

Mobile devices, information behaviour and academic studies

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SUMMARY

ICTs, including mobile devices, are changing rapidly, and so is the application of these technologies in various disciplines. From the literature it was determined that mobile devices have an influence on information behaviour, whether it be in the form of information seeking, searching, use, sharing, collaboration, or any other information behaviour activity. This study focused on the influence of mobile devices on the information behaviour of undergraduate and postgraduate students in the Department of Information Science at the University of Pretoria. Understanding the influence that mobile devices have on information behaviour might improve the effective use of mobile devices in education, and might be of use to library services.

A mixed methods approach was followed, consisting of questionnaires for the collection of quantitative data and focus group interviews for the collection of qualitative data. Convenience sampling was used to select undergraduate and postgraduate students in the Department of Information Science. This was followed by a census approach in which all students were invited to participate in completing the electronic self-administered questionnaire. The questionnaire collected data on mobile devices and information behaviour, mobile devices and academic studies, mobile devices and clickUP, mobile devices and the Blackboard App and mobile devices and communication. The questionnaire was open from 06 October – 07 November 2013 and 201/923 (21.8%) students responded. Purposive sampling was used to invite focus group participants. The focus groups were guided by four topics: general use of mobile devices to find, access, share and use information; differences in using mobile devices to find, access, share and use information for academic purposes; different mobile devices used for different purposes; and recommendation(s) to other students for using mobile devices for academic purposes. Five focus group interviews were conducted with a total of 32 participants between 20 August and 09 September 2014.

It was found that mobile devices have an influence on the information behaviour of students, confirming what was found in the literature. Mobile devices are used more in a general and social environment than in an academic one. They however hold much value for the academic environment. Participants in the study stressed the importance, the advantages, and the potential that the mobile devices have, and still could have in the future. Participants made use of multiple mobile devices in their day-to-day activities. Furthermore, it is clear that information should be available quickly, allowing access from anywhere and at any time in order to satisfy the changing demands of the information user. It may be because of this constant need for information in its various formats, that the lines between the different contexts are being blurred.

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LIST OF ABBREVIATIONS AND ACRONYMS

BBM:	BlackBerry Messenger
clickUP:	Electronic learning management system used by the University of Pretoria
EI:	Used for electronic sources without page numbers
GPS:	Global positioning system
ICT:	Information and Communication Technology
IM:	Instant messaging
IT:	Information Technology
ITAL:	Information Technology and Libraries
ITU:	International Telecommunication Union
JISC:	Joint Information Systems Committee
LISA:	Library and Information Science Abstracts
LISTA:	Library, Information Science and Technology Abstracts
OECD:	The Organisation for Economic Co-operation and Development
PDA:	Personal digital assistant
UP:	University of Pretoria
WhatsApp:	WhatsApp Messenger
WWW:	World Wide Web

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CHAPTER 1: OVERVIEW AND INTRODUCTION

1.1 INTRODUCTION

Information and communication technologies (ICTs) have an impact on various areas in people`s lives, so much so that they are described as “a powerful and pervasive factor in everyday life” (MacKay & Vogt, 2012: 1381). ICTs also have an impact on academic contexts. An example of this can be seen in the way that ICTs have modernised education, introducing new means of learning. These new means of learning can be described as virtual learning, mobile learning, e-learning, and computer assisted learning (Punie, Zinnbauer & Cabrera, 2006: 5; Van Brakel & Chisenga, 2003: 477).

Together with e-learning, universities are making use of mobile technologies more regularly for educational purposes, by offering content optimised for mobile formats. This can be seen in the development of mobile websites and mobile applications, increasing budgets for mobile web development and the increased time spent by staff members developing and using mobile platforms (El-Hussein & Cronje, 2010: 12; Joly, 2012: el¹; Rogers, Connelly, Hazlewood, & Tedesco, 2009: 111).

This trend is no exception at the University of Pretoria (South Africa), where the university library provides users access to a mobile website. The electronic learning management system of the university (referred to as clickUP) can also be accessed via mobile applications designed for various mobile devices such as Apple, Blackberry and Android. The system is run on the Blackboard platform.

ICTs have an impact on information behaviour, as suggested by Counts and Fisher (2010: 98) who state that “mobile messaging systems, particularly those that incorporate social networking capabilities, affect how individuals socially interact and how they exchange information”. Evidence of the impact of information technology on information behaviour was also found by MacKay and Vogt (2012), who conducted a study on the use of information technology in everyday and vacation contexts. Among the findings was an increase in the use of ICTs during the planning stages of vacations (MacKay & Vogt, 2012: 1393).

Understanding the impact that mobile devices have on information behaviour might improve the effective use of mobile devices in educational settings. This is investigated in this study.

¹ el used for electronic sources without page numbers

Chapter 1 includes the background to the study, clarification of concepts, problem statement and sub-problems, literature review, review of the research design, value of the study, demarcation and limitations of the study and a summary of chapters of the dissertation.

1.2 BACKGROUND

The background provided in the sections that follow offers a brief description of the setting in which the research took place, and a brief overview of the ICT landscape in South Africa.

1.2.1 The ICT landscape in South Africa

The ICT landscape has changed drastically over the last few years as can be seen in the data provided by the International Telecommunications Union (ITU) and Ookla's Net Index.

According to the ITU (2015a: e1) 5.35% of the South African population used the internet in 2000 and this number had grown to 49% at the end of 2014. Broadband subscriptions also increased drastically, from 2 669 fixed broadband subscriptions in 2002 to 1706313 fixed broadband subscriptions in 2014 (ITU, 2015b: e1). Tests by Ookla (Net Index) between 2008 and March 2015 shows that across the various types of internet connections in South Africa there is an average upload speed of 3.4 Mbps and an average download speed of 6.9 Mbps (MyBroadband.co.za, 2015: e1).

In the mobile and tablet arena a similar trend can be noticed. The number of mobile telephone subscriptions in South Africa has grown from 8.3 million (18.6% penetration rate) in 2000 to 79.5 million (149.7% penetration rate) by end of 2014 (ITU 2015c: e1). According to Goldstuck (2012: e1) there were 325 000 tablet computers sold in South Africa by February 2012 across a variety of vendors. In this study the researcher refers to "tablets" instead of "tablet computers" or "tablet PCs".

The advantages of ICTs for education have been widely discussed. Among other things, they:

- Help improve literacy;
- Address some of the disadvantages of the traditional classroom setting;
- Allow for collaboration;
- Allow the sharing of information;
- Help motivate learners;
- Increase access to education;
- Improve quality of learning; and
- Reduce costs (Livingstone, 2012: 19; Sarkar, 2012: 34).

Although the preceding list is by no means comprehensive, it illustrates the potential benefits of introducing ICTs such as mobile devices into the educational process.

1.2.2 University of Pretoria

According to the University of Pretoria website (2015a: e1), the university has more than 50 000 students, and is regarded as one of the leading higher education institutions on the continent. Lectures are presented in two mediums of instruction, Afrikaans and English, to a diverse and multicultural group of students.

The university makes use of a blended learning approach, where there is face-to-face and digital contact between lecturers and students, and between students (University of Pretoria, 2015b: e1.). A blended learning approach can be defined as: “the thoughtful integration of conventional and digital methods of teaching and learning as the means to achieve our greatest ambitions for 21st century education” (Laurillard, 2014: 3). Online teaching and learning also take place, via clickUP, the learning management system of the university, and multimedia presentations are occasionally used in the classroom. Students have access to resources from the library in both print and digital format, and access to the internet via a range of on-campus computer laboratories, the library and Wi-Fi hotspots (University of Pretoria, 2015b: e1; University of Pretoria, 2015c: e1).

1.3 CLARIFICATION OF CONCEPTS

In this section a number of important concepts are discussed. It is important that these concepts are discussed in the beginning, so that the reader knows what the concepts refer to when they are used later in the dissertation. The following concepts are discussed: information behaviour, ICT, mobile technology and mobile devices, academic studies and e-learning.

1.3.1 Information behaviour

According to Wilson (1999: 249) information behaviour refers to “those activities a person may engage in when identifying his or her own needs for information, searching for such information in any way, and using or transferring that information”.

This definition was adapted by Wilson (2000: 49) where he defines information behaviour as: “the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking, and information use. Thus, it includes face to face communication with others, and the passive reception of information as in, for example, watching TV advertisements, without any intention to act on the information given”.

The strength of these definitions by Wilson are that they focus on information behaviour as a whole, and are not limited to the use of certain sources of information only, or to a single

activity such as information seeking. They also address the idea that information behaviour can be divided into smaller areas or activities that can be investigated separately, such as information seeking, information use, information exchange, information encountering and information avoidance (Case, 2012: 13).

Based on the above definitions and views it can be said that information behaviour involves people and the activities or actions they take when engaging with information. The behaviour can be passive, where the person does not take any actions to find the information or to do something with the information received, or the behaviour can be active, where the person actively sets out to seek information, searches information channels and sources, uses the information or communicates the information.

1.3.2 Information and Communication Technology (ICT)

ICT can be defined in a number of ways, depending on the context in which it is used. According to Merriam-Webster.com (2012: el), information technology is “the technology involving the development, maintenance, and use of computer systems, software, and networks for the processing and distribution of data”. Another definition of information technology by Gartner (2012: el) states that information technology is “the common term for the entire spectrum of technologies for information processing, including software, hardware, communications technologies and related services”. A term that is often used interchangeably with information technology and thus requires consideration is ICT, which according to TechTerms (2010: el) refers to “technologies that provide access to information through telecommunications. It is similar to Information Technology (IT), but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums”. It thus also includes mobile technology and mobile devices.

1.3.3 Mobile technology and mobile devices

According to Counts and Fisher (2010: 98) ICT plays an important role in information behaviour. Considering the new means of teaching and learning made possible by ICTs (Punie, Zinnbauer & Cabrera, 2006: 5; Van Brakel & Chisenga, 2003: 477), and the time, funding and development allocated to mobile websites and mobile applications, it can be said that ICTs also play an important role in the academic context.

To contextualise the empirical component, research on the use of mobile technology in academic contexts is briefly noted. According to TechTerms (2010: el), ICTs include “the Internet, wireless networks, cell phones, and other communication mediums”, inherently thus mobile technology and mobile devices as well.

According to the *Oxford Dictionaries* (2014: el), a mobile device can be defined as a “portable computing device such as a smartphone or tablet computer”. From these definitions it can be seen that mobile devices are part of the broader term “mobile technology”. In this dissertation, the term “mobile devices” is used.

Mobile technology can be defined as: “a device, such as a PDA or smartphone, that can store, access, create, allow to modify, organize, or otherwise manipulate data in various forms from a location without being required to be tethered to any particular spot” (Regas, 2002: el). For the purposes of this research, the researcher will not go into too much detail about the technicalities of the different types of technologies, as the focus of the study is not to investigate the technology itself, but rather the use of the technology and its influence on information behaviour. Therefore a brief overview only of the types of technologies is provided. The technologies include tablet, phone and phablet technologies.

According to TechTerms.com (2011: el) a tablet can be defined as: “a portable computer that uses a touchscreen as its primary input device”. Some of the tablets on the market include the Apple iPad, Samsung Galaxy Tab, Motorola Droid XY Board, Google and Samsung Nexus, Acer Iconia and the Sony Experia Tablet (Cernuta, 2013: el).

Phone technology on the other hand can be broadly defined as a “device that does not require the use of landlines” (BusinessDictionary.com, 2013: el). Some of the newest phone technology includes devices (from various manufacturers) such as the Samsung Galaxy S6, Samsung Galaxy S6 edge, Apple iPhone 6, Apple iPhone 6 Plus, Samsung Galaxy Note 4, Google/Motorola Nexus 6, LG G Flex 2 and HTC One M9 (Shanklin, 2015: el).

Phablet technology according to Rouse (2012: el) is “essentially a tablet that also functions as a phone”. Some of the devices that can be regarded as a phablet are the Samsung Galaxy Note 3, LG G Pro 2, HTC One Max, Nokia Lumia 1520, OnePlus One and LG G3 (Shanklin, 2014: el).

Tablets, phones and phablets are used for various purposes in various contexts. The following list highlights some of the uses of these devices: sending and receiving e-mails, playing games, sending and receiving text messages, listening to music, watching videos offline and online, making and receiving phone calls, navigating via global positioning system (GPS), searching for information, reading, shopping, checking the weather, Skype and taking notes (Bosker, 2011: el; Hahn & Bussel, 2012: 45; Wikipedia cited in Griffey, 2010).

These devices have some advantages, including that:

- They are constantly connected to the internet;

- They are aware of their location owing to their GPS capabilities;
- All information resources on the WWW can be accessed;
- They have great interactive capabilities;
- They provide access to relevant information; and
- Content can be delivered to the user quickly (Babbar & Chandrok cited in Ally & Needham, 2010:17; Business Know-How, 2013: el; Hudson, 2011: el; IBM. Nd).

In the context of this study, these advantages hold a lot of potential. If these advantages could be applied in the academic context, they will certainly have value to the users.

It is also important to note, however, that some problems have also been reported. If these can be addressed before they become too great, there is still much potential for the user. The problems include:

- Connectivity can be slow sometimes;
- Data is expensive;
- Different standards are used, which makes optimisation difficult;
- Displaying content in large format is difficult;
- Providing content for visually impaired people is difficult;
- The design process is complex;
- Users must choose among the many devices available;
- Some devices have a short battery life;
- Some devices have insufficient storage space; and
- Some devices does not support all file formats. (Babbar & Chandrok cited in Ally & Needham, 2010:17; Cogert, 2011: el; Business Know-How, 2013; Parsons, 2010: 233).

1.3.4 Academic studies

It is difficult to define the concept of academic study in a single definition. The University of Greenwich (2010: el.), suggests that academic studies can be explained as “programmes/courses connected to studying and thinking and not with practical/vocational skills. Studying for enjoyment in a subject you are interested in”.

Another approach is to break the concept down into the component words, namely “academic” and “study”. According to Collins (2012a: el), “academic” can be defined as “belonging or relating to a place of learning, esp. a college, university, or academy” or “relating to studies such as languages, philosophy, and pure science, rather than applied, technical, or professional studies”. “Study”, on the other hand, can be defined as “to apply the mind to the

learning or understanding of (a subject), esp. by reading” or “to take a course in (a subject), as at a college” (Collins, 2012b: e1).

From these definitions it can be said that academic study refers to studying or learning the theoretical or academic component of a subject or set of subjects at an institution like a college or university, instead of studying the applied component of the subject or subjects.

1.3.5 E-learning

The concept of e-learning can be defined as “training or education using Information Technology most importantly computers integrated with Internet Technology and their infrastructures” (Sribhadung, 2006: 352). A much simpler definition is offered by Collins (2013: e1) who suggests that e-learning is: “an internet-based teaching system”. According to the Joint Information Systems Committee (2013: e1) e-learning is “learning facilitated and supported through the use of information and communications technology”. It can be a combination of online and traditional learning (a blended approach) or it can be a programme that is delivered only online (Joint Information Systems Committee, 2013: e1).

From these definitions it can be said that e-learning can be used as a support to traditional teaching and learning, or it can replace traditional teaching and learning. What is, however, important is that e-learning makes use of information and communication technologies.

1.4 RESEARCH PROBLEM AND SUB-PROBLEMS

Given this background, there is a need to understand the information behaviour of students using mobile devices in an academic context with regard to learning, and specifically with regard to information seeking, searching, retrieval, and sharing. To address this problem, the following research question was addressed:

What is the impact of mobile devices on the information behaviour of students in the Department of Information Science at the University of Pretoria?

- What has been reported on the information behaviour of students with regard to the use of mobile devices in academic contexts?
- What has been reported on the information behaviour of students with regard to the use of mobile devices in general?
- What are the factors that influence the use by students of mobile technology for academic purposes?
- What is the information behaviour of students in the Department of Information Science with regard to information seeking in an academic context, using mobile devices?

- What is the information behaviour of students in the Department of Information Science with regard to the electronic learning management system (clickUP), using mobile devices?

1.5 BRIEF REVIEW OF THE LITERATURE

Literature reviews have been discussed by authors such as Leedy (1997), Mouton (2001), Vithal and Jansen (2010) and others. In this section, a definition of a literature review is provided, and the importance and some of the advantages of literature reviews are discussed. A brief overview is provided of what other researchers have reported on the topic of information behaviour and mobile technologies in Africa and abroad.

A literature review can be briefly described as “a search and evaluation of the available literature in a given subject area” (La Trobe University, 2012: e1). It forms an important part of a study, and therefore should receive good attention. The importance and advantages of literature reviews include:

- Ensuring that the same study has not been done before;
- Determining the results of similar studies;
- Identifying authoritative sources;
- Determining what methodologies and approaches were followed;
- Enabling the evaluation and comparison of the reported research project with the research of others; and
- Increasing knowledge about the subject (La Trobe University, 2012: e1; Leedy, 1997: 71; Mouton, 2001:87; Vithal & Jansen, 2010: 14).

1.5.1 Search terms, search strategies and resources

During this literature review, a combination of different keywords and search strings was used to search the literature for relevant information from a wide variety of resources. Although some searches were conducted using Google Scholar with success, a large number of the sources retrieved are from online platforms such as Emerald, Science Direct, EbscoHost, Proquest and Sabinet. Through these platforms, databases such as ERIC, SA ePublications, Africa Wide, and others, were searched for material relevant to the topic. Some of the main databases included Library and Information Science Abstracts (LISA), Library, Information Science and Technology Abstracts (LISTA), Library and Information Science Source and ISI Web of Science. The researcher also searched the comprehensive bibliographies by Case (2012) and Julien and Fisher (2009) for relevant titles.

In order to find relevant material, the following searches were conducted (for all terms the singular and the plural were included):

<u>Title field</u>
“information behaviour” OR “information “behavior” OR “information seeking” OR “information searching” OR “information use” OR “information sharing”
AND
<u>Title, keyword or abstract fields</u>
university OR tertiary OR college OR academic OR education OR student
AND
mobile OR “mobile device” OR “mobile technology” OR “cell phone” OR “smartphone” OR “tablet”

Table 1.1: Search strategy for literature review

For literature on South Africa, the full text was searched, adding “South Africa” as a search term.

1.5.2 International research

In the international context numerous studies have been conducted on ICT and information behaviour (Allen, 2011; Case, 2012; Fisher & Julien, 2009; Khan & Shafique, 2011; Punie, Zinnbauer & Cabrera, 2006). Less has been conducted on mobile devices and information behaviour (Auld, Snyder & Henderson, 2012; Cahill, Kuhn, Schmoll, Lo, McNally & Quintana, 2011; Counts & Fisher, 2010; Rogers, Connelly, Hazlewood & Tedesco, 2009).

Counts and Fisher (2010) for example investigated the effect of mobile social networking devices on information behaviour in a study titled “Mobile social networking as information ground: A case study”. An earlier study by Rogers, Connelly, Hazlewood, and Tedesco (2009) investigated the effect of mobile devices on sense-making and how these devices were used for teaching and learning. Hahn (2010) conducted a study within the broad area of information behaviour and investigated how students seek information via the iPod touch with the use of a Wikipedia application, in a study titled “Information seeking with Wikipedia on the iPod Touch”.

Studies done more recently include a study on mobile learning in museums and the support for learning as well as the influence on student behaviour (Cahill *et al.*, 2011). They investigated how a mobile based application named Zydeco influenced the learning and behaviour of students in a museum environment. Auld, Snyder and Henderson (2012) investigated the effect that mobile devices have on the literacy training of school children in an indigenous community in Australia, and how that affected their behaviour. Dresselhaus and Shrode (2012) conducted a study with a twofold aim, investigating the use of mobile devices for academic purposes by students and their associated behaviour, and how the academic library is handling these new developments. Walsh (2012) studied information behaviour and mobile information literacy at the University of Huddersfield library, and found among other things that there is a distinct difference in information behaviour between users of fixed ICT, such as computers, and users of mobile devices (Walsh, 2012: 67). There was thus a considerable body of international research that supported the planning of this study. Chapter 2 elaborates on the findings of such studies.

1.5.3 Research conducted in Africa

There is less research available from Africa. However, a South African study by El-Hussein and Cronje (2010) investigated how mobile learning fits into the higher education landscape. Even though the study did not focus specifically on information behaviour, the findings are still useful for the purposes of this dissertation. Among their key findings are that investigation of this area is likely to increase, and that mobile devices hold great potential for teaching and learning (El-Hussein & Cronje, 2010: 20).

For another South African study by Nkomo, Ocholla and Jacobs (2011), concentrating on web-based information-seeking behaviour, some interesting results regarding the effect of ICT on information behaviour were found. Among the findings were that staff and students of the University of Zululand and the Durban University of Technology relied more on wired network connections and fixed computer terminals to conduct their information searches, rather than on wireless connections and mobile devices (Nkomo, Ocholla, & Jacobs, 2011: 286). The authors recognise the value of mobile technology, and suggest that improvements are needed in this regard (Nkomo, Ocholla & Jacobs, 2011: 295).

The fact that there is limited research from the African context on this specific topic suggests that this study on the impact of mobile devices on information behaviour within an academic context (Department of Information Science at the University of Pretoria) will be a valuable contribution, especially since it focuses specifically on the academic context and use of an electronic learning management platform and information behaviour.

1.6 RESEARCH METHODOLOGY

The research methodology of a study is described by Wang (1999: 53) as a “theory of methods that guides the description, explanation, and justification of methods in empirical studies”. From the above definition, it can be said that a methodology describes how research will be conducted.

According to Wang (1999: 53), research methodology has the aim of describing various research methods, identifying their advantages and disadvantages, and noting the potential outcomes that they might have. Methodology further focuses on the various strategies and measurements that are used in the design of the research (Wang, 1999: 53). This study consists of a literature review and an empirical component, which is discussed in the sections to follow.

1.6.1 Research design

According to Trochim (2006: e1), the research design of a project can be described as “the structure of research ... the ‘glue’ that holds all of the elements in a research project together”. It shows all the important parts of the research that work together in order to address the problem statement (Trochim, 2006: e1).

1.6.1.1 Literature review

The importance and advantages of a literature review have been briefly discussed. A discussion of the literature review follows in Chapter 2, where a more detailed analysis of the literature is presented. As a reminder about the value and importance of literature reviews, the following is noted. A literature review is important because it allows the researcher to see whether similar studies were conducted, find sources relating to the topic, find approaches and findings related to the topic, make sense of findings by comparing them to other studies, and to determine exactly where his or her research falls in the existing body of research (La Trobe University, 2012: e1; Leedy & Ormrod, 2013: 51).

1.6.1.2 Empirical component

The two broad approaches followed when doing research are quantitative and qualitative research (Berg & Lune, 2012: 3). But researchers often decide to combine the two approaches, so that a more thorough investigation can be done. This is described as a “mixed method” approach (Leedy & Ormrod, 2013: 95). Mixed methods research is based on the collection of both quantitative and qualitative data, and the use of both quantitative and qualitative approaches in the data analysis (Cresswell, 2013: 44).

A quantitative approach to research refers to “counts and measures of things, the extents and distributions of our subject matter” (Berg & Lune, 2012: 3). In this type of research, the

researcher uses numerical ways of measurement, often in the form of questionnaires (Leedy & Ormrod, 2013: 95). A qualitative approach, on the other hand, refers to “the meanings, concepts, definitions, characteristics, metaphors, symbols and descriptions of things” (Berg & Lune, 2012: 3). In this type of research, the researcher focuses on characteristics, qualities, human interactions, and other complex situations that cannot be measured by numerical measurement methods (Leedy & Ormrod, 2013).

1.6.2 Methods of data collection

There are various methods of data collection that fall within the domain of both quantitative and qualitative research. Among the methods that have been used in research relating to information behaviour are the following:

- Questionnaires in various forms;
- Face-to-face interviews;
- Telephone interviews;
- Focus group interviews;
- Observations through experiments; and
- Observations in natural settings (Case, 2012: 204; Fidel, 2011: 66, Wang, 1999: 60).

In this study questionnaires and focus group interviews were used as data collection methods. These are discussed in more detail in Chapter 3. The advantages of using a mixed method approach include:

- The researcher can do a more in-depth study by collecting quantitative and qualitative data;
- The researcher can confirm the accuracy of results by comparing quantitative and qualitative data; and
- The researcher can test hypotheses identified during qualitative research by using quantitative measurements (Leedy & Ormrod, 2013: 259).

Although the present researcher noted the concerns expressed by Case (2012: 208) about web-based surveys, an electronic questionnaire available through Google Forms was used. Participants were invited to participate by e-mail. Participants for focus group interviews were invited during lectures and by means of e-mail.

1.6.3 Research sample

The research sample refers to the various sources that are used by the researcher as a source of empirical data. Although it mostly refers to people, it can include other objects such as audiovisual material, electronic and paper based materials. The general idea behind sampling

is to collect data from a small sample group or population, which can be applied to a larger population (Berg & Lune, 2012: 3; Leedy & Ormrod, 2013: 152).

The before-mentioned population is also referred to as the target group, and can be selected by means of various sampling strategies, depending on the purpose of the research, and the needs of the researcher.

In this study, the target group was the students in the Department of Information Science at the University of Pretoria. The group consisted of both undergraduate and postgraduate students. The study was based on convenience sampling, a method of sampling where subjects are selected because they are easily accessible to the researcher (Berg & Lune, 2012: 50).

1.6.4 Ethical considerations

According to Leedy (1997: 116), the use of human subjects during research raises some ethical questions. It is thus important that researchers adhere to certain rules or guidelines when conducting their research. One way of doing this is to obtain signed permission from participants before research is conducted. This protects not only the researcher, but also the participants. This permission can be obtained by means of an information letter that explains the research to be conducted and the role that the participant will play in it, asking for the participant's consent (Leedy, 1997: 116).

An information letter and a consent form were prepared and distributed to the sample group before data collection started. An online information letter and a consent form were built into the questionnaire, and paper versions were given to participants in the focus groups (see Appendix A). The Department of Information Science Research Committee gave permission on behalf of the Faculty of Engineering, Built Environment and Information Technology (EBIT) Research Ethics Committee for data to be collected.

1.7 ASSUMPTIONS AND LIMITATIONS OF STUDY

This study is restricted to students in the Department of Information Science at the School of Information Technology of the University of Pretoria. Participants from other institutions and students from other disciplines in the same institution may not necessarily report the same information behaviour as the participants in this study.

1.8 VALUE OF THE STUDY

The value of the study for the Department of Information Science will include finding out how students not only use their mobile devices, but how they use them for academic purposes in relation to information activities. The findings can help the department to develop new ways of delivering content to students, and adapting teaching and learning methods to include mobile devices, so that teaching and learning, and especially information activities such as information seeking and sharing, can contribute to academic success.

Another benefit of the study will be that it will reveal the difference, if any, between the use of mobile devices between undergraduate and postgraduate students. This may lead the department to explore differentiated means of providing teaching and learning opportunities to students on different academic levels. Findings could also inform similar studies in related contexts, and the theory of information behaviour.

1.9 DIVISION OF CHAPTERS

Chapter 1: Overview and introduction

Chapter 1 is the introduction and background to the study and is meant to place the dissertation in context. Some background information about the University of Pretoria and about South Africa is provided, followed by clarification of key concepts such as information behaviour, information and communication technology, mobile technology, mobile devices, academic studies and e-learning. The problem statement and sub-problems are discussed, which introduces the literature review (of research in the international and African contexts).

Chapter 1 also introduces the research methodology including the research design, methods of data collection and the research sample.

Chapter 2: Literature analysis

A brief reflection on the value and advantages of literature reviews introduces Chapter 2. An analysis of the literature pertaining to the research problem and sub-problems forms part of Chapter 2, which includes key definitions and concepts such as information behaviour, information and communication technology, academic studies, and e-learning. The literature review focuses on the topic of information behaviour and mobile devices, and research from international and African context is analysed. A research framework appropriate to a study of information behaviour and mobile devices is also selected in this chapter.

Chapter 3: Research methodology

The research methodology is explained in Chapter 3. It includes a discussion of the research design, the target group, and the sampling methods used. In this chapter, data collection methods, and the process of analysing and interpreting results, are discussed, as are the research instruments, namely questionnaires and focus group interviews.

Chapter 4: Data collection, findings and analysis

The data collected is presented and analysed in this chapter. This chapter, in addition to the literature analysis presented in Chapter 2, forms the basis for the findings, interpretations, and recommendations that are discussed in Chapter 5.

Chapter 5: Findings, interpretations and recommendations

The findings of the study, and the interpretations and conclusions that can be drawn from the study, are discussed in this chapter. Recommendations for future studies are also discussed.

CHAPTER 2: LITERATURE ANALYSIS

2.1 INTRODUCTION

In this study, the effect of mobile devices on information behaviour in an academic context is investigated. The concepts of information behaviour and mobile devices form the core of this study. In order to place the research in context, an analysis of the literature reporting earlier studies is provided. Although mobile devices *per se* feature briefly, the focus is on studies of information behaviour.

The value of this chapter is to form the basis on which the research design and the development of the data collection instruments, discussion of findings and recommendations are based. Chapter 2 provides the theoretical background and theoretical framework for the study.

According to Spink and Heinström (2012: 291) the maturity of a scientific field can be measured by assessing the depth and understanding of the issues and contexts studied. Studies of information behaviour in particular have undergone changes in their focus, which have ranged from work-related information behaviour, to problem-based information behaviour, to leisure-related information behaviour and many more topics (Case, 2012; Fisher & Julien, 2009). A further suggestion in this regard by Sin (cited in Spink & Heinström, 2012: 292) is that we should take an integrated view of information behaviour, as the various contexts are also becoming integrated.

The aim of the literature review is to trace and analyse relevant material that helps to address the research problem and sub-problems. Literature pertaining to the following was therefore searched and analysed:

- Information behaviour of students with regard to mobile devices in everyday life and in academic contexts;
- Factors that influence the use of mobile devices by students for academic purposes; and;
- Issues surrounding mobile devices.

2.2 FURTHER CLARIFICATION OF KEY CONCEPTS

Information behaviour has been studied extensively over the years and numerous articles have been published on it, books written about it, and reviews conducted on it (Case, 2012; Chowdhury & Chowdhury, 2011: 55; Fisher & Julien, 2009).

In Chapter 1 the concepts related to information behaviour were defined and briefly explained. In this section these concepts are discussed in more detail.

2.2.1 Information behaviour as overarching concept

It was mentioned earlier that Wilson's (2000) definition of information behaviour is a broad one, encompassing a number of activities relating to information behaviour (as portrayed in Figure 2.1). In order to help explain this concept, Wilson (1999: 263) developed the "nested" or "onion" model of information behaviour. This model suggests that information seeking and information searching falls under the umbrella term of information behaviour.

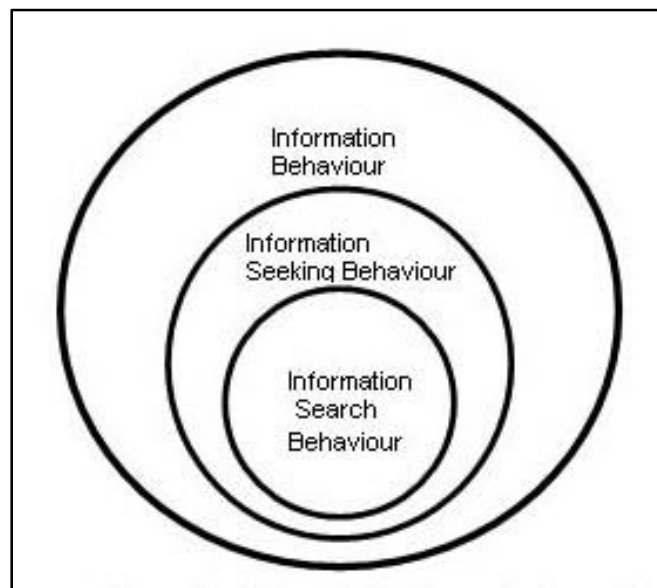


Figure 2.1: A nested model of Information behaviour (Wilson 1999: 263)

Although Wilson does not explicitly mention in his 1999 definition of information behaviour that information needs form part of information behaviour, we can deduce that they do when he refers to "the totality of human behaviour" (Wilson, 1999: 263). Fisher and Julien (2009: 1), support the notion that information needs form part of information behaviour as they argue that information behaviour focuses on: "people's information needs; on how they seek, manage, give, and use information, both purposefully and passively, in the varied roles that comprise their everyday lives". An important part of this definition is the emphasis on "purposefully and passively", which implies that we as humans can actively play a role in information behaviour by purposefully acting on the information that we have, or trying to find the information that we need. We also can be passive in our information behaviour, by choosing not to act on certain information or by not recognising that we have information needs. This study does not focus specifically on information needs, but because information needs trigger information seeking and other information behaviour, they should be acknowledged. In the next section, information needs are discussed in more detail.

2.2.2 Information needs as a concept

According to Miranda and Tarapanoff (2007: e1) an information need is “a state or process started when one perceives that there is a gap between the information and knowledge available to solve a problem and the actual solution of the problem”.

After considering the above definition it is important to note that an information need can be described as the gap between the information available, and the correct information required to solve a particular problem. In an earlier article on information needs Taylor (1967: 9) distinguished visceral needs, conscious needs, formalised needs, and compromised needs.

A visceral need is a need that has not been not expressed in words yet. In this instance, the user might be unaware of the need, and he or she might have a vague feeling that something is “missing”. A conscious need, on the other hand, is a need that the user is aware of. He or she can express the need, but cannot express it clearly (Taylor, 1967: 9).

A formalised need is a need that can be clearly expressed by the user. The problem with this type of need is that the user is unsure whether it can be addressed successfully. The need must often be reformulated several times. A compromised need is one that has been adapted by the user to fit with what he or she thinks is available that could address the need (Taylor, 1967: 9).

In the next section studies related to information behaviour are discussed.

2.3 STUDIES OF INFORMATION BEHAVIOUR

Although the main focus of this study is to investigate the effect of mobile devices on information behaviour in an academic context, other areas connected to the topic are also investigated. The discussion starts broadly and then narrows down to the specific topic of the research. The purpose of the broader point of departure is to contextualise the more specific research findings.

2.3.1 Information behaviour and mobile devices

A study conducted in South Africa by Chigona *et al.* (2008) investigated the factors that affect university students` use of mobile internet. The authors made use of a uses and gratifications framework in order to understand the various motivations for using the internet. The results were tabulated to determine the content, process and social gratifications of mobile phones, traditional internet and mobile internet (Chigona *et al.*, 2008). Some of the findings that are of particular relevance to this study are that social factors play a significant role in the motivation for mobile internet usage, and that there are certain factors that obstruct mobile internet usage. These include reliability and speed problem, ease of use and experience issues, and

information presentation issues (formatting and navigation). A further finding is that some participants preferred the use of mobile internet, and in some cases it was the only means of accessing the internet (Chigona *et al.*, 2008).

Kassab and Yuan (2012) conducted a study aimed at understanding the needs and search behaviours of users on mobile devices. Twelve graduate students were used as the target audience to investigate some trends of mobile users' behaviour. According to Kassab and Yuan (2012: 1) popular activities include searching for information, reading the news, looking at the weather, browsing specific websites, and using e-mail and reading blogs. The authors also investigated the information needs of the participants, and determined that mobile information needs could be classified into three broad categories, those of informational, geographical and personal information management (Kassab & Yuan, 2012: 1).

Other findings that should be highlighted include the motivation of the participants for using their mobile devices. It was found that participants were motivated by: searching for information; not having access to a computer or a wireless network; wanting to answer a question during a discussion; keeping up with social networks; doing online shopping; and to pass the time (Kassab & Yuan, 2012: 1).

A study by Walsh (2012) examines the influence of mobile devices on information behaviour, specifically information searching and use. An important argument is that there is a difference in information behaviour between fixed and mobile environments. Information searching differs in terms of where, what, how, and time spent on the search, when fixed and mobile environments are compared (Walsh, 2012: 58). The results of this study highlight three main themes relating to the different "modes of information engagement" that are of particular relevance: people search and evaluate information on the move, people use and create new information and knowledge on the move, and people deal with the "always on" nature of mobile devices (Walsh, 2012).

Burford and Park (2014) investigated the effect of mobile devices, specifically tablets, on human information behaviour. The researchers conducted their work in an online community of iPad users, and their findings demonstrate that there is a definite and significant impact on the information behaviour of users. Burford and Park (2014: 636) suggest that mobile device developers should move away from the focus on information systems and instead focus on the information actor (the user) and the context of the user. This stems from the fact that mobile devices enable access to all forms of digital information and that they influence the context of information engagement to such an extent that these contexts are becoming "multi-dimensional, undetermined and fluid" (Burford & Park, 2014: 635).

Turning to a study that is more focused to the events and convention domain, some interesting observations can be made regarding mobile devices and information behaviour. Lee and Lee (2014) investigated how convention attendees made use of mobile devices to use social media applications specifically relating to a convention. The study highlights that attendees of different generations had the same motivations for the use of social media applications for convention purposes. The motivations include building a community with other attendees and sharing of current information (Lee & Lee, 2014: 145). Generation (Baby Boomer, Generation Y, and Generation X) does however play a role in the source of information, and the intended use of mobile applications for conventions. Generation Y and Generation X used information available via mobile devices more than the Baby Boomers (Lee & Lee, 2014: 145). The Baby Boomers were born roughly between 1946 and 1964; Generation X, roughly between 1960 and 1980; and Generation Y roughly between 1980 and 2000 (Waterworth, 2013: e1).

In the next section studies related to information behaviour, mobile devices and academics are discussed.

2.3.2 Information behaviour, mobile devices and academics

Numerous studies have been conducted on the information behaviour of academics in various institutions and disciplines all over the world (Case, 2012; Hemminger *et al.*, 2007; Niu *et al.*, 2010; Perera, 2014; Wang, 2007, to mention a few). The term “academics” is used when referring to faculty such as lecturers and professors. For purposes of this dissertation studies on the information behaviour of academics with specific consideration of the impact of ICT, and more specifically mobile devices, are important. Academics are discussed to help contextualise the study.

Bills *et al.* (2006: e1) wrote an article to help scholars understand the value of ICTs and using them to their advantage. Even though the main focus of the article is on ICTs in general, attention is also given to mobile devices, in the form of mobile phones and tablets. The authors argue that it is important for the new mobile scholar to be aware of and make use of the benefits of these devices, which include features like e-mail, providing access to various information sources, and that they can be used for designing, taking notes and acting as an additional monitor (Bills *et al.*, 2006: e1). As a conclusion, Bills *et al.* (2006: e1) state that “we urge scholars to seek ways to be in control of the technology, not the other way around”.

Bauder and Emanuel (2012) investigated the information behaviour of academics in relation to the use of emerging technologies. Some of the findings of this study were that faculty make use of mobile devices for accessing the web and e-mail. Their usage ranged between multiple times per day to a few times per month (Bauder & Emanuel, 2012: 69). With regard to the use of a mobile catalogue or a mobile library website to satisfy their information needs, only 30%

of faculty expressed interest in having this option. The researchers concluded that although there is some interest in using mobile devices for academic purposes in satisfying information needs, most of the faculty uses their mobile devices only for non-academic purposes (Bauder & Emanuel, 2012: 74).

In the next section studies related to information behaviour, mobile devices and students are discussed.

2.3.3 Information behaviour, mobile devices and students

Research into new methods of teaching and learning with specific regard to mobile technologies has been done in the last few years. What brought this about was the fact that mobile technologies are an ever-present feature of the lives of today's learners (Owen, 2010: 215). The availability of these technologies created the opportunity to use them for teaching and learning (Owen, 2010: 215).

For some time, studies have been done on the use of mobile devices in teaching and learning, aimed at improving the delivery of content. One of these studies was conducted by Mock (2004: 17), who investigated the use of a tablet in the teaching of two courses. One of the courses was software engineering, the other was computer science. A questionnaire was distributed to the students and many advantages of using this medium of instruction were identified. Among the advantages were that the lecturer could make notes on the material during the lecture, work covered in the previous class could be opened and displayed to the students, and there was no mess as was caused by chalk dust (Mock, 2004: 19). Some students said that they preferred this medium to the traditional blackboard (Mock, 2004: 22).

In this study by Mock (2004), a definite influence on behaviour could be seen when tablets were used for teaching, in both students and instructors. From these findings it can be deduced that tablets have an influence on information behaviour, especially if seen in the light that they changed how the instructor and students used information, and also how they collaborated by means of their mobile devices.

In a study conducted at the Delta State University in Nigeria, Adomi (2006: e1) found that library and information science students also rely on mobile device communication, specifically cell phones, for a variety of purposes. These include communication about financial matters, family matters and academic matters. The latter included timetable matters, exchanging research information, and task- or assignment-related matters. Even though there were some limitations on the technology, the use of these devices definitely had benefits for the undergraduate students (Adomi, 2006: e1). It can also be said that their behaviour, particularly their information behaviour, was greatly influenced. Among the findings of particular relevance

for this study: “mobile phone use has limited the need for most of the students to travel followed by facilitation of exchange information anytime the need arose” (Adomi, 2006: e1).

Parsons (2010) studied the habits of distance education students with regard to mobile devices and accessing information, and the students’ attitudes towards the use of mobile devices in the future for academic purposes. This study yielded some interesting results. One of the most significant findings was that “evidence is not yet strong enough that students want to use mobile devices for education” (Parsons, 2010: 242). Taking into consideration that the study was conducted on distance education students and it was conducted in 2008 one can argue that the availability of devices, the type of technology and software available and a number of other factors could have had an impact on the outcome of this study.

In a study conducted by Owen (2010: 215), it was found that students in general make use of laptops, audio listening devices, netbooks, handheld gaming devices, smartphones and personal digital assistants (PDA’s). These devices were mostly used for social purposes that included texting, talking, playing music, taking photos, and to a limited extent listening to podcasts (Owen, 2010: 215). Among the most important findings in the context of this particular study is that students wanted access to teaching and learning materials on mobile formats, and it led to the conclusion that there is a definite need for mobile technology in teaching and learning (Owen, 2010: 215).

The two before-mentioned studies are thus in direct contrast: one group of students expressed no interest in having the opportunity to use their mobile devices for educational purposes (Parsons, 2010), while the other group definitely wanted to have this opportunity (Owen, 2010). In order to support the argument that information behaviour is influenced by mobile technologies, some further studies are discussed.

A study on information seeking with the use of iPod Touch and Wikipedia was conducted by Hahn (2010). He found that students used the iPod to search for short factual information, and for recreational information and he established that they (students) felt that there was an improvement in their searching behaviour (Hahn, 2010: 294). Another study, conducted by Hahn and Bussel (2012) focused on the use of iPads for educational purposes in an undergraduate learning community at the University of Illinois. The study was based on a loan system where the students were allowed to take out an iPad from the library and use it for a certain time, after which they had to check it back in.

This study found that the iPad had a definite impact on the students as they could connect wirelessly to the internet in class and access information that included e-mails, lecture notes and PowerPoint slides. Students could also take notes during classes and bring previous

notes to class with them without having to print them out. Students could collaborate easily, and they made use of the applications on the iPad to complete tasks and assignments (Hahn & Bussel, 2012: 43). Considering the activities that the students engaged in by means of the iPad, namely accessing information, sharing information, and using information it can be concluded that it had an impact on their information behaviour. Results from this particular study were obtained through focus group interviews and online questionnaires (Hahn & Bussel, 2012: 43).

Bomhold (2013) conducted a study on mobile phone applications (apps) that undergraduate students use for both everyday and academic purposes. By means of a literature review and an online questionnaire the author determined that students not only use their mobile devices for communication and entertainment purposes, but also for academic matters. Some of the apps used for information seeking are the app version of academic websites (Bomhold, 2013: 430). Some important deductions about the use of mobile devices include that convenience is an important consideration when choosing what information to access. This could be ascribed to the fact that the participants were millennials (born between 1980 and 1994). This group of users are used to having access to information, and getting information quickly (Bomhold, 2013). Taking into consideration the information accessed and used, the apps used to do so, and the need to be able to do it quickly, it can be said that mobile devices also had an influence on the behaviour of these students.

2.4 MODELS AND FRAMEWORKS

A theoretical or conceptual framework is “an overarching set of beliefs, theories, and perspectives that shape the design of the research project” (Given, 2016: e1). Theories can play different roles at different stages of the research process, depending on the requirements of the researcher. They can help the researcher in the design of the study; determining goals, ethical design, selection of methods and methodologies; they can aid in the interpretation of data; and they can guide a study, and they can be used for theory generation during the analysis of data (Given, 2016: e1).

Several models were considered as potential frameworks to guide this study, including Wilson’s nested model of information behaviour (1999) (see Figure 2.1), the information search process model of Kuhlthau (1991) (see Figure 2.2), Wilson’s model of information behaviour (1981) (see Figure 2.3), and Wilson’s model of information behaviour (1999) (see Figure 2.4).

The Kuhlthau model is very important in the academic context. For the purposes of this study, only the feelings related to mobile devices and information behaviour of participants will be noted. This is however not according to the process of completing an academic task, but according to the device.

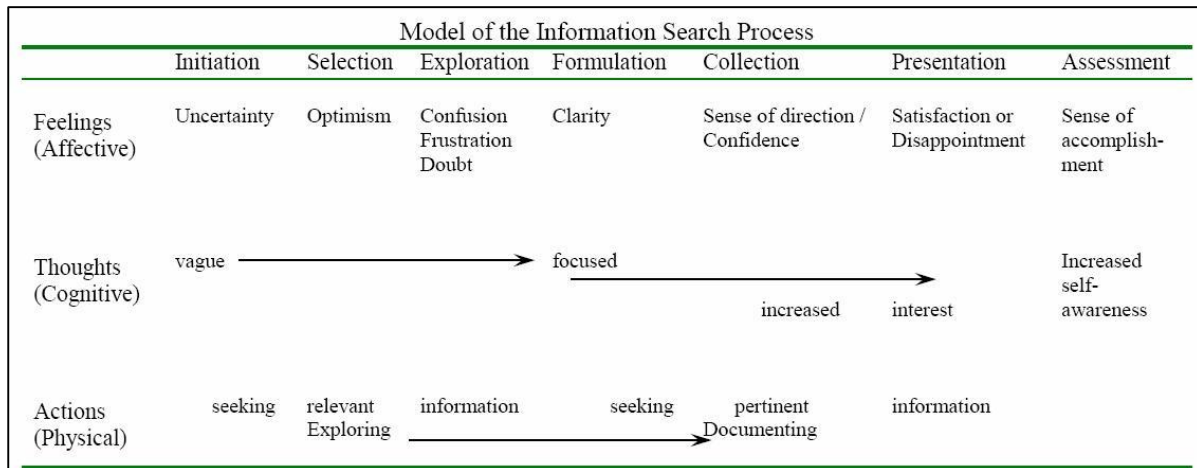


Figure 2.2: Kuhlthau's model of the Information Search Process (Kuhlthau, 1991: e1)

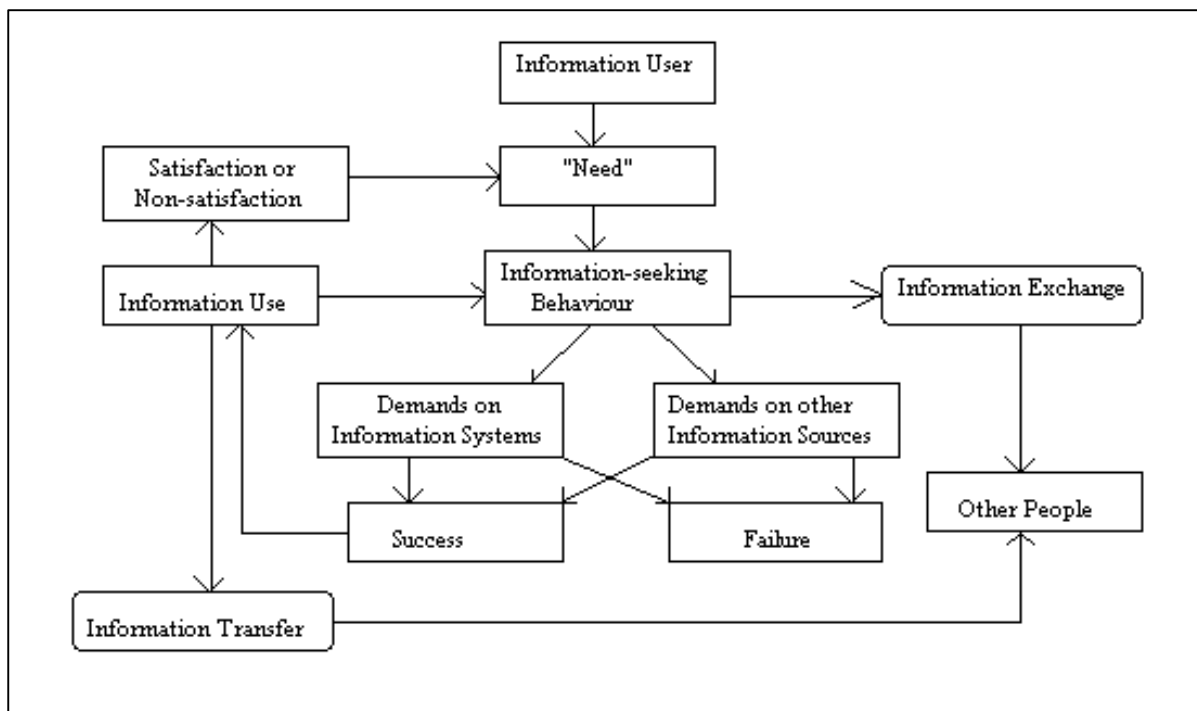


Figure 2.3: Wilson's 1981 model (Wilson 1981: 251)

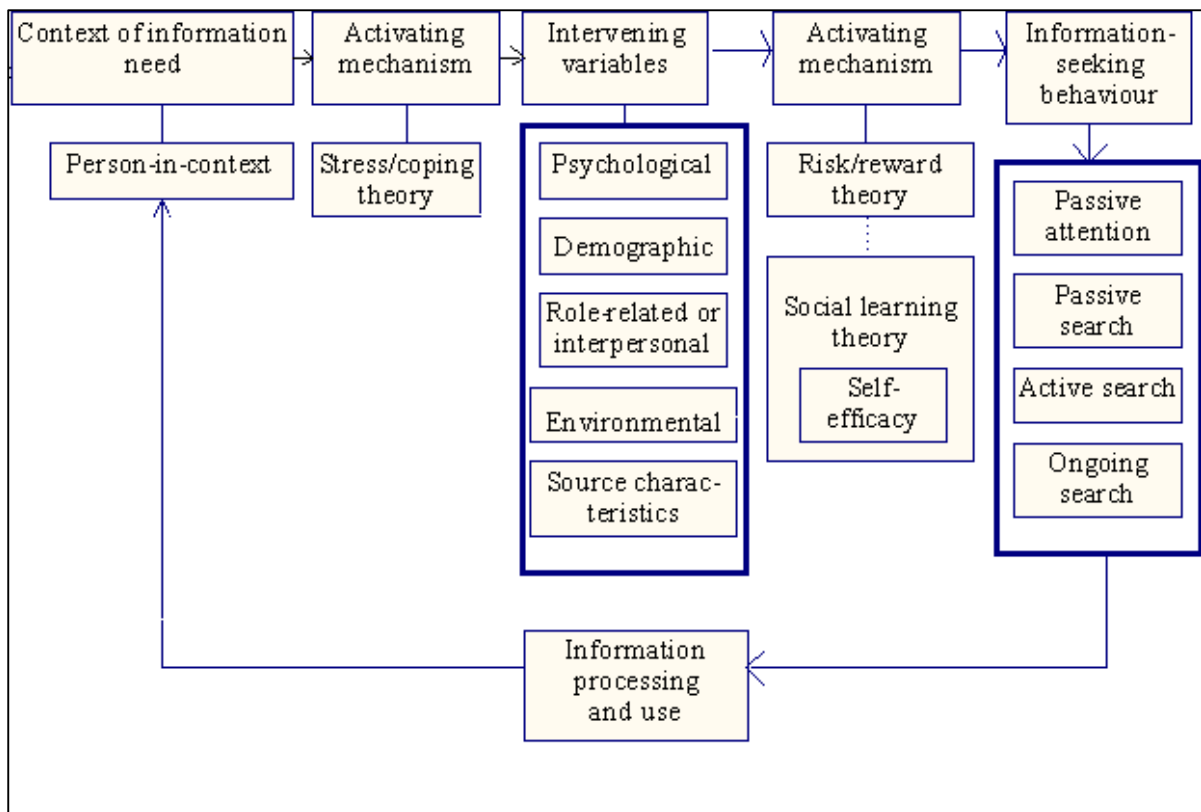


Figure 2.4: Wilson's 1999 model (Wilson 1999: 257)

These models, i.e. Wilson 1981 and Wilson 1999, can be applied to this study. The following two models demonstrates by means of examples, where the data for this study fits in, within the Wilson models (see Figure 2.5 and Figure 2.6). The Kuhlthau (1991) model could also be applied in areas such as self-efficacy as well as activating mechanisms.

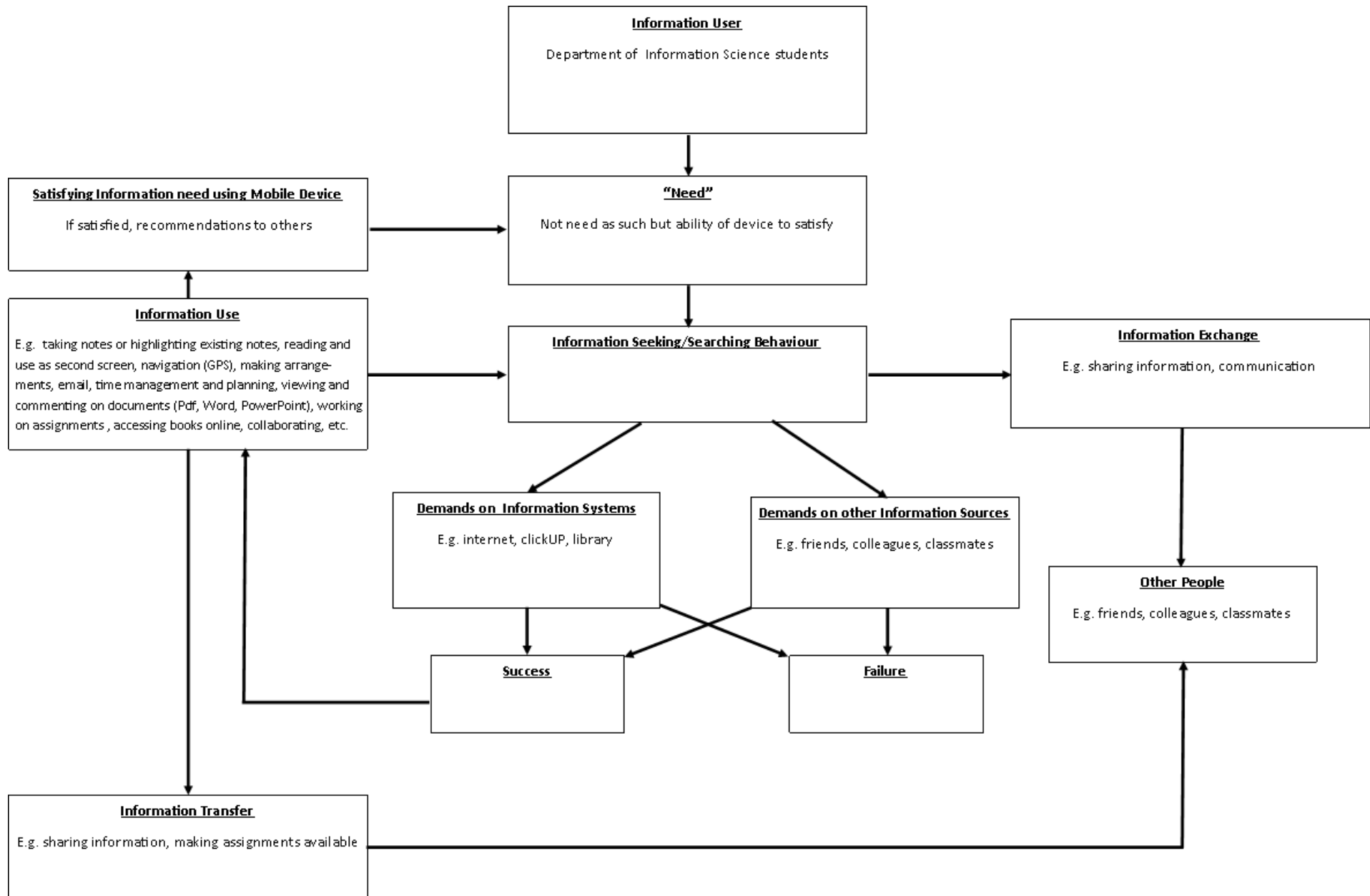


Figure 2.5 Adapted Wilson 1981 model

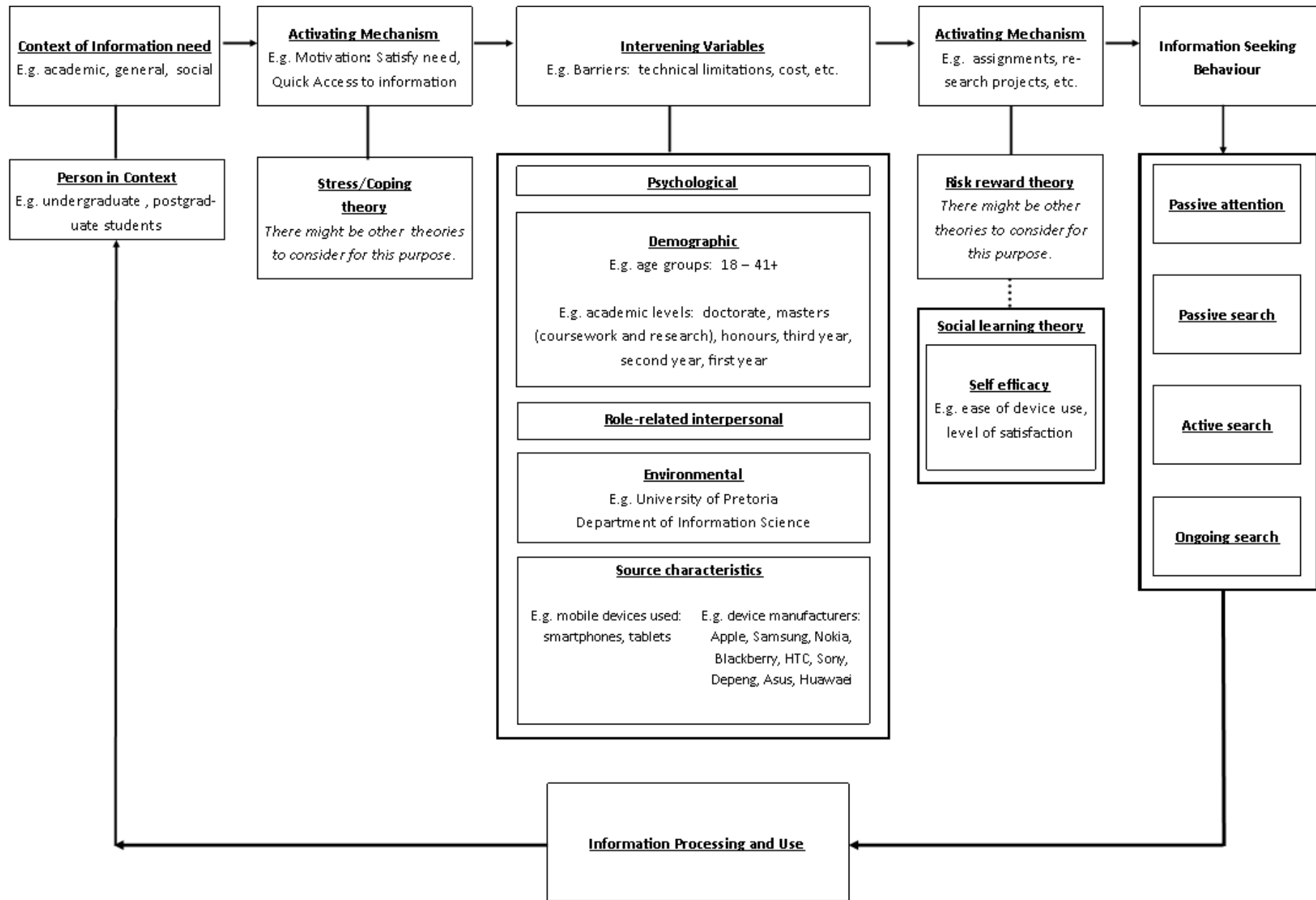


Figure 2.6: Adapted Wilson 1999 model

2.5 SUMMARY OF FINDINGS FROM THE LITERATURE ANALYSIS THAT INFORMED DATA COLLECTION AND DATA ANALYSIS

After reviewing the literature, a number of observations can be made. Information behaviour includes activities such as information searching behaviour and information seeking behaviour (Wilson, 1999). Included under the umbrella term of information behaviour are information needs (Fisher & Julien, 2009: 1) which have an influence on people's day to day lives. There are various types of information needs, including visceral needs, conscious needs, formalised needs and compromised needs (Taylor, 1967: 9). It was established that information needs, which in essence are the gap between problems and their solutions (Miranda & Tarapanoff, 2007: e1), can also be addressed by mobile devices, and that these needs could be divided into informational, geographical and personal information management (Kassab & Yuan, 2012: 1).

Some activities relating to information behaviour that can be observed regarding mobile devices include: information use, searching, browsing, reading, e-mail, taking notes, listening to music, taking photos, talking, texting, social networking and collaboration (Bills *et al.*, 2006: e1; Hahn & Bussel, 2012: 43; Kassab & Yuan, 2012: 1; Owen, 2010: 215).

From the studies reviewed, a number of data collection methods were identified. They included: literature reviews, focus group interviews and questionnaires (Bomhold, 2013: 430; Hahn & Bussel, 2012: 43). According to Walsh (2012: 58), it is important to note that there is a difference in information behaviour between fixed and mobile environments. More importantly for the purposes of this study, it can be extrapolated from the various sources consulted that mobile devices have an influence in some or other form on the information behaviour of their users (Adomi, 2006: e1; Bomhold, 2013: 430; Burford & Park, 2014: 636; Hahn & Bussel, 2012: 43; Mock, 2004: 17; Owen, 2010: 215).

2.6 CONCLUSION

In this chapter the literature was analysed. The aim was to provide background information of the concepts used in this study and to report on findings from similar and related studies. The framework that guided the study was also developed, based on an eclectic use of selected information seeking and information behaviour models.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

In this chapter the research methodology of the study is discussed. This includes a discussion of the research design, research method and data collection methods. The target group and sampling strategies followed are also discussed. The ethical considerations and measures to ensure validity and reliability are also discussed. Data analysis is introduced, which is discussed in depth in Chapter 4.

3.2 RESEARCH SUB-PROBLEMS TO BE ADDRESSED BY THE EMPIRICAL COMPONENT

The main research problem has been contextualised in Chapter 1, namely:

What is the influence of mobile devices on the information behaviour of students in the Department of Information Science at the University of Pretoria?

The following sub-problems are addressed in the empirical component:

- *What is the information behaviour of students in the Department of Information Science with regard to information seeking and use using mobile devices?*
- *What is the information behaviour of students in the Department of Information Science with regard to the electronic learning management system (clickUP) using mobile devices?*

3.3 RESEARCH DESIGN

In the past, researchers who conducted studies on users in libraries and information services (and this can be extended to researchers who conducted studies on information behaviour) made use of a positivist or reductionist research approach (Chowdhury & Chowdhury, 2011: 38). But researchers today are to a great extent using an interpretive research approach. Owing to the various approaches, i.e. positivist, reductionist, interpretivist, etc., that are followed to do research in this field, qualitative and quantitative methods of data collection have been used (Case, 2012: 222; Chowdhury & Chowdhury, 2011: 38). Over the years, researchers have made use of various methods, models, and data collection methods to research information behaviour. According to Ellis (in Spink & Heinström, 2011: 18) research in information behaviour before the 1980s could be divided into four main categories. These categories were:

- Studies adopting a social science perspective;

- Studies that adopted a qualitative approach in contrast to a quantitative one;
- Studies that focused on information behaviour modelling; and
- Studies concerned with empirical validation and exemplification (Ellis in Spink & Heinström, 2011: 18).

According to Ellis, research in information behaviour today is, however, a combination of all of these categories (cited in Spink & Heinström, 2011: 19).

Owing to the nature of this study, a mixed methods approach was followed. Johnson and Onwuegbuzie (2004: 17) define mixed method research as: “the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study”. Creswell and Clark (2011: 5) move away from a single definition of mixed methods research and suggest that the focus should rather be on the characteristics connected to the approach. These characteristics include collecting and analysing qualitative and quantitative data, mixing the data together, and combining procedures and processes together in single or multiple phases of a study. Making use of a mixed methods approach to conduct research offers a number of advantages, including:

- The strengths of one method counter the weakness of the other;
- Multiple paradigms can be considered;
- More evidence can be gathered by using various data collecting methods; and
- It is practical, so researchers can use whatever methods they deem appropriate (Creswell & Clark, 2011: 5).

The study consists of a quantitative and qualitative component where data were collected using questionnaires and focus group interviews (to be discussed in more detail in Sections 3.5.1. and 3.5.2). The quantitative component of the study is aimed at gathering numerical data from the participants. This includes, for example, the number of students making use of their mobile devices in order to satisfy certain information needs, and the number of times that students access information using their mobile devices. Quantitative research, according to Pickard (2013: 325) is “empirical research in which the researcher explores relationships using numeric data. Results can often be generalized...”

The qualitative component of the study on the other hand is focused on the reasons for or the ways in which certain things are done. This, for example, includes the reasons why students prefer to use their mobile device to search for information rather than to use a computer, or how students share information with their peers using their mobile devices. Anguera and

Izquierdo (2006: 210) state that qualitative research is aimed at understanding how human beings interact with one another and how they interact with their environment.

3.4 RESEARCH METHOD

This study is in the form of a case study, and the focus of the study is the students in the Department of Information Science at the University of Pretoria. Yin (2014: 234) states that a case study is “a study that investigates a contemporary phenomenon in depth and in its real world context”. The phenomenon investigated is the information behaviour of students with regard to their use of mobile devices in an academic context. Case (2012: 224) also supports the idea of using case studies in information behaviour research, and says that an important aspect of case studies is that they focus not only on the individual elements or problems of what is being studied, but the context as a whole. The context of students in the Department of Information Science at the University of Pretoria has briefly been sketched in Section 1.6.3.

3.5 DATA COLLECTION METHODS

Both quantitative and qualitative research makes use of a broad spectrum of data collection methods, and each of these methods has its advantages and disadvantages. Some methods work better than others depending on the nature and context of the research (Pickard, 2013: 192). Some of the general data collection methods include: questionnaires, interviews, focus group interviews, observations, diaries, transaction log analysis, interaction tracking, eye-tracking, field and laboratory experiments, unobtrusive approaches and network and discourse analysis (Case, 2012: 221; Chowdhury & Chowdhury, 2011: 40).

There are, however, some methods that are more commonly used in the domain of information behaviour. Among these methods are:

- Questionnaires in various forms;
- Interviews in various forms; and
- Observation in various forms (Case, 2012: 204; Fidel, 2011: 66; Wang, 1999: 60).

Parsons (2010), for example, made use of an online questionnaire in a study conducted on the information behaviour of distance learners and how they make use of mobile devices. Hahn and Bussel (2012) made use of focus group interviews and questionnaires to collect data from their sample group in a study on the information behaviour of students with the use of tablets at the University of Illinois.

For this study, questionnaires and focus group interviews were used as data collection methods. After considering methods used by other studies and the review of the literature

reported in Chapter 2, it is evident that questionnaires and focus group interviews are acceptable methods for data collection in the studying of information behaviour.

3.5.1 Questionnaires

Hofstee (2011: 132) describes questionnaires as “a form of structured interviewing”. In this process the participants are provided with a standardised set of questions. These questions can be closed-ended, which means there is a given set of answers, like yes, no, or ranking type questions, such as Likert scale questions. Questions can also be open-ended, which means that the respondents can share their own interpretation and meaning attached. It gives the respondent the opportunity to not only provide a short yes, no or ranking based answer, but also to provide descriptions and motivations for their answers.

Closed-ended questions are generally used for quantitative data, whereas open-ended questions are used for qualitative data. Open-ended questions are used in cases where more detail or clarification is required (Pickard, 2013: 219; Struwig & Stead, 2004: 92). Closed-ended questions on the other hand are used when participants are given the opportunity to select predetermined answers, which may include ranking according to given standards, or just providing a yes or no answer. The questionnaires were made available to students through the University of Pretoria electronic learning management system (clickUP) and via e-mail. (Refer to Appendix B for the questionnaire and cover letter used in this study.)

3.5.1.1 *Advantages of questionnaires*

Using questionnaires for data collection holds several advantages, including:

- Objectivity, if the questions asked were properly standardised;
- Data can be collected from large groups, especially if the questionnaire is web based;
- Questionnaires can be anonymous, meaning the respondents' identities are hidden;
- Questionnaires allow a high level of control, meaning that the researcher creates an environment in which certain issues can be addressed (Fidel, 2011: 67; Milne, 2010: 52; Morgan, 2008: 6).

3.5.1.2 *Disadvantages of questionnaires*

Using questionnaires for data collection, however, holds several disadvantages too. These include:

- Participants can misunderstand the questions;
- Participants may rush through the questionnaire just to complete it;
- Participants may refuse to complete the questionnaire;

- Often the researcher cannot interact with the participants during the completion of the questionnaire to guide them;
- There can be a lack of depth in the questions asked (Hofstee, 2011: 132; Milne, 2010: 52).

3.5.2 Focus group interviews

Focus group interviews can be defined as “a method of collecting data, in a safe environment, from more than one individual at a time, regarding a specified area of interrogation” (Krueger & Casey cited in Onwuegbuzie, Leech & Collins, 2010: 711). Focus groups are a type of group discussion where between six and twelve participants are interviewed by a facilitator, with the aim of gathering in-depth yet spontaneously provided data (Case, 2012: 251; Kuniavsky cited in Chowdhury & Chowdhury, 2011: 46; Morgan, 1998: 1; Wang, 1999: 64).

Focus group interviews can be conducted in various areas and for various purposes. They include interviews that explore general requirements, attitudes and issues; interviews intended to determine priorities; interviews intended to analyse competition; and interviews intended to explain trends (Kuniavsky cited in Chowdhury & Chowdhury, 2011: 48). In this study, the aim of the focus groups was to explore general and specific issues related to the influence of mobile devices on the information behaviour of students. All sessions were recorded, with the permission of the participants, so that the researcher could analyse the data afterwards. Ethical concerns are discussed in Section 3.7. The focus group interviews were held in meeting rooms in the Department of Information Science, which included the tea room and board room. (Refer to Appendix C for the interview schedule used in this study).

3.5.2.1 Advantages of focus group interviews

Using focus group interviews for data collection holds several advantages, including:

- Speed: they can be done quickly, and provide immediate results;
- They are transparent, so the participants know what is going on;
- There is interaction between the research and the participants;
- They are flexible, so the researcher can adapt the questions according to the circumstances;
- They allow the researcher to observe non-verbal communication;
- They are not expensive to conduct (Gorman & Clayton cited in Chowdhury & Chowdhury, 2011: 46; Krueger & Casey cited in Case, 2012: 250; Morgan, 2008: 7).

3.5.2.2 Disadvantages of focus group interviews

There are however some disadvantages in using focus group interviews as data collection methods, such as:

- Focus groups are often difficult to control;
- They can be difficult to set up;
- They must take place in a suitably relaxed environment;
- It can be difficult to get people together to participate;
- Dominating personalities might prevent other participants from sharing;
- The moderator needs to be skilled in conducting interviews (Gorman & Clayton cited in Chowdhury & Chowdhury, 2011: 46; Krueger & Casey cited in Case, 2012: 250).

3.6 TARGET GROUP, CENSUS APPROACH, CONVENIENCE AND PURPOSIVE SAMPLING

Sampling refers to a process where a researcher chooses a portion or section of a population as the sample group on which research will be conducted. Results from the sample group can then be generalised to the larger population (Berg, 2009: 48; Berg & Lune, 2012: 3; Leedy & Ormrod, 2013: 152; Trochim, 2006: e1).

There are various sampling strategies, and they fall into two main categories, namely probability sampling and non-probability sampling. Probability sampling makes use of a random method of selecting participants so that all the subjects (people) within the population have an equal chance of being selected (Trochim, 2006: e1; Berg, 2009: 49). Non-probability sampling does not involve random selection, and subjects are selected because the researcher needs to collect data from those specific subjects (Berg, 2009: 49; Trochim, 2006: e1).

In this study, students participated in two methods of data collection, namely a questionnaire and a focus group interview. For each of the methods a different strategy was used to select the participants. In order to select the overall target group, convenience sampling was used. Convenience sampling is a method where participants are selected because the researcher has access to them (Cohen & Crabtree, 2006: e1; Trochim, 2006: e1). This entailed selecting students from the Department of Information Science at the University of Pretoria, both undergraduate and postgraduate students. The postgraduate students included students on honours, master's and doctoral level. Master's students are further subdivided into students completing a coursework or a full research master's.

A census approach was used for the questionnaire component of the data collection. A census approach can be described as "an attempt to list all elements in a group and to measure one or more characteristics of those elements" (Cantwell, 2008: e1). The questionnaire was made available to all students in information science within the target group by means of an e-mail with a link to the questionnaire. The reason for using a census approach was to gain as much information as possible from the students in the Department of Information Science, so that

conclusions could be drawn regarding their information behaviour, and their use of mobile devices for academic purposes.

Purposive sampling was used for the focus group interview component of the data collection. It was used to follow up on issues that could not be addressed in detail in the questionnaire. It added depth to the data obtained from the questionnaires. The researcher asked students to participate in the focus group interviews during classes they attended as part of their information science studies. Correspondence via e-mail was used to make final arrangements about location, date and time of the interviews.

3.7 ETHICAL CONSIDERATIONS

The use of human subjects in research raises ethical questions (Leedy, 1997: 116). It is thus important that researchers adhere to certain rules or guidelines when conducting research. One way of doing this is to obtain signed permission from participants before research is conducted. This protects not only the researcher, but also the participants. This permission can be obtained by means of an information letter that explains the research to be conducted and the role that the participants will play in it, asking for the participants' consent (Leedy, 1997: 116). Case (2012: 213) and Yin (2014: 78) also focus on the importance of ethics in research and state that there are certain guidelines or principles that should be followed when conducting research on human subjects. Among these guidelines are:

- Gain informed consent;
- Protect participants' privacy and confidentiality;
- Do not deceive participants; and
- Protect vulnerable groups (National Research Council, cited in Yin, 2014: 78).

An information letter and informed consent form were prepared and distributed to the participants before data collection began (see Appendix A). An online consent form accompanied the questionnaire, which participants had to agree to before completing the questionnaire. Participants signed a consent form (on paper) before the focus group interviews began.

3.8 VALIDITY AND RELIABILITY

Consideration of validity and reliability is important for researchers to ensure that a study is meaningful, accurate, credible and reliable (Case, 2012: 208; Leedy & Ormrod, 2013: 101; Pickard, 2013: 22). To ensure the validity of a study, one considers internal validity, or the extent to which conclusions can be drawn from the data collected, and external validity, or

whether or not conclusions can be generalised to a broader context than the focus of the study (Leedy & Ormrod, 2013: 101; Pickard, 2013: 22).

A study is reliable when the methods used in it can be applied to another study, or in a different context and by different researchers, with similar results (Case, 2012: 209; Pickard, 2013: 23). According to Leedy and Ormrod (2005: 28) reliability also depends on the consistency of results using different measuring instruments within the same study. Pickard (2013: 22) also emphasises the importance of reliability, and states that reliability can be demonstrated by the test-retest method.

In order to ensure validity and reliability in this study, the researcher has carefully considered the literature to ascertain the measuring instruments used in similar studies, so that the correct instruments could be used in this study. Multiple instruments were also used, including questionnaires and focus group interviews. By comparing the literature, results from the questionnaires, and the results of the focus group interviews, it was determined that results were either similar or complemented each other. Therefore the study is deemed to be valid and reliable.

3.9 DATA ANALYSIS

According to the Organisation for Economic Co-operation and Development (OECD) (2013: e1) data analysis can be described as the “process of transforming raw data into usable information”. Vithal and Jansen (2010: 27) describe it as “to make sense of the accumulated information”. As this study made use of quantitative and qualitative data collection methods two sets of data have been collected. Data collected from the questionnaire are mostly quantitative, and are presented as tables and graphs that highlight the important findings.

Data collected during the focus group interviews were analysed by means of thematic analysis, which according to Braun and Clarke (2006: 6) is: “a method for identifying, analysing, and reporting patterns (themes) within data. It minimally organises and describes your data set in (rich) detail”.

Results from the questionnaire and focus group interviews were compared and discrepancies investigated. In order to ensure the validity of the study, questions asked were clearly formulated to gain the appropriate information required from the respondents. In order to ensure reliability, results from the questionnaire were compared to results from the focus group interviews (triangulation). When compared to the literature available, similar trends were identified.

3.10 CONCLUSION

In this chapter the research methodology was explained, and the research method, data collection methods, ethical considerations, target group, sampling strategy, ethical considerations and issues of validity and reliability were discussed. In the next chapter the findings are reported and interpreted.

CHAPTER 4: DATA COLLECTION, FINDINGS AND ANALYSIS

4.1 INTRODUCTION

In this chapter the researcher reports on the data collected and the analysis of the data. The results are presented in three sections: 1) results from the questionnaire; 2) results from focus group interviews; and 3) triangulation of the data.

The purpose of the survey was to address the main research problem: *What is the influence of mobile devices on the information behaviour of students in the Department of Information Science at the University of Pretoria?* The more specific sub-problems that help in addressing the main problem are: *What is the information behaviour of students in the Department of Information Science with regard to information seeking and using mobile devices?; and what is the information behaviour of students in the Department of Information Science with regard to the electronic learning management system (clickUP) using mobile devices?*

4.2 QUESTIONNAIRE: RESULTS AND ANALYSIS OF FINDINGS

The questionnaire was the primary data collection method. It is available as Appendix B. The questionnaire has a number of sections focusing on areas in students' lives where mobile devices have an influence. These include a general section aimed at gathering demographic information, questions focusing on mobile devices in general, questions focusing on students in the academic arena, and questions focusing on mobile devices and communication. These are discussed and analysed throughout the remainder of this chapter.

4.2.1 Participation and response rate

The questionnaire was sent out to 923 students via e-mail. Of these students, 201 returned the questionnaire, meaning that the response rate is 21.8% (N = 201) (See Figure 4.2). Only 2/201 (1%) respondents who started with the questionnaire indicated that they did not want to participate in the study (N = 199).

In order to make sure that participants answered only questions relevant to them, restrictions were built into the online questionnaire that allowed the researcher to exclude respondents from sections not applicable to them. The effect of these restrictions was that the number of respondents changed constantly, depending on the sections that respondents deemed relevant to them. As a direct result, the N value fluctuated.

Respondents who did not make use of mobile devices were not allowed to continue, as they did not fall within the focus of the study (N = 175). Respondents who did not use their mobile devices for their academic studies were also not allowed to continue, reducing N to 143. Further restrictions narrowed responses (N) down to 104 when students were asked about mobile devices and clickUP, and even further to 87 when they were asked about mobile devices and the Blackboard App. Students who made use of their mobile devices for communication relating to their studies were included in the results again. Of the original number of students who made use of their mobile devices for academic studies (N = 143), 115 indicated that they use their mobile devices for academic communication, reducing the N value to 115 (see Figure 4.1).

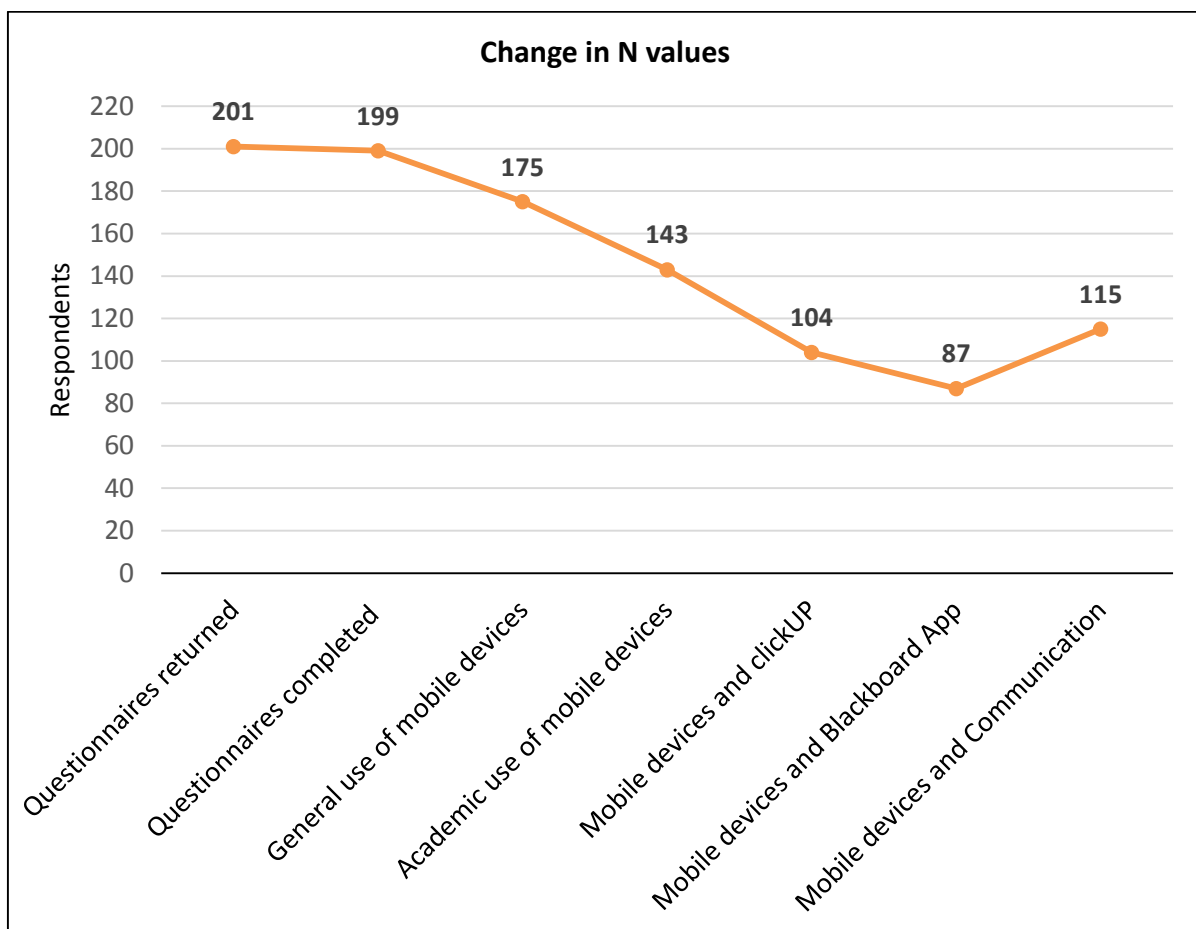


Figure 4.1: Change in N values

The results of the focus group interviews are discussed in Section 4.3, following the analysis and discussion of the results of the questionnaire.

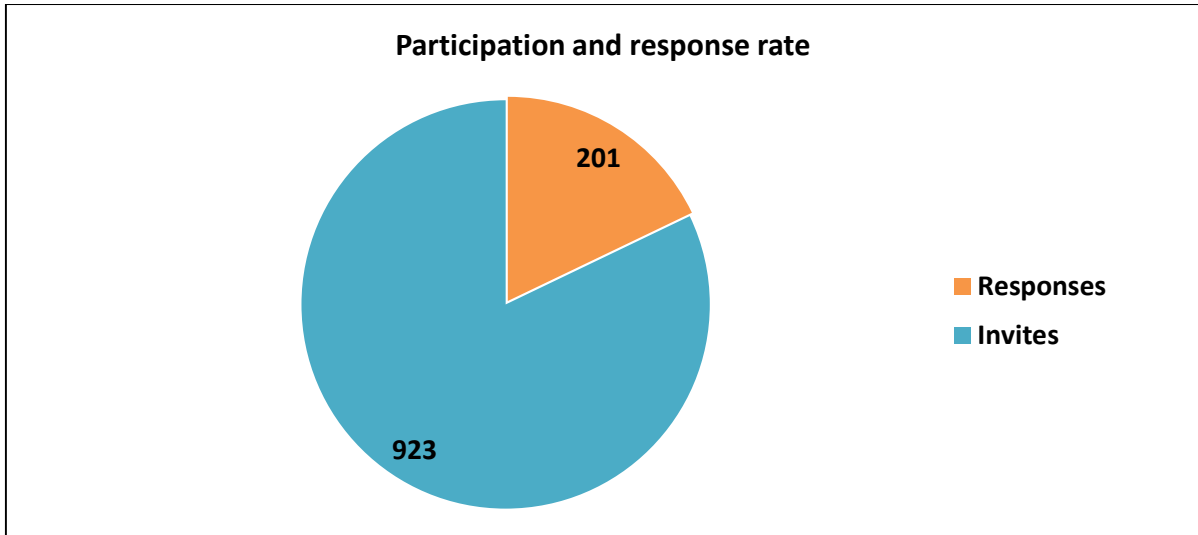


Figure 4.2: Participation and response rate

4.2.2 Demographic information

Demographic information was collected to contextualise the research participants. This included data on the age and academic levels of respondents. It is discussed in detail in the sections to follow. A brief summary in a table format is provided (see Table 4.1).

Questionnaires distributed	923
Total number of questionnaires returned	201 (21.8%)
Questionnaires declined	2 (1%)
Questionnaires completed (N)	199
Age of respondents (groups)	18-21 (115; 57.8%)
	22-25 (39; 19.6%)
	26-30 (10; 5%)
	31-35 (11; 5.5%)
	36-40 (6; 3%)
	41+ (18; 9%)
Academic levels	Doctorate (1; 0.5%)
	Master's (coursework and research) (31; 15.6%)
	Honours (21; 10.6%)
	Third year (43; 21.6%)
	Second year (48; 24.1%)
	First year (55; 27.6%)

Table 4.1: Overview of responses and demographic information collected

4.2.2.1 Age

The age group of respondents ranged from the youngest category (18-21) to the oldest category (41+). Most participants were in the age group 18-21 (115/199; 57.8%) while only 6/199 (3%) were in the age group 36-40 (see Figure 4.3).

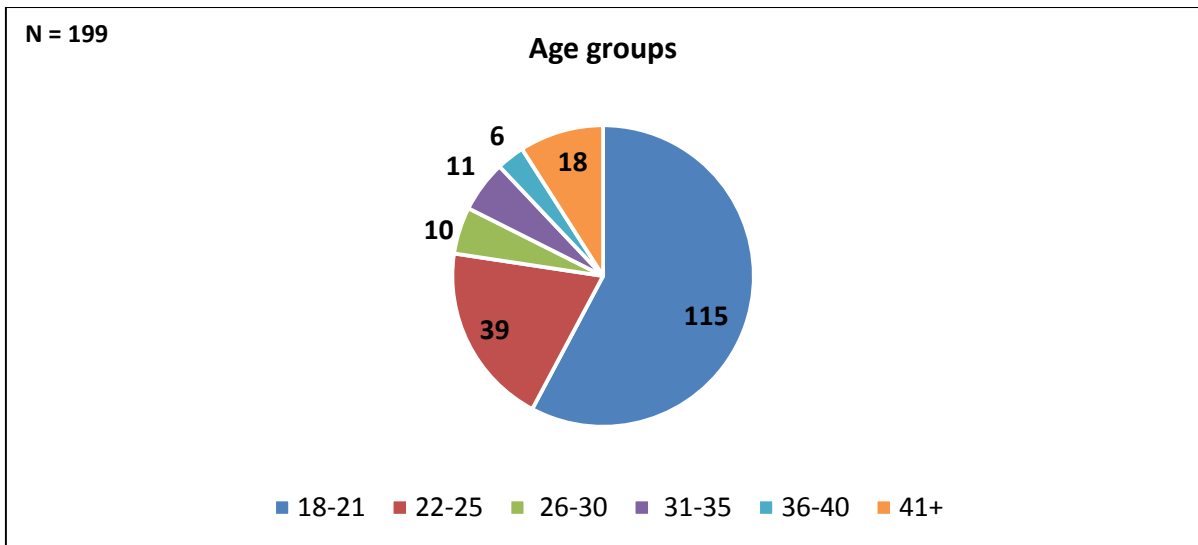


Figure 4.3: Age groups

4.2.2.2 Academic level

Respondents from various academic levels completed the questionnaire. Only one doctoral student completed the questionnaire (1/199; 0.5%), whereas 55 first year students (55/199; 27.6%) completed the questionnaire. The 31 master’s students included students completing a coursework and full research master’s degree (31/199; 15.6%) (see Figure 4.4).

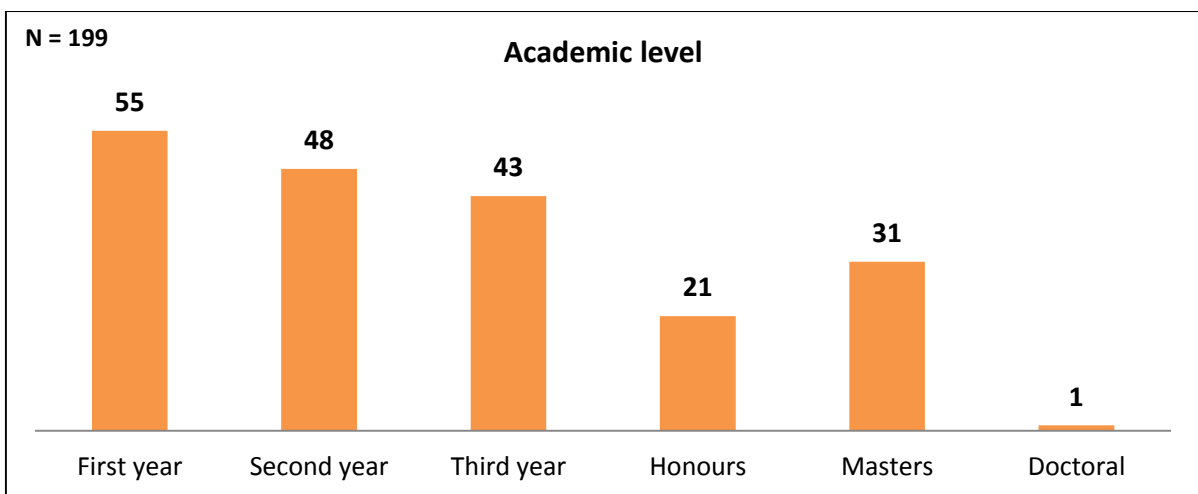


Figure 4.4: Academic levels

4.2.3 General use of mobile devices

Participants were asked to indicate if they make use of mobile devices, specifically referring to smartphones and tablets. As the study is focused on the influence of mobile devices on information behaviour, respondents who indicated that they do not use mobile devices were excluded from the remainder of the questionnaire (see Figure 4.5).

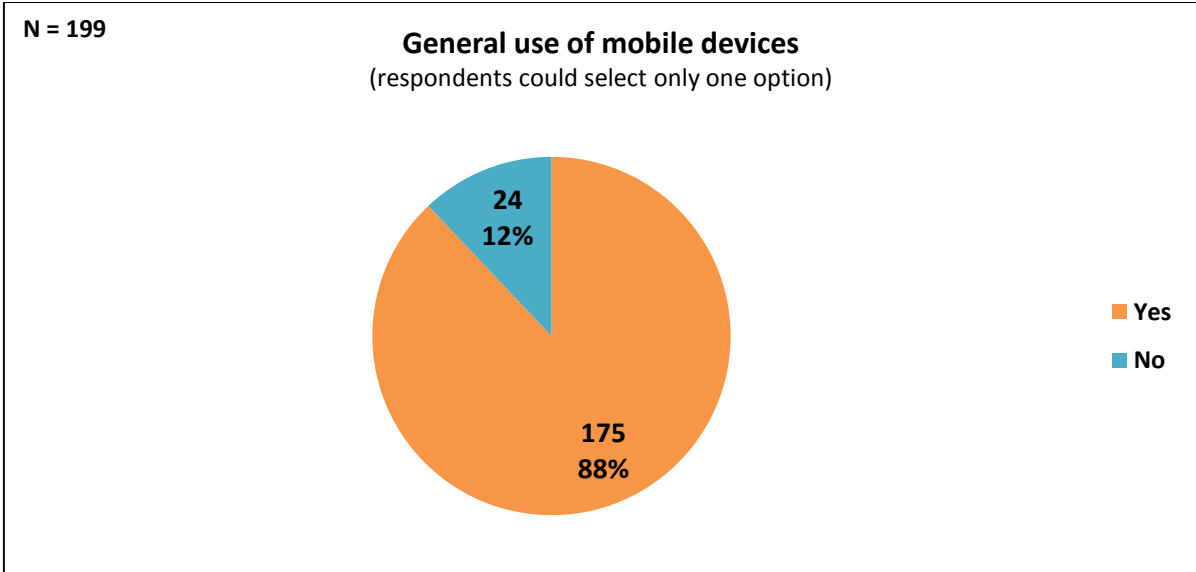


Figure 4.5: General use of mobile devices

After exclusions, 175 respondents continued with the questionnaire, changing the value of N to 175. Respondents were asked to indicate what type of mobile devices they use, i.e. smartphones, tablets or both. One hundred and eleven out of 175 (63.4%) indicated that they use smartphones, 56/175 (32%) indicated that they use both smartphones and tablets, and only 8/175 (4.6%) indicated that they use a tablet only (see Figure 4.6).

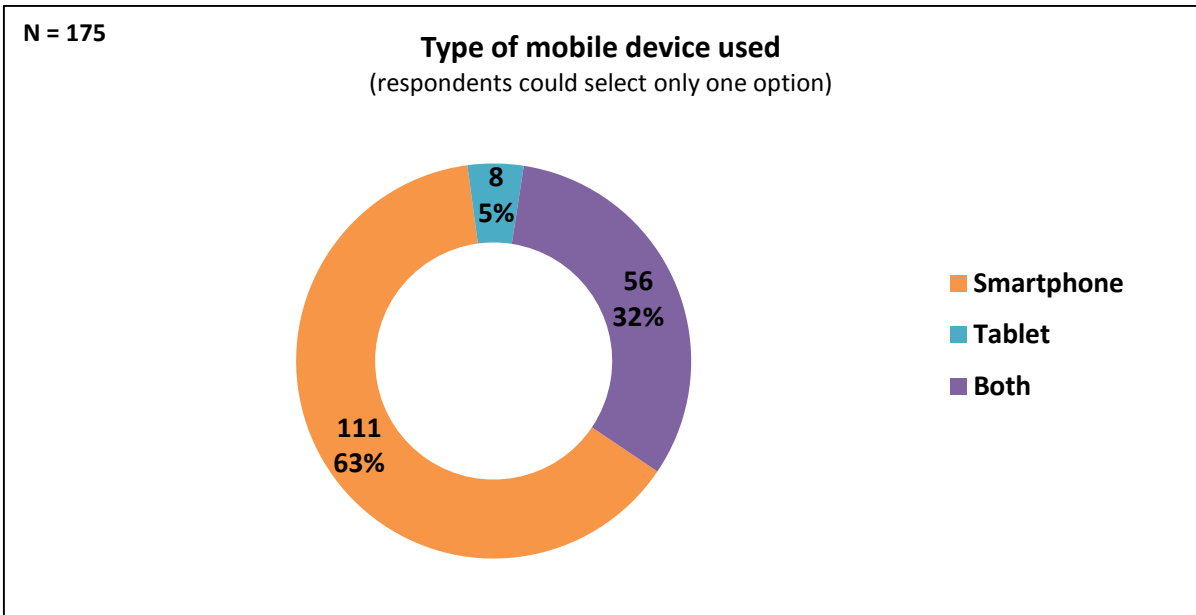


Figure 4.6: Type of mobile device used

4.2.4 Mobile devices and information behaviour

In reporting the data, adjustments in the tables and figures were made to capture briefly the longer phrases used in the questionnaire scales (see Table 4.2).

Scale phrases used in questionnaire	Shorter terms used in figures and tables to represent questionnaire scale phrases
No influence	None
Influence to a small extent	Small
Influence to a medium extent	Medium
Influence to a high extent	High
Influence to a very high extent	Very high

Table 4.2: Representation of questionnaire scale phrases used in figures and tables reporting findings

Respondents were asked about the extent to which mobile devices have an influence on their information behaviour, in three different contexts: general, academic and social (see Tables 4.3, 4.4 and 4.5 respectively). General context was not explicitly defined. Respondents were asked to rate the influence on a Likert scale ranging from “no influence” to “influence to a very high extent”.

The following options were given:

1. Sharing information with others
2. Actually using information
3. Staying abreast with changes in an area of your interest
4. Increasing your motivation to seek information
5. Organising or sorting your information for future use
6. Using information sources available through the library website, e.g. databases
7. Finding useful information by chance

The discussion of Tables 4.3, 4.4 and 4.5 is provided only after the tables are shown. For display purposes the layout of the document is switched to horizontal, so that all three tables can be viewed on a single page.

Academic context: Influence of mobile devices (N=175)														
	Sharing information with others		Actually using information		Staying abreast with changes in an area of interest		Increasing motivation to seek information		Organising and sorting information for future use		Using information sources available through a library website		Finding useful information by chance	
None	8	4.6%	8	4.6%	12	6.9%	6	3.4%	19	10.9%	34	19.4%	15	8.6%
Small	18	10.3%	16	9.1%	13	7.4%	18	10.3%	22	12.6%	31	17.7%	23	13.1%
Medium	32	18.3%	41	23.4%	50	28.6%	46	26.3%	54	30.9%	53	30.3%	56	32%
High	51	29.1%	59	33.7%	55	31.4%	63	36%	48	27.4%	33	18.9%	51	29.1%
Very high	66	37.7%	51	29.1%	45	25.7%	42	24%	32	18.3%	24	13.7%	30	17.1%

Table 4.3: Influence of mobile devices (academic context)

General context: Influence of mobile devices (N=175)														
	Sharing information with others		Actually using information		Staying abreast with changes in an area of interest		Increasing motivation to seek information		Organising and sorting information for future use		Using information sources available through a library website		Finding useful information by chance	
None	2	1.1%	2	1.1%	4	2.3%	5	2.9%	10	5.7%	34	19.4%	9	5.1%
Small	12	6.9%	15	8.6%	11	6.3%	20	11.4%	33	18.9%	34	19.4%	22	12.6%
Medium	22	12.6%	43	24.6%	36	20.6%	40	22.9%	49	28%	51	29.1%	41	23.4%
High	55	31.4%	64	36.6%	60	34.3%	59	33.7%	45	25.7%	32	18.3%	55	31.4%
Very high	84	48%	51	29.1%	64	36.6%	51	29.1%	38	21.7%	24	13.7%	48	27.4%

Table 4.4: Influence of mobile devices (general context)

Social context: Influence of mobile devices (N=175)														
	Sharing information with others		Actually using information		Staying abreast with changes in an area of interest		Increasing motivation to seek information		Organising and sorting information for future use		Using information sources available through a library website		Finding useful information by chance	
None	3	1.7%	2	1.1%	3	1.7%	8	4.6%	17	9.7%	42	24%	16	9.1%
Small	8	4.6%	17	9.7%	15	8.6%	23	13.1%	28	16%	35	20%	22	12.6%
Medium	18	10.3%	35	20%	43	24.6%	41	23.4%	53	30.3%	49	28%	48	27.4%
High	36	20.6%	65	37.1%	51	29.1%	59	33.7%	40	22.9%	26	14.9%	46	26.3%
Very high	110	62.9%	56	32%	63	36%	44	25.1%	37	21.1%	23	13.1%	43	24.6%

Table 4.5: Influence of mobile devices (social context)

Overall it seems that respondents believe that mobile devices do have an influence on their information behaviour, throughout the three contexts (academic, general and social). A more detailed investigation revealed some similarities and differences between the three contexts. These are explained in more detail in this section.

According to the respondents, sharing information is influenced to a very high extent by the use of mobile devices: 66/175 (37.7%) in academic contexts, 84/175 (48%) in a general context, and 110/175 (62.9%) in a social context. Although sharing information is influenced to a high extent in academic contexts it is, however, still 25.1% less than in social contexts. On the opposite end of the scale, that of no influence, only 8/175 (4.6%) of respondents in the academic context, 2/175 (1.1%) in the general context and 3/175 (1.7%) in the social context stated that mobile devices have no influence on their information behaviour when it comes to information sharing. It thus appears that information sharing is influenced greatly by mobile devices.

A second aspect that emerged is that a very low number of respondents believed that mobile devices have no influence in all three of the contexts and for all of the information behaviour activities. Between 2/175 (1.1%) and 19/175 (10.9%) of respondents chose this option. The only area in which this result is different (higher), is where mobile device use and library website information are concerned. For this question, 34/175 (19.4%) and 42/175 (24%) of respondents indicated that mobile devices have no influence on their information behaviour in this regard.

In the following figures (Figure 4.7 to Figure 4.13), the different information behaviour activities are compared across the three contexts. Similar results were obtained throughout the three contexts, with the most noticeable difference in the activity of information sharing. If grouped together, the none-to-medium levels of influence have results below 20%, between 2/175 (1.1%) and 32/175 (18.3%). The high-to-very-high levels of influence, however, differ quite a lot for the three contexts, with 66/175 (37.7%) in the academic context, 84/175 (48%) in the general context, and sharing being the highest in the social context, with 110/175 (62.9%) (see Figure 4.7).

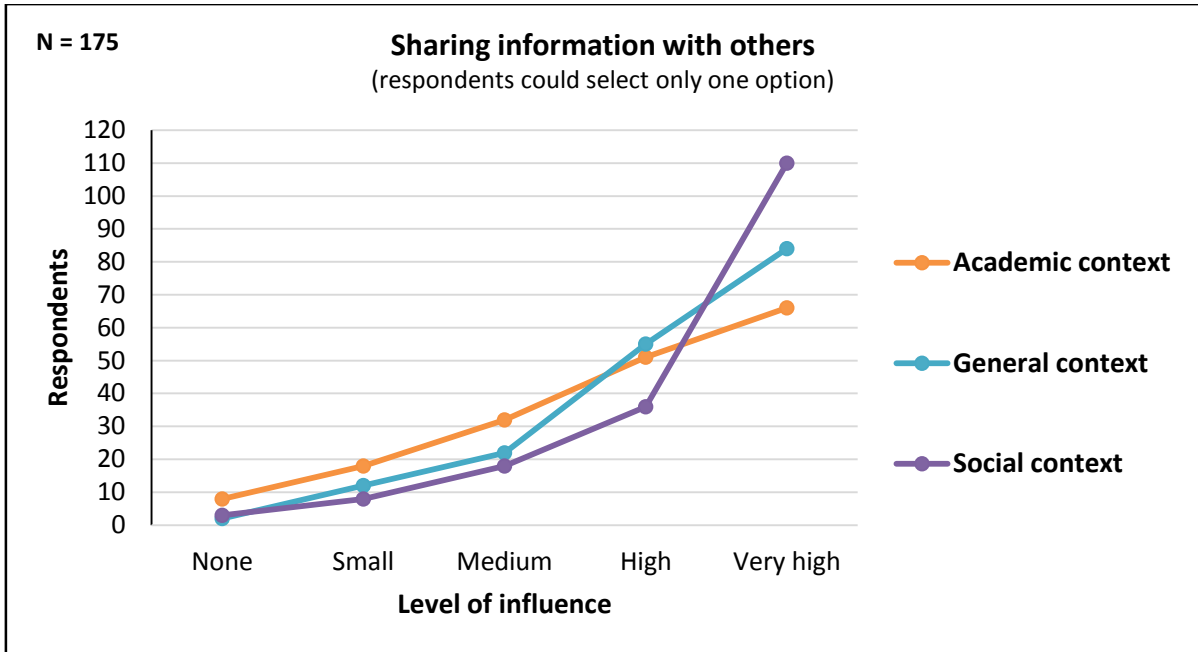


Figure 4.7: Sharing information with others

Actually using information is influenced to a high or very high extent by mobile devices in all three contexts, with the most respondents indicating that their behaviour is influenced to a high extent in the academic context (55/175; 33.7%), in the social context (65/175; 37.1%) and in the general context (64/175; 36.6%) (see Figure 4.8).

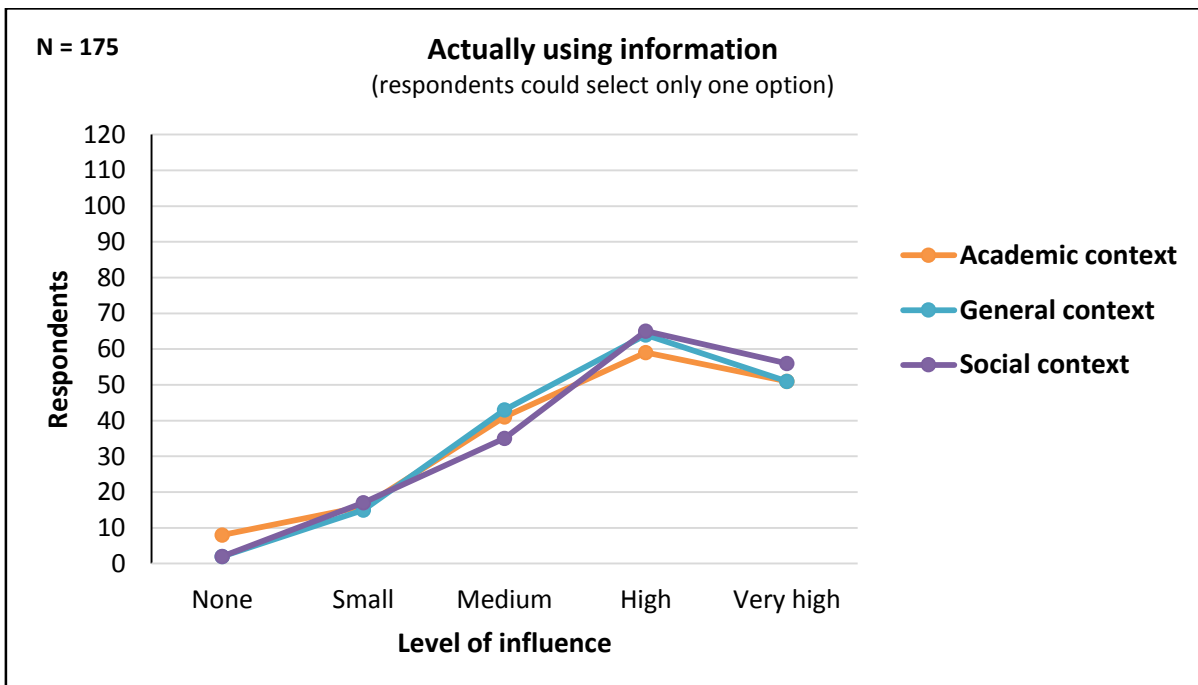


Figure 4.8: Actually using information

Staying abreast with changes in an area of interest is also influenced throughout the three contexts, with the most responses falling within the medium-to-very-high extent. An interesting observation, however, is that in the academic context, influence to a very high extent is much lower (45/175; 25.7%) than in the general (64/175; 36.6%) and social contexts (63/175; 36.6%) (see Figure 4.9).

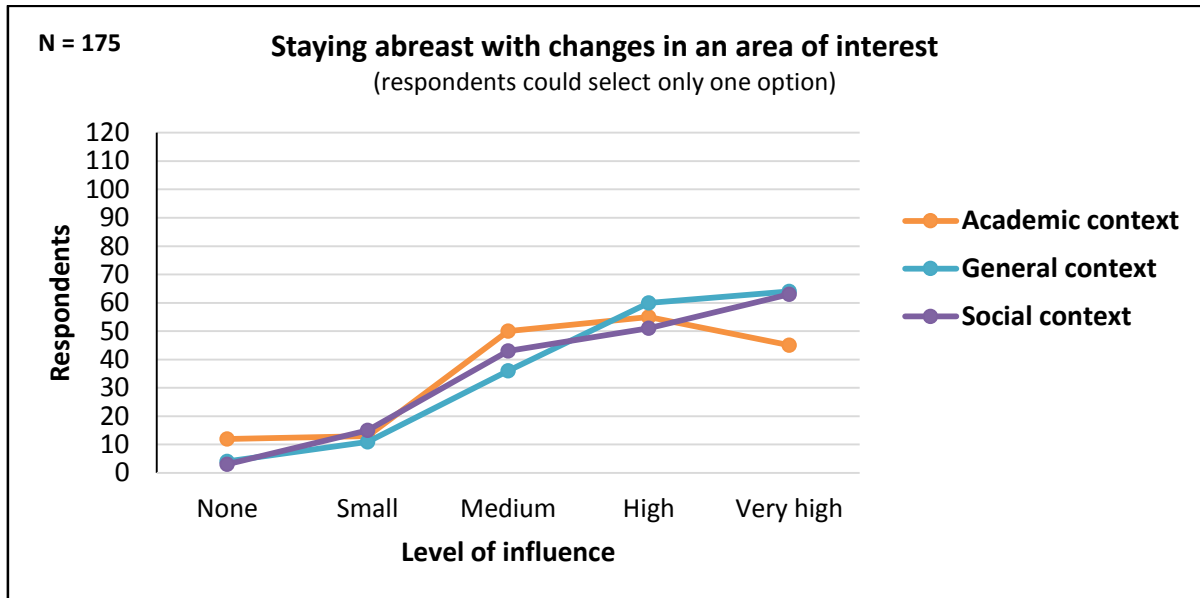


Figure 4.9: Staying abreast with changes in an area of interest

Mobile devices play a definite role in increasing motivation to seek information, and the most participants chose “influence to a high extent” in an academic context (63/175; 36%), in a social context (59/175; 33.7%) and in a general context (59/175; 33.7%) (see Figure 4.10).

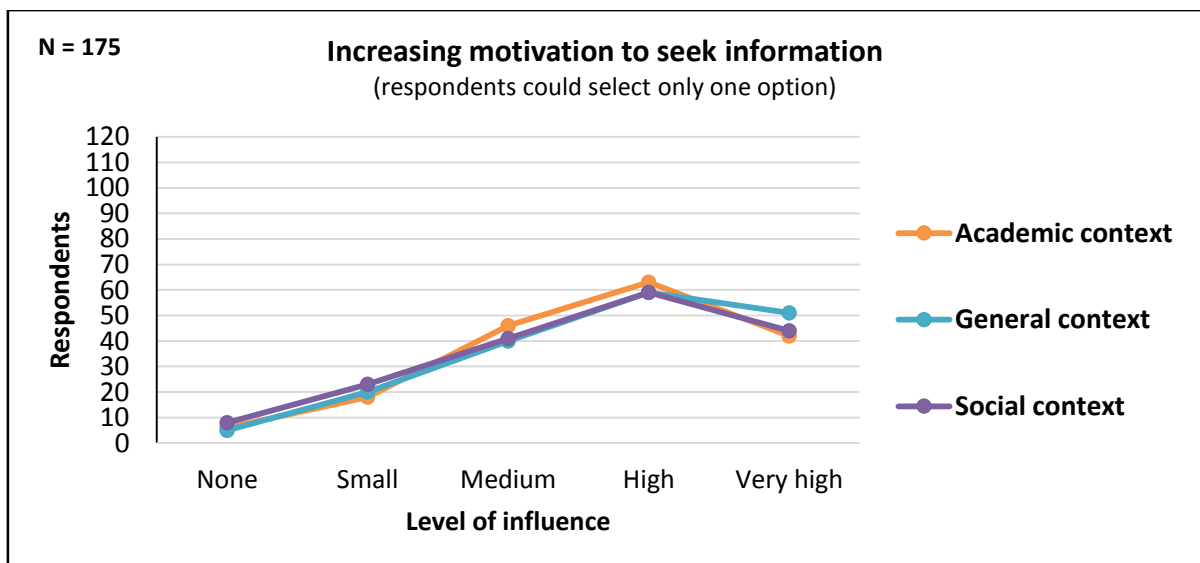


Figure 4.10: Increasing motivation to seek information

Organising information for future use is an activity in which similar results were obtained in the higher end of the spectrum (i.e. medium, high and very high extent) with the highest number of respondents (in the academic context (45/175; 30.9%), in the social context (53/175; 30.3%) and in the general context (49/175; 28%)) indicating that their mobile devices influence them to a medium extent (see Figure 4.11).

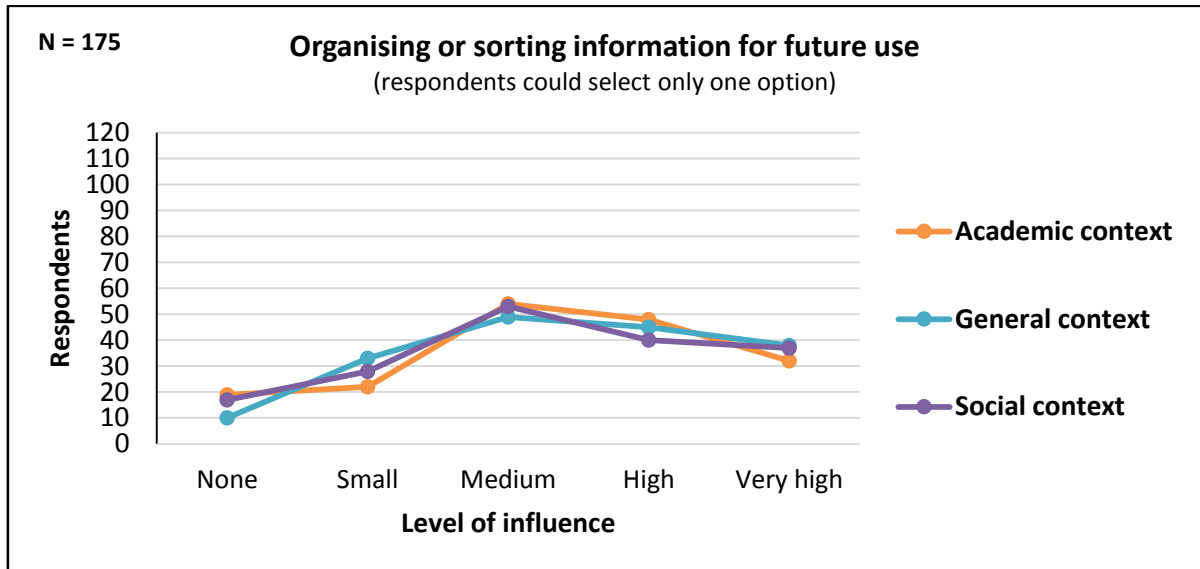


Figure 4.11: Organising or sorting information for future use

Using information available through a library website seems to be influenced to a medium extent in the academic context (53/175; 30.3%), in the social context (49/175; 28%) and in the general context (51/175; 29.1%). It is however interesting to note that the lower end of the spectrum (i.e. no and small extent) has more responses than the higher end of the spectrum (i.e. high and very high extent).

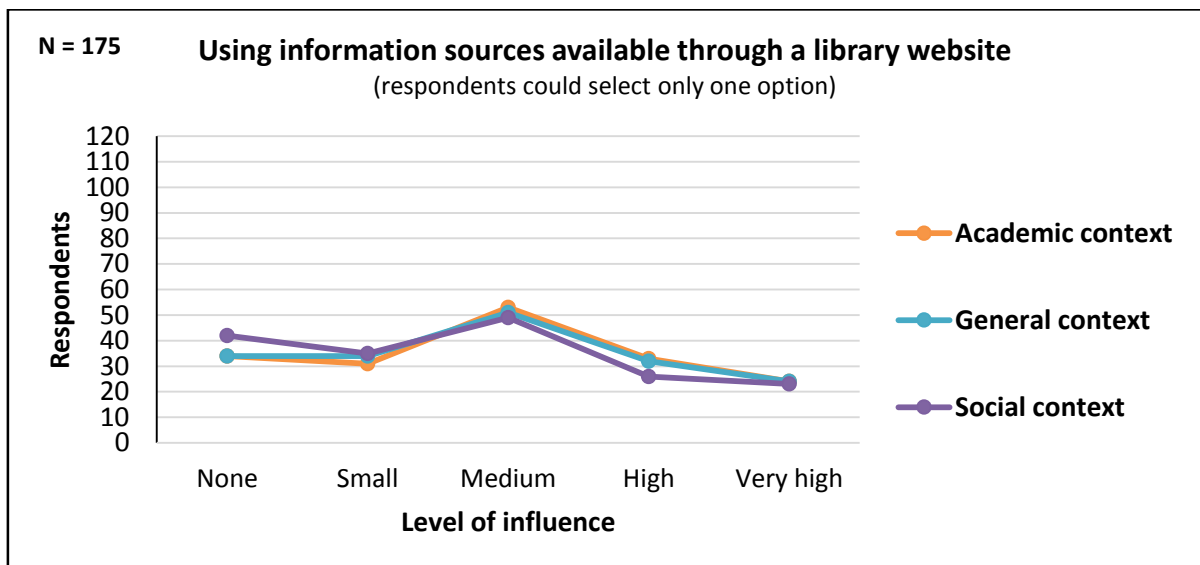


Figure 4.12: Using information sources available through library website

Finding useful information by chance has a medium to very high influence on participants, as a majority of respondents indicated that their mobile devices have an influence in all three of the contexts. An interesting observation however is that in an academic context the results are much lower (30/175; 17.1%) than in the general (48/175; 27.4%) and social contexts (43/175; 24.6) in the very-high-extent category (see Figure 4.13).

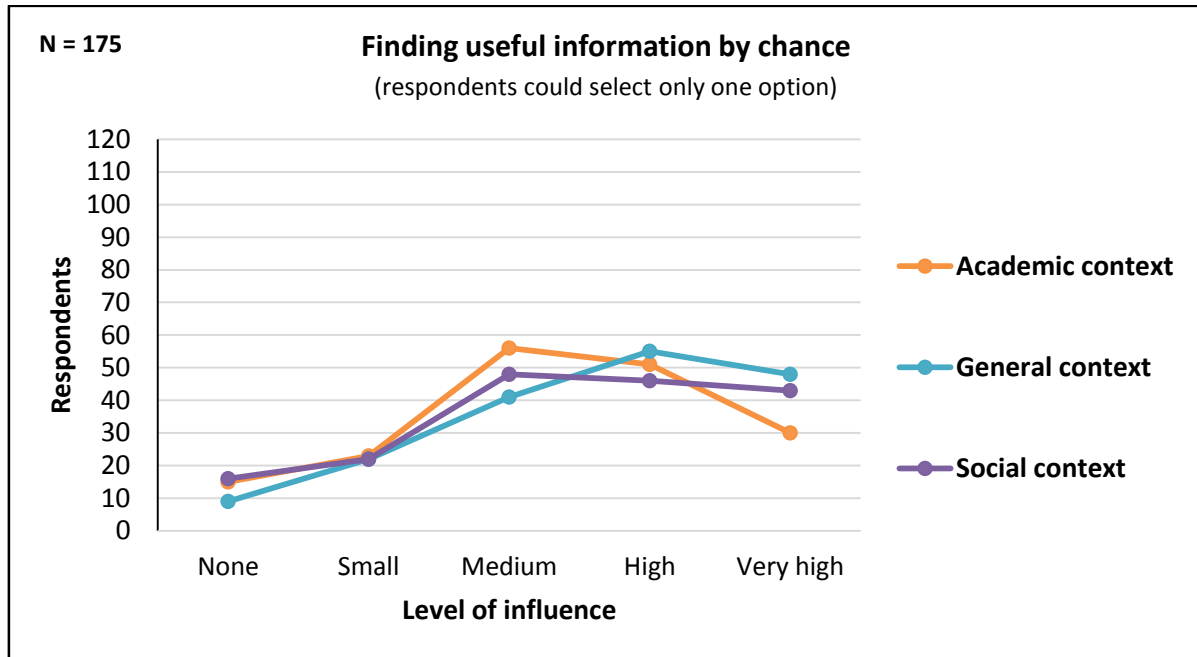


Figure 4.13: Finding useful information by chance

4.2.5 Use of mobile devices for academic studies

Respondents were asked to indicate how important they think mobile devices are in academic studies, and to indicate the level of difficulty involved in searching for academic information with a mobile device. The results reflect that mobile devices play a very important or important role in academic studies, and also that respondents think that it is easy to access academic information by means of a mobile device (95/175; 54.2%). The importance of the role that mobile devices play in academic studies can be seen in the results where 77/175 (44%) participants indicated that mobile devices play a very important role in academic studies (see Figure 4.14), while a further 63/175 (36%) respondents indicated that they play an important role (see Figure 4.15). None of the respondents indicated that the role of mobile devices in academic studies can be regarded as unimportant.

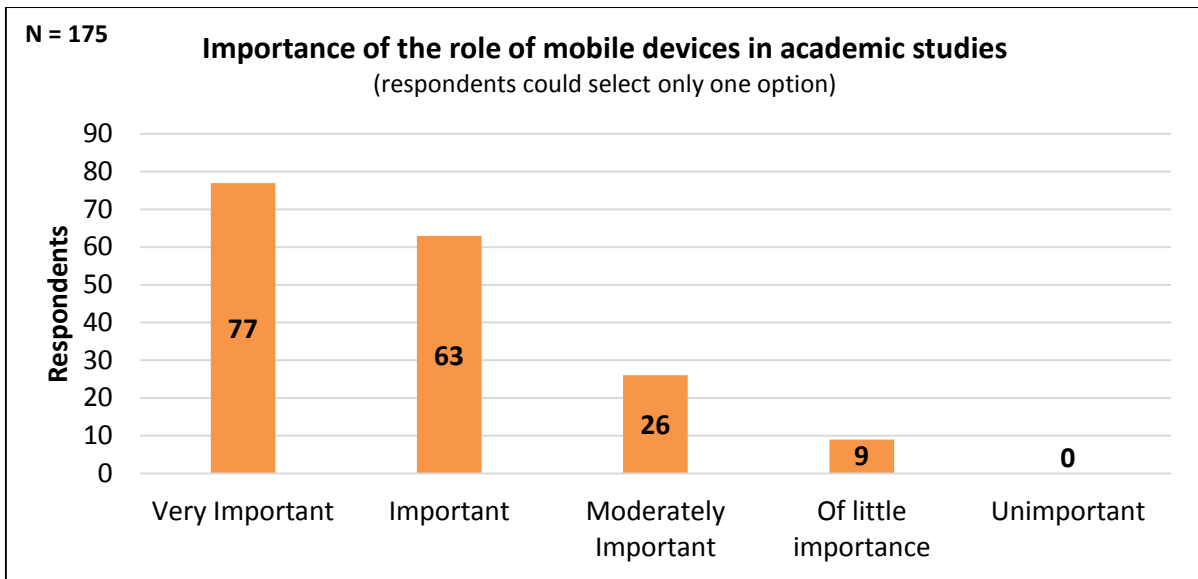


Figure 4.14: Importance of the role of mobile devices in academic studies

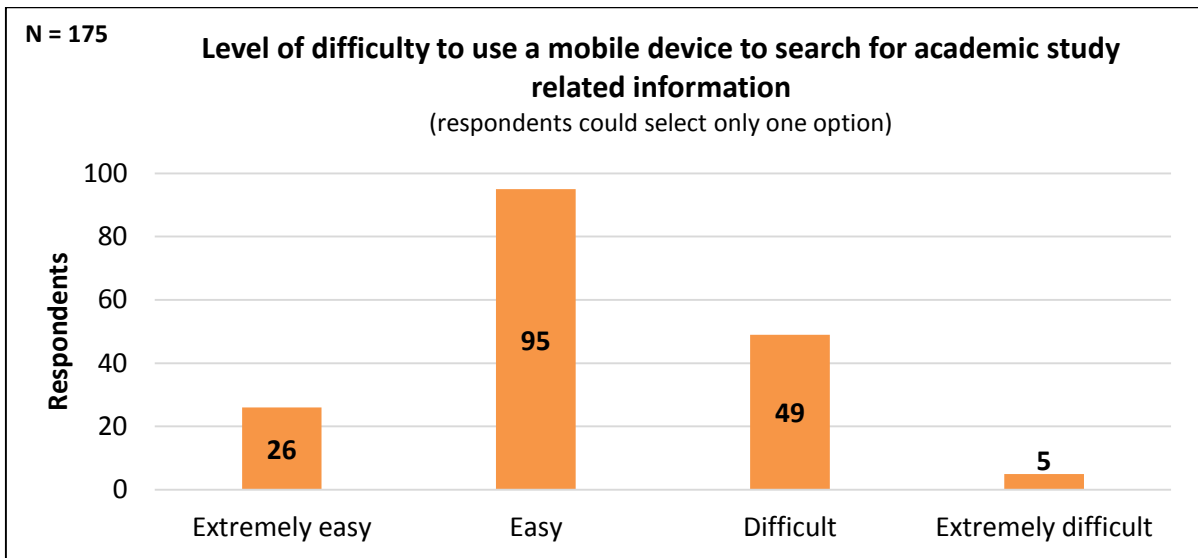


Figure 4.15: Level of difficulty to use a mobile device to search for academic study related information

Respondents were asked to provide more detail on what they thought about mobile devices and academic studies, and to indicate the extent to which they can lead to information overload in this context. The majority of respondents agreed that mobile devices can be a contributing factor to information overload (114/175; 65.1%), but only to a limited extent, while 38/175 (21.7%) thought that mobile devices do not lead to information overload at all (see Figure 4.16).

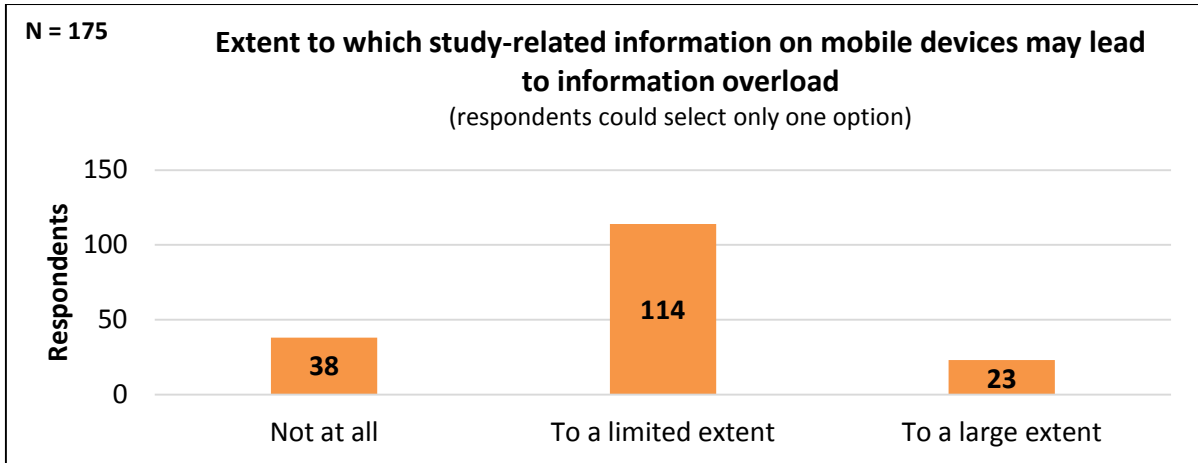


Figure 4.16: Extent to which study-related information on mobile devices may lead to information overload

Respondents were further questioned on how they think mobile devices can help satisfy academic information needs related to academic tasks, such as assignment-related information, test- or exam-related information and information relating to library resources.

“More than expected” was provided as an option because the researcher assumed that some users might be surprised by what they can do with their mobile devices. If they found that mobile devices could help satisfy their task- or assignment-related information need not only to a satisfactory level, but even beyond that, they would get more than they expected at the outset. This applies to the questions on the extent to which mobile devices can help to satisfy the need for task- or assignment-related information (see Figure 4.17), test- or exam-related information (see Figure 4.18), or information relating to library resources (see Figure 4.19). The discussion follows the figures.

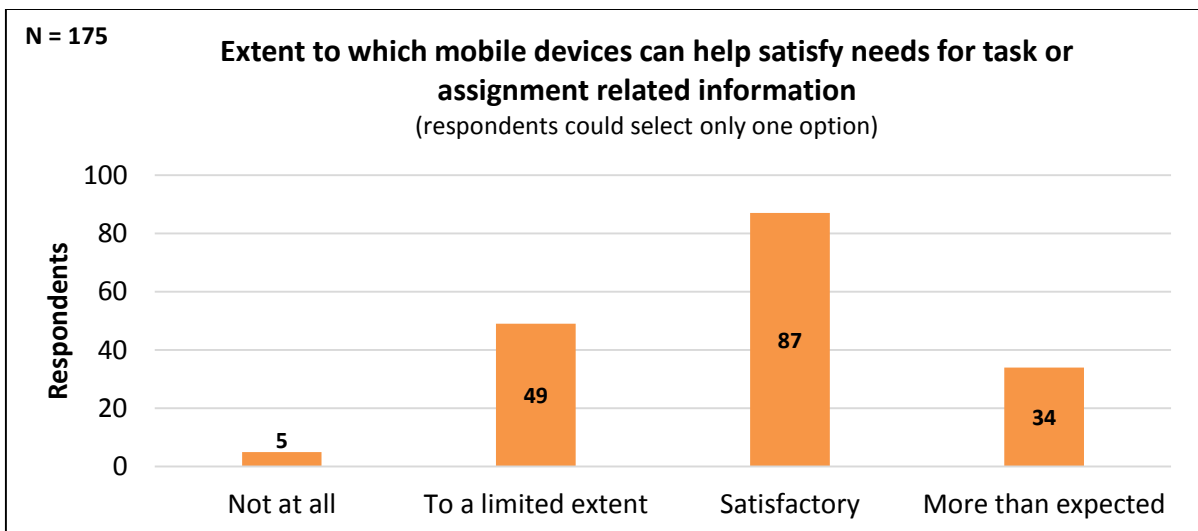


Figure 4.17: Extent to which mobile devices can help satisfy needs for task or assignment related information

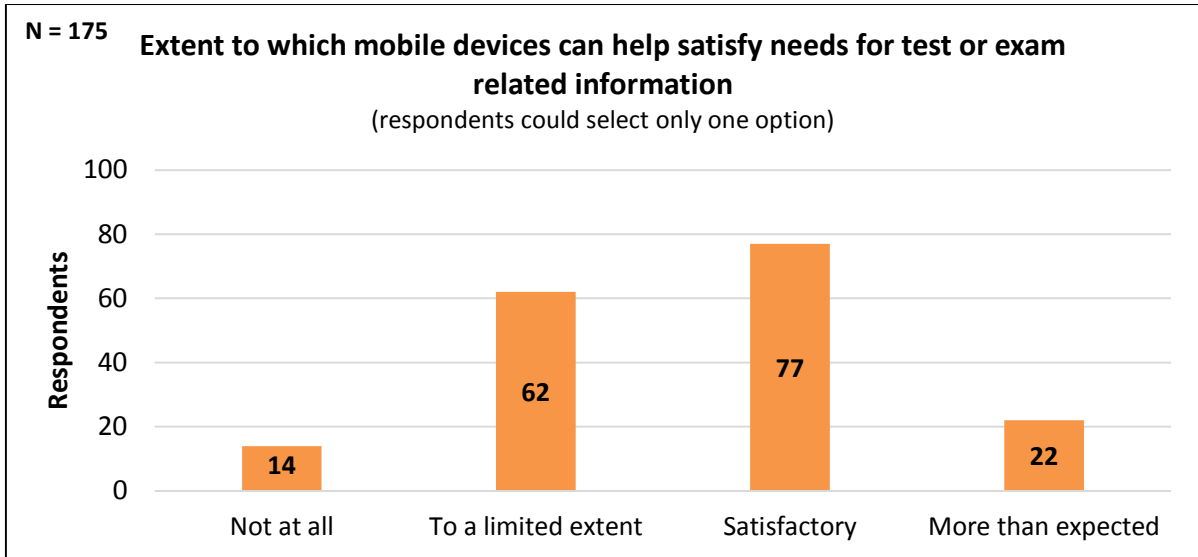


Figure 4.18: Extent to which mobile devices can help satisfy needs for test or exam related information

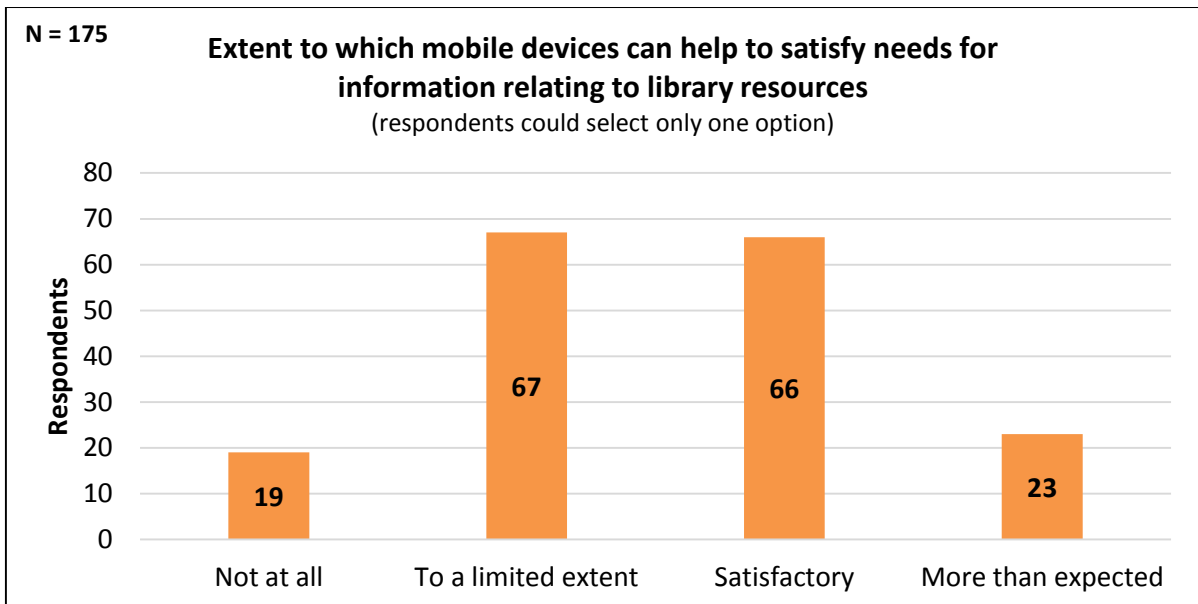


Figure 4.19: Extent to which mobile devices can help satisfy needs for information relating to library resources

In all three of the different applications of mobile devices, i.e. task- or assignment-related, test- or exam-related and library-resources-related, the majority of respondents replied that their level of satisfaction fell within the satisfactory category (i.e. satisfied to a limited extent, satisfactory and satisfied more than expected).

The results range from 66/175 (37.7%) to 78/175 (44.6%) (see Figures 4.17, 4.18 and 4.19). Between 5/175 (2.8%) and 19/175 (10.8%) respondents thought that mobile devices could not help to satisfy their information needs in the three different scenarios (see Figures 4.17, 4.18 and 4.19).

Respondents were then asked to change their focus from what they thought about mobile devices and academic studies, to how they use their own mobile devices in academic contexts. A majority of respondents (143/175; 81.7%) indicated that they used their own mobile devices for their studies. Because the researcher needed the experiences from respondents who actually used their own personal devices for academic purposes, and not just what they thought about it in general, 32 respondents who were not using their mobile devices for their studies were not allowed to continue with the questionnaire. Therefore, N = 143 for questions on the use of mobile devices in academic studies.

In the section about academic studies, respondents were asked what they used their mobile devices for, how frequently they made use of the devices, and in which situations they made use of them. Respondents could select only one option for their frequency of use, but multiple options could be selected for what they used it for and in which situations it was used (See Figures 4.20, 4.21 and 4.22). The results are that 74/143 (52%) made use of their mobile device multiple times a day (see Figure 4.20), and 133/143 (93%) used theirs to search and browse the internet. Social networking and viewing or downloading were also very popular (131/143; 91.6% and 110/143; 76.9% respectively) (see Figure 4.21). Respondents could add any activities and situations additional to the options that they could choose from. Some respondents indicated that they used theirs to keep timetables and schedules so that they do not miss important work, they browse the library catalogue to see if the books they are looking for are available, and one respondent said that “I take pictures of key references to use in academic writing”.

An interesting observation can be made with regard to the situations when the devices are used, as 128/143 (89.5%) stated that they used them when not close to a computer, whereas only 14/143 (9.8%) indicated that they use them all the time as they find them easier to use than a computer (see Figure 4.22). The reason why respondents were given the option: “it’s easier than to use a computer” was to test if there were actually people who felt that they can address their needs with a mobile device only, in other words, they do not need a computer. The results are overwhelming that a computer is still the first choice. In the words of a respondent, “this is only used if I do not have access to a PC/laptop”. Figures 4.20, 4.21 and 4.22 follow.

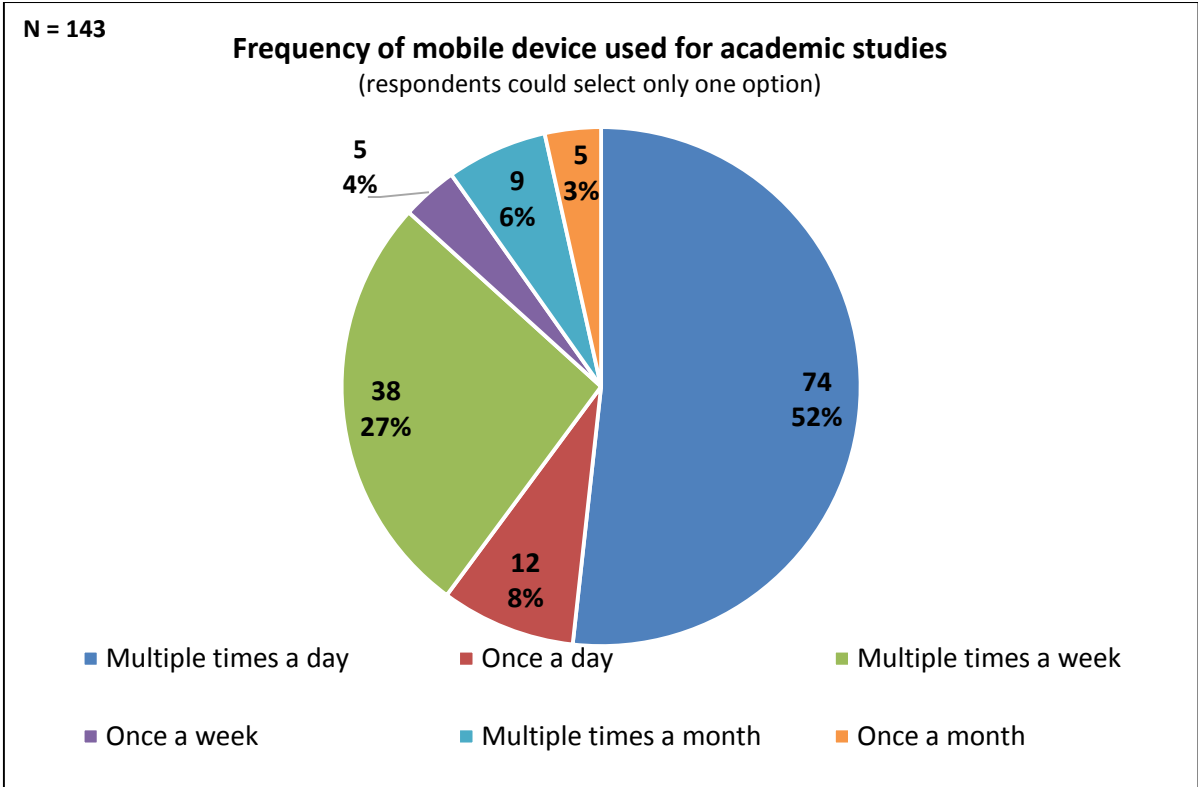


Figure 4.20: Frequency of mobile device used for academic studies

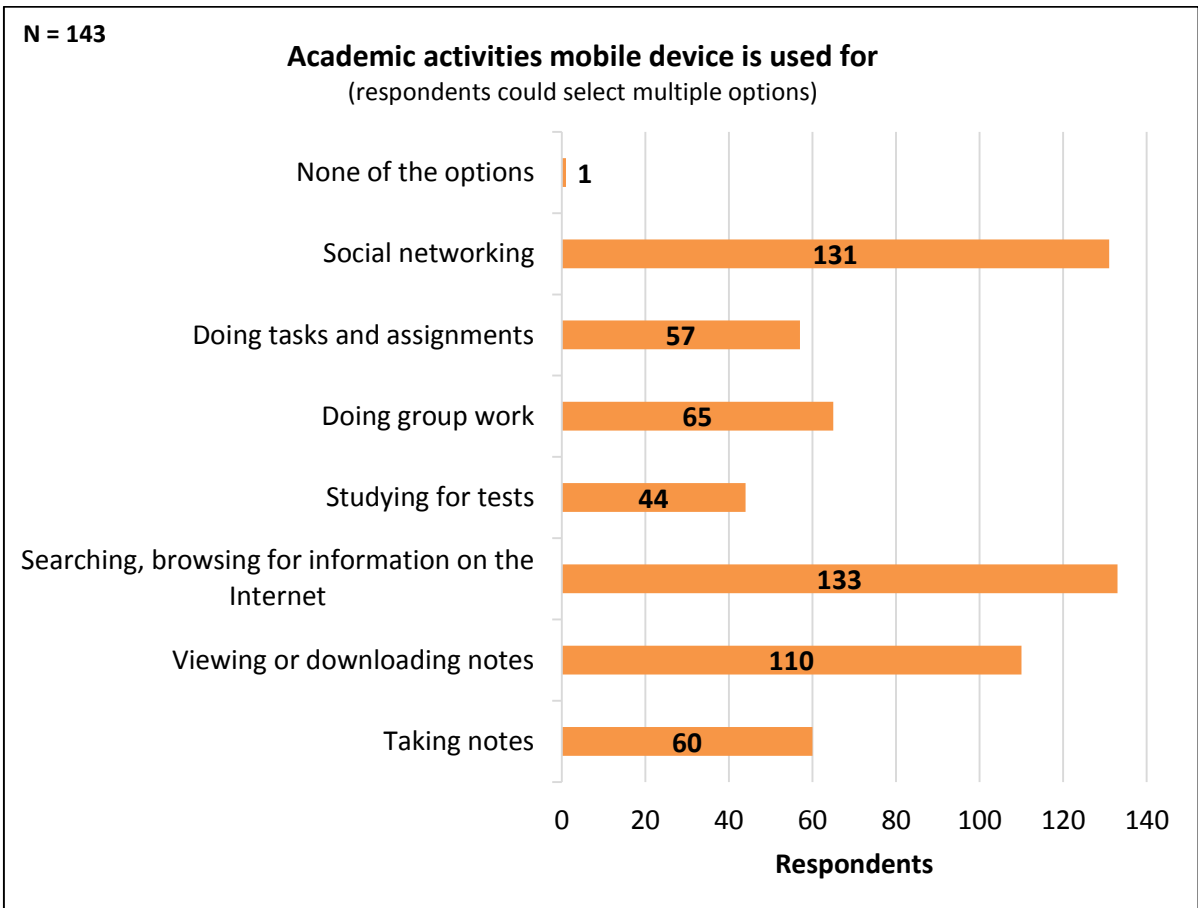


Figure 4.21: Academic related activities mobile devices are used for

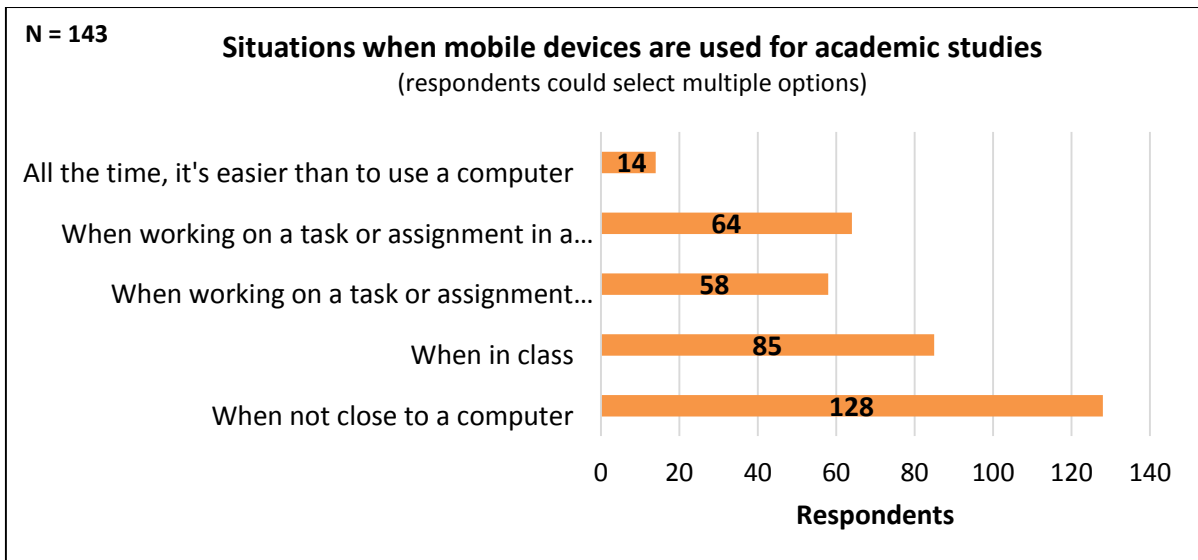


Figure 4.22: Situations when mobile devices are used for academic studies

Respondents were asked about their level of satisfaction when accessing and using information via their mobile devices, and whether or not they would recommend the use of mobile devices for academic studies to a friend. Respondents indicated that they were very satisfied (45/143; 31.5%) or moderately satisfied (64/143; 32.2%) (see Figure 4.23). From this group 135/143 (94.4% \approx 94%) would recommend using mobile devices for academic studies to a friend (see Figure 4.24).²

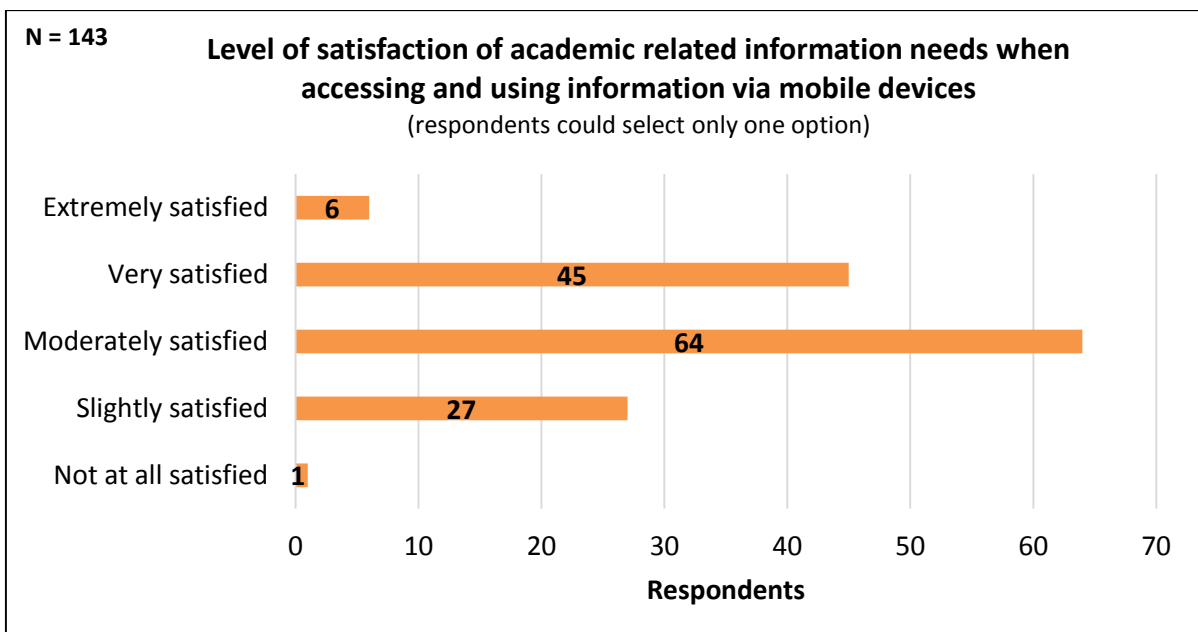


Figure 4.23: Level of satisfaction of academic related information needs when accessing and using information via mobile devices

² The almost equal to symbol (\approx) is used in cases where a value is rounded off to the closest number, e.g. 94.4% \approx 94%, as the pie charts display round numbers only.

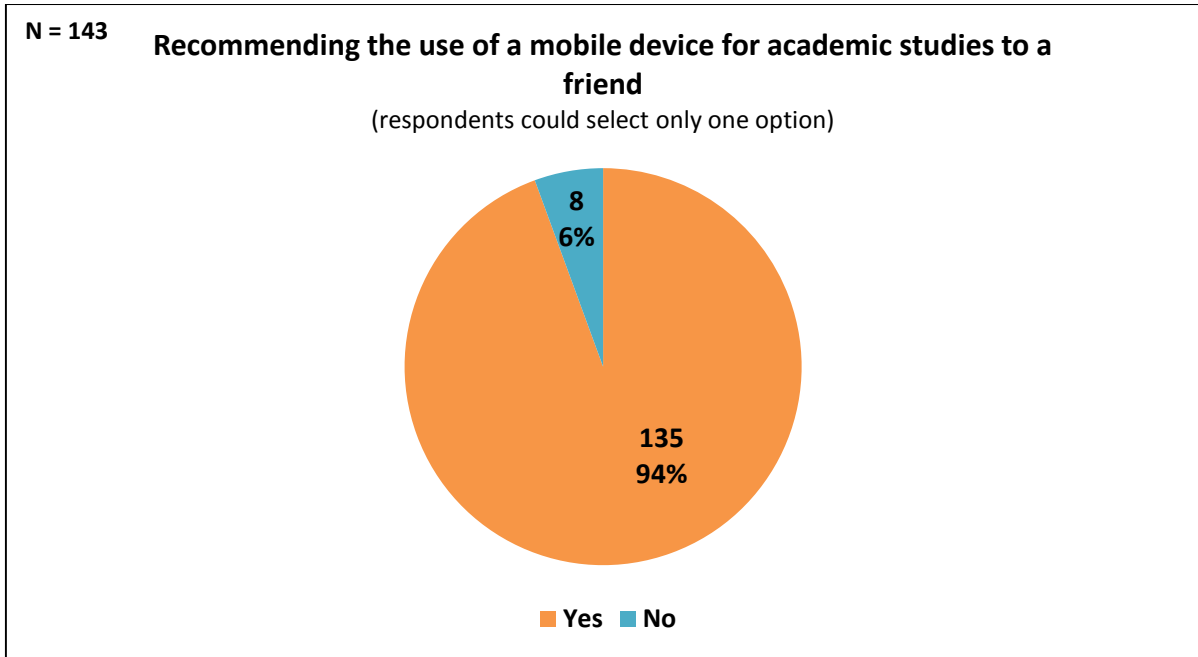


Figure 4.24: Recommending the use of a mobile device for academic studies to a friend

In addition to indicating whether or not a respondent would recommend the use of a mobile device to a friend, some also provided motivations. The major motivation for using a mobile device for academic study purposes is convenience. It is convenient as students do not have to stand in a queue to find a computer in a laboratory to work on, or they have to start up their own personal computers just to check something briefly on the learning management system (clickUP). It is a quick, easy to use, point of access to the information that they need. Those who cautioned against the use of mobile devices for academic studies explained that they do not offer the same level or the same quality of information as the web-based interface does, and that technical problems such as screen size and software problems cause more frustration than benefits.

4.2.5.1 Mobile devices and clickUP

Respondents were asked if they accessed clickUP via their mobile devices, specifically referring to access via a browser on the mobile device. A browser in this regard refers to internet browsing software such as Mozilla Firefox, Google Chrome, Opera, Safari, Internet Explorer, etc (Purch, 2015: e1). In total, 104/143 (72.7% \approx 73%) responded “yes “(see Figure 4.25). Because the remainder of the group (39/143; 27.3% \approx 27%) did not make use of the browsers on their mobile devices to access clickUP, they were removed from this section’s results.

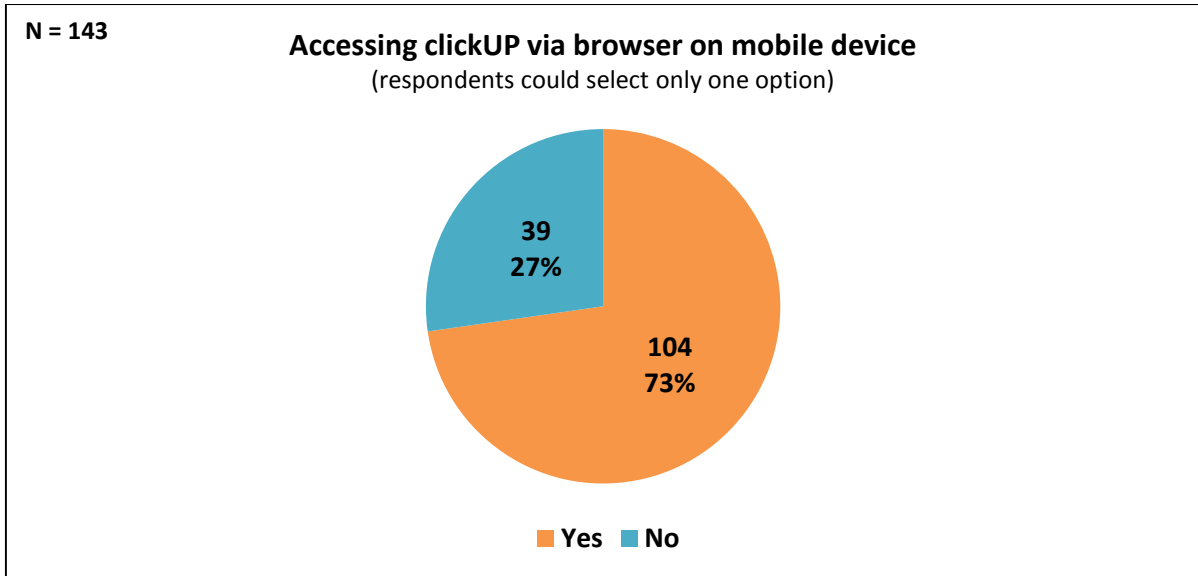


Figure 4.25: Accessing clickUP via browser on mobile device

The remainder of the respondents (N = 104) were asked about the features used in clickUP via the browsers on mobile devices, and their level of satisfaction with it. The results are discussed and the figures shown follow. The results are that 96/104 (92.3%) respondents used the system to check for announcements from their lecturers, while only 18/104 (17.3%) used it to discuss academic matters with their classmates through the discussion board. Only 1/104 (1%) of the respondents were not satisfied at all, while 39/143 (37.5%) and 35/104 (33.7%) respondents were, respectively, very to moderately satisfied. A large number, 85/104 (81.7% ≈ 82%), indicated that they would encourage friends to access clickUP via this method (see Figure 4.26, 4.27 and 4.28).

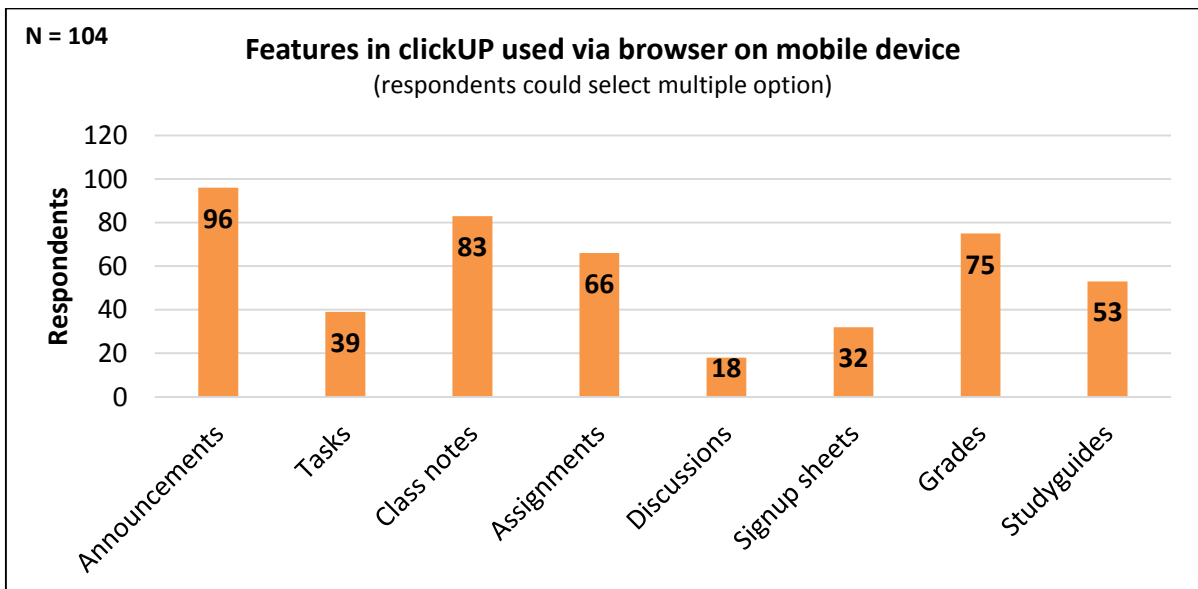


Figure 4.26: Features in clickUP used via browser on mobile device

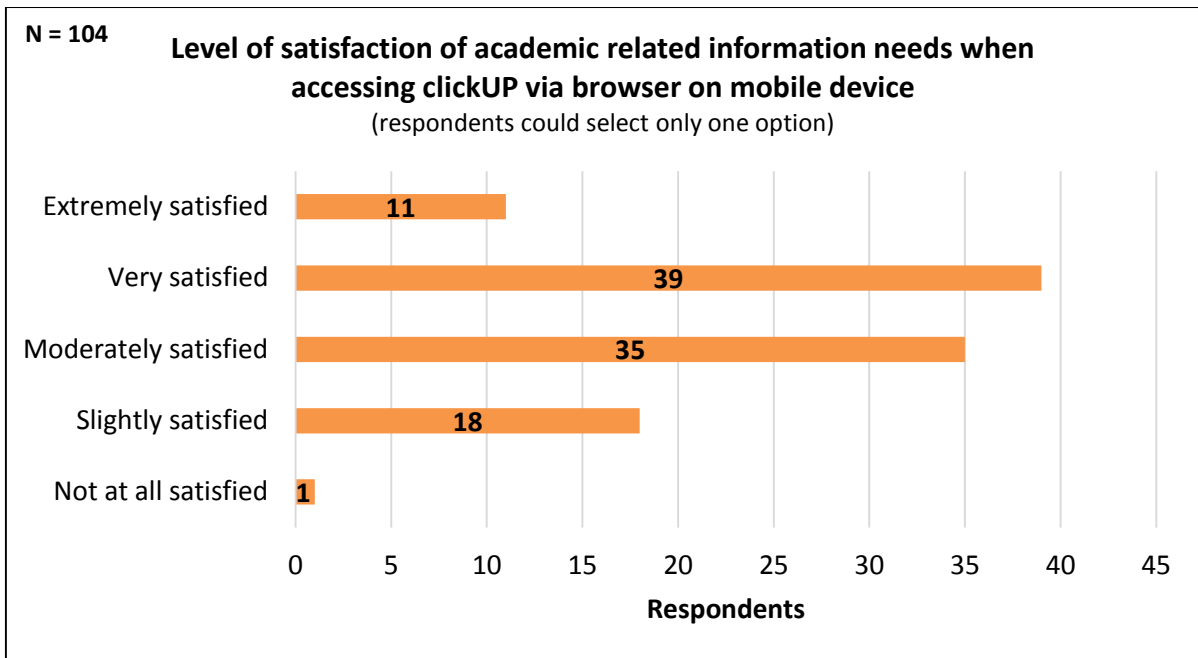


Figure 4.27 Level of satisfaction of academic related information needs when accessing clickUP via browser on mobile devices

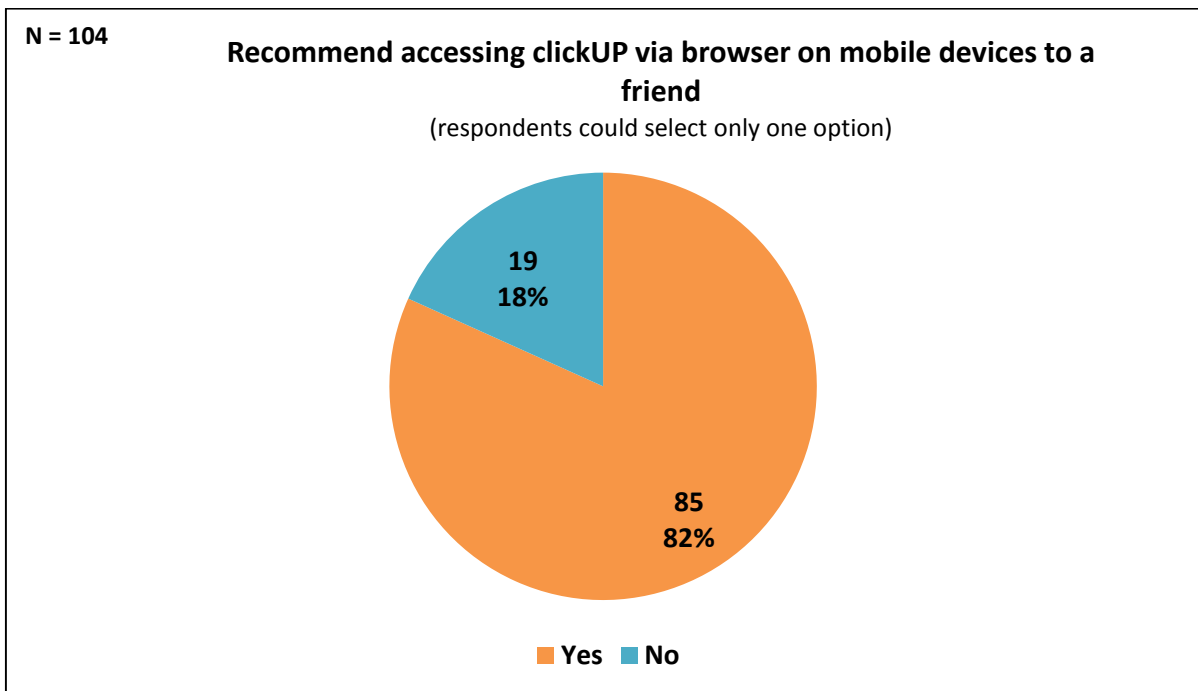


Figure 4.28: Recommend accessing clickUP via browser on mobile devices to a friend

4.2.5.2 Mobile devices and the Blackboard App

Respondents were asked to indicate if they made use of clickUP via the Blackboard App, what features they used, how satisfied they were and whether or not they would recommend the use of the app to a friend. The results are discussed and the figures shown follow. As this was another restriction in the questionnaire, the N value changed to 87, not allowing participants who did not make use of the Blackboard App to participate further. As discussed earlier, the

Blackboard App provides students with quick access to clickUP. Even though it does not provide the same level of functionality as the full web-based interface, students can still access and use a variety of functions on clickUP via their smartphones or tablets.

Announcements were accessed the most (81/87; 93.1%), followed by class notes (63/87; 72.4%) (see Figure 4.30). This correlates with the use of announcements via the browser on the mobile devices (See Figure 4.26). Respondents were moderately to very satisfied (see Figure 4.31) and 78/87 (89.7% \approx 90%) would go as far as recommending it to a friend (see Figure 4.32).

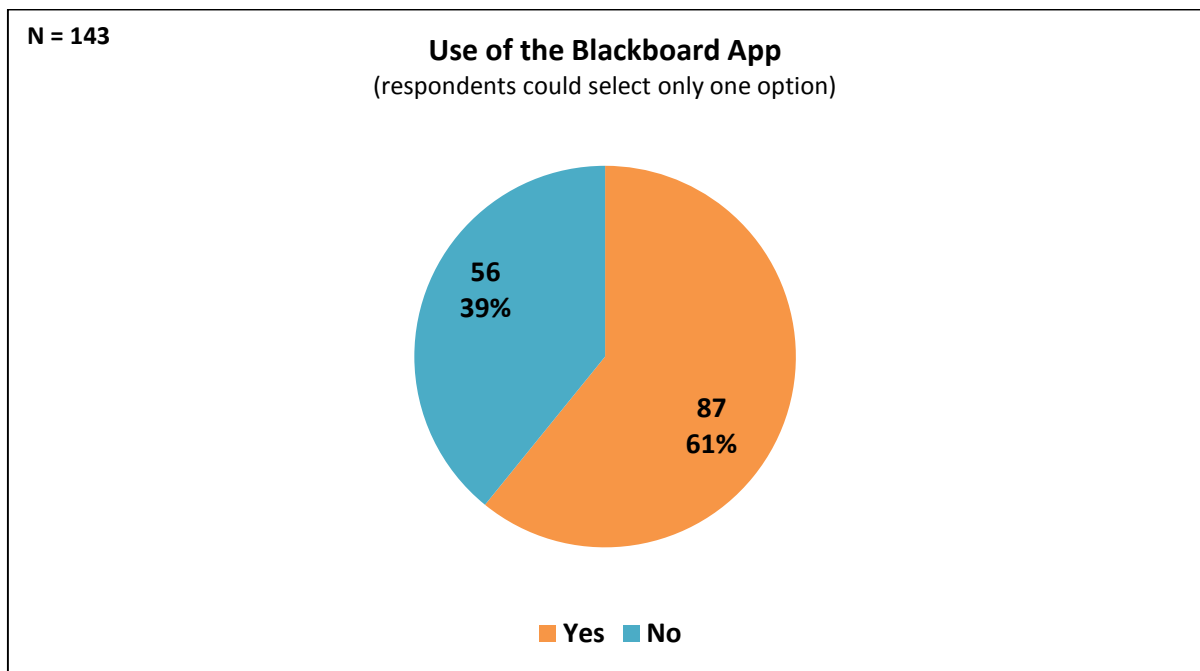


Figure 4.29: Use of the Blackboard App

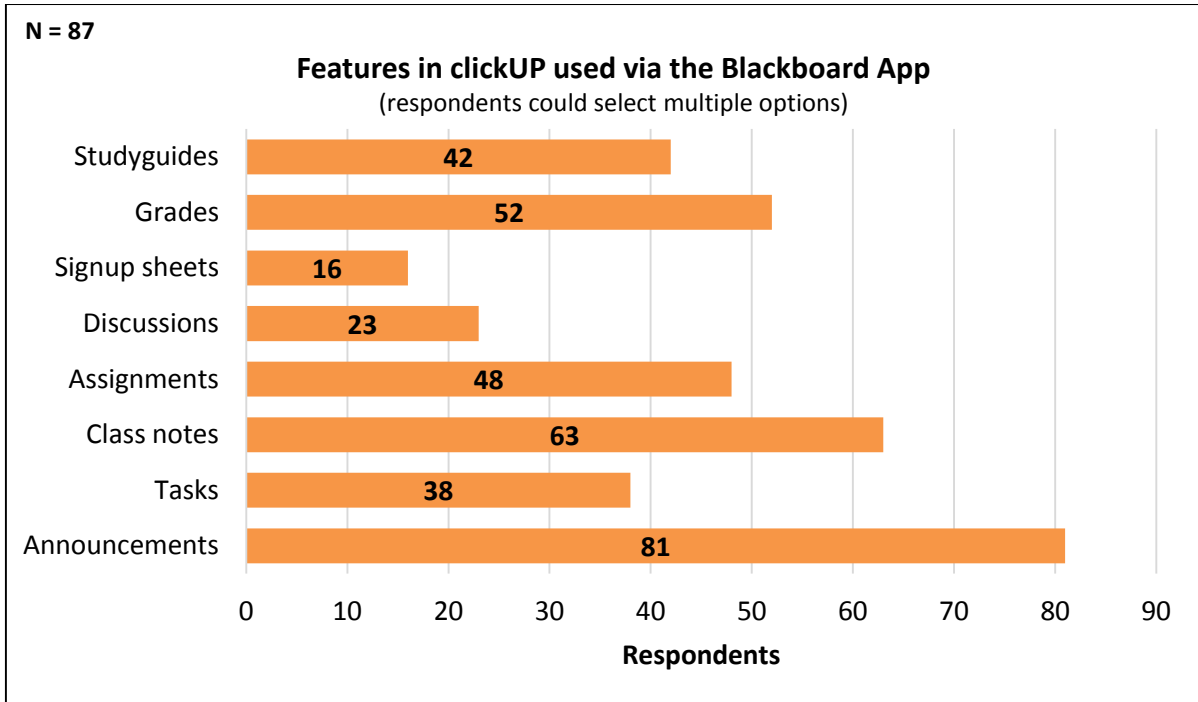


Figure 4.30: Features in clickUP used via the Blackboard App.

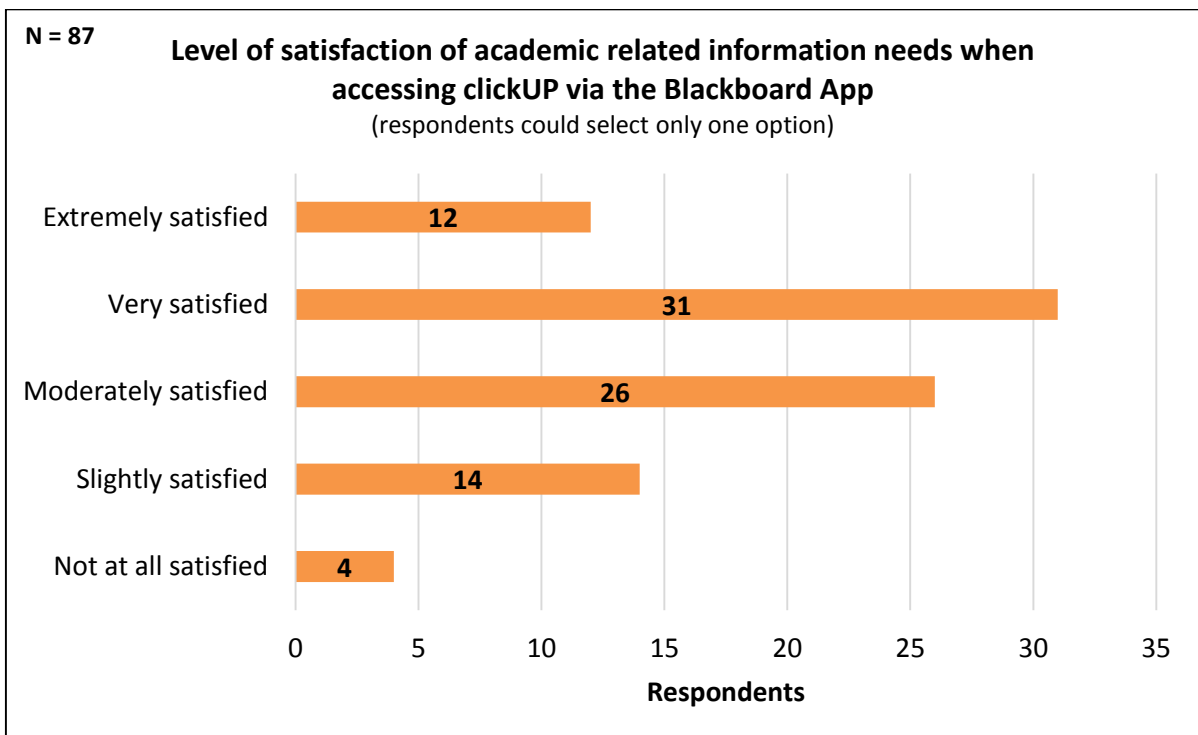


Figure 4.31: Level of satisfaction of academic related information needs when accessing clickUP via the Blackboard App.

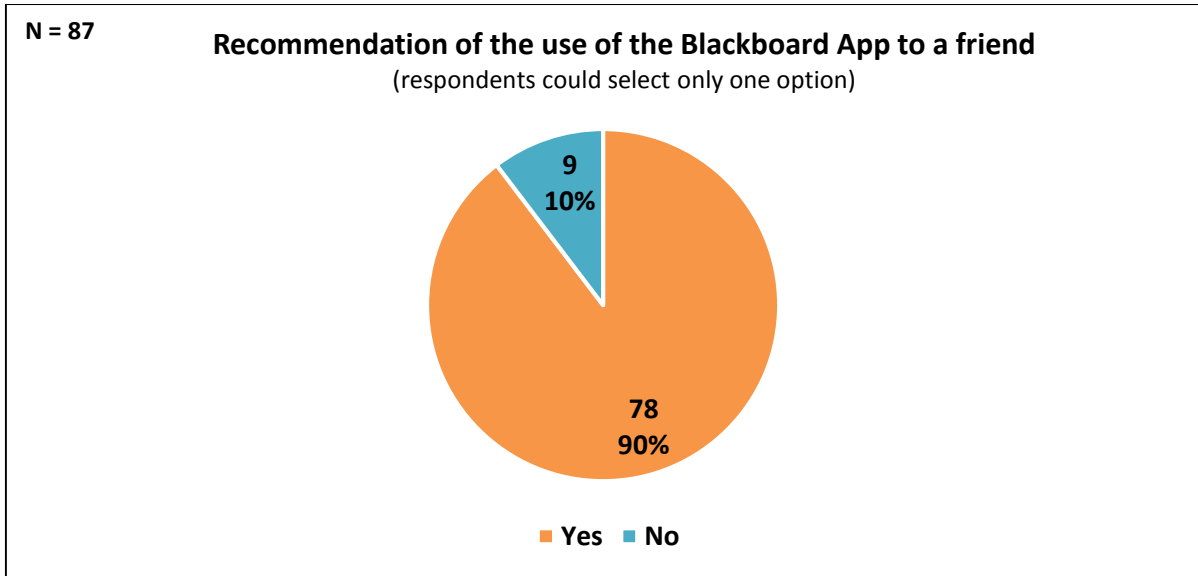


Figure 4.32: Recommendation of the use of the Blackboard App to a friend

When asked about the preferred method of accessing clickUP, the majority of the respondents (49/87; 56.3%) indicated that they preferred to access clickUP via the browsers on their computers (See Figure 4.33). What is significant about this result is that it also speaks to the fact that participants in this study primarily made use of their computers, and only when they do not have access to one, will they make use of a mobile device to satisfy their academic needs. The preference thus seems to be to use a computer first, and then only a mobile device, either by means of the app or the browser on their mobile device. This relates to a study by Kassab and Yuan (2012: 1) who also found that the motivation for using mobile devices sometimes stems from the user not having access to a computer (see Section 2.3.1).

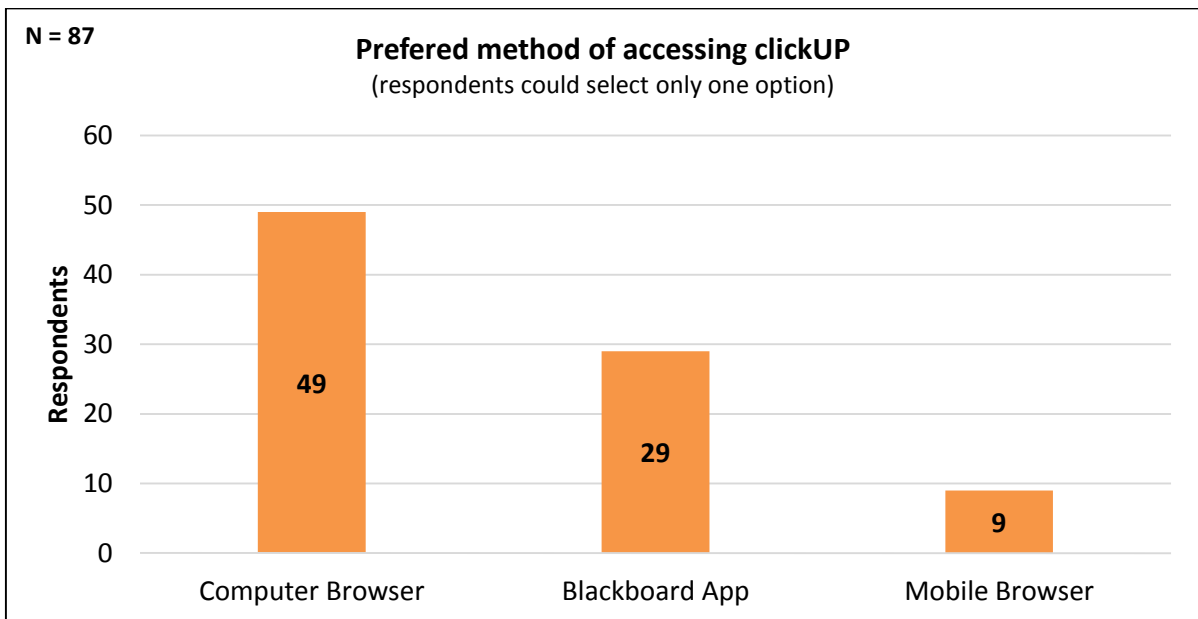


Figure 4.33: Preferred method of accessing clickUP

4.2.5.3 Mobile devices and communication

In order to find out more about the use of mobile devices for academic purposes, a section of academic related communication was included in the questionnaire. Respondents were asked if they used their mobile devices for communication, how often they used it and what applications were used. The results are that 115/143 (80%) respondents made use of their devices to discuss academic matters, while 28/143 (19.5% \approx 20%) did not (See Figure 4.34).

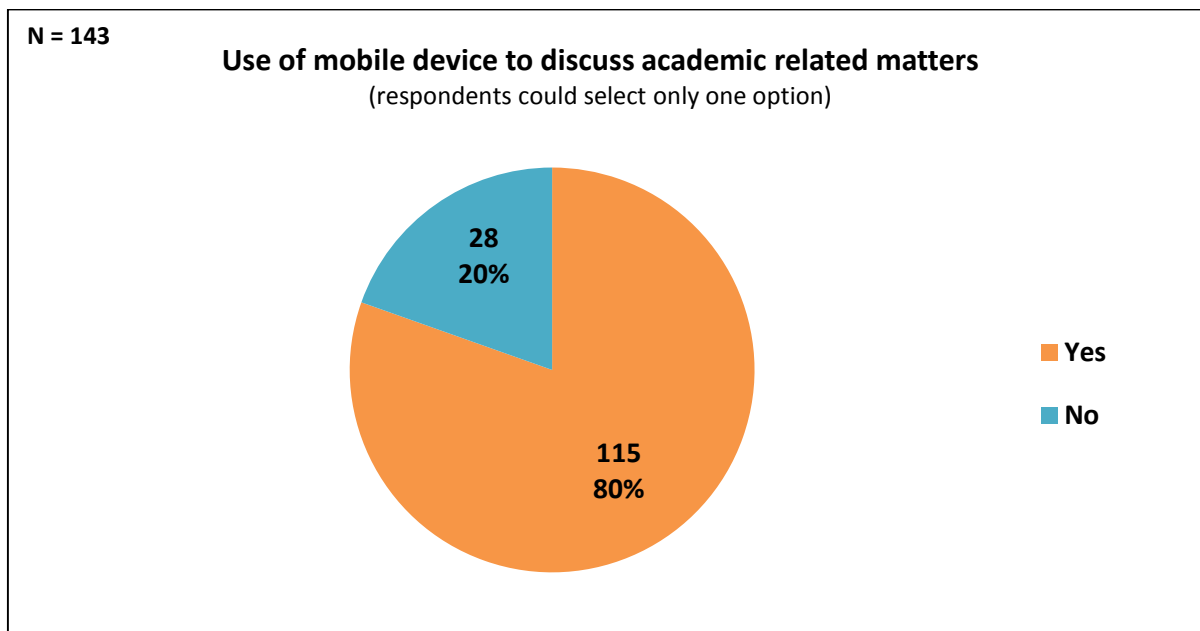


Figure 4.34: Use of mobile device to discuss academic related matters

Mobile devices were mostly used multiple times per day (53/115; 46.1%) and multiple times per week (38/115; 33%) (See Figure 4.35). This was done mostly via WhatsApp (102/115; 88.7%) and e-mail (98/115; 85.2%). Interestingly, SMS and Facebook were used almost as much for discussions, with SMS being used by 57/115 (49.5%) and Facebook by 54/115 (46.9%). Respondents could choose more than one application (see Figure 4.36).

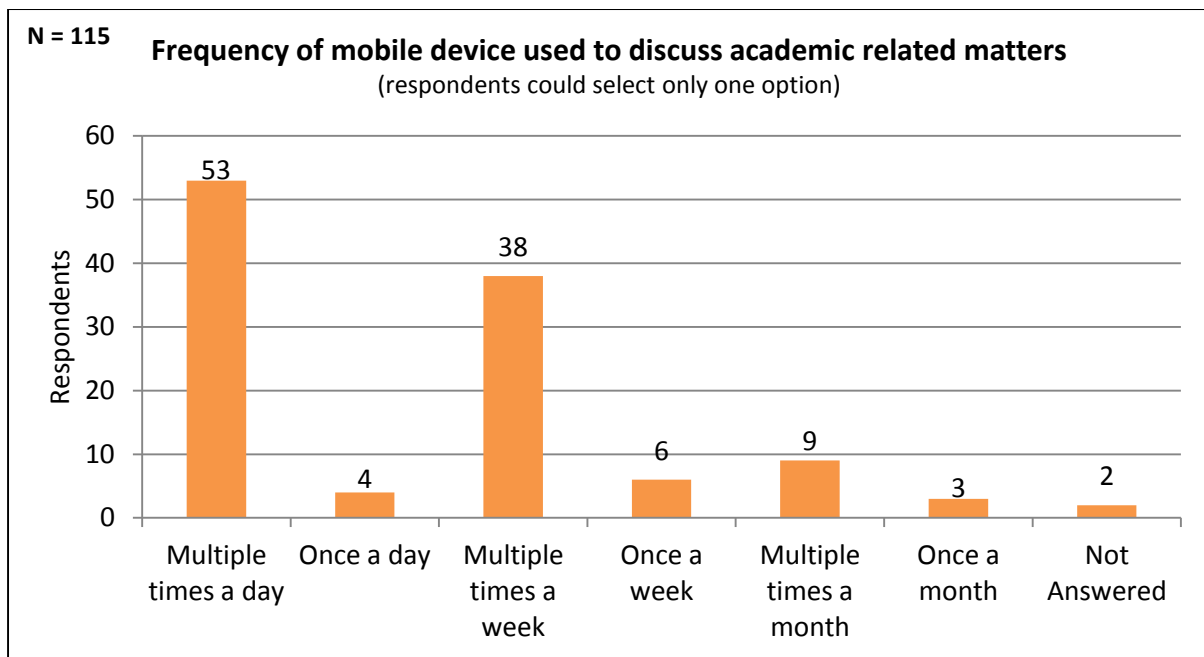


Figure 4.35: Frequency of mobile device used to discuss academic related matters

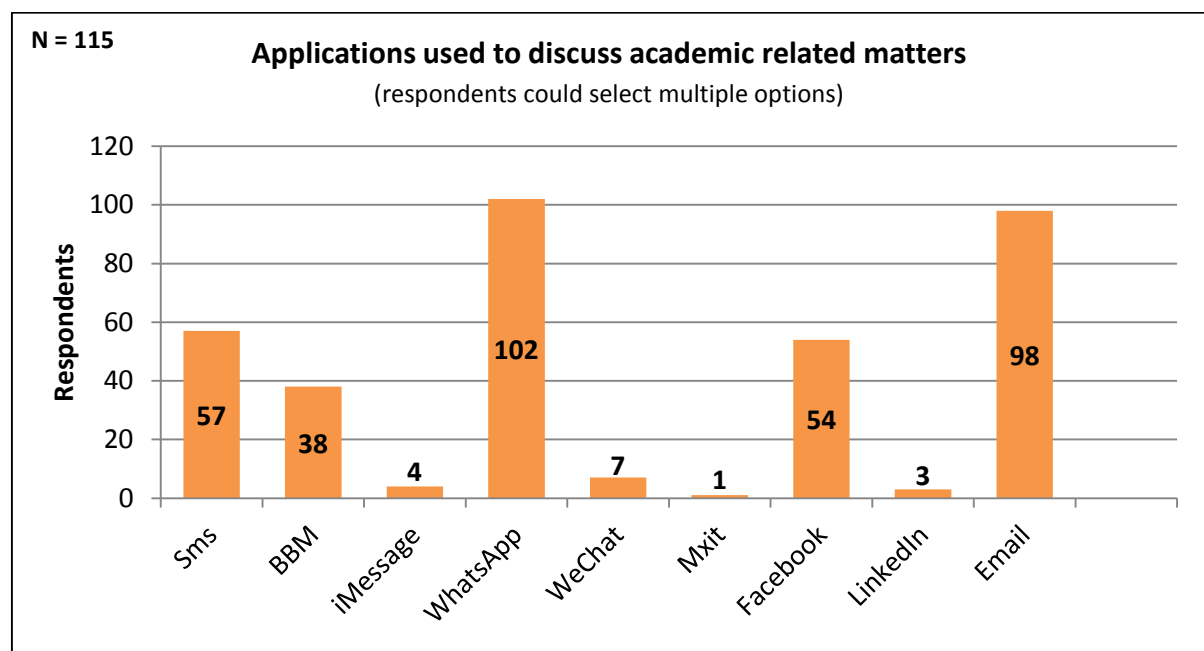


Figure 4.36: Applications used to discuss academic related matters

4.3 FOCUS GROUP INTERVIEWS

In order to help the researcher contextualise the participants of the focus group interviews, a short questionnaire was distributed to the participants, together with a list of the four topics to be discussed (i.e. the interview schedule) (see Appendix C). These participants were chosen by means of convenience sampling. They were invited by the researcher in person or via e-mail to participate in the interviews. The results of the focus group interviews are divided into

two subsections: (1) an analysis of the accompanying questionnaire providing demographic data, and (2) an analysis on the focus group discussion, according to the topics.

A total of 32 students participated in the focus group interviews, being second year, third year, honours and master's students (See Figure 4.37). The master's students were completing either a coursework or a full research master's degree. A number of the participants have also completed the main questionnaire. However, due to the anonymity of the main questionnaire, an exact number cannot be provided.

As was mentioned earlier, the focus group interviews were recorded by means of an audio recorder so that the researcher could analyse the data at a later stage. Thematic analysis was used (see Section 4.3.2).

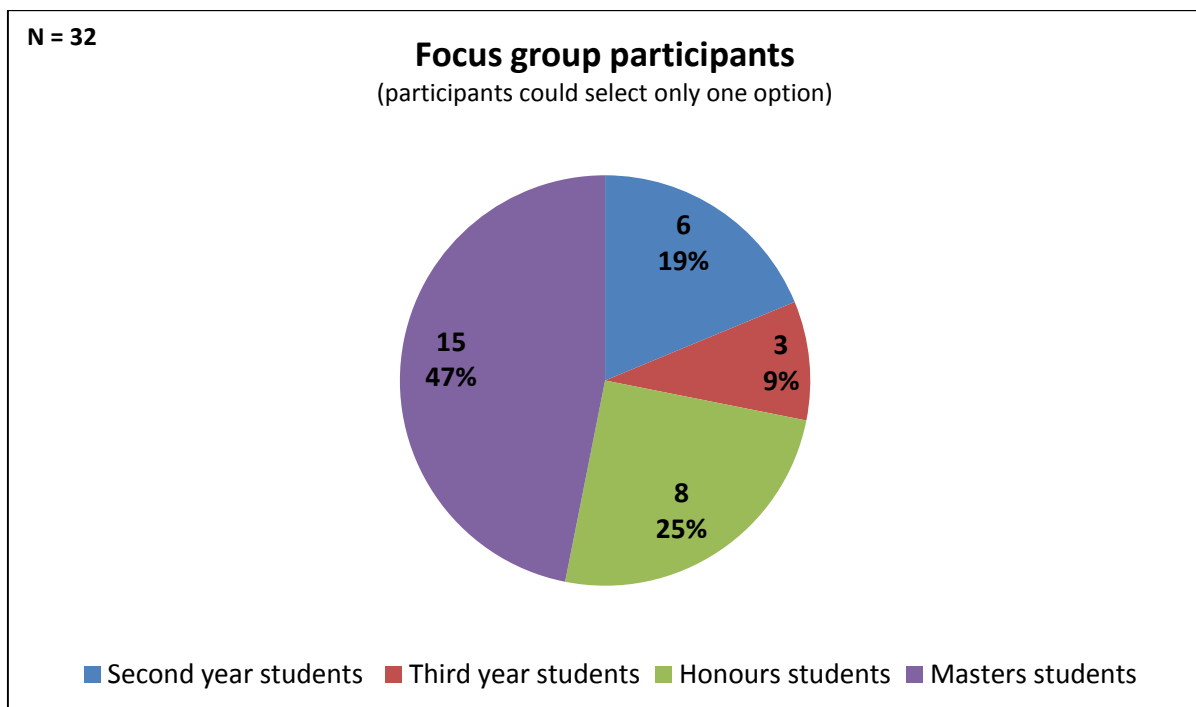


Figure 4.37: Focus group participants

4.3.1 Results from questionnaire completed by focus group participants

4.3.1.1 Participants' experience

Participants were asked if they had experience as a tutor, lecturer or research assistant, and multiple options could be selected. Among the group, six indicated that they had experience as a research assistant, seven as a lecturer, and ten as a tutor, while sixteen indicated no experience in any of the options provided. Only five of the participants indicated that they had experience in more than one of the options (See Figure 4.38).

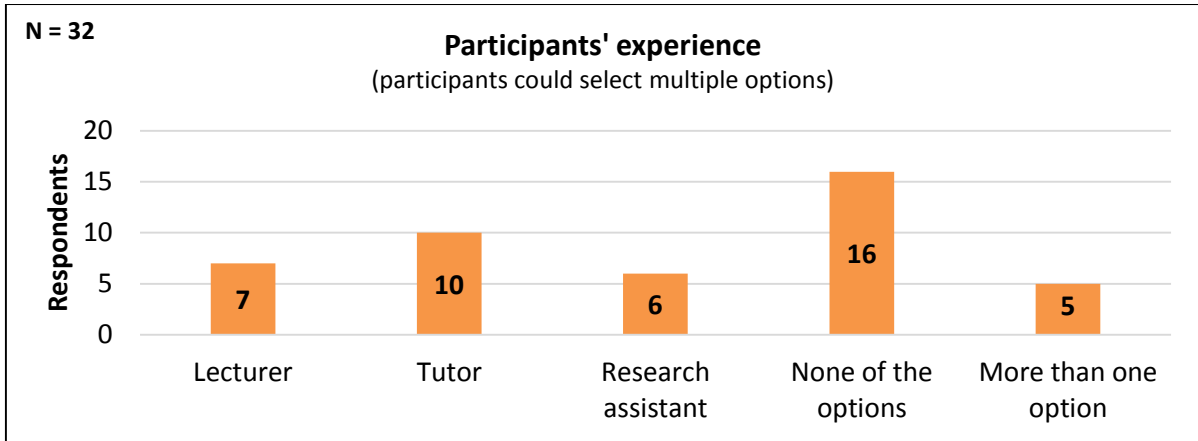


Figure 4.38: Experience of focus group participants

4.3.1.2 Number of mobile devices used

Participants were asked about the number of mobile devices they used, specifically focusing on tablets and smartphones. Half of the participants (16/32; 50%) indicated that they used only one device, while 11/32 (34.4%) indicated that they made use of two. Only 5/32 (15.6 ≈ 16%) participants indicated that they make use of three or more devices (see Figure 4.39).

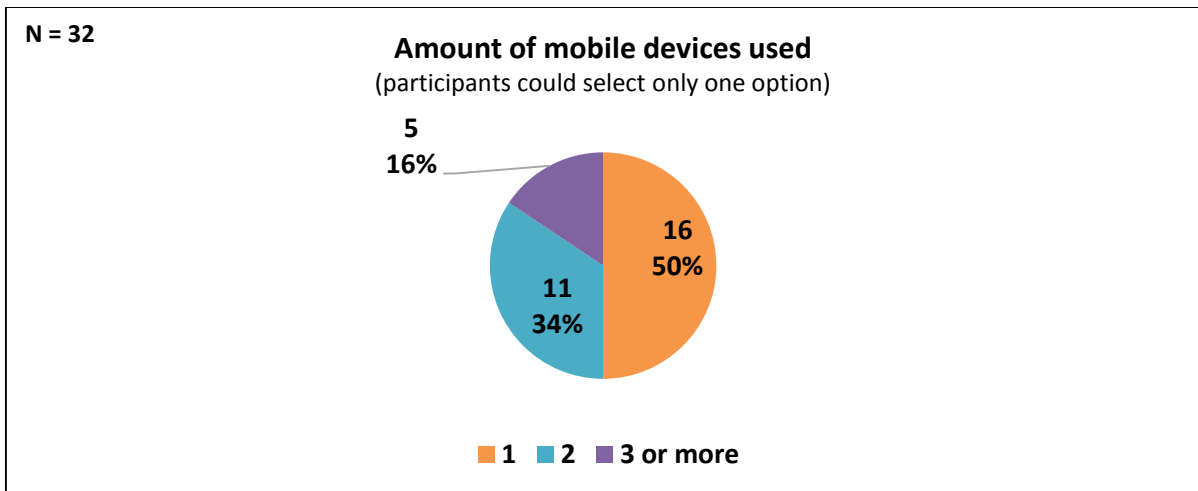


Figure 4.39: Number of mobile devices used

4.3.1.3 Type of mobile devices used

Participants were asked what type of mobile devices they used, with the options of smartphone, tablet or both. The majority of participants 18/32 (56.3%) indicated that they made use of a smartphone, while 14/32 (43.8%) indicated that they used both smartphones and tablets (See Figure 4.40). An interesting observation that can be drawn from these results is that none of the participants made use of a tablet only. Participants used a smartphone, or smartphones and tablets, but never just a tablet. This correlates to some extent with results from the questionnaire where only 5% of respondents indicated that they made use of a tablet only.

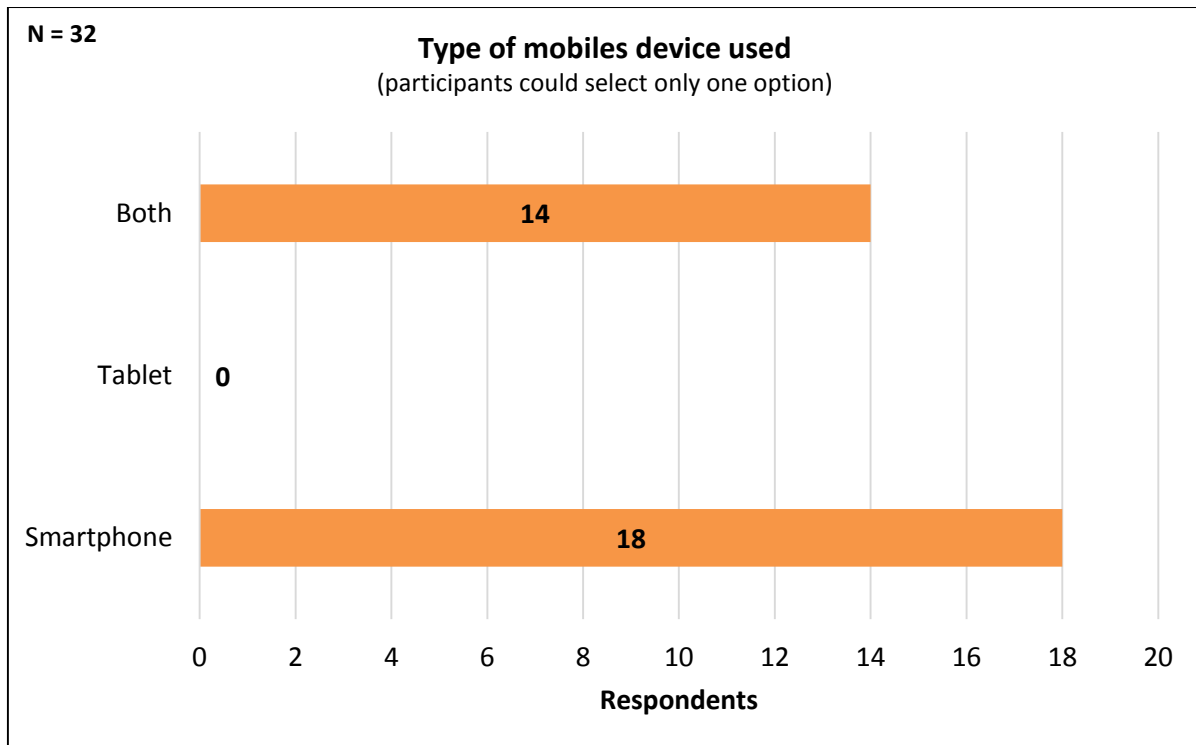


Figure 4.40: Type of mobiles device used

4.3.2 Analysis of focus group discussion

An interview schedule guided the discussion. It covered four questions (see Appendix C).

4.3.2.1 Question 1: General use of mobile devices to find, access, share and use information

The purpose of this question was to determine what some of the activities were of users with their mobile devices, and to find out how they used them. The range of answers derived from this question is similar throughout the five groups that took part, and therefore are reported together. Some of the answers could be expected. Participants made use of their mobile devices for communication: making calls, which include video and audio, SMS and other messaging applications. Using mobile devices for social networking purposes was also very popular, with Facebook the preferred application. The calendar and reminder feature of the mobile devices were also used among the group, as a participant stated, *“I use my phone to set deadline dates so that I could get reminders”*.

Participants also indicated the use of RSS feeds, mostly for news related materials. Services such as Feedly or the Android news app were used. Alerts are set up on these services, using certain keywords. If the summarised versions of the article or news story are interesting, the participants access the main website to get more detailed information. In the words of a participant: *“I find I read more by reading smaller sections”*. This respondent mentioned that he spent a few minutes every morning reading through the alerts.

Searching for information is a very popular activity, whether on an application such as Wikipedia, via the mobile browser, or via the Google voice search function. Participants also indicated that they used their mobile device to find their way when travelling using the built-in GPS. Taking and sharing of photos are also among the various uses of mobile devices in general.

Mobile devices thus seem to be used for a range of activities, including activities that take place during day-to-day activities. As a participant stated, *“My behaviour is different, I pick up my phone to check when I’m unsure”*, referring to daily conversations. This particular phenomenon was also found by Kassab and Yuan (2012: 1) who found that among the motivations for mobile device usage is to be able to answer a question during a conversation (refer to Section 2.3.1).

Two activities that relate more to the hardware than to information behaviour are that participants use their mobile devices to read from while working on their computers or laptops, using the device as an additional monitor. As a participant said, *“I use it as a second screen”*. Bills *et al.* (2006: e1), mentioned earlier, found a similar result. Among the many advantages of mobile devices that were mentioned, particular reference was made to the ability to use the mobile device as a second screen (refer to Section 2.3.1). The second activity relates to storage. When asked what a particular participant would do with a mobile device, specifically a tablet, the response was: *“I would use it for storage space”*.

A response that is worth mentioning with regard to the use of mobile devices, or rather different types of mobile devices, is that participants seem to be influenced by how they feel about the technology. As one participant stated, *“everything depends on my mood, do I feel more technology based or more old school”*. There is also some distrust in the technology, with some participants feeling that they may lose work if it is not also backed up elsewhere, whether it be in the cloud or on a PC at home.

A further limitation that should be mentioned is the problem of connectivity and the associated costs. It influenced participants in the group to a great extent. In the words of two participants, *“I don’t use my phone if I am not in a Wi-Fi area”* and *“I only use the phone properly when I have got Wi-Fi”*. Another participant summarised this well by stating that *“I think that is the irony about ICTs”* referring to the fact that one still needs connectivity, even if one has the best technology.

4.3.2.2 Question 2: Differences in using mobile devices to find, access, share and use information for academic purposes

This question was asked to determine if there are similarities and differences between how users make use of their mobile devices in a general setting and to how they use them for academic purposes. From the answers it is clear that participants also use mobile devices for academic purposes. This includes working with print and electronic material. A participant indicated that she saves time that would have been spent on making photocopies or scans, by using the camera in a mobile device as a scanner. She mentioned that *“I take picture of contents page, instead of photocopying or scanning”*.

Accessing sources from the internet and sharing this information with their colleagues or group members are also among the academic activities. Sharing included sharing information via social platforms such as Twitter and social bookmarking. One participant said *“I use it to find the articles”* after which she e-mails the article to herself or to a friend or colleagues. Another indicated that the *“ability to share bookmarks across the Google platform, that is amazing”*. A participant indicated that after he found interesting articles he would share them with those he thought would benefit: *“I would disseminate information via Twitter”*.

Some participants indicated that they work on their tasks and assignments on their mobile devices as well, with one of the nicest features being that *“Editing can be done anywhere”*. It was however mentioned that when looking for mistakes, it is easier to check the assignment for mistakes on paper format than to edit in electronic format. As one individual stated, *“I noticed so much more if I printed it out”*.

Even with the ability to synchronise articles to all devices and being able to read articles on a mobile device, some participants still preferred to print out their articles. Among the reasons given was that the glare of the screen is disturbing, and as one individual stated, *“maybe it’s the age factor as well”*, elaborating that printing out articles is the way that they (age group 41+) is used to doing it. This statement would support research by Lee and Lee (2014: 145), who found a difference between how the generations use mobile devices, and the source of information used (see Section 2.3.1).

Some participants recorded lectures so that they could listen to them again afterwards, while others stated that they do not go through the trouble of recording the lecture, because they will in any case not listen to it again. When asked why specifically the lectures are recorded, the participant admitted, *“because I don’t listen in class”*.

ClickUP is also accessed via mobile devices, either through the web-based version or via the Blackboard App. This correlates with the results from the questionnaire. At the time of the

research, the general feeling about the Blackboard App was not positive. A participant said outright: *"I think it's terrible!"* Another participant did not share the same sentiment as the others, and indicated that he preferred the app over the website, *"I like the app better than the webpage, the webpage is slow"*.

Participants use their mobile devices for communication within group settings as well, such as group tasks or assignments. Communication once again takes place via the standard routes such as calls, SMS and messaging applications. Social networking tools are also used in this regard. In the words of a participant: *"Mobile devices help with the social component of academics"*. To a certain extent, it can be said that the activities remain the same, it is the context that differs.

4.3.2.3 Question 3: Different mobile devices used for different purposes

The purpose of this question was to determine if users have dedicated certain devices for certain contexts. Most users indicated that they use their devices, including cell phones and tablets, for all purposes. As a participant stated *"My phone is my tablet"*. Others indicated that they use their tablets for academic work and their smartphones for personal and general purposes. Looking for information seems to be easier on devices with larger screens, be they PCs, laptops or tablets. The participants said, *"The screen of my phone is too small"*, *"The bigger the screen, the easier it is to use"*, *"I Google on my iPad, it is bigger, and you can open different tabs"*, *"I usually prefer to read on normal big screen like my laptop,"* and *"I don't find it very hard, I just prefer my computer to my phone"*.

One of the other reasons given for using devices for different purposes is information overload. Sifting through personal and social e-mails takes up so much time that it is difficult to get to all the work or academic e-mails if they are stored on the same device. According to a participant, *"Separation makes it a lot easier to manage where your information is"*. Most participants however indicated that they manage to keep up with all their e-mails, even if they are all synced to one device.

E-mail seems to play a big role with the use of mobile devices for different purposes. It was mentioned earlier that participants look for information on the tablet, after which it is e-mailed to themselves. Others indicated that they do the same with notes. Notes are taken on the tablets and then e-mailed. When asked to elaborate on the reason for this, a participant stated, *"e-mail is a reminder, and I know that it is there"*. Not all participants, however, had multiple devices and therefore could not provide in-depth information, and only commented on what they think could be provided. As a participant stated: *"If my work supplied a tablet, I would use it"*.

4.3.2.4 Question 4: Recommendation(s) to other students for using mobile devices for academic purposes

A broad range of advice was offered from the various groups. It ranged from pointing out the advantages to cautioning against the disadvantages (see Table 4.5).

Someone who did not yet have a mobile device that they use for academic purposes thought other students should get mobile devices because they are easy to use and much more portable than laptops. Recommendations included the advantage of backup: not only that an additional copy can be stored on the device, but that regular backups of the device should also be made, even to some form of cloud storage such as Google Drive, One Drive or Dropbox. One participant went as far as to say *“back up every single version of every single chapter that you ever submit to anybody”* to stress the importance of backups.

Participants cautioned about technology-related matters, such as battery life, that the small size of the screen can be a problem, and that it is not always as easy to type on a mobile device as on a PC or laptop. Suggestions were, however, made that some nice tools such as hand writing recognition software are available and work well if used properly.

Initial device costs and data costs were also points on which advice was offered. When discussing data costs one participant reacted: *“data costs, eish...”* Participants suggested that students should carefully research proper what mobile device they require, so that they know which to get. Further, considering the cost of data, they suggested updating the software on devices in places where free Wi-Fi networks, for example, are available. As one participant stated, *“It comes back to the data, first and foremost”*.

Students were also warned to watch out for distractions such as games, movies or TV series that could also be stored on the devices. Even though they are fun, they might be distracting to the student and to others, as they might be more interested on what is happening on a fellow student’s tablet than paying attention to a lecture, for example.

A definite improvement in communication was highlighted as a big advantage, as sharing could take place through various platforms, and discussions could take place through applications such as IM, Messenger, WhatsApp, BBM and others.

From the responses to these questions it is clear that various information behaviour activities can be seen. They include information seeking, collecting information, sharing of information, use of information, management and organisation of information, and storage and safekeeping of information. One respondent, who had a smart phone but not a tablet, stated that: *“I feel if I had a tablet it would have a big influence”*.

In order to map out what has been said and link it to the various information behaviour activities, a summary of the results are presented in table format.

Information behaviour activity	Results from focus groups
Management and organisation of information	Backup
	Cloud-based storage
	Social bookmarking
Information use	Taking notes or highlighting existing notes
	Reading and use as second screen
	Navigation (GPS)
	Making arrangements
	E-mail
	Announcements or notifications from various platforms
	Synchronisation or transfer between devices
	Attending lectures via online platform
	Time management and planning
	Viewing and commenting on documents (PDF, Word, PowerPoint)
	Working on assignments while on the move
	Accessing books online (via library platforms)
	Collaborating
Information seeking	Quick referencing
	Using Google voice
	Help with questions (assignments)
	Definitions of words or concepts
	Quick search
Information sharing	Social bookmarking
	Social networking (FB, Twitter, Instagram, IM, etc.)
	Pictures
	Articles for academic purposes
	Study and work groups
Collecting information	Recording of lectures
	Buying online books
	Downloading articles
	RSS feeds
	Pictures of tables of contents
	Pictures of class slides and notes

Table 4.6: Summary of information behaviour activity

Even though the participants indicated that they make use of their mobile devices for the purposes mentioned above, and the associated advantages, they also indicated several disadvantages. Table 4.7 highlights some of these advantages and disadvantages.

Advantages	Disadvantages
Ease of use	Device costs
Portability	Data costs
Substitute for PC or laptop	Screen size too small
Synchronisation or backup	Keyboard
Quick capture of information	Security of information
Sharing of information	Initial setup is complicated
Accessibility of information	Need full version of app to gain full potential
Collaboration	Glare of screen
Group discussion	Formatting gets lost
Reminders and alerts	Technical limitations (hardware and software)
	Difficult to write on tablet
	Information overload
	Remembering passwords
	Distractions on device, such as games

Table 4.7: Advantages and disadvantages of mobile devices

4.3.3 Themes that emerged

A number of themes emerged from the results of the focus group interviews. Each of these themes is briefly discussed.

1. **Benefits:** Participants agreed that there are definite advantages in using mobiles for academic purposes.
2. **Purposes of use:** Mobile devices were used more for general and social purposes than for academic purposes.
3. **Security and ethical issues:** Participants were concerned about the security and ethical issues relating to mobile devices.
4. **Preferences for medium:** Print material is still used frequently.
5. **Preferences for device:** PCs or laptops are still the preferred technology.

Participants in the focus group interviews all agreed that there are definite advantages in using mobile devices for academic purposes. Those who used their mobile devices for academic purposes confirmed the advantages, and the participants who did not make use of mobile devices for their academic studies stated that they could see the advantages of these devices. This stems from the experience that they have had in using these devices for general and social purposes, or from the experience of friends and family.

Mobile devices were also used more in the general and social contexts than the academic context. This could be because the academic context is a smaller part of the participants' lives, whereas the general and social contexts are larger parts. It may also be that these contexts are so interwoven that it is difficult to separate them.

Participants were concerned about the security and ethical issues surrounding their mobile devices. One issue was the physical theft of the devices, which contain all their personal information, and also much of their work- and/or study-related information. In order to keep a device secure, passwords must be remembered – a problem considering the number of accounts the participant is connected to.

Printed material was still used frequently, especially by members of the older generation. The motivation for that can be ascribed to a number of things, including the distrust in the devices in that it may lose their information, and that it was difficult to read electronic material on these devices. This then introduces the next theme, of PCs or laptops still being the preferred technology.

Even though participants all indicated that they make use of their smartphones and their tablets in all the various contexts discussed, they still prefer to use a PC or laptop if they have access to one. The motivation behind this is that screen sizes of mobile devices are too small, the applications have limited capabilities, data costs are too high, and it is difficult to type on a mobile device.

4.4 TRIANGULATION OF QUANTITATIVE AND QUALITATIVE DATA

When comparing the results obtained from the quantitative component of the study to the qualitative component, similarities can be identified. Among these are that students make use of various mobile devices, including smartphones and tablets in their everyday lives. They make use of these devices in an academic, social and general context for various purposes and applications. A key point that must be emphasised is the fact that mobile devices still remain the secondary choice if the user has the option to make use of a PC. Various reasons were provided for this, including limitations of the mobile devices, and device and data costs. Preference for print material and security concerns were also provided as reasons why users are not fully committed to using mobile devices only.

With regard to experience and level of satisfaction, similar results were obtained from the qualitative and quantitative components, with users indicating that in general they are satisfied with the information activities that they can perform with their mobile devices. These include information seeking, searching, use, management and sharing of information. From the

qualitative data, it was clear that emotional issues such as feelings towards technology and convenience are often influencing factors.

4.5 APPLICATION OF FINDINGS TO MODEL OF INFORMATION BEHAVIOUR

The empirical component of the study, confirmed the validity of the model (see Figure 4.41) as a framework (adapted from Wilson 1981 and Wilson 1999). Some of the factors that motivates this statement include that the context of the information needs, contributes largely to the process. In the case of this study; the academic, social and general context had an influence on the information needs of the users. The users were activated or motivated by various mechanisms, including the need to satisfy academic related needs such as completing tasks or assignments. Other theories could also be investigated to determine the factors that could play a role in the activating mechanism, such as Use and gratification theory, or Social capital theory. It was however out of the scope of this study, and was not investigated.

Various intervening variables influenced the users. Users were from a diverse background, at different age levels, and different academic levels. They were influenced by their different roles they perform; the barriers that they faced, which may be device or cost related; as well as the type and brand of mobile devices used. The users' information seeking and searching behaviour had demands on information systems such as clickUP, Google the library, etc. but also on other information sources like friends, classmates and lecturers. Users also shared their information with these "other" information sources. In the end, information was used to satisfy a particular need. The Wilson models (figures 2.3 and 2.4) and the importance of feelings noted in the Kuhlthau model (figure 2.2) guiding the study, combined with the results from this study, converged into a new model (see Figure 4.4.1).

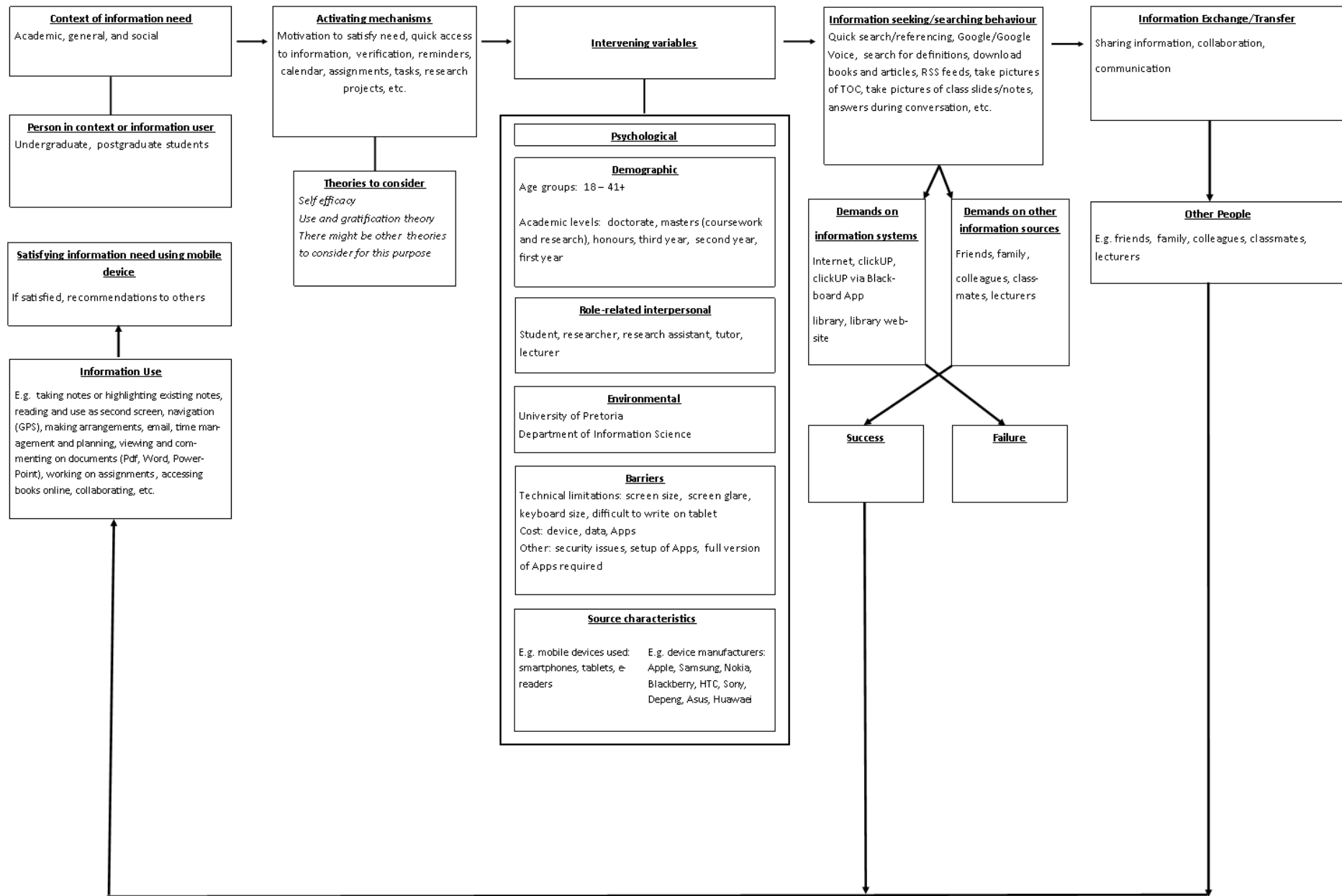


Figure 4.41: Adapted Wilson 1981 and 1999 models: addition of study finding

In order to elaborate on the composition of the new adapted model (figure 4.4.1), the model is briefly explained. This model is a combination of Wilson 1981 and Wilson 1999. The person in context (Wilson, 1999) is also the information user (Wilson, 1981), who requires information because of a particular information need (Wilson, 1981). This need is within a particular context (Wilson 1999). Certain activating mechanisms (Wilson, 1999) has an influence on the information seeking or searching behaviour of the user (Wilson, 1981 and 1999). This is also influenced by a number of intervening variables (Wilson, 1999). Searching or seeking for information places certain demands on information sources (Wilson, 1981), and based on the outcome thereof, information is used. Information is also exchanged or transferred to other people (Wilson, 1981), after which it can be processed and used (Wilson, 1981 and 1999). Depending on this process is whether or not the user is satisfied (Wilson, 1981), and how they feel about it (Kuhlthau, 1991).

4.6 CONCLUSION

In this chapter the results from the questionnaires and focus group interviews were reported and discussed. The results were described and also presented in table and graph format. In the next chapter a summary of the study is provided, and recommendations offered for further studies.

CHAPTER 5: FINDINGS, INTERPRETATIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In this chapter, the researcher provides an overview of the study, presented in a summarised table format, and a more detailed discussion. The findings of the study, organised according to the sub-problems of the research and the interpretations thereof, are discussed. The section and the research report end with recommendations for future studies.

5.2 RESEARCH PROBLEM AND SUB-PROBLEMS

What is the impact of mobile devices on the information behaviour of students in the Department of Information Science at the University of Pretoria?

5.2.1 Sub-problems answered from the literature

- What has been reported on the information behaviour of students with regard to the use of mobile devices in academic contexts?
- What has been reported on the information behaviour of students with regard to the use of mobile devices in general?
- What are the factors that influence the use of mobile devices by students for academic purposes?

5.2.2 Sub-problems answered from the empirical component

- What is the information behaviour of students in the Department of Information Science with regard to information seeking in the academic context using mobile devices?
- What is the information behaviour of students in the Department of Information Science with regard to the electronic learning management system (clickUP) using mobile devices?

5.3 SUMMARY OF THE STUDY

A brief summary of the study is provided in table format (see Figure 5.1), followed by a more detailed summary.

Research approach	Mixed methods
Research method	Case study

Target group	Students in the Department of Information Science at the University of Pretoria
Selection of target group	Convenience sampling
Data collection methods	(1) Online questionnaire (06 Oct – 07 Nov 2013) (2) Focus group interviews (20 Aug – 09 Sept 2014)

(1) Online questionnaire	Selection of sample	Census approach
	Questionnaires distributed	923
	Total number of questionnaires returned	201 (21.77%)
	Questionnaires declined	2 (0.99%)
	Questionnaires completed	199
	Age of respondents (groups)	18-21 (115; 57.78%)
		22-25 (39; 19.59%)
		26-30 (10; 5.02%)
		31-35 (11; 5.52%)
		36-40 (6; 3.01%)
		41+ (18; 9.04%)
	Academic levels	Doctorate (1; 0.50%)
		Master's (coursework and research) (31; 15.57%)
		Honours (21; 10.55%)
Third year (43; 21.60%)		
Second year (48; 24.12%)		
First year (55; 27.63%)		

(2) Focus group interviews	Selection of sample	Purposive sampling
	Interviews conducted	5
	Amount of participants	32
	Academic levels	Master's (coursework and research) (15; 46.87%)
		Honours (8; 25.00%)
		Third year (3; 9.37%)
Second year (6; 18.75%)		

Ethical clearance	Department of Information Science Research Committee (on behalf of the Faculty of Engineering, Built Environment and Information Technology (EBIT) Research Ethics Committee).
Confidentiality	Cover letter and consent (electronic and paper based). Anonymous for questionnaires. With focus groups, some of the people were known to the researcher – but names were not used in reporting data.
Reliability and validity	Instruments based on the literature analysis and developed according to chosen framework, triangulation of data collected by different means and from quantitative and qualitative perspectives.

Table 5.1: Summary of the study

In this study, a mixed methods approach was followed, consisting of a quantitative and a qualitative component. The study was in the form of a case study, with the focus on the students in the Department of Information Science at the University of Pretoria. The data collection methods used included an online questionnaire, which was open from 06 October – 07 November 2013 (completed by 199 respondents) and five focus group interviews conducted between 20 August and 09 September 2014 (with a total of 32 participants). The participants and respondents in the study included undergraduate and postgraduate students. In order to select this target group, convenience sampling was used. A census approach was used for the questionnaire component of the data collection, while purposive sampling was used for the focus group interview component of the data collection. Ethical clearance to conduct the study was obtained from the Department of Information Science Research Committee (on behalf of the Faculty of Engineering, Built Environment and Information Technology (EBIT) Research Ethics Committee). In order to ensure confidentiality, an information letter and consent form was prepared and distributed to the sample group before data collection started. An online cover letter and consent form were built into the questionnaire, and a paper version of it was given to participants in the focus groups (see Appendix A).

In order to ensure validity in reliability in this study, the researcher has carefully considered the literature to ascertain the correct measuring instruments used in similar studies, so that the correct instruments could be used in this study. Multiple instruments were used, including questionnaires and focus group interviews. By comparing the literature, the results from the questionnaires, and the results of the focus group interviews, it was determined that similar results were obtained from all three instances.

5.4 FINDINGS FOR SUB-PROBLEMS

5.4.1 Literature on the information behaviour of students

There is a widespread adoption and use of mobile devices across generations in different contexts. Mobile access to information is especially useful “on the move”, and different types of information can be obtained, which also supports various information behaviour activities. Students make use of mobile devices, such as smartphones and tablets for various purposes, as part of their academic studies. In studies by Mock (2004: 17), Owen (2010: 215), and Hahn and Bussel (2012: 43) it was found that making and accessing notes, and accessing teaching and learning material, were part of the common activities. Adomi (2006: e1) found that students keep their schedules on their devices, and share task- and assignment-related material. The sharing of material was also found by Hahn and Bussel (2012: 43). Bombold (2013: 430) found

that the millennials (people born between 1980 and 1994) do indeed engage in the activities mentioned above, but also that they make use of various apps to satisfy their information needs.

5.4.2 Information behaviour of students with regard to the use of mobile devices in general

It is clear from the literature that mobile devices play a big role in the information behaviour of students in general. From the studies reviewed, the following can be highlighted. Students make use of their mobile devices to search for information such as news or weather. They also access their e-mails, read blogs and browse the internet using their mobile devices (Kassab & Yuan, 2012: 1). There is also a big social component to the use of mobile devices by students in that they use these devices to interact on social platforms (Chigona *et al.*, 2008). Because these devices are not fixed to a specific location, students can access and use information on the move (Walsh, 2012: 58). Other motivations for using mobile devices include building communities, and sharing and use of information (Lee & Lee, 2014: 145). It also came to light that Generation X and Generation Y tend to use mobile devices more than the Baby Boomers (Lee & Lee, 2014: 145).

5.4.3 Information behaviour of students in the Department of Information Science with regard to information seeking in an academic context using mobile devices

It is clear from the empirical component that the information behaviour of students in the Department of Information Science is influenced by mobile devices. Students make use of their mobile devices for a variety of purposes, including the management and organisation of information, information use, collecting information, seeking information, and sharing information, to mention a few. Smartphones and tablets were used for various academic activities such as searching for material, making notes, sharing task- or assignment-related material and discussing academic work. This happened at various levels of frequency ranging from only a few times per month to multiple times in a day. Students reported various levels of satisfaction when using their mobile devices for academic purposes, but most indicated that they were satisfied. Overall, it can be said that mobile devices have an influence on the information behaviour of students.

5.4.4 Information behaviour of students in the Department of Information Science with regard to clickUP using mobile devices

With regard to clickUP and mobile devices, students make use of various mobile devices in the Department of Information Science. Students access clickUP from their smartphones, tablets or both, if they own more than one. They access most of the features available through

clickUP, including announcements, assignments, class notes and grades. Overall, students are satisfied with this process, and the majority will even recommend to friends or classmates that they make use of clickUP via their mobile device.

5.5 LIMITATIONS OF THE STUDY

This study is restricted to students in the Department of Information Science at the School of Information Technology of the University of Pretoria. Participants from other institutions and students from other disciplines within the same institution may not necessarily report the same information behaviour as the participants in this study. Disciplinary differences are often noted in studies of information behaviour (Case, 2012). If further case studies were to be conducted at other institutions, the results may differ.

Another limitation of the study is that mobile devices were limited to smart phones and tablets. Phablets are becoming more and more prevalent, and it may well be that in the future users will have a phablet only, and not a smartphone and a tablet. Another type of mobile device that is becoming more common is the e-reader, but e-readers were excluded from this study. As the e-reader offers the advantage of downloading books, it will certainly have an influence on the academic arena in the future. Once again, if further case studies were to be conducted, at the University of Pretoria, or at other institutions, the results may differ if the influence of different mobile devices on information behaviour is investigated.

5.6 VALUE OF THE STUDY

The value of the study for the Department of Information Science will include finding out how students not only use their mobile devices, but how they use them for academic purposes in relation to information activities. Findings can help the department develop new ways of delivering content to students, and adapting teaching and learning methods to include mobile devices, so that teaching and learning (and especially information activities such as information seeking and sharing) can contribute to academic success.

Another benefit of the study will be that it will reveal the difference, if any, between the use of mobile devices between undergraduate students and postgraduate students. This may lead the department to explore differentiated means of providing the various teaching and learning opportunities to the students on different academic levels. Findings could also inform similar studies in related contexts, and the theory of information behaviour.

Further value that the study offers is that it confirms what has been found in the literature. Similar information behaviour activities were present in this study and in studies conducted elsewhere.

5.7 RECOMMENDATIONS

Based on the literature and the results from this study, certain recommendations can be made.

- (1) **Different student groups – different levels and different modes of study:** In this study, the focus was on the information behaviour of students, both undergraduate and postgraduate students, and on-campus and off-campus students. In reporting the results, the researcher did not separate the results to further investigate the differences in information behaviour of undergraduate and postgraduate students or the difference in the information behaviour of on- and off-campus students. If the study were to be conducted again, or in another setting, it would be interesting to note the more detailed differences between these groups.
- (2) **Different types of mobile devices:** A further recommendation is to investigate the influence of phablets and e-readers among mobile devices. In this study, mobile devices were limited to smartphones and tablets. With e-readers and phablets becoming more popular among users, we can assume that they will also have an influence on the information behaviour of users. Specifically in the academic context, access to articles and books on e-readers will have a significant influence.
- (3) **Isolated focuses on single contexts:** Another recommendation for future studies is to break down the study even further, investigating each of the contexts, general, social and academic, individually. From the results it is clear that there is much overlap between the contexts, and the respondents and participants may find it difficult to separate the contexts if they are all addressed together, as in this study. By stating clearly at the outset of the study which context specifically is investigated, it may help users to orient themselves better. After all three contexts have been studied, a comparison between the results of the three studies can be drawn.
- (4) **Studies from the viewpoints of academic departments and libraries:** Recommendations could also be made with regard to academics and academic libraries. One could investigate whether academics make use of their mobile devices for academic purposes, and if lecturers make their content available in mobile-friendly format, whether in an accessible online format or repackaged in app format. The same question could be directed at libraries to determine what they are doing to help students access and use information on their mobile devices.

- (5) **Information sharing:** Further recommendations could be made to investigate the use of mobile devices in sharing of information and collaborative learning and collaborative seeking. One might also investigate how this influences how users organise information on mobile devices. This study did not investigate this in much detail. Some of the results did indicate that collaboration takes place, that people share the information they find, and that they work together. It will be interesting to note how this takes place in the mobile environment. The scope of the study could also be expanded to investigate what the effect of this type of information sharing is on information users.
- (6) **Ethical issues:** A study could also be done on ethical implications relating to mobile devices. One could investigate the security of the devices, and the measures and protocols in place to protect users of mobile devices. One could ascertain what ethical concerns users have and how to address them.
- (7) **Different theoretical frameworks – activity theory:** Different lenses reveal different facets and complexities of a research problem. Lenses can be based on theories or on other frameworks such as a model. The study was based on an eclectic use of the following models: Wilson’s nested model of information behaviour (1999) (see Figure 2.1), the information search process model of Kuhlthau (1991) (see Figure 2.2), Wilson’s model of information behaviour (1981) (see Figure 2.3), Wilson’s model of information behaviour (1999) (see Figure 2.4), and an adapted model based on a small component from Kuhlthau (1991), and larger components from Wilson 1981 and Wilson 1999 (see Figure 4.41). Although this worked well a recommendation is made towards the use of other frameworks in future studies namely to make use of activity theory. According to Wilson (2008: 120), activity theory “connotes the study of the mode of human behavior that acts upon objects to transform them”. Case (2012: 188), further suggests activity theory is “concerned with human reasoning (internalization and actions upon objects externalization) that creates new artefacts”. The value of using activity theory as a framework for a future study is that research in library and information science has according to Wilson (2008: 119) been done primarily in “silos”. Research is conducted in the areas of information retrieval behaviour, information seeking behaviour, and other areas of information behaviour. But due to different methodologies, approaches and areas of publication, a disconnect exists between these areas. Activity theory can serve as the “overarching paradigm” for research conducted in these areas (Wilson, 2008: 119). A framework based on activity theory is portrayed in Figure 5.1

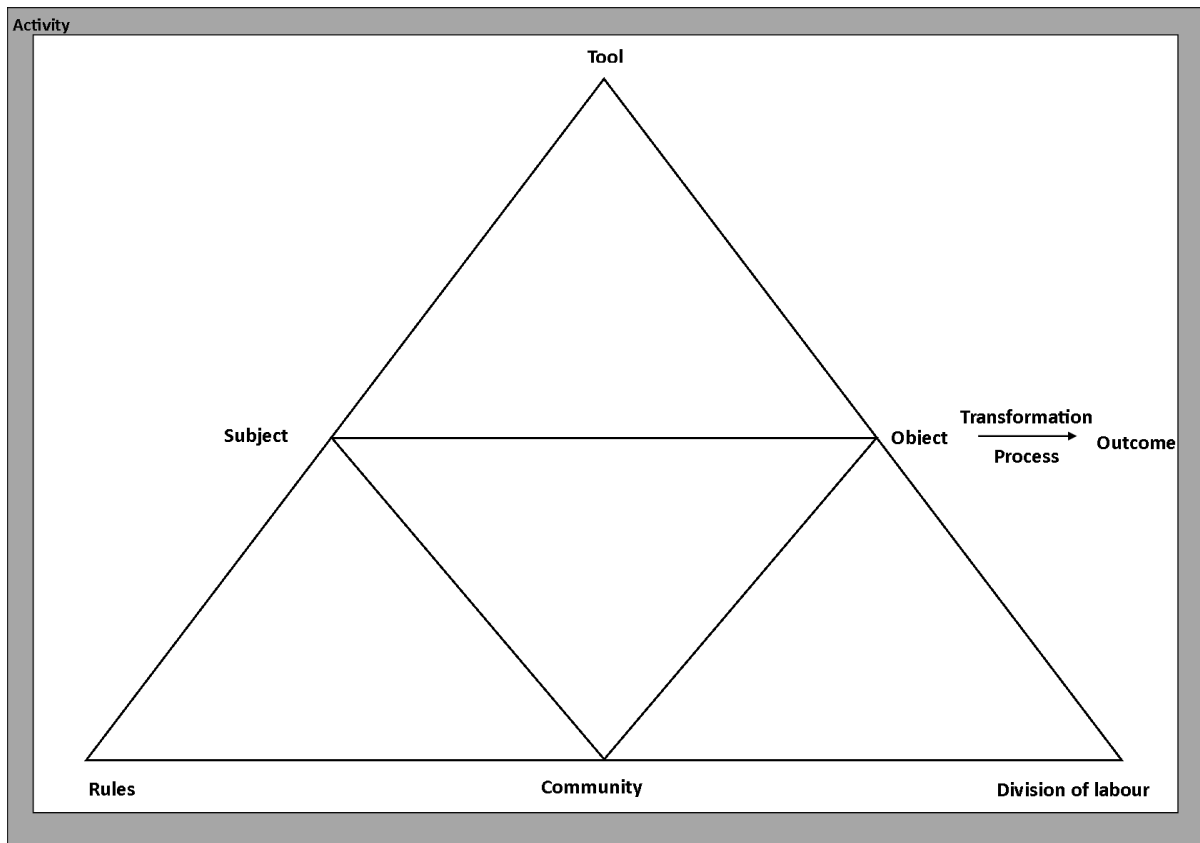


Figure 5.1: Activity theory model (Kuuti, 1997: 7)

This would mean that in the context of this research, the activity will be the education or teaching that takes place at the Department of Information Science at the University of Pretoria. The tool refers to the mobile devices, such as smartphones and tablets used by lecturers and students for academic purposes. The subjects involved in this activity are thus the lecturers and the students. The object of the activity is to learn. Through interaction between the various elements of the activity, transformation takes place, so that the student enrolled for a particular module can obtain the necessary information and knowledge to pass the module. The student would thus have gone from a very low level of understanding, to a level of understanding adequate to complete a module successfully.

- (8) **Different information actors:** A study could be conducted to investigate different information actors. In this study, the primary focus was on students within the department. Another study could be conducted to investigate the behaviour of the lecturers within the department. If they use mobile devices in their teaching, by for example setting up activities in mobile format, interesting results could be seen in the information behaviour of the students.

- (9) **Personal Information Management (PIM):** A study could be conducted on PIM, investigating information behaviour practices regarding use of mobile devices to manage personal information. For example, one could ask how users make sure that their information is organised or stored properly on their mobile devices.
- (10) **General recommendation:** A general recommendation, aimed at the University of Pretoria, is to offer advice on mobile devices and academic studies to first year students. This could happen during the orientation week even before the students start their academic career. Introducing the idea of mobile devices, Blackboard, the various apps, technologies, advantages, etc. to students, right at the beginning can set them on the right path to make full use of mobile devices. In this sense it will contribute to their academic success.

5.8 CONCLUSION

The aim of this study was to investigate the influence of mobile devices on the information behaviour of students in the Department of Information Science at the University of Pretoria. By considering the literature and the empirical data collected it was determined that there is a definite influence. Recommendations were made for further studies, including: to investigate different information actors, i.e. students and academic staff, to investigate different types of mobile devices, to focus on single contexts and on single contexts from different viewpoints, such as the academic departments and libraries. Other topics could be added to the discussion, including information sharing and personal information management, and ethical issues. A final recommendation is to make use of different theoretical frameworks to guide the study.

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APPENDICES

Appendix A: Cover letter and consent form

Cover Letter

University of Pretoria

Department of Information Science

2013/09/16

Dear Student.

I invite you to participate in a study I am conducting as part of my Master of Information Technology degree (MIT Stream B). The title of my mini-dissertation: Mobile devices, information behaviour and academic studies. In the study I will focus on the influence of mobile devices on information behaviour in an academic context. I will focus on the information behaviour of students within the Department of Information Science at the University of Pretoria.

Participation in this research is voluntary and the research will be conducted by means of an anonymous online questionnaire. All data collected will be handled confidentially and may be used for the purposes of publication and conference presentations.

If you have any questions regarding the study or if you need more information please contact me at: werner.vanwyk@up.ac.za or 012 420 5908.

My study leader is Prof Ina Fourie at the Department of Information Science of the University of Pretoria and she can be contacted at ina.fourie@up.ac.za or 012 420 5216.

I look forward to working with you, and I thank you in advance for your participation.

Yours sincerely

Werner van Wyk

Informed consent form

(Form for research subject's permission)

(Must be signed by each research subject, and must be kept on record by the researcher)

- 1 Title of research project: ***Mobile devices, information behaviour and academic studies.***
- 2 I hereby voluntarily grant my permission for participation in the project as explained to me by ***Werner van Wyk.***
- 3 The nature, objective, possible safety and health implications have been explained to me and I understand them.
- 4 I understand my right to choose whether to participate in the project and that the information furnished will be handled confidentially.
- 5 I am aware that the results of the investigation may be used for the purposes of publication.
- 6 I am aware that this session will be recorded, and I agree to this. (Please tick)

Yes

- 7 Upon signature of this form, you will be provided with a copy.

Signed: _____ Date: _____

Witness: _____ Date: _____

Researcher: _____ Date: _____

Appendix B: Questionnaire

Questionnaire on mobile devices, information behaviour and academic studies

* Required

Information Letter

Dear Sir/Madam,

I am inviting you to participate in a study I am conducting as part of my Masters of Information Technology degree (MIT Stream B). The title of my research project is Mobile devices, information behaviour and academic studies. In the study I will focus on the influence of mobile devices on information behaviour in an academic context. I will focus on the information behaviour of students within the Department of Information Science at the University of Pretoria.

Participation in this research is voluntary and the research will be conducted by means of an anonymous online questionnaire. All data collected will be handled confidentially and may be used for the purposes of publication and conference presentations.

If you have any questions regarding the study or if you need more information please contact me at: werner.vanwyk@up.ac.za or 012 420 5908.

My study leader is Prof. Ina Fourie of the Department of Information Science at the University of Pretoria and can be contacted at ina.fourie@up.ac.za or 012 420 5216.

I appreciate you taking the time to read through this and I thank you in advance for your participation.

Yours sincerely,
Werner van Wyk

Consent form

- 1) Title of research project: Mobile devices, information behaviour and academic studies.
- 2) I Hereby voluntarily grant my permission for participation in the project as explained to me by Werner van Wyk.
- 3) The nature, objective, possible safety and health implications have been explained to me and I understand them.
- 4) I understand my right to choose whether to participate in the project and that the information furnished will be handled confidentially.
- 5) I am aware that the results of the investigation may be used for the purposes of publication.

1. **Date:**

.....
Example: December 15, 2012

2. **Consent: ***

Mark only one oval.

- Yes (given) *Skip to question 3.*
 No (not given) *Stop filling out this form.*

Skip to question 3.

General Questions

Please complete the survey as completely and truthfully as possible.

3. **Age: ***

Mark only one oval.

- 18-21
- 22-25
- 26-30
- 31-35
- 36-40
- 41+

4. **Academic level: Undergraduate ***

Mark only one oval.

- First year
- Second year
- Third year
- Not applicable (select postgraduate level)

5. **Academic level: Postgraduate ***

Mark only one oval.

- Honours
- Masters
- Doctorate
- Not applicable (select undergraduate level)

6. **Degree:**

Baccalaureus Informationis Scientiae [BIS]

Mark only one oval.

- with specialisation in Information Science
- with specialisation in Multimedia
- with specialisation in Multimedia (Four-year programme)
- with specialisation in Publishing

7. Baccalaureus Informationis Scientiae Honores [BISHons]

Mark only one oval.

- with specialisation in Information Science
- with specialisation in Multimedia
- with specialisation in Publishing

8. Magister Informationis Scientiae (Research) [MIS]

Mark only one oval.

- with specialisation in Library Science
- with specialisation in Information Science
- with specialisation in Multimedia
- with specialisation in Publishing

9. Masters in Information Technology (Research & Coursework) [M.IT]

Mark only one oval.

- Masters in Information Technology

10. Doctor Philosophiae [DPhil]

Mark only one oval.

- with specialisation in Library Science
- with specialisation in Information Science

11. Philosophiae Doctor [PhD]

Mark only one oval.

- with specialisation in Publishing

12. Other (please specify):

.....

Mobile devices (Smart Phones and/or Tablets)

13. **Do you make use of mobile devices? ***

(Smart Phones and/or Tablets)

Mark only one oval.

- Yes
- No *Stop filling out this form.*

Mobile devices (Smart Phones and/or Tablets)

14. **What type of mobile device do you use?**

Mark only one oval.

- Smartphone
- Tablet
- Both

15. The manufacturer(s) of your mobile device(s):

(More than one option can be selected)

Check all that apply.

- Apple
- Samsung
- Blackberry
- Nokia
- HTC
- Windows

16. Other (please specify):

.....

17. Name of device:

E.g. iPhone 5s, Galaxy S4, iPad 3, Galaxy Tab 10.1

.....

18. Name of device (only complete if more than one mobile device):

E.g. iPhone 5s, Galaxy S4, iPad 3, Galaxy Tab 10.1

.....

Mobile devices and information behaviour

19. Please rate the extent to which your mobile device(s) has an influence on the following, within an academic context: *

i.e. Information related to your studies

Mark only one oval per row.

	No influence	Influence to a small extent	Influence to a medium extent	Influence to a high extent	Influence to a very high extent
Sharing information with others:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Actually using information:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staying abreast with changes in an area of your interest:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing your motivation to seek information:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organising or sorting your information for future use:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using information sources available through a library website e.g. databases:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Finding useful information by chance (i.e. you were not looking for this information):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. Please rate the extent to which your mobile device(s) has an influence on the following, within a general context: *

i.e. Information related to everyday life activities such as commercial, hobby, health or travel related information

Mark only one oval per row.

	No influence	Influence to a small extent	Influence to a medium extent	Influence to a high extent	Influence to a very high extent
Sharing information with others:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Actually using information:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staying abreast with changes in an area of your interest:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing your motivation to seek information:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organising or sorting your information for future use:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using information sources available through a library website e.g. databases:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Finding useful information by chance (i.e. you were not looking for this information):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. Please rate the extent to which your mobile device(s) has an influence on how your information behaviour in a social context, e.g. interacting with friends and acquaintances:

*

i.e. Information related to communication with others

Mark only one oval per row.

	No influence	Influence to a small extent	Influence to a medium extent	Influence to a high extent	Influence to a very high extent
Sharing information with others:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Actually using information:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staying abreast with changes in an area of your interest:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing your motivation to seek information:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organising or sorting your information for future use:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using information sources available through a library website e.g. databases:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Finding useful information by chance (i.e. you were not looking for this information):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Mobile devices and academic studies

22. How important do you think the role of mobile devices in academic studies is? *

Mark only one oval.

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant

23. Please explain:

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24. **How difficult do you think it is to use a mobile device to search for academic study related information? ***

Mark only one oval.

- Extremely easy
- Easy
- Difficult
- Extremely difficult

25. **To what extent do you think easily accessible study-related information on mobile devices may lead to information overload? ***

Mark only one oval.

- Not at all
- To a limited extent
- To a large extent

26. Please explain:

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27. **To what extent do you think mobile devices can help satisfy your need for test or exam related information? ***

Mark only one oval.

- Not at all
- To a limited extent
- Satisfactory
- More than expected

28. **To what extent do you think mobile devices can help satisfy your need for task or assignment related information? ***

Mark only one oval.

- Not at all
- To a limited extent
- Satisfactory
- More than expected

29. **To what extent do you think mobile devices can help to satisfy your need for information relating to library resources? ***

(E.g. Checking if a book is available in the library)

Mark only one oval.

- Not at all
- To a limited extent
- Satisfactory
- More than expected

30. **Do you use your own mobile device for your academic studies? ***

Mark only one oval.

- Yes *Skip to question 31.*
- No *Stop filling out this form.*

Mobile device use and academic studies

31. **How often do you use your mobile device for your academic studies? ***

Mark only one oval.

- Multiple times a day
- Once a day
- Multiple times a week
- Once a week
- Multiple times a month
- Once a month

32. **What do you use your mobile device for? ***

(More than one option can be selected)

Check all that apply.

- Taking notes
- Viewing or downloading notes
- Searching, browsing for information on the internet e.g. Google, Wikipedia, etc.
- Studying for tests
- Doing group work
- Doing tasks and assignments
- Social networking (Facebook, Twitter, LinkedIn, etc.)
- None of the above

33. Other (please explain)

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34. **When do you make use of your mobile device for your studies? ***

(More than one option can be selected)

Check all that apply.

- When you are not close to a computer
- When you are in class
- When you are working on a task or assignment individually
- When you are working on a task or assignment in a group
- All the time, it's easier than to use a computer

35. Other (please explain)

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36. **How well are your academic related information needs satisfied when accessing and using information via your mobile device? ***

Mark only one oval.

- Not at all satisfied
- Slightly satisfied
- Moderately satisfied
- Very satisfied
- Extremely satisfied

37. Please explain:

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38. **Would you recommend the use of a mobile device for academic studies to a friend? ***

Mark only one oval.

- Yes (please explain why)
 No (please explain why not)

39.

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40. **Do you access clickUP via your mobile device`s browser? ***

Mark only one oval.

- Yes *Skip to question 41.*
 No *Skip to question 47.*

Mobile devices and clickUP

41. **Which of the following features in clickUP do you use via you mobile device`s browser? ***

More than one option can be selected

Check all that apply.

- Announcements
 Tasks
 Class notes
 Assignments
 Discussions
 Signup sheets
 Grades
 Studyguides

42. Other (please specify):

.....

43. **How well are your academic related information needs satisfied when accessing clickUP via your mobile device`s browser? ***

Mark only one oval.

- Not at all satisfied
 Slightly satisfied
 Moderately satisfied
 Very satisfied
 Extremely satisfied

44. Please explain:

.....
.....
.....
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45. **Would you recommend accessing clickUP via your mobile device`s browser to a friend? ***

Mark only one oval.

- Yes (please explain why)
 No (please explain why not)

46.

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Mobile devices and the Blackboard App

47. **Do you make use of the Blackboard App? ***

Mark only one oval.

- Yes
 No *Skip to question 56.*

Mobile devices and the Blackboard App

48. **Which of the following features in clickUP do you use via the Blackboard App? ***

More than one option can be selected

Check all that apply.

- Announcements
 Tasks
 Class notes
 Assignments
 Discussions
 Signup sheets
 Grades
 Studyguides

49. Other (please specify):

.....

50. **How well are your academic related information needs satisfied when accessing clickUP via the Blackboard App? ***

Mark only one oval.

- Not at all satisfied
- Slightly satisfied
- Moderately satisfied
- Very satisfied
- Extremely satisfied

51. Please explain:

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52. **Would you recommend the use of the Blackboard App to a friend? ***

Mark only one oval.

- Yes (please explain why)
- No (please explain why not)

53.

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54. **Which method of accessing clickUP do you prefer? ***

Mark only one oval.

- Via the mobile device`s browser (please explain)
- Via the Blackboard App (please explain)
- Via the browser of your computer, notebook, laptop (please explain)
- None of the above (please explain)

55.

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Mobile devices and Communication

56. Do you make use of your mobile device to discuss academic related matters? *

Mark only one oval.

- Yes
 No *Stop filling out this form.*

Mobile devices and Communication

57. How often do you make use of your mobile device to discuss academic related matters?

Mark only one oval.

- Multiple times a day
 Once a day
 Multiple times a week
 Once a week
 Multiple times a month
 Once a month

58. Which of the following applications do you use to discuss academic related matters?

Check all that apply.

- Sms
 Blackberry Messenger
 iMessage
 WhatsApp
 WeChat
 Mxit
 Facebook
 LinkedIn
 Email

59. Other (please specify):

.....

60. Are you part of any groups on any of the above mentioned applications?

(More than one option can be selected)

Mark only one oval.

- Yes (please explain)
 No (please explain)

61.

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Appendix C1: Focus group interview schedule

- How do you use your mobile device in general to find, access, share and use information?
- Are there any differences in using your mobile device to find, access, share and use information for academic purposes?
- Do you have different mobile devices that you use for different purposes?
- What recommendation(s) can/would you make to other students for using mobile devices for academic purposes?

Appendix C2: Focus group: profile questionnaire for participants

What is your current level of study? (Please mark only the relevant option)

- Second year student
- Third year student
- Honours student
- Master's or doctoral student

Do you have any experience as a? (Please mark all appropriate options)

- Lecturer
- Tutor
- Research assistant
- None of the above

How many mobile devices do you use? (Please mark only the relevant option)

- 1
- 2
- 3+

What type of mobile device do you use? (Please mark only the relevant option)

- Smartphone
- Tablet
- Both