%) had as objective to study the use of Facebook for educational communication, while 11 studies (14%), investigated the use of Twitter for educational communication. Social networking sites (SNSs) as the inclusive term for a variety of social media tools, made up 19% (12 studies) of the studies in this regard. All the social media tools investigated were found to support educational communication.

The communication patterns of students participating in Facebook study groups were found to be complex: a student may, for example, communicate with many students in different Facebook study groups linked to different disciplines, forming a network of Facebook communication groups over campus. Facebook therefore seems to improve



communication within and beyond the campus, and serves to shape campus culture. Students commented that Facebook supported the communication between different groups of students about social and campus-related events.

Evidence from the systematic analysis show that Twitter could alter traditional face-to-face communication patterns and enhance class discussions with tweets from and to students. The use of Twitter in class reportedly impacted positively on students' understanding of practices and on their learning. Students used Twitter for project-oriented, peer-to-peer communication and in that way improved the relationships with other students in a group.

Students reported that they use SNSs for academic and social communication, and for the exchange of knowledge. Students found that using SNSs added to the success of their studies. SNSs had also increased and improved educator-student communication: SNSs provided educators with many alternative ways to communicate with students, and students preferred educators to use social networking technology to communicate with them. Wikis were in particular found to support and improve communication in collaborative group learning activities, for example: students posted messages for group discussion on the wiki and commented on each other's work.

Findings showed that students valued e-mail as important for communication with educators and other students concerning formal or learning-related work. Educators, however, generally communicated with students using e-mail. Findings indicated that mobile phones enabled intimate and direct communication between students, and between students and educators in an educational context. Although student respondents communicated mostly face-to-face, they also spent several hours a day on mobile phones texting, browsing, reading or talking.

Texting and instant messaging (IM) were found to be commonly used for interaction among students because it presents short, fast, and affordable communication. Students experienced communicating via text messages as useful because they could communicate about mutual topics and course information, while they also could receive and give emotional support and practical advice.

Various social media applications, including Facebook and Twitter, provided universities/institutions with an open line of communication with students, although mostly one-way communication. The study of Zimmerman (2009) found that 82.3% of students never communicated on the specific university's Facebook page. In contrast, educators confirmed that Facebook improved their communication with students: The use of Facebook helped in the organisation and preparation of projects and assignments, and enabled students to communicate and interact with the educator. Students, even shy students, were found to ask questions and make comments on the Facebook page of a specific course. Twitter also created an effective communication channel between the university/institution and students, and between educators and students.

SNSs were also found to create a direct communication channel between scholars and the public/community, enabling the public/community to have daily access to scientific knowledge. Educators pointed out that it was easier to communicate news and research-related findings with the community using SNSs than with traditional means of communication. Communication via SNSs furthermore was shown to stimulate professional communication and collaboration between educators, although some educators indicated strong opinions against social networking – these educators voiced the opinion that more face-to-face communication was needed in education.

### **Communication in an educational context: Key perspectives**

Social media technologies, e.g. Facebook, Twitter, Wikis, social networking sites, etc. can be used to improve communication among students, and communication between students and educators and universities/institutions. Social technologies seem to create more opportunities for students to communicate with other students and educators about course-related work, and in that way add to the success of students' studies. Social media can also be used for communication from the university/institution to students and/or the community.

Computer-mediated communication (CMC) allows students to work and study together, to ask each other questions and discuss answers, and to evaluate their own and other students' work to effectively learn. The attributes of effective teaching and learning with technology, listed in Table 4.4 (Chapter 4), includes the concepts active learning,

student engagement, collaboration, interaction, participation, motivation, feedback, and others. The mentioned concepts are also listed as categories in Data set 3 (comprising of the findings of each of the studies in the sample of 220 documents – see Section 5.5.2.2c). Through careful scrutiny of the findings – and against the background of the theory described in Chapter 4 – these concepts are, in the context of this study, divided into two groups: those found to focus on the student and effective learning, and those focusing on the educator and effective teaching.

### **6.3.2 The student and active learning with social media**

Aspects discussed in this section relate to the following attributes of effective teaching and learning with technology (see Chapter 4, Table 4.4): active learning, collaboration, participation, student engagement, and interaction. The researcher acknowledges that these aspects are often intertwined. For example: interaction and collaboration imply, and can lead to active learning and student engagement, while student engagement can be seen as an umbrella term that embraces all the aspects discussed in this section. In reported research (as in the study sample), authors/researchers also used a variety of terms to refer to these aspects as best suited to their research interests. In the systematic analysis for this study the researcher was led by the terminology used in each individual study. Therefore, in the discussion that follows, possible relationships among terms are mentioned when regarded as of importance.

#### **6.3.2.1 Active learning**

As an attribute for effective teaching and learning with technology (see Table 4.4), active learning is described as involving collaboration, participation, student engagement (also engagement with, and interest in learning material) and interaction.

Findings from the analysis indicated that social media use encouraged students to participate in collaborative learning activities in order for them to actively learn. Of the 220 studies analysed, 31 studied aspects which may motivate students into active learning, or encourage them to be engaged in activities which promote active learning. All 31 studies provided evidence that by using social media in education, active learning took place, or that active learning were supported, promoted, and encouraged, or that

opportunities for active learning were created. Findings also indicated that students changed from passive to active learners, and that students were willing to collaborate in the learning process if social media technologies were involved.

Seventeen of the 31 studies found that through the use of various social media tools, both students and educators became actively and socially involved in the learning process. Educators were able to play a more active role in student learning and were able to give more active guidance.

Findings of 11 studies showed that social media use encouraged students to become active contributors of information by participating in learning activities through social media. Students in general became more inclined to question information provided by educators and other students and in that way became more involved in the construction and retention of knowledge.

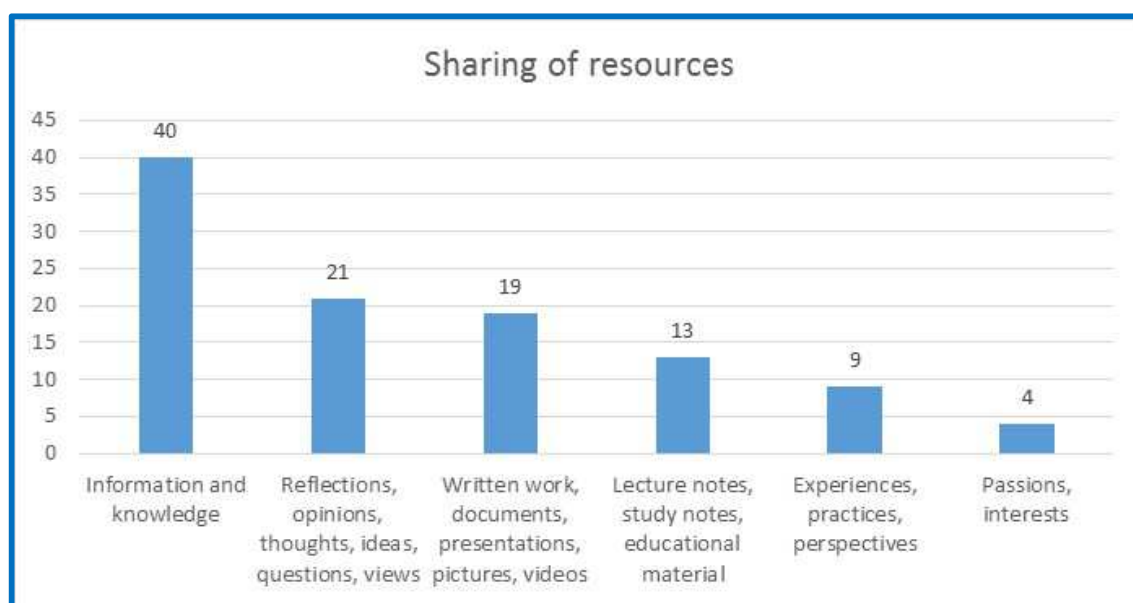
Nine studies found that Web 2.0 technologies enabled students to think critically *about information* instead of just being passive recipients thereof. Seven studies emphasised that social media use encouraged students to think more critically *about what they learn*. Furthermore, findings indicated that students applied the knowledge they learned and used it in problem solving situations, thereby improving their learning skills, language-related skills, and writing skills.

Of the 31 studies, 25 focused on the use of one or more tool of social media for active learning. These tools included Facebook, blogs, Twitter, wikis, Web 2.0 technologies, virtual worlds, VoiceThread and podcasts. In the mentioned studies it was determined that both educators and students were willing to participate in social media activities and to share educational material on social media platforms: meaning that active learning, interaction, and collaboration could take place (Mix 2010: 41; Chickering & Gamson 1987: 4; Ally 2012: 1). Of all 220 studies in the sample, 106 studies referred to the *sharing* of one or other type of educational information or resources. These resources can be summarised into six groups:

1. Information and knowledge (40 studies);
2. Reflections, opinions, thoughts, ideas, questions and views (21 studies);

3. Written works, documents, presentations, pictures, and videos (19 studies);
4. Lecture notes, study notes, and educational material (13 studies);
5. Experiences, practices, and perspectives (nine studies); and
6. Passions and interests (four studies).

Figure 6.11 illustrates the groups of resources which were shared via social media as mentioned above.



**Figure 6.11:** Resources shared via social media.

From Figure 6.11 it is clear that resources can have a wide variety of formats: documents, videos, sound, pictures – even experiences. These resources can be retrieved and used at a time the student/educator prefers and therefore encourage active learning.

### **Active learning: Key perspectives**

Active learning takes place when social media is used in an educational context. Social media seem to encourage students to participate in collective learning and become active learners. Both students and educators become involved in the learning process, are willing to contribute and share information, and are encouraged to construct and apply knowledge.

Cooperative and collaborative learning are regarded as crucial elements of active learning (Barkley 2010: 16), which will be accentuated in the next discussion.

#### 6.3.2.2 Collaboration

Collaborative learning is defined as a pedagogical method that enables learners to work together to accomplish shared learning goals and to co-construct knowledge, while the educator only guides or facilitates the process (Section 4.4.2.4). As an attribute of effective teaching and learning with technology (see Table 4.4), collaboration involves activities performed by a group of students using social media tools.

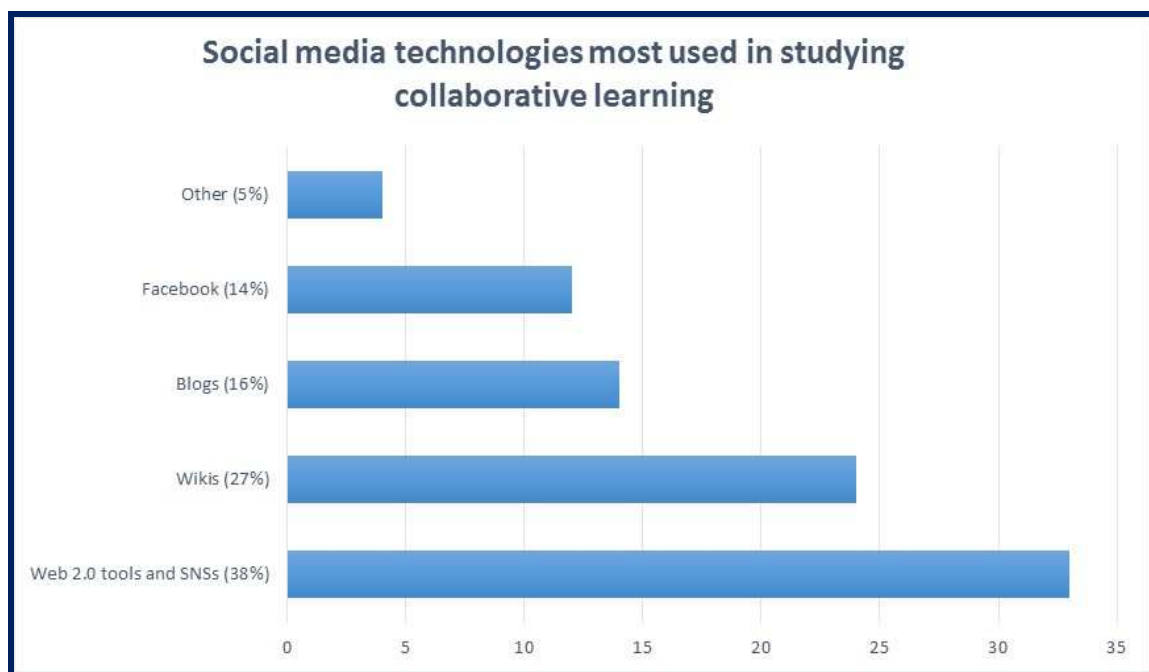
From the 220 studies analysed, 60 studies were found to include discussions about the collaborative role of social media technology in education. Of these, 16 studies had as their research objective to study the way in which various social media tools can be used to support collaborative learning. In 33 of the 60 studies, collaborative learning via Web 2.0, social networking sites (SNSs) and technology in general were discussed. (Take Note that in some studies several CMC tools were studied simultaneously). A summary of the findings from the 33 studies indicates that technology was used for teaching and learning purposes by most, if not all, people involved, including: educators, colleagues of educators, faculty members, members of management, administrative staff, students, distance education students, tutors, support groups of students, and other stakeholders. Findings of only one study implied that social media technologies were not found conducive to collaborative activities.

By listing the collaborative activities described in the studies, it was found that social technologies can be used for a wide variety of collaborative learning activities:

- Teamwork activities, collaborative assignments, and group projects;
- To create learning networks where students can co-create learning material;
- To interact with peers in an online learning environment;
- To find resources and share information;
- Having online conversations or discussions about educational topics;
- To gain educational or learning experiences;
- To participate in learning and social learning activities;

- To review projects, and to edit and comment on others work;
- To generate learning content, knowledge, or written works; and
- To teach and to share teaching experiences and teaching practices.

Except for the studies referring to either Web 2.0 technologies, social media tools, or new technologies, specific technologies studied/mentioned in regard to collaborative learning included wikis (in 27% of the studies), blogs (16%), Facebook (14%), and various other technologies (in 5% of the studies). Figure 6.12 illustrates the social media technologies used in investigating collaborative learning.



**Figure 6.12:** Social media technologies used to study collaborative learning.

As indicated above, wikis as collaborative learning tools were mentioned or studied in 24 of the 60 studies in this category. Wikis were also specifically mentioned in six of the *titles* of these studies. All 24 studies focused on the effectiveness of using a wiki as an online collaborative learning tool and all 24 reported positive findings. One study advised that students may need motivation to participate in wiki activities. Fourteen of the studies discussed the role of blogging or micro-blogging in collaborative learning. Although findings in these studies indicated that students did not take full advantage of the peer feedback features of blogs, blogs were found to be positively related to collaborative activities. Twelve studies focused on the role of Facebook in collaborative learning, and

indicated mostly positive findings. All the other technologies discussed reported positive findings.

### **Collaboration: Key perspectives**

Social media can be used for collaboration among most of the role players in the teaching and learning environment. A wide variety of collaborative activities are made possible by the use of social media, including finding and sharing information and co-constructing knowledge. In referring to specific tools, Wikis seem to be the most effective tool for collaboration, followed by blogs and Facebook. Some participants, however, need motivation to participate in collaborative activities.

Active learning also depends on the active participation of students and educators: participation enhances students' interest in learning and engages them in learning projects (Ally 2012: 1). Participation as an attribute of teaching and learning with technology is discussed next.

#### 6.3.2.3 Participation

Twenty of the 220 studies in the sample mentioned or discussed the role of social media use on students' participation in learning activities. Five of the 20 studies focused on the influence of Twitter on student participation: by incorporating Twitter into a class, students' participation and engagement in learning improved. Students shared information, and sent and responded to tweets to and from educators and other students. Even introverted and normally shy students were encouraged and participated in learning activities.

Results pointed out that the use of all the social media applications researched increased student participation in online learning activities and also created opportunities for effective learning. Involvement in learning activities via social media technologies were found to also empower students to participate in campus activities.

Findings related to the 20 studies mentioned, point out that the membership of educational staff in social networks has increased between 2009 and 2012: educators, teachers, principals, and librarians were found to increasingly participate in the learning



projects and educational activities of students using social media technologies.

### **Participation: Key perspectives**

Social media applications lead to increased participation, in particular in online learning activities. Social media serve to encourage students to share information with other students, and to participate in both learning and campus activities. Educators and other staff are increasingly participating in students' educational activities via social media.

Collaboration and participation ensure that active learning takes place. Active learning, however, also depends on students' engagement in the learning process and engagement and interest in the learning material.

#### 6.3.2.4 Student engagement

Although student engagement is closely linked to all the other attributes, and attributes of effective teaching and learning with technology (see Table 4.4), student engagement depends to a large extent on interaction with other students in collaborative learning activities using social media technologies.

Of the 220 studies, 51 investigated the influence of social media use on students' engagement in learning. Most of the 51 studies had as study objective the investigation of possible ways in which social media technologies could be utilised to best engage students in their studies. Twitter and Facebook were the social media tools mostly studied in these investigations.

Sixteen of the 51 studies investigated if Twitter could be used to enhance student engagement in learning. The findings of all 16 studies observed that Twitter increased academic engagement and reflected positively on grades. Twitter increased interpersonal and social engagement between educators and students, and also engagement among students. Twitter has been found to show a positive impact on students' opinions about a course and created a sense of community among students, which motivated students to actively participate in learning activities.

In the 14 studies related to the level of engagement offered through Facebook, findings also indicated mostly positive results. Facebook enhanced student engagement, especially regarding communicative and cooperative group interactions in learning activities. Only two comments were found implying less favourable, and contradictory findings: 1) that Facebook had neither a positive nor negative impact on students' writing success, and 2), that Facebook's contextual resources offered both opportunities and constraints in terms of engagement.

Findings of the other eleven studies in this category also reported positive results regarding the role of social technology and student engagement. Of the 32 findings summarised from the studies (excluding the findings referring to Facebook and Twitter mentioned), only one implied a less favourable opinion; namely that only a small number of students contributed to a group wiki, and that not all students became engaged in the specific project.

#### **Engagement: Key perspectives**

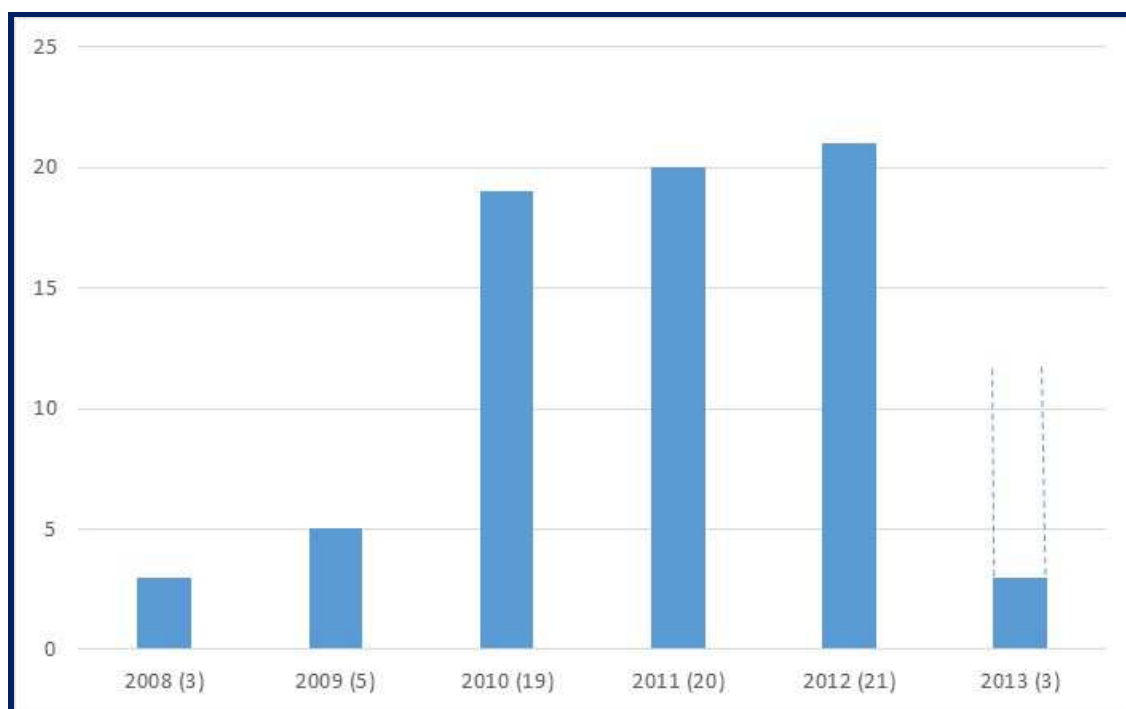
Twitter and Facebook were mostly investigated in studies related to engagement. Use of Twitter can lead to an increase in student engagement, which can result in improvement in student-educator contact, contact among students, and a sense of community among students. Similar findings were reported for Facebook and other social technologies. Caution must be taken in regard to the possible effect of the use of social media on students' writing skills, and of some students' unwillingness to become engaged in, and contribute to wiki projects.

A fourth attribute of effective teaching and learning with technology (see Table 4.4), namely social interaction (closely related to collaboration, participation and engagement) is important for active learning to take place.

#### 6.3.2.5 Interaction

Interaction is described as something happening among students and/or their educators in a collaborative learning environment where learning takes place and knowledge is constructed (compare, for example, the emphasis on student-educator contact in Principle 1, discussed in Section 4.3.1). Of the 220 studies analysed, 71 studies

investigated interaction or the role of interaction when using social media in the context of education. By analysing the studies conducted in each of the years included in the analysis, a sharp increase in studies investigating interactivity since 2010 were found (see Figure 6.13).



**Figure 6.13:** Interaction as study topic in the six-year period involved in the analysis.

The increase in studies investigating interactivity since 2010 may be the result of the development of the many social media applications since 2008.

By analysing the research objectives and the research findings of the 71 research studies, 19 studies were found to specifically mention interaction. Three distinct categories were identified from the analysis: student-educator interaction, student-student interaction, and interaction and learning.

The analysis provided evidence that 24 of the 71 studies investigated the influence of communication via social media on the **student-educator** relationship and the influence of this interaction on students' learning. Results of all 24 studies pointed out that using social media increases student interaction with educators and in that way encourages students to learn. The interaction that happened between educators and students changed students from passive to active learners, encouraged them to create and retain

knowledge, and motivated them to participate in, for example, academic research. The interaction furthermore contributed to a sense of community and connectedness, which appeared to encourage students to learn. Findings in five of the 24 studies accentuated, however, that face-to-face communication between student and educator is still important to involve students in learning activities.

Findings from the 24 studies indicated that blogs, Twitter, Facebook, e-mail, and texting were mainly used for interaction between educators and students. These technologies were used by educators to communicate with students, to send information, announcements and reminders to students, and to encourage students to learn and do research. It was furthermore found that texts (SMSs and IM) from educators contributed to students' feeling of connectedness and encouraged students to participate in learning. Teclehaimanot and Hickman (2011), however, pointed out that students in their study were uncomfortable with commenting on items posted by educators and with educators commenting on things they have posted.

Of the 71 studies, 25 investigated communication and the influence of communication via social media on **student-student** interaction, and the influence of this interaction on student learning. All 25 studies indicated positive findings. Academic interaction via social media allowed students to also interact with each other outside the classroom: they discussed career goals, helped each other find information and resources, and created additional learning opportunities. Salaway, Caruso and Nelson (2008) however, found that the way the educator uses Web 2.0 technology in class may discourage social interaction between students.

The analysis of these 25 studies further provided evidence that in the studies in the sample, online social interaction increased students' involvement in campus life and supported the creation of a campus community. Students interacted – using social technologies – with students new to the university/campus and in that way built a support network on campus. Increased social interaction between local and international students, and between students of diverse backgrounds were also found. Students who used social networking sites were more engaged in offline campus activities and reported greater satisfaction with and a stronger connection to their universities/institutions.

Gao (2013) reports that online communication enhanced students' participation in the traditional, face-to-face classroom and provided students with a sense of belonging. Ericson (2011), however, reports in this regard that the need for electronic social communication has overtaken students' desire for personal interaction. Findings of most of the 25 studies pointed out that face-to-face communication between students proved to still be important to enhance involvement, integration, and out of class interaction.

Findings from the studies specified Facebook, blogs, wikis, Twitter and mobile phones as the most popular social media applications to ensure interaction between students. Facebook was found to combat social isolation through the building of an online community for both personal and academic interactions. Students found Twitter easy to use and to communicate and interact with friends and other students. Blogs and wikis were found to encourage collaboration and interaction: doing group assignments on blogs or wikis motivated students to dedicate extra effort to the work and to support other students.

Of the 71 studies, 22 studies investigated the influence of interaction via social media on **education, learning and/or pedagogy**. Findings in this regard were mostly positive: social media and Web 2.0 technologies were found to increase student learning and improve student performance. Both students and educators expressed that they were in favour of using social networking services (SNSs) for knowledge sharing and learner-centered activities. Twitter was found to be a useful medium to share academic information with students: students responded positively to announcements from educators on Twitter and most were found to share tweets with other students. Blogs and wikis were effectively used to create online learning environments where students were able to share work, interact with peers, and collaborate in a learning community. Facebook proved to be an effective platform to share/access information: Wang *et al* (2012), however, stated that Facebook was found more appropriate for social interaction between friends than suitable for formal learning. Podcasting allowed ease of access to information and recordings of lectures.

In 10 of the 71 studies recommendations regarding future research focused specifically on interaction when using social media for education. Researchers recommended that

more research is needed on ways to use social media to improve interaction between students, and between students and educators.

### **Interaction: Key perspectives**

Use of social media was overwhelmingly found to increase interaction among various role-players in teaching and learning. Student-educator interaction can help to change students from passive to active learners, encourage students to learn, share information and create and retain knowledge. For purposes of interaction, educators mainly make use of blogs, Twitter, Facebook, e-mail, and texting. Students are, however, not always willing to comment on the information sent by educators. Often academic interaction among students lead to increased interaction outside the classroom and can improve involvement in campus life, which may be of special importance to first-year and international students. Face-to-face interaction has, however, still a role to play.

Findings from this section illustrate that social media use motivates students to **participate** in **collaborative** learning activities and to **interact** with other students and educators on social media platforms: in that way they become **engaged** in activities which promote **active learning**. Active learning also takes place when students receive feedback and motivation from the educator.

### **6.3.3 The educator and effective use of social media**

The educator can use social media to support and encourage students. Timely feedback motivates students to learn, especially if supported by high expectations and teaching methods which suit the needs of the learner (see Principles 4, 6 and 7 in Section 4.3). Feedback, motivation and diverse teaching methods as attributes of effective teaching and learning with technology (see Table 4.4 in Chapter 4), are discussed next.

#### **6.3.3.1 Feedback**

Feedback to students about their progress can be provided via social media. Out of the 220 studies in the sample, 22 studies focused on the possibility of providing feedback to or receiving feedback from educators via social media. Findings showed that technology allowed educators easy access to students' writing efforts (which also allowed for fast

evaluation of the learning process) and to provide timely, specialised feedback (see also Section 4.3.4). The richer the medium, the more opportunities there are to use the medium for teaching, to give prompt feedback in order to enable students to correct mistakes and to learn, and for educators to set high levels of expectations to motivate students.

Students appreciated the feedback from both educators and peers to determine the correctness of what they were studying, and noted that timely feedback impacted positively on their results. Some students, however, indicated that they felt uncomfortable when receiving negative feedback on a public platform, for example on their Facebook timeline or on a wiki.

#### **Feedback: Key perspectives**

Social media can serve as an effective platform for appropriate and timely feedback by educators on students' work, which can impact positively on student learning. Public platforms should however be avoided or used with caution.

As an attribute for effective teaching and learning with technology (see Table 4.4), timely feedback is important to stimulate information processing, create knowledge, and motivate students into active learning.

#### 6.3.3.2 Motivation

Barkley (2010: 6, 8) suggests that learners must be motivated and engaged in meaningful tasks for effective learning to take place: motivated students will actively seek information and understanding which constitute engaged learning.

Motivation is discussed or mentioned in 20 of the 220 studies in the sample: in six studies the objective was specifically to investigate how social media influence the motivation of students to learn, in 15 studies motivation was discussed as part of the research results, and in five studies recommendations regarding the influence of social media on student motivation were made.

The findings of all 20 studies showed 100% positive results regarding increased motivation in both students and educators when social media is utilised in the educational context. Various technologies, e.g. SNSs, Web 2.0 tools, Facebook, Twitter, Highlighter, etc., were found to enhance motivation and enthusiasm for educational activities in both students and educators. Student motivation improved because they experienced an increased sense of community and as a result were able to communicate freely with other students and educators. Educators' faith in their students and their commitment to support students' efforts contributed to students' motivation and success.

### **Motivation: Key perspectives**

Social media technologies can effectively be used to motivate students. Motivated students will seek information and will learn more, they will communicate with other students and educators, and be more successful in their studies.

Educators' expectations of students' success, supported by timely feedback, contributes strongly to students' motivation to actively learn. Educators must also employ diverse teaching methods to motivate and support students. Using diverse teaching methods as an attribute of effective teaching and learning with technology (see Table 4.4 in Chapter 4), is discussed next.

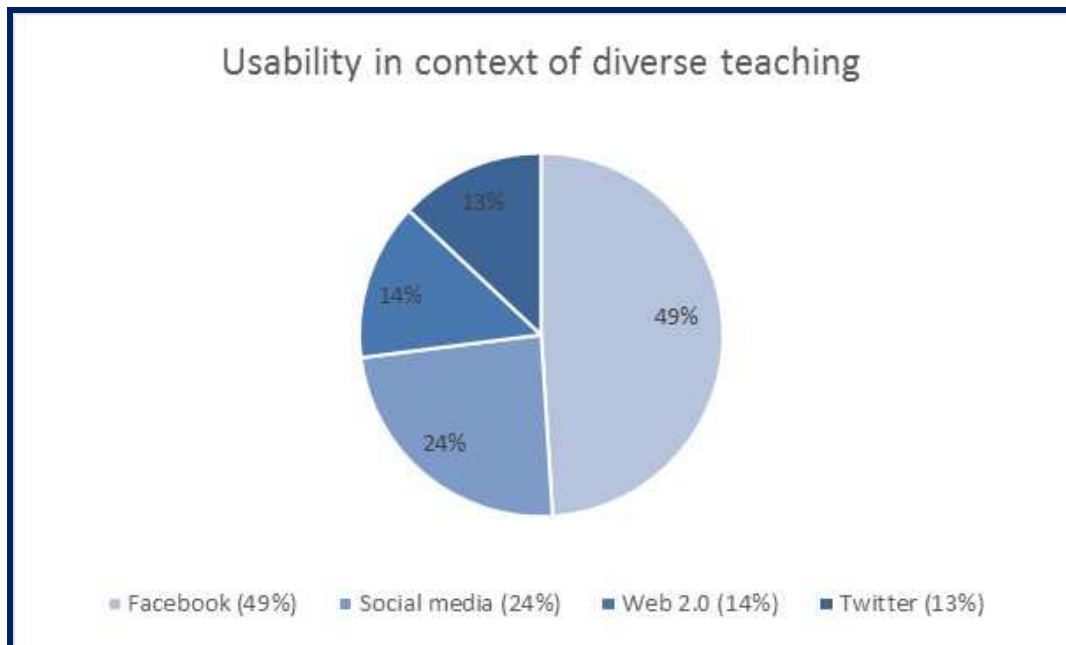
#### 6.3.3.3 Diverse teaching methods

Institutions worldwide have to accommodate students from diverse backgrounds, students with different needs and abilities, and students who learn in special ways (see Section 4.5.7). Information must be presented in ways that are perceptible to all groups of learners (Rose & Gravel 2010: 4) to enable all students to learn effectively.

Scrutiny of the findings in the context of this analysis found an exponential increase in the use of social media technology to support students' diverse educational needs. Web 2.0 technologies were found to accommodate and enhance new and diverse learning and teaching experiences for both educators and learners. Web 2.0 environments enabled students to study in a way and at a time suitable to their own needs, and to apply their individual knowledge and their educational background to their learning. The



analysis found that in this study sample, 49% of the research focused on the usability of Facebook in educational learning, 24% on social media, 14% on Web 2.0 technologies, and 13% on Twitter. Again, one must take into consideration that the terms 'social media' and 'Web 2.0' include a variety of social media tools, and may even include Facebook and Twitter, but were not specified as such by the authors. Figure 6.14 illustrates the most useful social media tools in the context of diverse teaching.



**Figure 6.14:** Most useful social media tools in the context of diverse teaching.

Except for Facebook and Twitter, 117 types/classes/categories of social media tools and Web 2.0 technologies (listed in Table 6.5) were also investigated in order to evaluate the use thereof for teaching and learning.

**Table 6.5:** List of Web 2.0 applications studied.

Academia.edu	Google Maps	MediaWiki	Protovoulia	ValuePulse
BlackPlanet	Google.knol	MediWiki	Qizbox	Vimeo
CourseHero	Google+	MELT	Second Life	Voice thread
Cramster	GoogleDocs	Mendeley	SecondReiff	WATBlog
Delicious	Graasp	MEPS	Sharenow	Webshots
Desire2Learn	GradeGuru	Myempowermedia	Snapfish	Welker's Wikinomics
Diigo	Hy-Lighter	MyNote	Solodox	WetPaint
Edmodo	Infoman2b wiki	MySpace	Startonline	WHATBlog
EdWeb.net	Jigsaw	Nettilukio	StateCraft X	Wikipedia
Elgg	KooL	Ning	StudiVZ	Wikispaces
Evernote	Kwik-survey	Notaland	Tagged	Wimba Voice (WV)
Facebook	LauLima	OpenSimulator	TeacherTube	Wordle
Flickr	LeMills' Calibrate	OpenSocial	Texese	Yahoo!Messenger
Flinchat	Limewire	Opendzine	The Wild	Yammer
Gmail	LinkedIn	Photobucket	TUT Circle	YouTube
Google Earth	Machinima	Piczo	Twitter	Zotero

In Table 6.5 a list of all the Web 2.0 applications mentioned or investigated in the 220 studies are listed. This serves to illustrate the wide range of technologies educators investigated in an effort to accommodate students' learning needs. Some of these technologies are unknown because they experienced only temporary success, are known in only a certain community/country, or are overshadowed by the success of social technologies such as Facebook and Twitter. The researcher acknowledges however, that it is possible that the list may not be 100% correct because some applications may have been either overlooked, or that were not specifically mentioned by the research authors.

Findings in the context of the use of diverse teaching methods vary to a great extent because many social media tools and applications were mentioned. Most of the findings of the studies were positive. The analysis provided evidence that a growing number of educators are using social media to support and accommodate students' communication and learning needs. Research results showed that students' educational use of social media mainly focuses on the sharing of learning experiences and teaching events, the exchange of factual information and information about assessment requirements, and on providing support with regards to assessment or learning. Students experienced the use of social media for learning as positive and motivating, and pointed out that social media contributed to their success. Both educators and students indicated, however, that they

needed training and support to use some of the social media technologies more effectively in an educational setting.

### **Diverse teaching methods: Key perspectives**

Educators can choose from a variety of social media tools and applications to support students' unique needs and learning abilities. By applying social media, students can learn in ways that fit their educational needs, and they can learn in a time and setting suitable to their specific needs and/or situation.

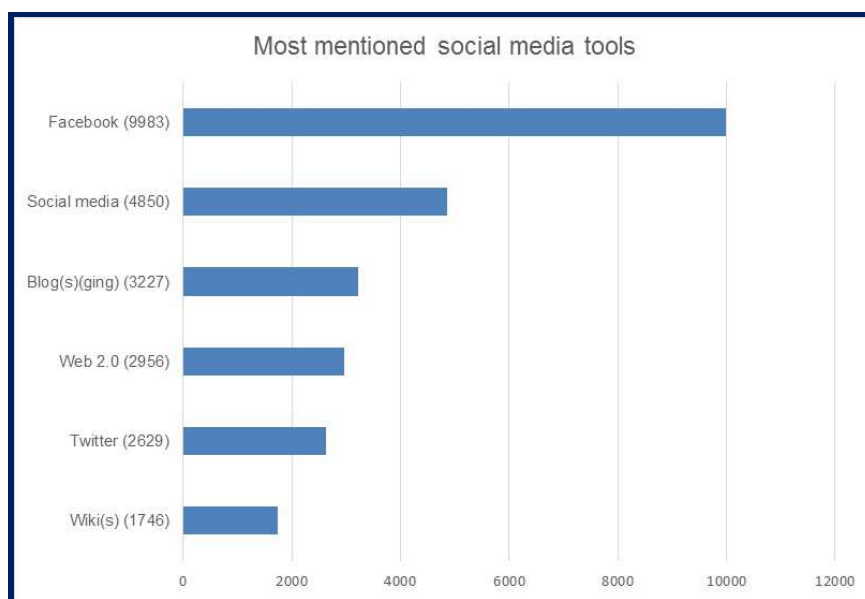
In Table 2.7 (Chapter 2), the aspects which may contribute to the choice a user makes when selecting a medium, are listed. For educators, the vastness of the social media landscape, as well as the immense amount of available information on social media technologies make it near impossible to select a suitable tool for effective teaching. In the next section, the most mentioned/studied/used social media tools from the study sample are discussed. Both the positive and negative findings from the studies regarding each of the tools are included in the discussion.

#### **6.3.4 Choice of media: Popular social media technologies**

When it comes to the choice of social media to use in an educational context, it is advantageous to have knowledge about positive and negative research findings on the use of specific media tools. In selecting the social media tools to be discussed in this section, the researcher was led by the 'popularity' of the tools in the study sample. This 'popularity' was determined by counts of the most mentioned social media technologies in the 220 studies analysed and the number of times each specific tool was the major focus or topic of a study.

By using the NVivo word count function, it was established that the most mentioned social media technologies in the 220 studies were *Facebook*, *Twitter*, *blogs*, and *wikis*. Some of the studies, however, refer to *social media technologies* or *Web 2.0 technologies* in general, not naming a specific tool, or either using the terms to refer to a variety of social media tools. Figure 6.15 shows how many times the six most mentioned tools were referred to: Facebook was, for example, mentioned 9983 times, and wikis

1746 times. Other technologies, e.g. e-mail, Ning, YouTube, Wordle, forums, etc., were studied to a lesser extent and are mentioned elsewhere in this chapter.



**Figure 6.15:** Number of references to the most mentioned social media tools.

By using NVivo, it was also possible to establish in how many studies each specific tool was the major focus or topic of a study. According to this count, Facebook was the major focus in 35 studies, Blogs/Blogging in 24, Twitter in 15 and Wikis in 10 studies. Based on these statistics, the social media technologies found to be the most mentioned or studied in the 220 studies of the review, are discussed next. The discussion commences with studies categorised under the more general description used, namely “Web 2.0 and social media tools”, followed by Facebook, Blogs, Twitter and Wikis.

#### 6.3.4.1 Web 2.0 and social media tools

The importance of Web 2.0 and social media technologies for education is illustrated by the NVivo word count in the documents included in the review: the term “social media” was used 4850 times in 116 of the 220 studies analysed, and the term “Web 2.0”, 2956 times in 173 of the studies. As mentioned earlier, these terms are inclusive of other CMC and social media technologies and tools.

The percentage of students using Web 2.0 and social media technologies to communicate with classmates, educators, and the faculty reportedly has increased

tremendously since 2008. Scrutiny of the findings in the study sample (see Data set 3, Section 5.5.2.2c), showed that Web 2.0 and social media technologies present much pedagogical potential: from the study sample many advantages of Web 2.0 and social media technologies were listed which are an indication of the reasons of the success of these tools.

Findings showed that Web 2.0 and social media technologies place more focus on the individual learner than any traditional web-based learning management system ever did, allowing for better communication between students and educators, and also between universities/institutions and students. Web 2.0 and social media technologies further allowed active learning: various opportunities for effective, interactive learning existed in which students were encouraged to participate in learning activities with other students. Various Web 2.0 and social media technologies were found to be especially successful in promoting language learning and writing training.

Web 2.0 and social media technologies allowed students to include various types of audio-visual media in their learning material; therefore they enjoyed participating in online learning activities. The use of Web 2.0 and social media technologies were also found to increase creativity and innovation in learning activities, and to support and enhance new and diverse learning and teaching experiences; therefore students experienced increased enthusiasm, attentiveness and engagement in their learning. Students reported that using these technologies improved their ability to multi-task and manage time, and in that way enhanced their long term management and professional working skills.

The use of Web 2.0 and social media technologies were found to increase both students' and educators' computer skills, their knowledge of and skills in the use of Web 2.0 tools, and enabled students to develop complex multimedia technology skills – this also applied to the skills of students without prior experience of using technologies or social media.

Analysis of the findings included in Data set 3 also showed some negative results from the 220 documents in the study sample about the use of Web 2.0 and social media technologies, for example: one study cautioned that the way the educator uses Web 2.0

technologies in class may discourage social interaction between students. Findings also show that some students did not experience the use of Web 2.0 technologies as necessary for their studies or that they gained skills and knowledge from the use of these technologies. Results from one study mentioned that younger students are not taking full advantage of the benefits of Web 2.0 for learning, while another study pointed out that although educators have positive perceptions regarding Web 2.0 tools, they do not always integrate the technologies into teaching and learning as planned.

Facebook as the most studied and used social media application is discussed next.

#### 6.3.4.2 Facebook

Facebook was the most studied social media tool in the 220 studies. The word “Facebook” appeared in total 9 983 times in the 220 studies, was used in 68 studies, and was the topic of research in 35 studies. Facebook was found to be an important tool for social interaction, collaboration, and communication between students. Students in general found that Facebook contributed to their communication skills: they indicated that they used Facebook for self-expression, entertainment, and to pass time. Additionally, Facebook was found to facilitate student-educator interaction: Facebook enabled students to interact directly with the educator and ask questions they might not feel comfortable asking in class. In this way Facebook increased students’ self-esteem: motivating them to communicate with educators and other students. Facebook also allowed educators to communicate with students and to provide immediate feedback on student activities.

Students preferred Facebook to other social media, and found the educational use of Facebook to provide advantages like time gain, increased academic success, and improvement of academic life. Students also commented that Facebook provided both social and general satisfaction and that they experienced education as more entertaining when incorporating Facebook. In several studies evidence suggested that Facebook enhanced student engagement and social interaction in learning activities. Findings pointed out that Facebook combatted social isolation through the building of an online community where students could learn from other students, and network with groups who have similar academic interests. Distance learning students also reported that they

benefitted from communication with fellow students over Facebook. Most students and educators viewed Facebook as a valuable learning tool, but which they can also use to interact on a social level.

Research findings of six studies showed an improvement in students' reading and writing skills when using Facebook. By holding casual discussions or by engaging in social chats with Facebook friends, students were able to learn new words, build confidence, and experience a positive attitude towards language learning. Dixon (2012), however, reports that his research did not find that Facebook offered any advantages to student writing, nor did it have a negative impact on measures of writing success.

Research results regarding the use of Facebook in an educational context showed highly positive findings. However, in the 68 documents studying Facebook use, some less positive results were found. Students did not necessarily consider Facebook a space for academic engagement or formal learning. Results also showed that students seldom communicated on their universities/institutions' Facebook pages. Some students found commenting on items posted by educators, and educators' comments on items they had posted, uncomfortable and indicated that educators' presence on Facebook affected their willingness to collaborate. Student respondents also revealed a low opinion of educators with high levels of self-disclosure on Facebook. Some educators pointed out that they found it challenging to use Facebook due to varying ICT literacy levels.

Responses from both students and educators indicated that Facebook was viewed by some as addictive – causing students to spend too much time online. Some respondents also commented that Facebook use increased negative academic effects, e.g. distraction, procrastination, spending less time on schoolwork, and lower grades. The predominance of English on Facebook was also experienced as a disadvantage, especially for European institutions.

### 6.3.4.3 Blogs

Blogs were the second most studied social media tool in the 220 studies analysed. The words “blog, blogging, blogs” appeared 3 227 times in the 220 studies, was used in 47 studies, and was the topic of research in 24 studies.

Blogs were mostly found to enhance collaboration: blogs created an online collaborative learning environment in which students could learn by looking at the contributions of other students, do research with other students, and take part in cooperative, creative learning activities in groups. Blogs were also found to stimulate active and cooperative language learning and improve students’ writing abilities.

Evidence furthermore showed that the use of blogging by students and teachers created an effective online learning community in which students took part in collaborative reflection and thinking activities. Most studies pointed out that a learning community on a blog stimulated the sharing of ideas, opinions, thoughts and learning materials. Students were also able to participate in knowledge construction, became involved in the learning process, and changed from passive to active learners. Blogs reportedly made classes more interesting, increased students’ satisfaction with learning, and helped them to gain self-confidence - which in turn enabled them to engage with other students both inside the classroom and outside in the community.

Blogs were found to be highly suitable for interaction. Blogs increased students’ interaction with peers, other students, educators, and with faculty members, especially because they could communicate in their own time. Students reported better social interaction using blogs than just studying together in the traditional classroom. Students mentioned that they found blogs easy to use, good for communication, good for integration on campus, and good for working in groups. In one study students commented that they perceived blogging as extra work, and in another study students revealed that they were disappointed with the limited participation of other students and the educator on the blog.

By using blogging for learning, educators were able to assess students’ development, provide support and give timely feedback about students’ work and progress.



Furthermore, blogs enabled educators to reflect on their own teaching practices and teaching experiences, and to share their teaching ideas with peers and other educators. Only one study reported that educators were not always willing to use blogs.

Students' perceptions of blogs were mostly positive: according to a number of studies students perceived blogs as the most useful Web 2.0 application in terms of learning. They indicated that using blogs improved their willingness to help other students and to share work online. Students furthermore saw blogging communities as online collaborative learning environments where they could interact with peers and friends. Findings from two studies indicated that there were students who were not willing or preferred not to comment on other students' posts on blogs. Only one study reported that blogs were seen as not suitable for educational use.

#### 6.3.4.4 Twitter

Twitter was found to be the third most studied social media tool in the 220 studies analysed: the word "Twitter" appeared 2 629 times in the 220 studies, was referred to in 51 studies, and was the topic of research in 15 studies.

Analysis found that Twitter was described as a fast and viable communication channel, easy to use, and available across international time zones and over geographical boundaries. Twitter was also portrayed as suitable for project-oriented, academic communication, for private, informal communication; for peer-to-peer communication; for communication between students and educators; and for communication from and to universities/institutions. Twitter was furthermore found to improve communication and relationships between students by altering in-class communication patterns and by enhancing face-to-face discussions. One study concluded, however, that Twitter is unsuitable for communication and for teaching because of the 140 character limit.

By incorporating Twitter into the classroom, findings showed that students' levels of attentiveness and their enthusiasm for learning activities increased, because Twitter created a sense of community which motivated students to actively participate in learning activities. Twitter was also found to increase the participation of more

introverted students in learning activities. Two studies, in contrast, inferred that Twitter created classroom distraction and may constrain critical thinking and self-reflection.

Twitter increased interpersonal, social, and academic engagement between faculty and students, and among the students in a course. Educators found Twitter suitable to send academic information, e.g. assignment reminders or class announcements, to students, on which students were found to respond positively. Twitter also enabled timely feedback to students regarding learning activities and requests for information. Some students however, mentioned that Twitter did not enhance their interaction with instructional staff.

Most students were willing to use Twitter for education and for social learning because they experienced Twitter use to impact positively on their grades and on their perception of a course. Students mentioned that their reading and writing skills improved by using Twitter: they also found that their second language skills improved. One study stated, however, that Twitter was found to create poor writing and language use skills.

Educators were found to be using Twitter to connect with peers from around the world. The need for training of (as well as support to) educators in the use of Twitter in educational settings was accentuated.

#### 6.3.4.5 Wikis

Wikis were the fourth most studied social media tool in the 220 studies analysed: the word “wiki(s)” appeared 1 746 times in the 220 studies, was the topic of research in 10 studies, and was mentioned in 36 studies; of which 24 mentioned the wiki as a collaborative learning tool.

Scrutiny of the findings of the study sample found that wikis as a collaborative learning tool were used to encourage students to work cooperatively in understanding learning content. Wikis were found to work well to support group projects, and were found important for group self-regulation and self-explanation: students, for example, posted messages for group discussions on the wiki and worked together on group assignments. Organising wiki content encouraged students to contribute to web-based information,

and in that way actively learn. Students regarded wikis as a publishing tool rather than a collaborative learning tool: findings showed that students' perception of a wiki affects how they use it, and the way in which they designed and implemented individual activities.

Wikis were found to improve students' satisfaction with learning – doing a project on a wiki motivated students to dedicate extra effort to a project and engaged them in the construction and retention of knowledge. Wikis were especially useful for language learning and to improve reading and writing skills.

Educators reported that they experienced some disadvantages from the use of wikis for teaching: a majority of the contributions of students on wikis were made late in a task or assignment, making the possibility of extensive collaboration unlikely. One (1) study indicated that some students who participated in wiki-based activities needed constant encouragement and support: collaborative learning happened only when students were willing to read and edit the contributions of other students on the wiki. One study reported that student achievement and learning outcomes did not necessarily improve after the use of a Wiki. Two studies reported that although overall participation was high, only a few students did the bulk of the work and many students' contributions were superficial. The findings of one study indicated that students made little use of the wiki's commenting feature.

The positive and negative responses summarised from the study sample, and focused on the attributes of effective teaching and learning with technology (see Table 4.4), are listed in Table 6.6.

**Table 6.6:** Positive and negative findings which may influence the choice of media.

<b>CHOICE OF A MEDIUM</b>	Web 2.0	Facebook	Blogs	Twitter	Wikis
<b>Positive / favourable findings/comments:</b>					
Allow for <b>interactive learning</b>	X	X	X	X	X
Allow <b>interaction</b> between students	X	X	X	X	X
Allow <b>interaction</b> between students and educators	X	X	X	X	X
Allow timely <b>feedback</b>	X	X	X	X	X
Enable the forming of <b>communities</b> /groups of learning	X	X	X	X	(X)*
Help to gain/save/manage <b>time</b>	X	X	(X)*	X	X
Keep students <b>engaged</b> in their studies	X	X	X	X	X
<b>Motivate</b> students to <b>actively learn</b>	X	X	X	X	X
<b>Motivate</b> students to <b>collaborate</b> in groups	X	X	X	(X)*	X
<b>Motivate</b> students to <b>participate</b> in groups	X	X	X	X	X
Stimulate <b>enthusiasm and satisfaction</b> in students	X	X	X	X	X
Suitable as <b>diverse teaching</b> method	X	X	X	X	X
Suitable for <b>communication</b> between students	X	X	(X)*	X	X
Suitable for <b>communication</b> between students and educators	X	X	X	X	X
Improve <b>language, writing and reading</b> skills	X	X	X	X	X
Increase <b>computer/Web 2.0/technological</b> skills	X	X	X	X	X
Develop <b>management and professional working</b> skills	X	X	X	X	X
Improve students' <b>communication</b> skills	X	X	X	X	X
<b>Negative / less favourable findings/comments:</b>					
Constrain critical thinking				X	
Discourage interaction	X		X	X	
Limited participation from students			X		X
Negative influence on collaboration		X			
Not good/conducive for learning	X		X		
Not good/conducive for writing or reading skills		X		X	X
Not suitable for academic engagement		X			
Not suitable for academic interaction		X			
Students gained no skills	X				
Use is a waste of time	X	X		X	

\*Aspects not specifically mentioned in research documents.

The summary above focuses only on the most popular social media technologies found in the study sample. Many advantages or disadvantages (positive and negative comments/findings), described in the previous section are not listed in Table 6.6. In

Table 6.6 only those positive and negative aspects applicable to the attributes of effective teaching and learning with technology, and those found to be mentioned under each of the technologies discussed, are listed. Table 6.6 shows that Facebook, Twitter, blogs and wikis are advantageous to effective teaching and learning.

Although the findings reported are mostly positive regarding the use of all the social media tools mentioned, some negative findings/concerns were mentioned about social media use in general. Both educators and students expressed concerns about professionalism, liability, privacy, safety, copyright, and ownership of work when using social media. Students were also concerned about the absence of substantive feedback from other students, and because not all students contributed equally in online projects. Time was mentioned as the biggest concern. Respondents mentioned that it takes a lot of time to learn to use social media, and a lot of time to keep current. Older respondents, some educators and a few students experienced social media as a waste of time. Educators also indicated that they felt pressured to use social media, despite having reservations regarding the usefulness thereof.

#### **Choice of media: Key findings**

Social media use seems to be highly effective in the context of education, and for enhancing effective teaching and learning. Although some concerns have been identified, most of them can be addressed by awareness of possible positive and negative effects, appropriate planning, and applicable training.

In Table 6.7 a list of the key perspectives, summarised from the findings of the 220 documents included in the review (the study sample), are presented. The analysis of the data was guided by the conceptual framework of the study (see Figure 4.3), and in particular by the attributes of effective teaching and learning indicated in the framework. These key perspectives are important for establishing the most effective ways in which educational applications of social media can enhance the theory and practice of South African higher education.

Table 6.7: Key perspectives from the systematic analysis.

<b>KEY PERSPECTIVES GAINED ON THE EFFECTIVE USE OF SOCIAL MEDIA IN EDUCATION</b>	
<b>Access to or use of computers or technology</b>	Most institutions seem to have access to technological devices. Low-income students have the least access. Increased access to technologies enables students and educators to have any-time, any-place access to study material, information, news feeds, and class discussions.
<b>Familiarity with, skills in, and prior experience with technology</b>	Most students are familiar with social media, although their skills in using social media may differ. Limited skills in using social media may negatively influence students' use of social media in an educational context. Guidance and/or training in the use of social media in an educational context is important to increase skills.
<b>Attitudes toward use of social technologies</b>	Expectations, prior knowledge, and skills in the use of technologies influence attitudes toward social media. Institutions use social media for communication, marketing, and administration; educators use social media for teaching, and for personal and professional communication; students use social media for communication, social interaction, to share information and knowledge, and for learning.
<b>Time associated with use of social media</b>	Social media allow students time to learn, communicate, collaborate, and interact. Social media may create opportunities for distraction and procrastination, may negatively impact on students' grades, and may be regarded as a waste of time and too time consuming.
<b>Communication in educational context</b>	Social media can be used to improve communication in an educational context. Social media create opportunities for students to communicate with other students and educators, and for communication from the university/institution to students and/or the community.
<b>Active learning</b>	Active learning takes place when social media is used. Social media encourage students to participate in collective learning, become involve in the learning process, to contribute to and share information, and to construct and apply knowledge.
<b>Collaboration</b>	A wide variety of collaborative activities are made possible by the use of social media, including to find and share information and to co-construct knowledge. Students and educators may need motivation to participate in collaborative activities.
<b>Participation</b>	Social media use leads to increased participation by students and educators in learning activities. Social media encourage students to share information with other students, and to participate in learning and in campus activities.
<b>Engagement</b>	Social media use can increase student engagement, improve student-educator contact, contact among students and the sense of community among students. Social media use may impact negatively on students' writing skills, and some students may be unwilling to become engaged in online learning projects.
<b>Interaction</b>	Use of social media increases interaction: student-educator interaction may change students to active learners, encourage them to learn, share information, and create knowledge. Academic interaction among students leads to increased interaction outside the classroom and can improve involvement in campus life.
<b>Feedback</b>	Social media can serve as an effective platform for appropriate and timely feedback by educators on students' work, which can impact positively on student learning. Public platforms should, however, be avoided or used with caution.
<b>Motivation</b>	Social media technologies can be used to motivate students. Motivated students will seek information and will learn more, they will communicate with other students and educators, and can be more successful in their studies.
<b>Diverse teaching methods</b>	A variety of social media tools and applications are available from which educators can choose to support students' unique learning needs and abilities. Social media use can support students to learn in ways that suit their educational needs, and they can learn in a time and setting suitable to their specific situation.

The perspectives presented in Table 6.7 clearly correspond with the criteria for effective teaching and learning (see Chapter 4, Table 4.4) and the principles for good teaching and learning (see Chapter 4, Table 4.3). The perspectives gained from this chapter also bring to the fore the role of the communication features (see Chapter 2, Table 2.8), and the features of social media (see Chapter 3, Table 3.3) in using social media in an educational context; especially the background of the user, the hardware and software needed, and the networks used for communication transfer.

#### **6.4 CONCLUSION**

The results of the analysis of the data retrieved from the 220 documents included in this study delivered substantial findings that provided invaluable insight into the use of computer-mediated communication (CMC) technology and Web 2.0 applications in higher education and their potential to communicate with students. The determining role of good communication underlying effective teaching and learning using social media has clearly been established.

In Chapter 7, these findings, in relation to the research question, are interpreted and discussed in order to come to conclusions that may give direction to the most effective ways in which social media and CMC can enhance the theory and practice of South African higher education.

## CHAPTER 7

### DIRECTIVES FOR THE EFFECTIVE USE OF SOCIAL MEDIA IN SOUTH AFRICAN HIGHER EDUCATION

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Interpretations or conclusions are the main opinion statements or findings derived at by the reviewer after examining and interpreting the results of common elements across heterogeneous studies (Pai *et al* 2004: 94). The Joanna Briggs Institute (2011: 75) advises that the conclusions of a systematic analysis should demonstrate the significance of the review findings to practice and research and cautions that conclusions or interpretations must be based on documented results, and not on the reviewer's opinion. Chapter 7 presents understandings, interpretations and conclusions based on the research findings of the systematic analysis, supported by the literature review of Chapters 2 to 4.

#### 7.1 INTRODUCTION

The aim of Chapter 7 is to answer the overarching research question, namely:

*What are the most effective ways, as suggested by current research on CMC and social media undertaken globally, in which educational applications of social media can enhance the theory and practice of South African higher education?*

In addressing this question, the previous chapters provided important background information:

- Chapter 2 provided the theoretical communication science background by investigating the major concepts related to the communication process on hand of the Traditions of Communication Theories, and applicable Communication and CMC Theories. Perspectives gained from this “communication-centred lens” provide focus on the key features of CMC relevant to the study (see Table 2.8).
- Chapter 3 provided the theoretical foundation for the study focused on social media as tool of CMC. A profile of social media as CMC was sketched by comparing the features of social media, the characteristics of popular social



media tools and applications, and features of new and improved social media applications and tools. This “social media-centred lens” provides focus on the features of communication using social media (see Table 3.3).

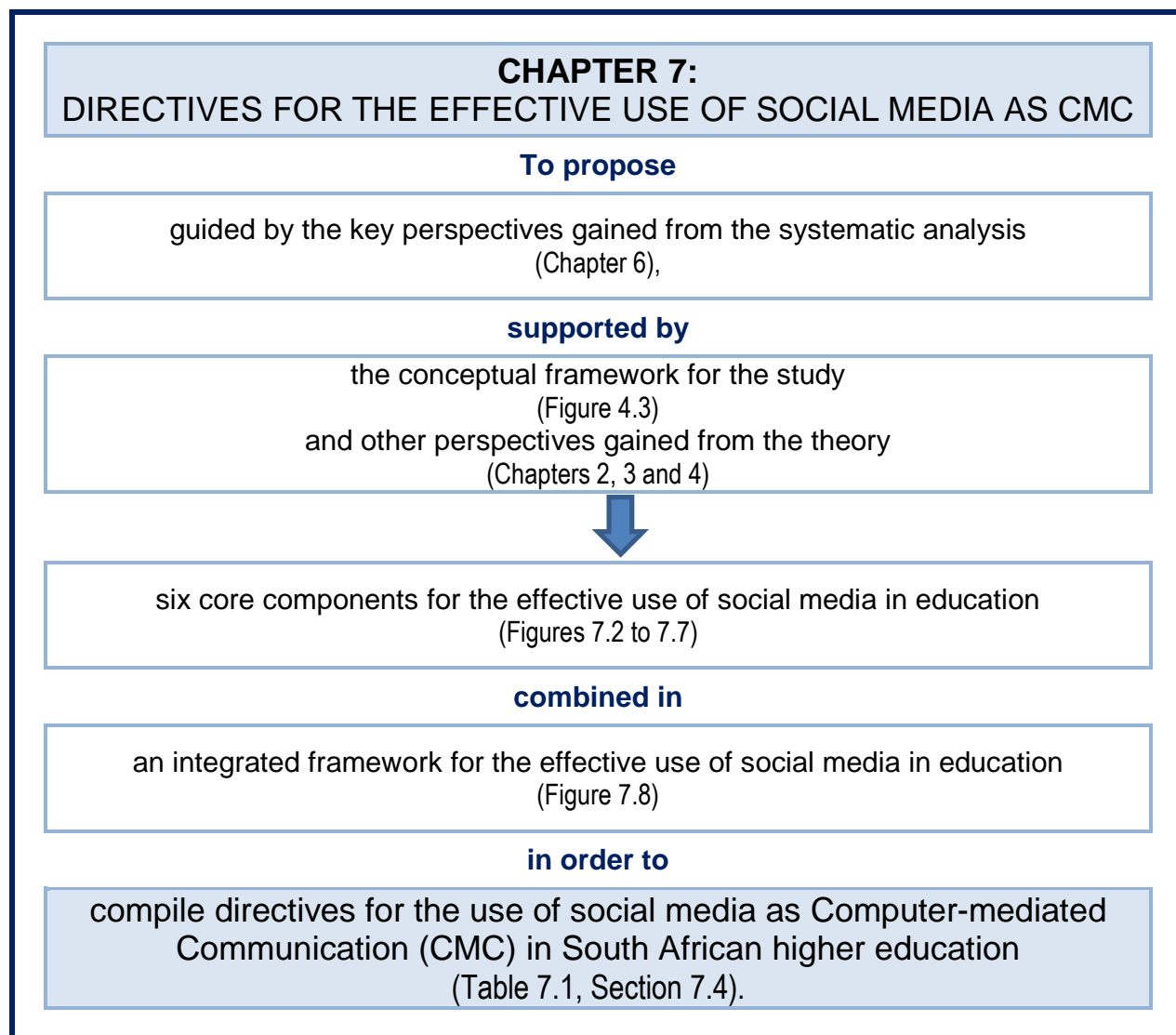
- Chapter 4 was devoted to a discussion of the major Learning Theories and the principles of good practice in teaching and learning using social media. The perspectives gained in this chapter were used to filter theory through an “education-centered lens” which were summarised into key elements for effective teaching and learning with technology (see Table 4.4).
- Chapter 6 presented the findings of the systematic analysis of the data retrieved from the 220 documents included in the review (the study sample).

In Chapter 7, key perspectives gained from the analysis, supported by the knowledge gained from the previous chapters, are integrated to compile a framework for the effective use of social media as CMC in teaching and learning. The perspectives are supported by recent, relevant facts and statistical information about features of South African higher education. Four resources used need special mentioning:

- 1) A comprehensive study conducted during 2013 by the Centre for Teaching and Learning (CTL) at the University of the Free State (UFS) on the digital identity of students and staff at the institution (UFS 2013a/b/c);
- 2) The 2012 statistical report on post-school education and training in South Africa, compiled by the Department of Higher Education and Training (DHET), South Africa (DHET 2014). From this report, statistical information about current student numbers in South Africa were deducted;
- 3) The “SA High-tech student research study 2013”, conducted by the agency World Wide Worx (World Wide Worx 2013; SouthAfrica.Info 2013c); and
- 4) Papers delivered at two recent conferences attended by the researcher:
  - a. The Social Media Conference 2014 (Johannesburg, South Africa); and
  - b. The 2014 Conference of the Higher Education Learning and Teaching Association of Southern Africa (HELTASA), (Bloemfontein, South Africa).

From the framework (Figure 7.8), directives for the use of social media as computer-mediated communication in South African higher education are compiled.

Figure 7.1 illustrates the layout and goal of Chapter 7.



**Figure 7.1:** Outline and goal of Chapter 7.

In this chapter, the results of the analysis are integrated into a summarised explanation of the use of CMC technologies in higher education. The summary allows the researcher to propose a framework from which directives can be compiled in order to answer to the research objective of the study, namely:

*To undertake a systematic analysis of selected research reports on the educational applications of social media in higher education **in order to establish research-based directives for the utilisation of CMC and social media in South African higher education.***

The results of the study are presented in six categories as components of a cyclic process using social media for communication, teaching and learning, and knowledge creation. The foundation of the process consists of the Communication Theory presented in Chapter 2, the cyclic process of knowledge creation (Figure 2.5), enhanced by the Theories of Learning discussed in Chapter 4 (see Table 4.1 and Figure 4.2). The six categories are illustrated as six separate cyclic processes, each containing six elements (see Figures 7.2 to 7.7). Together, the six categories form the core components of the framework for the effective use of social media in education, presented in Figure 7.8.

## **7.2 CORE COMPONENTS OF A FRAMEWORK FOR THE EFFECTIVE USE OF SOCIAL MEDIA IN SOUTH AFRICAN HIGHER EDUCATION**

The Communication Theories (see Section 2.3), put the user, his/her culture and the language of the culture, central in any communication process. The first category therefore focuses on the user of social media and those factors related to the background of the user which influence the effective use of CMC technologies and social media tools.

### **7.2.1 Factors impacting on the effective use of social media**

A person skilled in using technology, or who has regular access to technology, will be skilled or experienced in the use thereof and will be willing to use technologies for communication in an educational context (see Section 6.3.1.3). This category consists of six elements, the user, his/her culture, language and background, as well as the experience the user has in using technology. These elements influence the user's willingness to use technologies in an educational context.

**The user** in the context of this study is the learner, educator, or institution/university. According to the Sociopsychological Tradition of Communication Theories (see Section 2.2.2), a user has a unique personality and specific characteristics, feelings, beliefs, norms, and values which influence the way he/she communicates and interacts with other people (see Table 2.8). Each learner or educator is an individual coming from a

specific background which impacts on the way the person communicates, interacts with other people, and studies (see Sections 2.5 and 4.3.3: Principle 3).

A user's personality, behaviour, development and learning are the result of the **culture** the user grew up in or lives in. The user may belong to one or more cultures, or may be part of one or more social groups. The Sociocultural Tradition of Communication Theories (Section 2.2.1), proposes that culture is the prime determinant of individual and learning development: culture impacts on the way a user communicates and also determines his/her patterns of thought, ideas, understandings and prior knowledge. The culture of a person may influence the person's socio-economic situation, and income mostly determines access to technology.

In South Africa, the background and culture of students pose a challenge to higher education: South Africa's 23 public universities have in total 953 373 students from many different cultures, ethnic groups and backgrounds. The report of the Department of Higher Education and Training (DHET 2014: 17) shows that 67% of South African students are black, 20% white, 7% coloured and 5% Indian/Asian. Most of the universities also accommodate students from other countries, mostly from neighbouring countries in Africa. Although statistics show that access to technology increased in most countries in Africa (see Chapter 3, Section 3.4.3), many students grew up with limited or no access to technology, and therefore have limited or no experience in the use thereof.

Users communicate using a specific **language** with words and signs that are known only to the people in a specific culture (see the Semiotic Tradition of Communication Theories, Sections 2.2.3). The language of a culture consists of shared meanings of words, rules, signs, symbols, codes, grammar, etc. and impacts on patterns of thought, and the understanding and processing of information. English, as the unofficial language of the WWW, influences people's use of technology because fewer technologies are available to people not fluent in English, or people who are not able to understand English. Although South Africa has 11 official languages, English is used or understood by most of the people in the country (SouthAfrica.Info 2013b), making Internet-based sources and social media available to most South Africans.

As shown in Chapter 6 (Section 6.3.1) and in Chapter 2 (Section 2.5 and in Tables 2.5 and 2.8), background, culture and income impact on **access to technology**. Access to computers, technological devices and social media tools influences communication between people, yet, has become increasingly necessary for teaching and learning. CMC technologies make research, the collection of data, the finding of information, and the sharing of knowledge easier, faster and accessible to many more people. Results from the systematic analysis (Chapter 6, Section 6.3.1.1) indicate that between 94% and 100% of student respondents have efficient or frequent access to CMC technologies; including computers, tablets, laptops, mobile or smart phones.

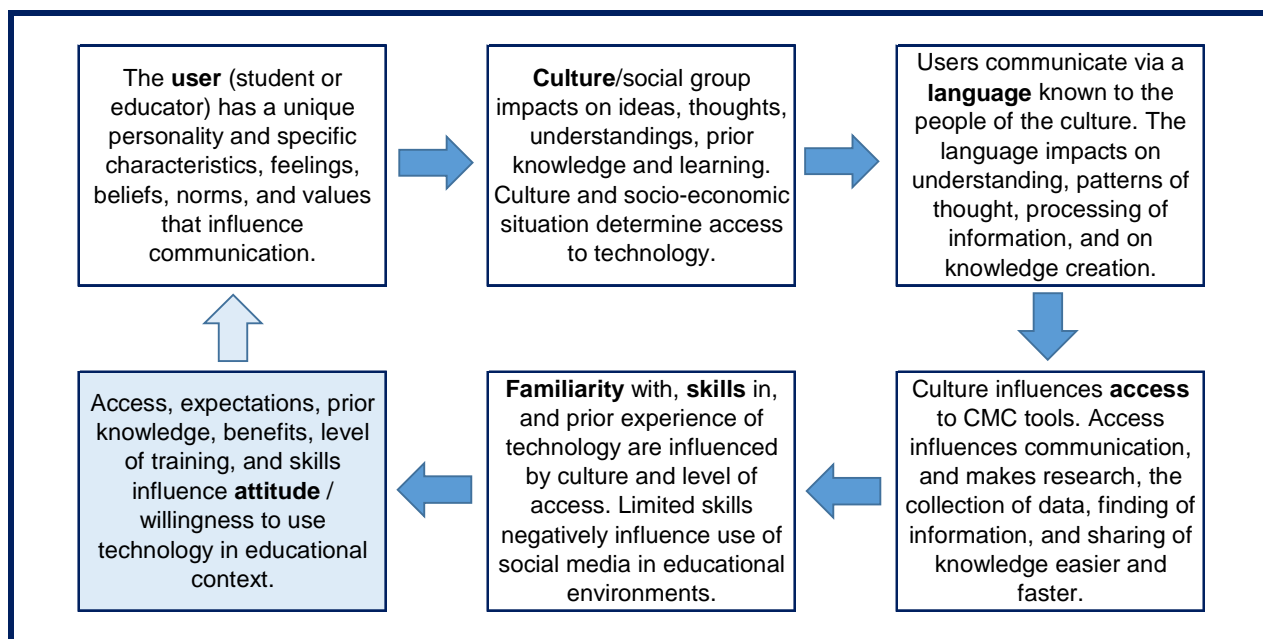
Although just over a quarter (25.5%) of South African households have Internet access (see Section 3.4.3), nearly 100% of students in South Africa have either a smart phone or a cell phone, and have access to technology at the campus where they study. The study conducted at the UFS on the digital identity of students and staff (UFS 2013a/b) indicates that although 100% of students at the UFS own a smartphone, only 85% of students use their smart phones for academic purposes due to costs related to devices and data, or because of limited Internet access (UFS 2013b: 7, 30). Telkom, South Africa's main fixed line operator, announced that by 2015, all South African universities are required to be wireless, providing free Internet access to students (SouthAfrica.Info 2013a).

**Familiarity with, skills in, and prior experience** of technology may be influenced by many factors, including culture, ethnic and racial background, age group, home language, beliefs and socio-economic factors, and therefore differ from person to person (see Cognitivism, Section 4.2.2.3 and Sections 4.3.4 and 4.5). Most learners (represented by the respondents of the study sample) are, however, experienced users of technology (see Section 6.3.1.2). Because of the high access to technology in most of the more developed areas of Africa and South Africa (see Section 3.4.3), most students in South African higher education are experienced and skilled users of technology and social media. Limited skills / prior experience in using social media may negatively influence students' use of Web 2.0 technologies in educational environments. Although, even if students and/or educators are familiar with social media, they might still need guidance to use social media in an educational context (see Section 6.3.1.2).

Access to technology influences the **attitude towards use / willingness to use technology** in an educational context (see Section 6.3.1.3 and Table 2.7). The Experiential and Perceptual Theories of CMC, especially the Channel Expansion Theory (Section 2.4.2.2), argue that as individuals gain more experience with a particular communication medium, they are more willing to use and experiment with other technologies. Findings of the systematic analysis (Chapter 6) indicate that attitudes toward use of social technologies are influenced by expectations about the social medium, prior knowledge of technology, benefits offered, as well as level of training/skills in the use of social technologies (see Section 6.3.1.3). Results show that educators utilise Web 2.0 technologies for personal and professional communication and for teaching, but may need training in the use of Web 2.0 technologies to adopt online learning technologies to a greater extent. Results show that students find technologies easy to use and are generally attracted to courses and programmes that utilise social media applications (see Section 6.3.1.3).

In a South African context, Van der Merwe (2014) reports that more than 80% of students on the campus of the UFS feel prepared enough to use technologies for studies: the students indicate that technology increases enjoyment of a module and also increases their active involvement in the module. Because social media allows students to use creative and innovative methods for learning, they experience the use thereof as academically motivating. Most of the staff at the UFS, however, indicated that they need either training or support in using social media applications in an educational context (UFS 2013a: 25, 33). The findings of the report of World Wide Worx (SouthAfrica.Info 2013b), show that students believe social media improve their studies, enhance their quality of life, and even support them in exam time.

Figure 7.2 depicts the elements impacting on the effective use of social media.



**Figure 7.2:** Factors impacting on the effective use of social media.

In Figure 7.2, the findings from the study illustrates that the user, his/her culture (including background and socio-economic situation), and language influence access to CMC and social media technologies which in turn influence the skills or experience a person has in using technologies. Skills, prior knowledge, and familiarity with technologies influence the willingness of a person to use social technologies, especially in an educational context. The arrows in the Figure 7.2 indicate that each element impacts on the following element, and is, in turn, dependent on the previous element. The focus of the last element of the figure is on the factors which influence the user's attitude towards / willingness to use and experiment with social media. This element is influenced by, and influences in turn, the availability of technology.

The second category focuses on the hardware, software, networks and technology needed to use CMC and social media technologies.

### 7.2.2 Technology needed for the effective use of social media

People can only have ample access to computer technology if the necessary infrastructure is available. Chapter 2 (see Table 2.8) and 3 (see Table 3.3) provide the

background information about the influence of computer technology on human communication. Computer hardware and software, telecommunication networks, and technological tools and devices are needed for computer-mediated communication, access to data and information, and to participate on social media.

As explained in Chapter 3, **computer hardware** includes personal computers, tablets, cell and smart phones, mobile or wearable technology, etcetera. **Computer software** includes all the programs, systems and program languages needed to enable computer technologies to function and communicate with one another.

**Telecommunication networks** consist of hubs, nodes and links, interactive web applications, high-speed Internet connections, broadband access, and a user-centric infrastructure (see Sections 2.4 and 2.5). Telecommunication networks are dependent on **electronic networks** with electronic components and elements. An electronic network is influenced by noise – anything that interferes with the transmission and reception of messages, or makes messages uncertain, inefficient or difficult to understand – and depends on the capacity of the system – the amount of information a channel of the system can carry (see the Shannon and Weaver Model of Communication, Figure 2.2).

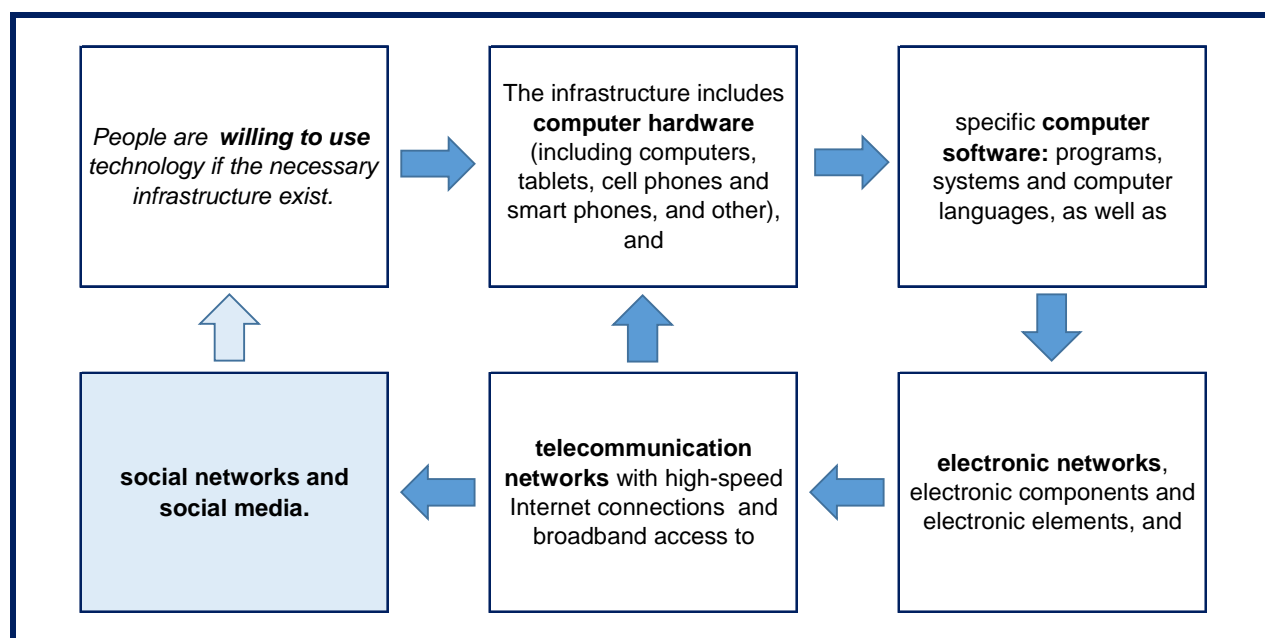
Communication happens via **social networks** or systems over telecommunication networks. A social network survives on collaboration, active participation, social interaction and feedback, and includes social media applications which people can use to interact with one another, share resources, create content, and participate in group projects. The Network Theory (see Section 2.3.4) focuses on the influence of the connections, interconnections, nodes and links found in networks on communication processes.

Although sub-Saharan Africa improved its broadband infrastructure and mobile network coverage during 2012, there is still a sharp digital divide between sub-Saharan economies in terms of ICT-driven economic and social impacts (Bilbao-Osorio, Dutta & Lanvin 2013: 25). Low levels of ICT skills, shortage of electricity, low educational attainments and unfavourable business conditions are hindering Africa's capacity to fully leverage the potential of the ICT infrastructure (AfricaFocus Bulletin 2013). In South



Africa, broadband access is growing with 41% a year (SouthAfrica.Info 2013a), providing 2.2 out of every 100 people with access to the Web. In a study by World Wide Worx (2014), 85% of South African students indicated that they use social media for their studies. The study at the UFS (2013c: 17) found, however, that computer literacy, student preparedness, the costs of access, and low device ownership create student resistance towards the use of technology in an educational context. These factors need to be taken into consideration when the use of social media for teaching and learning is planned.

Figure 7.3 illustrates the influence of computer technology on the use of social media by educators, students and/or institutions for teaching and learning.



**Figure 7.3:** Technology and the effective use of social media.

People’s willingness to use social media if they have access to computer technologies and reliable electronic and telecommunication network systems are illustrated in Figure 7.3. The aspect “willingness to use” in the first block of Figure 7.3 overlaps with the aspect “attitude towards use” indicated in the last block of Figure 7.2, meaning that an efficient computer infrastructure is crucial for the effective use of social media in an educational context.

### 7.2.3 The use of social media in an educational context

As illustrated in Chapter 2: Table 2.8, and in Figure 7.3, communication is supported by computer and network hardware and software which allow access to social networks and a wide variety of social media tools and applications from which users can choose. According to recent predictions (see Section 3.4.2), approximately 2.44 billion people will be using social networks by 2018 – made possible by developments in technology which will provide affordable and accessible access to many people worldwide. Social media are already becoming the main source/means of communication for most people, and are increasingly used for teaching and learning by universities and educational institutions worldwide.

**Social media** can be defined as Internet- and mobile-based tools and devices, as user-centred, interactive web applications, or as Web 2.0 resources (see Section 3.3.1). A variety of social media applications and tools are available which allow instantaneous communication over vast networks to engage enormous numbers of people in networking, sharing, and collaboration. The term “social media” comprises, *inter alia*, social networks, blog platforms, wikis, niche networks, social bookmarks, virtual worlds, gaming sites, forums, message boards, and many other social media applications (see Section 3.3.2 3). The vastness of the social media landscape is illustrated by the tools studied in the documents included in the study sample. The systematic analysis of these documents shows that Facebook and Twitter are the most studied (and popular) social media tools in the study sample (see Section 6.3.4), and that wikis, blogs, SNSs and Web 2.0 applications (as general terms to describe a variety of technologies) are also highly popular. To illustrate the extent of the social media landscape: results from the study example show that 117 different technologies were investigated/included in the studies involved (see Section 6.3.3.3).

A person will **select/choose** a medium influenced by personal or professional communication needs, by expectations regarding the outcomes of the use of the medium or by one or more of the features of CMC media guiding the choice. Section 2.4 provides an overview of five groups of CMC theories that includes aspects related to the way people select and use communication media (see Table 2.7). The choice of media may be fuelled by culture, background, skills, prior knowledge of CMC, and by

experience in using social media. When selecting social media, users are looking for social interaction with people of similar interests, they want communication that encourages participation, engagement and openness, and they want to experience feelings of social and individual well-being (see Section 6.3.4 and Table 2.7).

Facebook is currently “the universal social destination for students with 96% of students worldwide using it” (World Wide Worx 2013), while Twitter is used by 70% of students. The study of the UFS reveals that, although students prefer the use of Blackboard and SMSs as means to communicate with lecturers, they also indicate Facebook and Twitter as possible communication media (UFS 2013b: 20). The educators at the UFS campus, however, prefer e-mail, telephone communication and SMSs above Facebook and Twitter (UFS 2013a: 14).

When it comes to the choice of social media applications or tools to use in an educational context, the **positive and negative** research findings as summarised from the study sample in Chapter 6 (Table 6.6) provide useful guidelines. Most of the findings indicate positive results from the educational use of the social media tools mentioned; however, some negative findings/concerns were also mentioned. For example, both educators and students expressed concerns about professionalism, liability, privacy, safety, copyright and ownership of work when using social media. Students were also concerned about the absence of substantive feedback from other students because not all students contributed equally in online projects (see Section 6.3.4.5). Educators indicated that they felt pressured to use social media, despite experiencing reservations regarding the usefulness thereof. Based on the discussion of the Theories of CMC (see Section 2.4), negative aspects related to the use of social media are also summarised in Table 2.7. In the systematic analysis, time was mentioned as the biggest concern, but also as a positive aspect because of the speed of communication and access to information.

According to the Theories of CMC (see Section 2.4), enough **time**, and using time efficiently, is a prerequisite for effective learning (see also Sections 4.5.4 and 4.5.5). Social technologies can dramatically improve time on task, providing access to information and allowing more time for studying (see Section 6.3.1.4). In the profile of social media as a tool of CMC (Table 3.3), high-speed connections, fast, timely feedback

and instantaneous communication are accentuated as positive features of social technologies. Internet-based learning environments allow students to participate in courses at any time and from any place, increasing the time available for completing tasks or participating in activities. The systematic analysis found that social media tools allow students more time to communicate, collaborate and interact with other students (see Section 6.3.1.4). Older respondents, however, described the use of social media as time consuming and a waste of time.

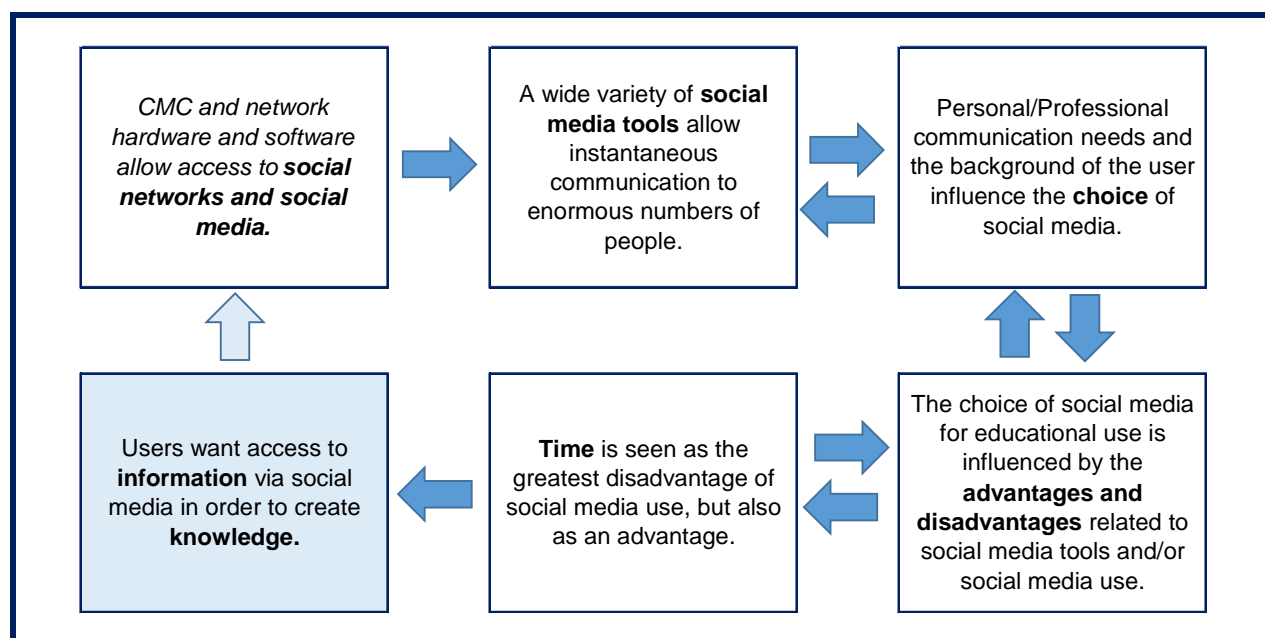
As illustrative of the South African context, students indicate that they experience social media as more positive than negative: students at the UFS campus reported increased enjoyment (and therefore increased involvement and engagement) when using social media for educational purposes (UFS 2013b: 15). More than 80% said social media helped them achieve their academic goals and made them feel more connected to the lecturers (UFS 2013b: 17). Lecturers also reported enjoyment of lecturing with social media, but reported that the cost of data, limited access to networks, lack of Wi-Fi and/or Internet connectivity prevent them from being able to employ all the technologies they would like to have for their teaching (UFS 2013c: ii). The study by World Wide Worx (2013) also found costs of mobile data to be a problem for South African students.

Use of social media may, however, also create opportunities for distraction and procrastination and as a result, may negatively impact on students' grades. Facebook was specifically mentioned as a distraction (see Section 6.3.1.4). The "SA High-tech student research study 2013" found that 59% of South African students describe themselves as "addicted to social media", some even "seriously addicted" (SouthAfrica.Info 2013c), with 45% of students feeling that social media keep them away from their studies. Older users may regard the use of social media as a waste of time and as too time consuming, possibly because they do not have time to learn to use social media. However, even if it initially takes some time to learn to use a new application, social media save time by providing easy access to information (see Section 6.3.1.4).

Both learners and educators want instantaneous access to **information**, and they want to share information with others. Social media applications support users' search for applicable information, and allow them to create, edit or process available information

online in order to create new **knowledge** (see Figure 2.5).

Figure 7.4 depicts key elements from this category; focusing on the choice of social media in education.



**Figure 7.4:** Social media and the choice of social media tools.

The elements: social networks and social media included in the first block of Figure 7.4 are also included in the last block of Figure 7.3, indicating the continuation of the process. Figure 7.4 illustrates that from the wide variety of social media tools available, users must select media suitable to their needs, but based on known or experienced advantages or disadvantages. The double arrows indicate that the aspects mentioned in the four blocks are interrelated and that a user may revisit his/her choice as circumstances change. In an educational context, the goal of using social media is to enable learners to find and process information and to create knowledge, a process depending on the leadership and involvement of the educator.

#### 7.2.4 The educator and the effective use of social media

The educator in the context of this study is a co-user of social media (see Section 6.3.3). The committed educator interacts with students, keeps them motivated and contributes to the student's success (see Constructivism, Social Constructivism and Connectivism,

Sections 4.2.2.5 – 6). Feedback from the educator is used to assess the student's knowledge, supports the student in monitoring his/her progress, and indicates what the student is doing right (or wrong) (see Section 4.3.4 and 6.3.3.1). To effectively use social media to teach a diverse group of students at different cognitive and developmental levels, and at the same time motivate students and provide efficient feedback, the educator should carefully investigate various types of social media technologies (see Sections 4.5.7 and 6.3.3.3). The role of the educator is therefore imperative in this regard.

The effective educator should be an expert in his/her subject and a source of **knowledge**, providing information and learning material to learners (see McLuhan's Systems Theory, Section 2.3.3 and Behaviourism, Section 4.2.2.1). The educator facilitates and guides learning activities, and helps students connect with other learners through debates, discussions and reflective writing projects. Learning activities should be designed to enhance students' understanding, develop critical thinking skills, and help students to create and retain knowledge. When using and choosing social media, the educator should focus on the principles of effective teaching and learning (see Section 4.3), to increase students' chances of success.

Social media allow appropriate and timely **feedback** from educators, which impacts positively on student learning. A "rich" social medium (see Table 4.3), provides more opportunities for prompt feedback in order to enable students to correct mistakes and to actively learn. As an attribute for effective teaching and learning with technology (see Table 4.4), timely feedback is important to stimulate information processing. In addition, feedback is used to assess knowledge, monitor progress, and strengthen actions that enable learning and knowledge creation. Feedback is seen as the most important aspect in good communication and allows information processing, change, learning and the creation of knowledge (see Figure 2.5 and Table 2.6). Wiener, in describing the Cybernetic Theory (Section 2.3.2), states that negative feedback maintains structure by counteracting any change that takes place while positive feedback amplifies change. CMC and social media technologies enable faster, more specialised feedback than what is possible in face-to-face situations: easy access to students' writing efforts enables easy evaluation and fast and timely feedback that motivates students to learn (see Section 6.3.3.1). In the systematic analysis, blogs, wikis, Facebook and Twitter were

found to be effectively used for feedback to students.

Social media technologies **motivate** students to seek information and understanding, communicate with other students and educators, and in that way learn more and be more successful in their studies (see Constructivism, Section 4.2.2.4). Student respondents involved in the study sample experienced an increased sense of community when using social media, and as a result were motivated to communicate with other students and educators. Motivation also depends on students' interest in a subject or learning activity (Barkley 2010: 6), and on educators' expectations of students' chances to succeed (Barkley 2010: 81). The Theory of CMC Competence (Section 2.4.2.5) proposes that certain motivations are served by certain media features and messages, while knowledge of the medium and CMC skills support the media selection. Various technologies, e.g. SNSs, Web 2.0 tools, Facebook, Twitter, Highlighter, etc., can be used to enhance motivation and enthusiasm for educational activities in both students and educators (see Section 6.3.3.2).

The many different types of social media technologies available allow educators to use **diverse teaching methods** and a variety of teaching and learning practices to accommodate students' individual learning needs. Differences among students is based on different talents, backgrounds, learning styles, ethnicity, gender, abilities, experience, prior knowledge, etcetera (see Section 4.3.7). As explained in Section 7.2.1, the student corps of South Africa is highly diverse, not only in the context of race or ethnicity, but also because of varying socio-economic levels and differences in background which impact on skills, prior knowledge and experience.

When students are allowed to use social media for learning, they can learn in ways that fit their educational needs, work in a time and setting suitable to their specific situation, and work at their own pace to complete tasks and assignments using methods or strategies that are more effective for their individual learning style. Aided by technologies, students with similar motives, backgrounds and talents can work together in study groups (Chickering & Gamson 1991: 62), they will be more motivated to learn and be encouraged to communicate with other students and the educator (see Cognitivism, Section 4.2.2.3). Findings in the context of diverse teaching (see Section 6.3.3.3) vary to a great extent because many social media tools and applications were

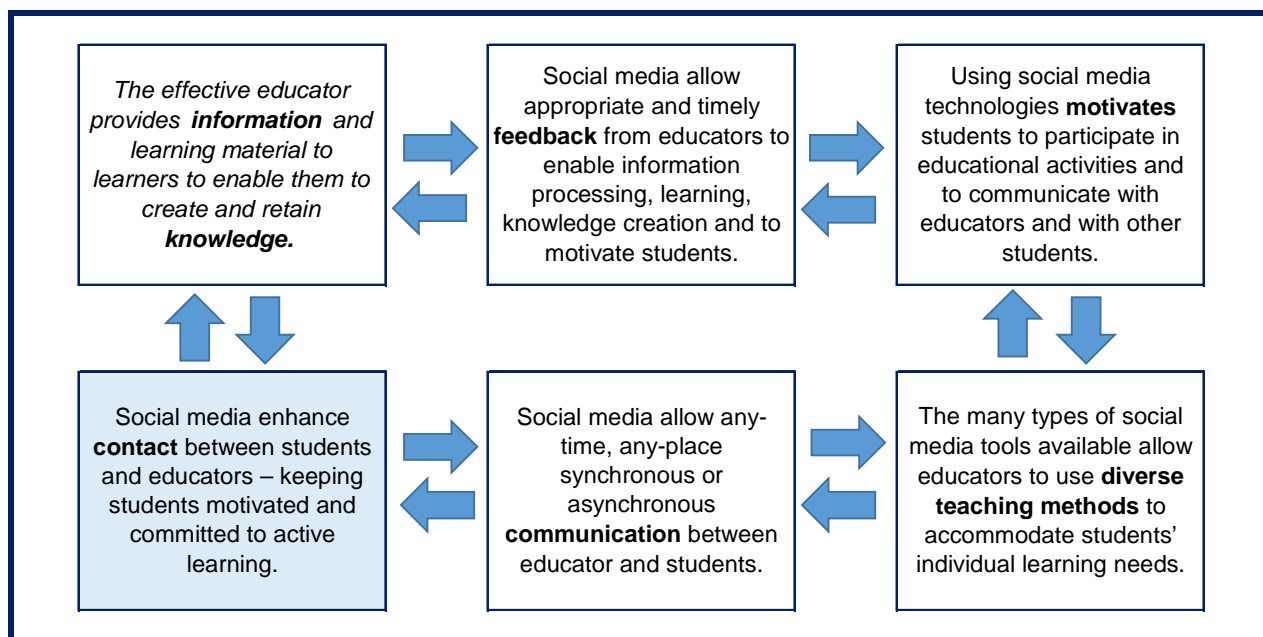
implied in the study sample.

CMC technologies can play an important role in enhancing **communication** between students and educators (see Section 6.3.1.5). The profile of social media as CMC (Table 3.3) lists communication as an important feature of social media because it allows users to communicate with who they want to, when they want to and about the topic they want. Social media also allow for any-time, any-place communication, synchronous or asynchronous communication and include options for both verbal (voice) and non-verbal (cues) communication. Social media encourage even normally shy or introverted students to communicate with educators where they will not do so in face-to-face situations (see Section 2.4.2.5 and 4.3.1, and the theory of CMC Competence, Section 2.4.2.5).

CMC technologies also play an important role in enhancing **contact** between students and educators. Contact between educator and students both in and out of the classroom keeps students motivated and committed to learning (see Principle 1, Sections 4.3.1 and 6.3.2.4). Learning takes place when educator and student debate and discuss learning materials using social media platforms, causing more students to participate. The richer the communication medium, the more opportunities there are for contact between the users of the medium (see the Media Richness Theory, Section 2.4.2.1c). In a South African context, most students at the UFS (75%) indicated that they feel more connected to lecturers and other students (68%) when using technology (UFS 2013b: 18), although they are more likely to connect with one another than with lecturers (UFS 2013c: ii). A 2014 study conducted at the Lupane State University in Zimbabwe, found that the use of technology since 2012 increased with 60%, allowing more contact with educators with the result that students are more engaged in their studies (Ndlovu 2014).

The way the educator can effectively use social media to motivate students into effective learning is illustrated in Figure 7.5.





**Figure 7.5:** The educator and effective use of social media.

In Figure 7.5, a series of two-way processes are shown during which the educator, using CMC and social media technologies, motivates and teaches students by providing prompt feedback, and in that way, motivates students to create knowledge. The first block in Figure 7.5 links with the last block in Figure 7.4 by focusing on information processing and the creation of knowledge. The creation of knowledge is an interactive process relying on motivation, feedback and effective teaching (as illustrated by the two-way arrows), depending on communication and contact with the educator to enable the student to actively learn.

### 7.2.5 The student and active learning with social media

As shown in Section 6.3.2.1, the modern learner, although influenced by background and culture, is independent but engaged and motivated, participates in learning projects which interest him/her, and constructs knowledge through engagement in learning material and collaboration with other learners. Social interaction enables students to form social communities that support collaborative learning and group problem solving. Using social networks, learners communicate, interact with other learners and with educators, and share learning material while actively learn.

**Active learning** happens when students are engaged in their studies, participate in learning activities, and collaborate and interact with other students (see Principle 3, Section 4.3.3 and Table 4.4). The Theories of Interpersonal Adaptation and Exploitation of Media (see Section 2.4.2.3) focus on the ways students learn in social groups, how they represent themselves online, and how students learn by experience to work with other students in online groups. If students also spend time efficiently, and are allowed to use learning methods which suit their individual needs, active learning will take place (see Constructivism, Social Constructivism and Connectivism, Sections 4.2.2.4 – 6). Using social media, both students and educators who become involved in the learning process, are willing to contribute and share information, and are encouraged to construct and apply knowledge (see Section 6.3.2.1). Social media technologies enable students to think critically about information and about what they learn, allowing them to apply the knowledge in problem-solving situations, improving their learning skills, language-related skills and writing skills.

Social media can be used for **collaboration** among most of the role players in the teaching and learning environment (see Section 6.3.3.2). Collaboration between students makes effective learning possible: students learn from one another, they engage in discussions about learning material and they motivate one another. Students also share information and collaboratively co-construct knowledge. CMC technologies furthermore enable educators to teach online, and to share teaching experiences and teaching practices with peers. The choice of the communication medium is therefore of utmost importance (see also the Social Influence Theory, Section 2.4.2.2b). South Africa's educators are challenged to teach to large classes with a highly diverse group of students: Kruger and Fourie (2014) report that the use of technology at the UFS improved collaboration and communication among students involved in large classes, enhancing the learning experience substantially.

In referring to specific tools, wikis seem to be the most effective tools to stimulate collaboration among students. Collaborative learning happens when students are willing to read the contributions of other students on the wiki, and they edit one another's work. Results from the systematic analysis, however, found that students made little use of the commenting feature of wikis, and some students need motivation to participate in collaborative learning activities (see Section 6.3.2.2).

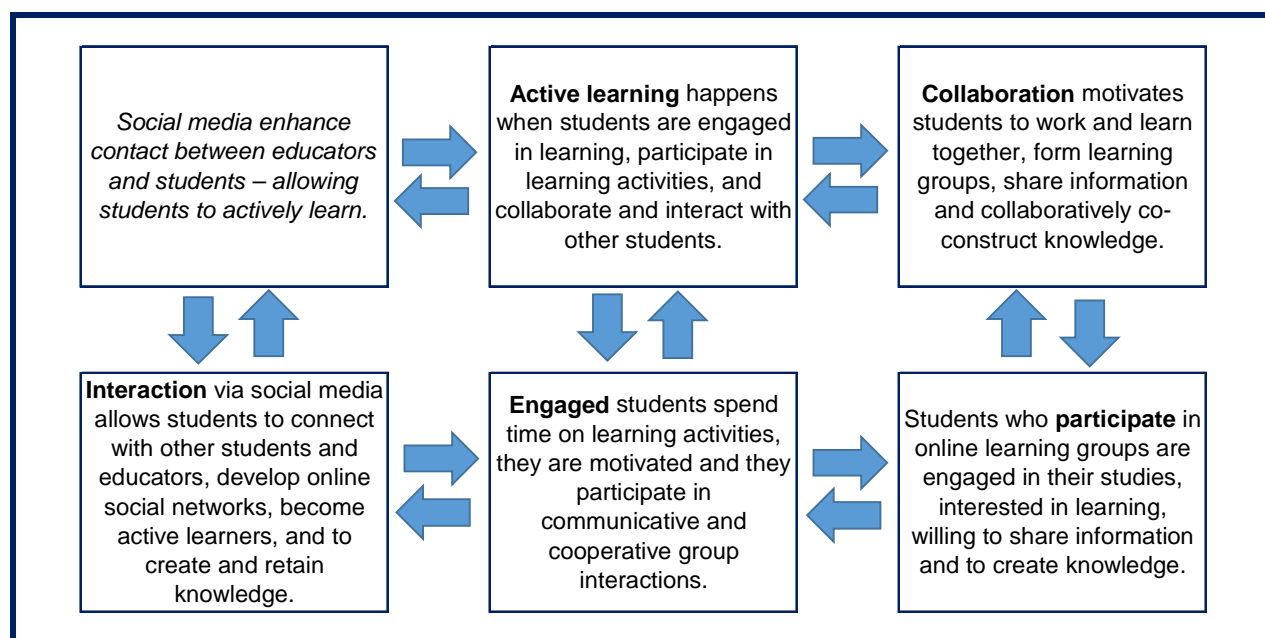
Using social media applications also leads to increased **participation** in online learning activities (see Section 6.3.2.3). An involved student is one who participates in student organisations and campus activities, interacts with faculty members and educators, and who works and learns with other students (see Section 4.3.2 and Table 4.4). Both the Systems Theory and the Network Theory (Section 2.3.3 and 2.3.4) focus on the abilities of electronic media to allow groups with special interests to form in which students can participate. Participation enhances students' attentiveness and interest in learning, and engages them in their studies. Social media encourage students to share information and various sources of educational material with other students, participate in online learning groups, and create opportunities for effective learning. Results from the systematic analysis found that even introverted or shy students feel encouraged to participate in online learning activities (see Section 2.4.2.5 and 4.3.1, and the theory of CMC Competence, Section 2.4.2.5). Twitter was the tool found most conducive to increase participation.

Using CMC technologies to enhance interaction, collaboration and participation, also enhances **student engagement** (see Principle 2, Section 4.3.2 and the Experiential and Perceptual Theories of CMC, Section 2.4.2.2). Student engagement is encouraged through time spent interacting with other students and educators, as well as time spent engaging in collaborative learning activities. If students are interested in a subject or learning activity, they will spend more time, will be more motivated and will therefore also be more engaged in studying. Using CMC technologies creates a sense of community which motivates students to actively participate in communicative and cooperative group interactions. Increased academic engagement reflects positively on grades. Results from the systematic analysis found Twitter and Facebook to be the social media tools most investigated to increase student engagement (see Section 6.3.2.4).

Use of social media increases **interaction** among various role players in teaching and learning (see Section 6.3.2.5). Academic interaction via social media allows students to interact with one another: they develop online social networks on which they discuss career goals, help one another to find information and resources, and look for additional learning opportunities. Online social interaction also increases students' involvement in campus life and the building of a campus community: students interact with local and

international students, with students new to the university and with students from diverse backgrounds. Student-educator interaction changes students from passive to active learners, encourages students to learn, and to create and retain knowledge (see Section 4.2.3). For purposes of interaction, educators mainly make use of blogs, Twitter, Facebook, e-mail and texting. The educator helps students connect with other learners through debates, discussions and reflective writing projects. Students are, however, not always willing to comment on the information sent by educators (see also Constructivism and Social Constructivism, Sections 4.2.2.5).

In Figure 7.6 the key points from the category: the student and active learning with social media are depicted.



**Figure 7.6:** The student and active learning with social media.

By means of another series of two-way processes, it is shown in Figure 7.6 that by building on the motivation provided by feedback and by contact with the educator (see the last block in Figure 7.5), the learner can become engaged in an interactive process of active learning in which engagement, interaction, participation and collaboration each, supported by social media, play an important role in the student's learning. Every element included in Figure 7.6 influences each of the other elements, illustrating how the student can actively learn and create knowledge by participating in online learning activities.

## 7.2.6 Social media and knowledge creation

The processing of information and the creation of knowledge emerged as key elements from both the literature study and the systematic analysis of the study sample. The creation of knowledge is listed as prominent communication features (see Table 2.8), as prominent social media features (see Table 3.3), and as attributes of effective teaching and learning with technology (see Table 4.4). Information processing as learning activity is based in the user's background, is stimulated by feedback, engagement and interaction, and leads to the creation of knowledge. Social media technologies were found to effectively support this process (see Chapter 6, Table 6.7).

As explained in Section 7.2.1, the background and **culture** of the learner influence how information is perceived (see Sections 6.3.1.5 and 2.5, Tables 2.5 and 2.8 and Figures 2.5 and 4.2). A person uses the common language of the culture to create patterns of thought in order to understand information. The language comprises the shared meanings of the people in the culture, and therefore impacts on how the person processes and understands information in order to create knowledge.

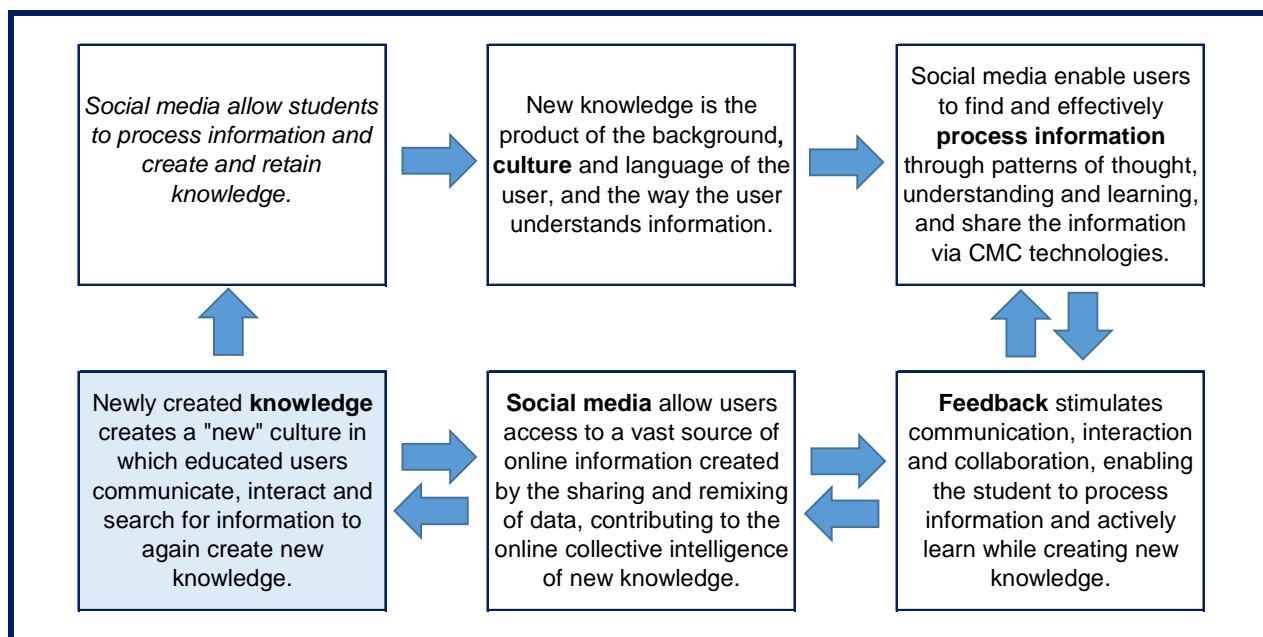
Electronic and social networks enable the **processing of information**. The Cybernetic Tradition (see Section 2.3.2) conceptualises communication as a system in a network of systems to process information which also creates knowledge (see Table 2.4). Social media support users' search for applicable information, and allow users to create, edit, store, share, or transfer various types of information to one or many users at the same time (see Section 6.3.2.1 for the numerous types of information that can be shared via social media, and the Theory of Media Richness, Section 2.4.2.1). The user processes information through conscious or unconscious patterns of thought, understanding and learning. Information procession leads to the creation of new knowledge which learners share on social media platforms with the other people in the culture, creating a society in which users learn and communicate through the use of various computer-mediate technologies.

The creation of knowledge is an interactive process dependent on communication, **feedback** and information processing (see Section 6.3.3.1). Feedback is the basis of the social interaction in which knowledge is created, and is one of the most important

advantages of utilising social media in an educational context. In effective teaching and learning, feedback from the educator or other students stimulates communication, interaction and collaboration, enabling the student to process information and to actively learn while creating new knowledge (see also discussion of feedback in Section 7.2.4).

Computer technology and **social media** applications enable all aspects of information processing and knowledge creation (see Section 6.3.1.1 and the Theories of Interpersonal Adaptation and Exploitation of Media, Section 2.4.2.3). Computer technology supports users in their search for information to suit their personal or professional needs. Social media technologies enable users to participate in crowd-sourced, open projects through the sharing and remixing of data to create useful information. Social technology also enables users to contribute to the online “collective memory” or “collective intelligence” (see Section 3.4), that allows access to vast amounts of information (Levy 1994: 13). By sharing information and contributing to the “collective intelligence” new knowledge is created. Tim Berners-Lee describes the future Web as one of *data sharing* (Morris 2011: 44), with computer technology capable of analysing the information to support users in their search for applicable information from which to create new knowledge.

Educated people with access to unlimited information via social technologies create a “new” culture (see the discussion of the Network Theory in Section 2.3.4), based on the newly created knowledge, starting a new cycle of information processing, learning and knowledge creation. Knowledge is therefore the product of the background (culture) of the individual, the communication and social interaction in the culture, and the processing of information supported by common understanding of the language. (see Table 2.5 and Figure 4.2). The role of social media in the process of knowledge creation are illustrated in Figure 7.7.



**Figure 7.7:** Knowledge creation with social media.

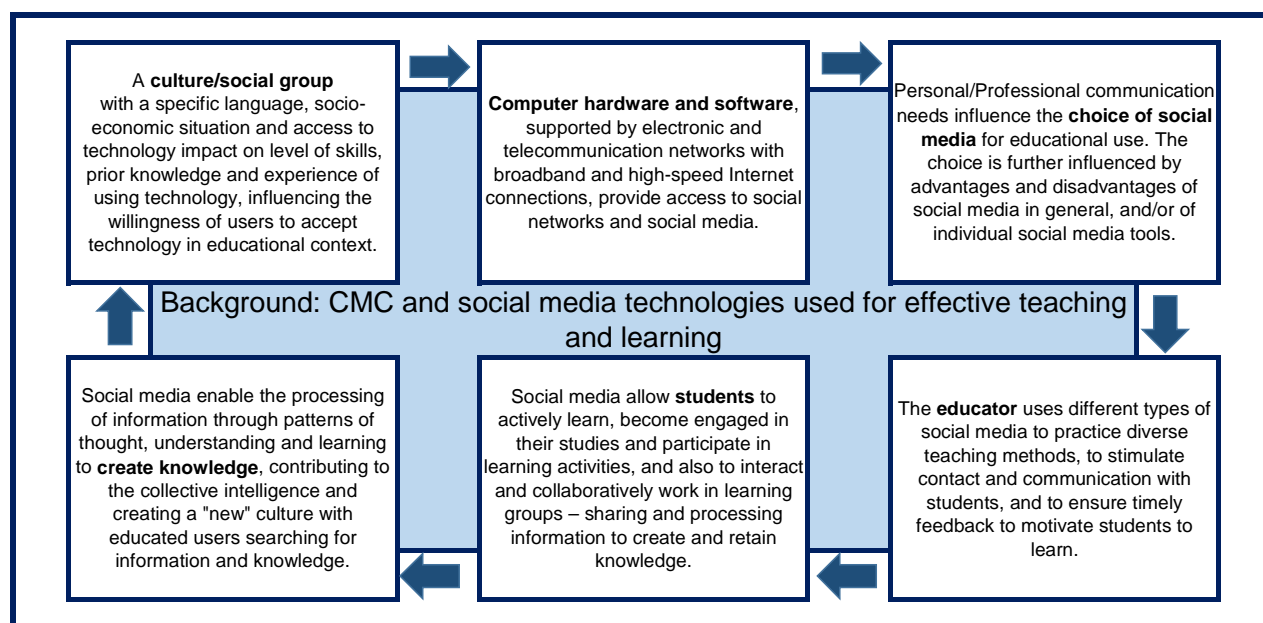
Figure 7.7 builds on Figure 2.5 (which illustrates the role of communication in knowledge creation), and Figure 4.2 (which elaborates on Figure 2.5 by illustrating the creation of knowledge as described by the Learning Theories). The process of knowledge creation is cyclical and indicates that as long as people communicate, use and search for information, they will learn and create new knowledge. Social media enhances and supports this process.

The six categories described above integrate the information from the literature studies (Chapters 2, 3 and 4) and the findings of the systematic analysis (Chapter 6), with both communication and learning theory to provide the foundation for the framework of the effective use of social media in education, presented in the next section.

### **7.3 INTEGRATED FRAMEWORK FOR THE EFFECTIVE USE OF SOCIAL MEDIA IN SOUTH AFRICAN HIGHER EDUCATION**

The purpose of the framework is to structure and present categories of importance to the effective use of social media in education. Six categories were identified from the study (discussed in 7.2), each including overlapping and interconnected aspects, features, or processes which distinguish it from the other categories, while it is at the same time closely related to the other categories to form a cyclic whole in which the use of

communication-mediated computer technologies to enable effective teaching and learning can be illustrated. The proposed framework is presented in Figure 7.8.



**Figure 7.8:** Integrated framework for effective teaching and learning with social media.

Figure 7.8 illustrates the role of social media in effective teaching and learning, resting on the firm theoretical foundation provided by communication through computer-mediated communication and social media technologies. The framework integrates the following:

- Features of CMC applicable to social media (Table 2.5);
- Aspects relating to the choice and use of a communication medium (Table 2.7);
- Communication features relevant to the study (Table 2.8);
- Profile of social media as tool of CMC (Table 3.3);
- Attributes of effective teaching and learning with technology (Table 4.4);
- Attributes listed on the conceptual framework for this study (Figure 4.3); and
- Key perspectives from systematic analysis (Table 6.7).

The core of the framework is the communication between the stakeholders (in this study the learners, educators and other staff of universities/institutions involved in effective teaching and learning), using computer-mediated and social media technologies.



From the extensive literature review it became clear that the level/quality of communication depends in the first place on the user (educator and learner), living in or coming from a specific culture or background, and understanding a specific language or languages (see Figure 7.2). Based on influences from the culture, the user has skills, experiences or knowledge that determine if the user is willing to use or learn how to use technologies to apply in an educational context. The willingness is fuelled or discouraged by the available computer hardware and software, supported by adequate access to the Internet. As seen in the study of the UFS and of the World Wide Worx (discussed in Section 7.2.3 above), both lecturers and students are discouraged by limited Internet connectivity and the cost of access.

As summarised in Table 2.7 (focused on the aspects relating to the choice and use of a communication medium) and based on the literature study of the Communication Science Theory presented in Chapter 2, the choice of a social media tool is influenced and dependent on positive and negative aspects related to the use of the medium (see also Table 6.6 and Figure 7.4). The study sample for the systematic analysis included numerous studies conducted on specific social media tools and applications to establish which social media tools are most beneficial to effective teaching and learning. The tools found to be most useful are Facebook, Twitter, wikis and blogs, although there are other technologies, classified under the inclusive terminologies “Web 2.0” or “social media” (see Sections 6.3.4) that can also be utilised in an educational context.

The fourth category included in the framework (illustrated by Figure 7.5), focuses on the educator and the effective use of social media to enable communication with students, and to allow students contact with the educator in order to motivate learners to learn. Educators are also able to provide fast and timely feedback via social media to motivate and encourage students, and, if educators use diverse teaching methods by employing social media tools in teaching, students will be encouraged to actively learn.

Active learning encapsulates student engagement, participation, interaction and collaboration – all of them attributes of effective teaching and learning with technology (see Table 4.4) – to allow the processing of information and the creation of knowledge – the main objective of teaching and learning. As explained in Section 2.3.4 of Chapter 2, knowledge creation is both the first and the last step in the cyclic process of

communication: newly created knowledge creates a “new” culture in which people build on existing knowledge by using the available technologies to search for new information to learn and, in that way, a new cycle is launched (see also the Network Theory, Section 2.3.4 and the cyclic process of knowledge creation, Figure 4.2).

From the integrated framework for effective teaching and learning with social media (Figure 7.8), directives for the utilisation of CMC and social media technologies in South African higher education are compiled.

#### **7.4 DIRECTIVES FOR THE EFFECTIVE UTILISATION OF CMC AND SOCIAL MEDIA TECHNOLOGIES IN SOUTH AFRICAN HIGHER EDUCATION**

The framework for effective teaching and learning with social media (Figure 7.8) provides a summary in which all the key aspects identified in the literature study and the systematic analysis are integrated into six categories, each with six components (as illustrated in Figures 7.2 to 7.7). From these six categories, three groups of possible directives for the effective use of social media in higher education were identified. By incorporating the needs, characteristics and diversities of the South African student (as identified in Sections 7.2.1 to 7.2.6), a list of 12 directives for the effective utilisation of social media in South African higher education were compiled, presented in Table 7.1.

Table 7.1: Directives to ensure effective use of social media in South African higher education.

<b>Directives for the effective utilisation of CMC and social media technologies in South African higher education</b>	
<b>Factors impacting on access to and effective use of social media technologies</b>	1. Acknowledge cultural differences in the design of online learning activities.
	2. Concede the influence of socio-economic circumstances on technological skills.
	3. Consider the language proficiency of learners.
	4. Investigate the costs of hardware, software and Internet access.
<b>The role of the educator in the choice and use of applicable social media technologies</b>	5. Select social media technologies most advantageous to both students and educators.
	6. Select social media technologies suitable to provide timely feedback and to motivate students.
	7. Select social media technologies most suitable to support students' diverse learning needs.
	8. Select social media technologies which enable contact and communication with students.
<b>The effective use of social media technologies to ensure active learning</b>	9. Encourage active learning through the effective use of social media technologies.
	10. Stimulate collaboration and participation through activities on social media applications.
	11. Ensure interaction and student engagement through social media activities.
	12. Implement learning activities to stimulate information processing and knowledge creation.

The directives listed in Table 7.1 are focused on the use of social media technologies in South African higher education. The three groups of directives are explained next.

#### **7.4.1 Factors impacting on access to and effective use of social media technologies**

When planning to utilise social media to communicate with students, or to use social media for teaching and learning, the culture and background of the learner should be taken in consideration as indicted by the following directives (numbers 1 to 4 of the set of 12 directives in Table 7.1):

1. Acknowledge cultural differences in the design of online learning activities: South African universities accommodate students from highly diverse national and international societies. Culture, ethnicity and background impact on the way a person communicates, thinks and understands, and influence individual learning needs. In South Africa, culture impacts on the use of social media only in the context of socio-economic circumstances.
2. Concede the influence of socio-economic circumstances on technological skills: About 25 million people in South Africa live below the poverty line, impacting on access to computer technology and influencing the skills, prior knowledge and experience with using technology a first-year student might have. However, 100% of current South African students own smart phones (UFS 2013b: 7, 30; Laughton 2011) and are affluent in the use of mobile social media applications.
3. Consider the language proficiency of learners: Language impacts on understanding and processing information, and therefore on communication and learning. For most of South African learners, English, as official language of most social media technologies, is a second or third language. Participating on social media platforms (in English) might impede students' willingness to contribute in online group activities or communicate with the educator or other students online.
4. Investigate the costs of hardware, software and Internet access: South Africa has the most developed telecom network in Africa with the latest in fixed-line, wireless and satellite communication (South Africa Info 2013: 1). However, as seen in the study of the UFS (see Section 7.2.3), both lecturers and students are discouraged by limited Internet connectivity and the costs of data and Internet access.

#### **7.4.2 The role of the educator in the choice and use of applicable social media technologies**

The educator, as responsible for implementing the use of social media, is responsible to select the most appropriate social media technologies for each specific situation, as can be concluded from the following four directives (numbers 5 to 8 of the set of 12 directives in Table 7.1):

5. Select social media technologies most advantageous to both students and educators: The choice of social media is influenced by reported and experienced

advantages and disadvantages. Social media should achieve or surpass face-to-face levels of communication, should have appropriate levels of media richness, should be of efficient quality to ensure quality interaction and communication, and should increase chances for success (see Table 2.7). In an educational context social media should increase enjoyment, involvement and engagement in learning, and should decrease feelings of stress, failure and loneliness. Study results report positively about all these aspects, while students are mostly of the opinion that social media increase their grades (see Section 6.3.1.2 and 6.3.1.5).

6. Select social media technologies suitable to provide timely feedback and to motivate students: CMC and social media technologies should enable fast, specialised feedback to students to motivate them to actively learn (see Section 6.3.3.1). The creation of knowledge relies on motivation, feedback and effective teaching, depending on communication and contact with the educator to enable the student to actively learn. In the systematic analysis, blogs, wikis, Facebook and Twitter were found to be most effective in this regard.
7. Select social media technologies most suitable to support students' diverse learning needs: Educators should use a variety of teaching and learning practices to accommodate students' individual learning needs. The student corps of South Africa is highly diverse: not only in context of race or ethnicity, but also because of different talents, backgrounds, learning styles, abilities, experience, and different cognitive and developmental levels (see Section 4.5.7). The educator should investigate various types of social media technologies for their suitability to accommodate student needs.
8. Select social media technologies which enable contact and communication with students: CMC technologies can play an important role in enhancing communication and contact between students and educators (see Section 6.3.1.5). Contact between educator and students, both in and out of the classroom, keeps students motivated and committed to learning. Students feel more connected to lecturers and other students when using technology (UFS 2013b), with the result that students become more engaged in their studies (Ndlovu 2014).

### **7.4.3 The effective use of social media technologies to ensure active learning**

Social media should be employed to support the student to actively and successfully learn. The following four directives (numbers 9 to 12 of the set of 12 directives in Table 7.1) are focused on the principles of effective teaching and learning with technology as summarised in Table 4.4:

9. Encourage active learning through the effective use of social media technologies: Active learning happens when students are engaged in their studies, participate in learning activities, and collaborate and interact with other students (see Table 4.4). If students also spend time efficiently, and are allowed to use learning methods to suit their individual needs, active learning will take place. Using social media, both students and educators become involved in the learning process, are willing to contribute and share information, and are encouraged to construct and apply knowledge (see Section 6.3.2.1).
10. Stimulate collaboration and participation through activities on social media applications: Social media applications can effectively be used to increase collaboration among students and to encourage participation in learning activities (see Section 6.3.2.3). South Africa's educators are challenged to teach large classes: Kruger and Fourie (2014) report that the use of technology at the UFS improved collaboration among students involved in large classes, enhancing the learning experience substantially. Wikis, blogs and Twitter seem to be the most effective tools to stimulate collaboration, although some students need motivation to participate in online learning activities (see Section 6.3.2.2).
11. Ensure interaction and student engagement through social media activities: CMC creates a sense of community which motivates students to interact with other students and become engaged in group activities using social media technologies (see Section 6.3.2.4). Time spent interacting with other students and educators, as well as time spent engaging in collaborative learning activities, encourage engagement which impacts positively on students' results. Results from the systematic analysis found Twitter and Facebook to be the social media tools most suitable to increase student engagement.

12. Implement learning activities to stimulate information processing and knowledge creation: Computer technology and social media applications enable users to find, edit, remix and share data to create useful information which allow knowledge creation (see Section 6.3.1.1). Social media also enable the forming of a vast online collective memory (see Section 3.4). By sharing information online, people contribute to this collective intelligence and in that way create new knowledge.

The directives are compiled to enable the selection and effective use of CMC and social media technologies in South African higher education. From the literature study and the systematic analysis it has become clear that there is not much that distinguishes South African students from students elsewhere in the world: every country in the world has diverse cultures in which people speak different languages and live in different socio-economic circumstances. South African students use the same social media technologies students from the countries included in the study sample are using, and are motivated and encouraged by the same aspects of social media use. Although the directives are applicable to South African higher education, they are in fact applicable to all contexts similar to those reflected in the studies selected for analysis.

## **7.5 CONCLUSION**

In this chapter it has become clear that the study has uncovered the effectiveness of CMC and social media technologies as a vehicle through which teaching and learning in South African higher education can be enhanced, and communication with students can be stimulated, especially in the digital era with students used to various forms of social media. The determining role of good communication underlying effective teaching and learning using social media has clearly been established.

The framework for the effective use of social media in South African higher education depicts six main categories, each containing six important and related elements, which led to the formulation of a set of 12 directives for the effective use of CMC and social media technologies to enhance the theory and practice of South African higher education and beyond. The new forms of socialisation that social networks afford seem ready-made for adoption into higher education worldwide, not only in South Africa. We

are still early in exploring the impact of networks – social and technological – on teaching and learning and plenty of research still needs to be conducted to explore how SNSs best fit into education (Siemens & Waller 2011: 166). In the final chapter, recommendations for further research in this regard are made.



## **CHAPTER 8**

### **CONCLUSION AND RECOMMENDATION**

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The study proposed a set of directives for the educational application of social media in South African higher education. The aim of this chapter is to provide a brief overview of the study as a means to present the final conclusions and recommendations.

#### **8.1 INTRODUCTION**

The chapter commences with an overview of the study by presenting answers to the various research questions in the format of a summary of the interpretations and conclusions of each chapter (in which a specific question was addressed). This is followed by an explanation of the framework and the ensuing directives for the effective utilisation of CMC and social media technologies; specifically in South African higher education. The chapter concludes by indicating the significance of the study, the acknowledgement of possible limitations in the study, and recommendations for further research.

#### **8.2 AN OVERVIEW OF THE STUDY**

In Chapter 1 (Section 1.5) an outline of the various research questions was presented. The research questions were based on the research problem described in Section 1.3; focusing on challenges regarding the educational application of social media in the HE context. The research questions guided this study towards the final outcome of the study; namely the proposal of a set of directives for educational application of social media in South African higher education. In the following sections the research questions are reviewed and answered on hand of a summary of the main findings of the chapter related to each question.

## **8.2.1 Historical-theoretical context of the study: The Communication Science foundation (Chapter 2)**

In Chapter 2 the first subsidiary research question was addressed:

*How do technological changes influence perspectives on communication?*

The comprehensive literature review presented in Chapter 2 provided the theoretical foundation of the study from the context of Communication Science and CMC. The focus fell on relevant communication theories and models. The aim was to address subsidiary question 1 mentioned above; namely to establish the influence of technological changes on perspectives of communication, especially since the introduction of the Internet and the WWW.

Through purposeful consideration of the Traditions of Communication Theories (Section 2.2), the Communication Models (Section 2.3), and CMC Theories (Section 2.4), a list of key features of the communication process was compiled that indicated the aspects which may influence effective communication when utilising social media in higher education (Table 2.8). These were identified from a series of tables (Tables 2.1 to 2.6) in which aspects from the theory applicable to the study were summarised. A summary of the concepts and elements important to the communication process (Table 2.6) and a compilation of the features of CMC applicable to social media (Figure 2.6) contributed valuable perspectives (as seen through the “communication-centred lens”).

Table 2.8 was crucial to the study: it provided focus on the most prominent features and characteristics of communication (also referred to as the “communication-centred lens” in the study). These features formed the theoretical reference point for the observation and appraisal of the effective use of social media as CMC in higher education. Based on these features, the communication process could be analysed to establish, for example, if the background of the user, his/her culture with its specific language, and the way in which communication happens has any influence on the effectiveness of the communication taking place over social media. The medium could be analysed to establish, for example, whether it increases social interaction and social well-being, and whether it can be used effectively to process information and create knowledge.

From the summaries provided in Tables 2.1 to 2.6, aspects relating to the choice and use of a communication medium were identified and listed in Table 2.7. As such, Table 2.7 provided a valuable insight into the reasons why social media are used and preferred; especially for the utilisation of social media in higher education, and served as a valuable point of reference in the literature reviews presented in Chapters 3 and 4.

### **8.2.2 Social media context: Social media as tool of computer-mediated communication (CMC) (Chapter 3)**

Chapter 3 provided the theoretical foundation of the study from the context of social media as tool of CMC. The aim was to answer the second subsidiary research question; namely:

*What are the most influential changes in the social media landscape and how do these changes impact on human communication?*

Chapter 3 commenced with background information about the evolution of technology since the invention of the computer. This information added to the understanding of the development of various theories and models that explain how communication happens (provided in Section 3.2).

A profile of social media as CMC was sketched by comparing the features of current popular social media tools and applications (Section 3.3), and features of new and improved social media applications and tools (Section 3.4). These features include aspects related to the hardware and software needed for communication, aspects related to the communication process and the content of the communication, and the ways in which social media provide access to information and support knowledge creation. These features were presented in two tables: the general features of social media were summarised in Table 3.2, and prominent features of social media as tools of CMC were listed in Table 3.3. Table 3.3 therefore represented the “social media-centred lens” through which the effective use of social media as CMC in higher education could be regarded.

### 8.2.3 The educational foundation: Effective teaching and learning using social media in higher education (Chapter 4)

Chapter 4 was devoted to a discussion of the major learning theories (Section 4.2), and the principles of good practice in teaching and learning using social media (Section 4.3). The aim was to answer the third subsidiary research question:

*How can educational theory contribute to effective teaching and learning by means of social media in higher education?*

The discussion of the Learning Theories and the selection of principles of good practice in teaching and learning provided a valuable background for understanding learning processes using social media. To add to this understanding, three tables were created:

- Table 4.1 summarised the key aspects of the Learning Theories into three categories: 1) the way learning happens as described by the specific theory, 2) the role of the educator as described in the theory, and 3) the role of the learner as described by each theory.
- Table 4.3 highlighted corresponding aspects between the Learning Theories, the Traditions of Communication Theories, and the Communication Theories. These communalities include, *inter alia*, perspectives on culture, a user's choices of communication media, the influence of language, and the role of social interaction in both learning and communication.
- Table 4.3 summarised the seven principles of good practice in teaching and learning (Chickering & Gamson 1987; Chickering & Ehrmann 1996) under four themes: the principle, the implicated roles of both the educator and the learner, and the role social media and CMC technologies can play in effective teaching and learning.

Based on the summaries provided in Tables 4.1 and 4.3, and supported by the background information provided in Chapters 2 and 3, the core “elements” – the learner, the educator, the learning environment, and effective teaching and learning – could be defined. The perspectives thus gained were used to filter theory through an “education-

centred lens” into a set of characteristics or attributes of effective teaching and learning with technology (Table 4.4).

The attributes listed and described in Table 4.4 focused on the important aspects of active learning, social interaction, collaboration, participation, motivation, feedback and student engagement, as well as on information processing and knowledge creation, while the role of previous experience, the effective use of time and of diverse teaching methods, were also listed. The determining role of good communication underlying effective teaching and learning using social media was clearly established.

Building on the cyclical process of communication that focuses on knowledge creation (Figure 2.5), and the creation of knowledge as described by the Learning Theories (Section 4.2), a cyclic process of knowledge creation was presented (Figure 4.2). This process indicates that as long as people communicate and use and search for information, they will learn and create new knowledge. Figure 4.2 served as the blueprint for the design and layout of the framework for effective use of social media in South African higher education (Figure 7.8).

Figure 4.3 provided the important conceptual framework for the study. Figure 4.3 illustrated the lens model used for this study, comprising the three “lenses” that focused the theory: the “communication-centred lens”, the “social media-centred lens” and the “education-centred lens”. These lenses, supported by attributes of effective teaching and learning with technology (Table 4.4), as well as the aspects that influence the choice of social media (Table 2.7), guided the empirical investigation, the interpretation of findings (Chapter 6), and the conclusions made (Chapters 7).

#### **8.2.4 Research design and methodology (Chapter 5)**

In Chapter 5 an overview was given of the research design and methodology employed in this study to fulfil the second objective of the study; namely:

*To undertake a systematic review of relevant research comprising the following steps: (a) collect and evaluate relevant research reports according to predetermined criteria for inclusion in a sample of documents; (b) to conduct a*

*comprehensive systematic analysis on the selected documents; and (c) to categorise the research and the identified educational applications in order to identify key perspectives on the effective use of social media as applicable to the study.*

Chapter 5 firstly described why applied research, using an explorative qualitative research method of inquiry, was selected as most applicable to this study (see Section 5.2). The qualitative methodology used for this study was a systematic analysis, also called a systematic review. In the chapter, evidence from literature was provided that emphasised that systematic reviews are reliable research methods for objectively summarising, evaluating, and interpreting large volumes of research information about a specific topic, highlighting similarities or differences between studies, and exploring the reasons for the variations (see Section 5.4).

Section 5.5 described the unbiased, comprehensive search strategy followed to find applicable research. The search was conducted with support from the UFS library in order to find as many applicable documents related to the study objective as possible. Searches were conducted on numerous online and electronic databases, as well as on the Google and Google Scholar search engines using a wide range of applicable key words and terms.

A list of inclusion and exclusion criteria was compiled with the intention to identify only those studies that serve the research objective and answer the research question (see Section 5.5.1.2). Following an iterative process of selection, based on the established criteria, 220 relevant documents were selected to be included in the study sample (see Appendix A for a list of the included documents). The researcher strived to ensure high ethical standards in the selection of documents, and followed predefined selection criteria to limit bias and ensure trustworthiness. Validity was ensured by the objective selection of the study sample while reliability was ensured by following a detailed, predesigned procedure.

The constant comparative method was employed to analyse and extract selected information from the study sample, using inductive category coding. Coding and data extraction were done with NVivo Qualitative Data Analysing Software and the Dedoose

web application (see Section 5.5.2). The data were categorised according to themes and subjects, and arranged into data sets which were used for the analysis (described in Chapter 6).

### **8.2.5 Key findings and perspectives gained in the systematic analysis (Chapter 6)**

In Chapter 6, the results of the systematic analysis of the 220 selected studies were presented. The purpose of the systematic analysis was to answer subsidiary research question 4:

*What are the most prominent perspectives from research undertaken world-wide on the use of social media in teaching and learning that can serve as basis for the compilation of directives to apply social media as CMC in South African higher education?*

Chapter 6 also focused on part (c) of the second objective; namely: “to undertake a systematic review of relevant research and to categorise the research and the identified educational applications in order to identify key perspectives on the effective use of social media as applicable to the study.”

In Section 6.2 the background and context of the research presented in the documents in the study sample were sketched by providing general information about specific features of each; namely: bibliographical details, the geographical distribution of institutions represented in the sample, the types of documents in the study sample, the respondents, faculties and disciplines represented in the studies, and the methods, methodologies and keywords/terms used by the author(s) of the included documents. From the analysis the following were highlighted:

- The research in the study sample represented 292 geographical locations worldwide, mainly from the more developed countries of the world (see Figure 6.2).
- Nearly 60% of the study sample comprised accredited journal articles (see Figure 6.4), while “grey literature” made up 40% of the study.

- The term “Web 2.0” was found to be the most used in all the studies, reflecting the general focus of the studies. The keyword “learning” was found to be the most used keyword, and “Facebook” was both the second most used word and the social medium most referred to.
- A wide variety of research methods and methodologies were used in the documents in the study sample (see Figure 6.7), which made it impossible to identify trends or make significant deductions about the frequency of use of the methods and methodologies mentioned.
- Of a total of 106 304 participants/respondents that were listed in the study sample, 86.13% were found to be undergraduate students (see Figure 6.8).
- Most studies were conducted in Information Technology-related disciplines or subjects, although most respondents involved were found to be from education-related subjects.

Section 6.3 presented the findings of the systematic analysis related to the effective use of social media in higher education as guided by the conceptual framework of the study. Section 6.3.1 presented the findings specifically focused on the factors impacting the effective use of social media:

- Most respondents/participants had high, or 100%, access to computers or technology, and most owned one or other CMC apparatus; including smart phones, tablets and laptops. Low-income students had the least access to technologies and the Internet, although it was found not to be a limiting factor, because most institutions make technology available to students and provide access to the Internet.
- Culture and background influence students’ *familiarity with, and skills of using technology* (see Section 6.3.1.2). Most students were familiar with social media and technology and they were able to transfer the skills into the educational context, although guidance was still important.
- *Attitudes* toward the use of social technologies were influenced by expectations, prior knowledge and benefits offered (see Section 6.3.1.3). Most universities/institutions were using social media, while findings showed that both educators and students were using social media and found technologies easy to use. Training is important for the educational use of social media.



- *Time* was found to be the most influential aspect in both the choice and use of social media (see Section 6.3.1.4). The choice to use social media was influenced by the user's opinion regarding time saved or time gained by the use. Social media allow students more time to learn, communicate, collaborate and interact with other students. Use of social media may, however, also create opportunities for distraction and procrastination and, as a result, may negatively impact on students' grades. Some older users regarded the use of social media as a waste of time or as too time consuming, possibly because they did not have time to learn how to use social media effectively.
- Social media tools, e.g. Facebook, Twitter, wikis, SNSs, blogs, etc. could be used to improve communication among students, and communication between students and educators and universities/institutions (see Section 6.3.1.5).

Section 6.3.2 presented the findings that specifically focused on the student and active learning with social media:

- Analysis of the 220 documents showed that social media can effectively be used to transfer or share any type of information or educational resources (see Figure 6.11).
- *Active learning* takes place when social media are used in an educational context (see Section 6.3.2.2). Social media seemed to encourage students and educators to participate in collaborative learning activities, become involved in the learning process, and contribute to and share information.
- Findings indicated that social media (mainly wikis, but also Facebook and blogs) can be used for many *collaborative activities* among most of the role players in the teaching and learning environment (see Section 6.3.2.2). Some participants, however, needed motivation to participate in collaborative activities.
- Social media applications were also found to increase *participation* in online learning activities (see Section 6.3.2.3). Educators and other staff were also found to increasingly participate in students' educational activities via social media.
- Most technologies, but especially Twitter and Facebook, were found to increase *student engagement* (see Section 6.3.2.2). Increased engagement improved

student-educator contact, contact among students, and a sense of community among students.

- Findings showed that social media use may negatively influence students' *writing* skills when only used for social communication. However, when used for language learning, students' language learning, writing skills and reading skills improved (see Sections 6.3.4.2; 6.3.4.4; 6.3.4.5; 6.3.1.2 and 6.3.2.4).
- Use of social media was found to overwhelmingly increase *interaction* among various role-players in teaching and learning. For purposes of interaction, educators mainly made use of blogs, Twitter, Facebook, e-mail, and texting. Students were, however, not always willing to comment on the information sent by educators. Academic interaction among students often led to increased interaction outside the classroom and could improve involvement in campus life. However, face-to-face interaction still has a role to play (see Section 6.3.2.5).

Section 6.3.3 presented the findings specifically focused on the educator and effective use of social media:

- Social media can serve as an effective platform for appropriate and timely *feedback* by educators on students' work, which can impact positively on student learning. Public platforms should, however, be avoided or used with caution.
- Social media technologies can effectively be used to *motivate* students to learn more and to communicate with other students and educators.
- Social media allow educators to make use of *diverse teaching methods* to accommodate students' individual educational needs.

Section 6.3.4 presented the findings related to the *choice of social media*:

- The use of most Web 2.0 technologies was highly popular among students and educators (see Section 6.3.4.1), and were found to increase the computer, management, writing, and professional skills of both students and educators.
- The analysis showed that students prefer Facebook to other social media. Facebook was found to provide advantages like time gain, increased academic success, social and general satisfaction, and increased enjoyment in learning and education. Facebook also enhanced student engagement and social interaction in

learning activities. Findings pointed out that Facebook combatted social isolation through the building of an online community where students could learn from other students, and network with groups who have similar academic interests (Section 6.3.4.2).

- Blogs were mostly found to enhance collaboration: blogs create an online collaborative learning environment in which students can learn by looking at the contributions of other students, do research with other students, and take part in cooperative, creative learning activities. Blogs also stimulate language learning and improve students' writing abilities. Evidence furthermore showed that the use of blogging by students and teachers created an effective online learning community for the sharing of ideas, opinions, thoughts and learning materials. Blogs reportedly made classes more interesting, increased students' satisfaction with learning, and helped them to gain self-confidence, which in turn enabled them to engage with other students both inside the classroom and outside in the community.
- Analysis found Twitter to be a fast and viable communication channel, easy to use, and suitable for project-oriented, academic communication, for private, informal communication, for peer-to-peer communication, for communication between students and educators, and for communication from and to universities/institutions. Twitter improved relationships between students, increased students' levels of attentiveness in learning activities and increased the participation of more introverted students. Twitter increased interpersonal, social, and academic engagement between faculty and students, and among students. Educators used Twitter to send academic information to students, and to provide timely feedback regarding learning activities and requests for information.
- Wikis were the fourth most studied social media tool in the 220 studies analysed: wikis can be used to encourage students to work cooperatively on group projects and group assignments. Organising wiki content encourages students to contribute to web-based information, and in that way to actively learn. Wikis improve students' satisfaction with learning, are useful for language learning and to improve reading and writing skills. Constant encouragement and support are however necessary to motivate students to participate and participate in time.

Social media use therefore seems to be highly effective in the context of education, and

for enhancing effective teaching and learning. Although some concerns have been identified, most of them can be addressed by awareness of possible positive and negative effects, appropriate planning, and through applicable training.

Table 6.7 presented a list of the most prominent perspectives gained on the use of social media in teaching and learning. These perspectives were key in establishing the most effective ways in which educational applications of social media can enhance the theory and practice of higher education, and for compiling the directives to apply social media as CMC in South African higher education.

### **8.2.6 Directives for the effective use of social media in South African higher education (Chapter 7)**

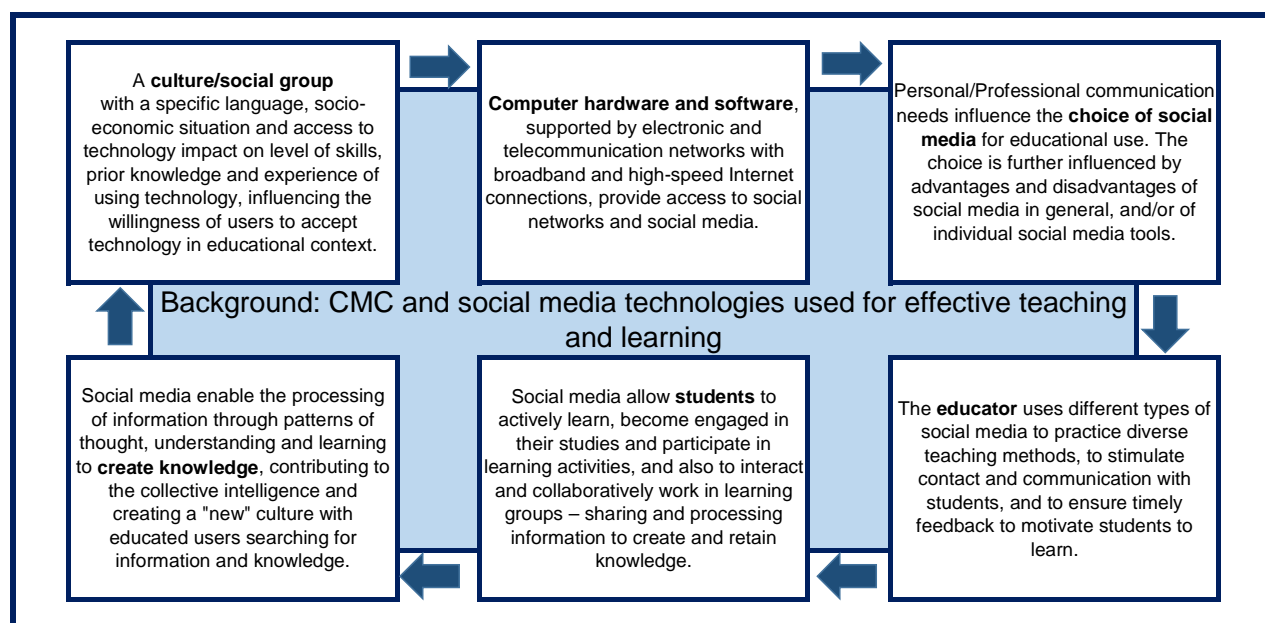
In Chapter 7 the results of the analysis were integrated into a summarised explanation of the use of CMC technologies in higher education. The summary allowed the researcher to propose a framework from which directives could be compiled in order to answer to the research objective of the study; namely:

*To undertake a systematic analysis of selected research reports on the educational applications of social media in higher education in order **to establish research-based directives for the utilisation of CMC and social media in South African higher education.***

The key perspectives gained from the analysis (described in Chapter 6), supported by insights from previous chapters and recent, relevant facts and statistical information on South African higher education, were integrated into a framework for the effective use of social media as CMC in teaching and learning.

The framework was built on a foundation consisting of the Communication Theory presented in Chapter 2, the cyclic process of knowledge creation (Figure 2.5), the Theories of Learning discussed in Chapter 4 (Table 4.1 and Figure 4.2), the attributes of effective teaching and learning (Table 4.4), and the perspectives gained from Chapter 6 (Table 6.7). From this foundation, core components for the framework were identified and grouped into six categories; each containing six elements (see Figures 7.2 to 7.7).

Together, the six categories form the core components of the framework for the effective use of social media in education, presented in Figure 8.1.



**Figure 8.1:** Integrated framework for effective teaching and learning with social media.

The framework led to the formulation of a set of 12 directives for the effective use of CMC and social media technologies to enhance the theory and practice of South African higher education:

1. Acknowledge cultural differences in the design of online learning activities.
2. Concede the influence of socio-economic circumstances on technological skills.
3. Consider the language proficiency of learners.
4. Investigate the costs of hardware, software, and Internet access.
5. Select social media technologies most advantageous to both students and educators.
6. Select social media technologies suitable to provide timely feedback and to motivate students.
7. Select social media technologies most suitable to support students' diverse learning needs.
8. Select social media technologies which enable contact and communication with students.
9. Encourage active learning through the effective use of social media technologies.

10. Stimulate collaboration and participation through activities on social media applications.
11. Ensure interaction and student engagement through social media activities.
12. Implement learning activities to stimulate information processing and knowledge creation.

A more detailed discussion of each directive can be found in Section 7.4.

The directives are meant to enable the selection and effective use of CMC and social media technologies in South African higher education. South African students, like many students worldwide, come from diverse cultural backgrounds in which people speak different languages and live in different socio-economic circumstances. South African students are used to social media technologies and are motivated and encouraged by social media use in education. Although the directives have been shown as applicable to South African higher education, they are in fact applicable to all developing educational contexts.

### **8.3 SIGNIFICANCE OF THE STUDY**

The significance of the study lies, firstly, in the contribution the study makes to the theory of CS and CMC, especially in regard to the use and application of social media tools and their applications. The study, however, also incorporates higher education as an area of application for this study, especially in identifying the most effective applications of computer-mediated social media in the context of higher education. Overall, it has become clear that communication forms the foundation of effective teaching and learning by means of social media. A range of similarities between communication theory and learning theory has been identified (see Table 4.2), while communication lies at the very core of effective social media use in an educational context. This applies to all attributes of effective teaching and learning with technology (see Table 4.4); whether active learning, participation, engagement, feedback or any other attribute. The study therefore highlighted the important link between Communication Science and Education as disciplines.

The study provided a categorisation of current research on the educational uses of social media in education; which included the methodological and theoretical foundations of such studies. The study furthermore provided an overview of the current worldwide use of social media in education. Based on evidence of the current most popular social media tools, informed choices of social media that may be used for educational use could be made. In this regard, Table 2.7 may provide valuable support in selecting social media applications most suitable for specific educational needs.

Another important contribution of the study to the research fields of CS, CMC and HE lies in the conceptual framework designed for this study (see Figure 4.3). The conceptual framework comprised perspectives gained by means of the three “lenses”: the “communication-centred lens”, the “social media-centred lens” and the “education-centred lens”. The framework, although specifically designed for this study, can be adapted and refined by other researchers to be used in related research.

The study contributes an interesting perspective to the process of knowledge creation in the design of “The cyclic process of knowledge creation”, presented in Figure 4.2. This basic design can be used by other researchers to illustrate the influence of various other aspects – also deduced from the theory of communication, CMC, and education – on the way people create new knowledge in order to influence and change cultures.

The integrated framework for effective teaching and learning with social media (Figure 7.8) incorporated findings from both theory and practice as established by the literature review and the systematic analysis. The components of the framework were placed against the background of the use of CMC and social media in higher education and provided a holistic view of the process of knowledge creation using current computer-mediated communication technologies.

The set of perspectives arrived at by analysing global research, contribute to theory in multi-disciplinary context, and can be applied in or contextualised for any discipline and context. If appropriately disseminated, the findings as a whole may also foster broad interest and contribute to a more extensive and effective application of social media in higher education world-wide.

The database of 220 carefully selected research-based documents on the use of social media in education is a valuable source of information about the topic and may be further investigated – also by other researchers – to deliver more insights into the field (Appendix A provides a complete and detailed list of the documents). Furthermore, the coding of the documents done by using NVivo created a vast amount of information not fully exploited.

Chapter 5 provided a comprehensive and detailed description of the steps taken in conducting the systematic analysis. Other researchers, planning a systematic analysis, can benefit from following the process as described.

On a personal note: the study contributed extensively to the intellectual growth and academic development of the researcher. The study widened her insight into the three disciplines/fields of CS, CMC and HE, as well as in social media and the possibilities of the WWW. The investigation took place over more than three years, during which many new technologies and applications were developed worldwide. Through the iterative nature of the literature search, the researcher was able to keep up to date with these developments, and, where applicable, incorporate them into the study to make the study current and applicable to the education of millennial students.

#### **8.4 LIMITATIONS**

The researcher acknowledges that there were limitations to the search strategy followed. Keywords and terms used were not infallible: studies may have been overlooked because the search terms used did not appear in the title or in the list of keywords of the journal articles (Petticrew & Roberts 2006: 101), or were not listed in the thesaurus of the database.

The vastness of the information available in databases and websites also made it almost impossible to find all the documents on a topic, even with the help of professional information officers. The researcher attempted to ensure a valid search for information, but there are aspects over which she had no control. For example: most database systems make use of human indexers who can make errors entering information into



electronic citation databases – including spelling mistakes when entering keywords, titles or the names of authors.

The quality of documents included in a systematic analysis can influence the results of the systematic review. Therefore, the researcher personally evaluated each document according to the criteria described to establish the quality of retrieved documents (see Section 5.5.1.3b). The researcher tried to identify documents with accepted levels of quality, but there may be levels of inaccuracy in included studies unknown to the researcher. Also, it is possible that the researcher did not recognise bias in included studies, although all possible steps were taken to identify any bias. By following the research protocol described, and by adhering to the inclusion and exclusion criteria, the researcher made all possible attempts to ensure valid research results.

## **8.5 RECOMMENDED RESEARCH**

The systematic analysis revealed that training in the use of social media is needed, especially for educators, but also for students where specific social media tools are utilised. Educators as respondents/participants in the study indicated that they lack time to learn to use social media, and that they were unsure about the media available that would enable the successful application thereof. In this regard, the 2014 NMC Horizon Report stated: “Despite the widespread agreement on the importance of digital media literacy, training in the supporting skills and techniques is rare in teacher education and non-existent in the preparation of faculty” (Johnson *et al* 2014: 22). Research in this regard is clearly needed. The existing database can be used to support such a study.

The effectiveness of teaching with social media should be explored to evaluate the quality of the learning taking place, as well as the impact of social media use on students’ grades and success. The range of skills students may develop from the use of social media also necessitates further investigation.

The application of the directives provides further research opportunities. The directives can provide questions and hypotheses to stimulate new research based on the successful application of the directives, or one or more of the directives might be investigated to provide for more, detailed information about each aspect.

Other aspects noticed during the research process that necessitates further research:

- the impact of social media use in education on the learning experience of low-income students with previous limited access to technology;
- the cost aspects involved in the utilisation of social media in an educational context, and the possibilities available to decrease the costs;
- the impact of social media use in education on the engagement and participation – and eventually the success – of shy or introverted students;
- how social media can be utilised to improve students' reading and writing skills, especially seen against the current negative influence of text messages on students' writing and spelling skills; and
- the impact of English, as the unofficial language of social media, on the success or failure of the utilisation of social media in an educational context (in particular in the context where English is not the first language of the user).

The application of social media to practise diverse teaching methods was briefly mentioned in the study. A study of technologies which enable “different students to see different variations of the same content to personalise the learning experience” (Johnson *et al* 2014: 19) can open many possibilities for the educational utilisation of social technologies for a diverse range of students (including students with disabilities).

Social media provide many opportunities for fast and effective communication among all stakeholders in the educational context. As indicated in the study, most of the social media technologies discussed are suitable for communication and contact between educator and learner. Research opportunities exist to investigate the effectiveness of this communication, from the perspective of both the educator and the learner, and ways in which communication, with the support of social media, may be improved.

## **8.6 CONCLUDING THOUGHTS**

Originally, this study was undertaken to establish ways in which social media could effectively be used for teaching a group of undergraduate students in the discipline of Communication Science. Much more has been learned and achieved. The study provided significant perspectives from global research on the theories of CS, CMC, and

HE, and in particular highlighted the wide range of opportunities of social media use in higher education in a multi-disciplinary context.

Social media will become increasingly important to “every aspect of university life” (Johnson *et al* 2014: 6), and will in time influence the culture and background of many people worldwide. The 2014 NMC Horizon Report emphasised that education will, very soon, be based on a mix of “online learning, blended and hybrid learning, and collaborative models” (Johnson *et al* 2014: 10). Universities/institutions should prepare themselves to embrace the challenges this new educational environment will offer. It is, however, not far-fetched to accept that computer-mediated communication – possibly with new social media, new virtual platforms, and tools we yet cannot imagine – will increasingly form the core of effective teaching and learning in higher education.

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## APPENDIX A

### DOCUMENTS INCLUDED IN SYSTEMATIC ANALYSIS

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