

**The Role of Uncertainty in the Information Seeking Behaviour of First  
Year Students at Tshwane University of Technology, Polokwane Campus**

**BY**

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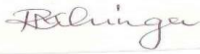
**at the**

**UNIVERSITY OF SOUTH AFRICA, PRETORIA**

**PROMOTER: Dr Madely du Preez**

## DECLARATION

I, Rirhandzu Sharon Mhinga, declare that *The role of uncertainty in the Information Seeking behaviour of first-year students at Tshwane University of Technology's Polokwane Campus* is my own work and that all sources I have used or quoted have been indicated and acknowledged by means of complete references.



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## ABSTRACT

The purpose of this study was to investigate the role of uncertainty in the information-seeking behaviour of first-year students at the Polokwane Campus of the Tshwane University of Technology. Many students in South Africa, particularly those who come from rural backgrounds, enrol at universities and other institutions of higher learning without the requisite information-seeking and searching skills. Students experience the library and other academic information resources for the first time at a university or an institution of higher learning.

A comprehensive literature review revealed that due to a lack of experience and knowledge, feelings of uncertainty arise, which in turn causes anxiety and a lack of confidence. Literature further suggests that uncertainty and anxiety in information seeking is the reason students submit work that lacks a theme, perspective and a particular point of view.

The study was guided by the Information Search Process (ISP) model of Kuhlthau (1991; 2004), as well as the four levels of information needs that were identified by Taylor (1968). Fifteen students with a background of a dysfunctional school system that does not provide libraries and other academic information resources and systems participated in this study. Data was collected through semi-structured interviews. The findings reveal that the participants, due to their uncertainty-associated feelings, would submit work without a perspective or a point of view.

Due to a lack of the required skills to search for information effectively, the participants experienced feelings of uncertainty and discomfort. The Internet and Google emerged as a platform for students to deal with their uncertainty. In addition to uncertainty, three information barriers that affect students who had no prior experiences of using academic information were identified. These are a lack of knowledge, information systems and cognitive information barriers. Through this study, a model that could be used as a framework for institutions to minimise the affective aspects of uncertainty that students experience during their information-seeking and searching activities could be developed. The envisaged application of the model could assist students and other researchers in enhancing their information-seeking and searching outputs.

**Keywords:** information behaviour, uncertainty, information seeking, information activities, information searching, information needs.

## NKOMISI LOWU NGA NA VUXOKOXOKO BYA NDZAVISISO - XITSONGA

Xikongomelo xa ndzavisiso lowu i ku lavisisa hi ndzima ya ku kala ntiyiseko hi matikhomelo ya ku lava vutivi eka machudeni ya lembe ro sungula eKhempasi ya Polokwane ya Tshwane University of Technology. Machudeni manyingi eAfrika Dzonga, ngopfu ngopfu lama ya humaku eka tindhawu ta le makaya, ya tsarisa etiyunivhesiti na le ka tiinstitutuxini tin'wana ta dyondzo ya le henhla, handle ka ku na vutivi lebyi lavekaka lebyi faneleke na swikili swa ku secha vutivi. Machudeni ya hlangana na tilayibrari na swihlovo swin'wana swa vutivi ro sungula eyunivhesiti kumbe eka institutuxini ya dyondzo ya le henhla.

Ku hlaya hi vuenti literechara kumbe matsalwa swi kombise leswaku hikokwalaho ko pfumala ntokoto na vutivi, ku va na tintwa to kala ku tiyiseka, leswi swi vangela ku karhateka no pfumala ku titsheba. Literachara kumbe matsalwa ya tlhela ya pimanyeta leswo ku kala ntiyiseko na ku karhateka hi ku lava vutivi i xivangelo lexi endlaka leswo machudeni ma nghenisa ntirho wo kala nhlokomhaka, mavonelo na tipoyinti to kongomisa miehleketo ko karhi.

Dyondzo leyi ya ndzavisiso yi leteriwa hi *Information Search Process (ISP)* modlele ya Kuhlthau (1991; 2004), xikan'we na tilevhele ta mune ta swilaveko swa vutivi leswi swi nga voniwa hi Taylor (1968). Machudeni ya khume ntlhanu lama ya humaku eka swikolo swa sisteme leyi yi nga tirheku kahle, leswi swi nga hava tilayibrari na swihlovo swin'wana swa vutivi na tisisteme, ma nghenele dyondzo leyi ya ndzavisiso. Ku hlengeletwe vutivi hi ku tirhisa ti-semi-structured interview. Vuyelo lebyi kumekeke eka vakhoma-xiavo, hikokwalaho ko kala ntiyiseko, leswi fambelanaka na tintwa, va nghenise mitirho ya vona leyi nga hava ku langutana na mavonelo yo karhi ku nga perspective kumbe tipoyinti ta mavonelo yo karhi ku nga point of view.

Hikokwalaho ko pfumala swikili leswi lavekaka ku secha vutivi hi mfanelo na hi ndlela ya vuyelo lebyi tirhekaka, lava nga va na xiavo va ve na tintwa to kala ntiyiseko na ku ku va nga khomeki lahle. Inthanete na Google swi vonake swi ri platfomo ya machudeni ya ku langutana na ku kala ntiyiseko ka vona. Na le henhla ka sweswo swa ku kala ntiyiseko, ku ve na swihingakanyi swinharhu eka vutivi leswi swi nga khumba machudeni lama a ya nga ri na ntokoto wo tirhisa vutivi bya xiakhademiki leswi swi nga voniwa. Leswi i ku kala noleji, tisisteme ta vutivi na swihingakanyi swa vutivi bya miehleketo. Hi ndzavisiso lowu, modlele lowu a wu ta tirhisiwa tanihi rimba eka tiinstitutuxini ku hunguta swiyenge swa nkala ntiyiseko leswi machudeni ya hlanganaka na swona eka nkarhi wa ku secha vutivi na migingiriko ya ku secha swi nga hluvukisiwa. Ku tirhisiwa ka modlele loku ringanyetiwaka hi xa mundzuku, ku nga pfuna machudeni na valavisisi van'wana eka ku entswisa vuswikoti bya vona bya ku lava vutivi na vuyelo bya ku secha ka vona.

**Marito ya nkoka:** matikhomelo hi vutivi, ku kala ntiyiseko, ku lavana na vutivi, migingiriko ya vutivi, ku secha vutivi, swilaveko swa vutivi.

## SETSOPOLWA -SEPEDI

Maikemišetšo a dinyakišišo tše e bile go nyakišiša tema yeo e kgathwago ke go hloka bonnete ka maitshwarong a go nyaka tshedimošo ga baithuti ba ngwaga wa mathomo ka Khamphaseng ya Polokwane ya *Tshwane University of Technology*. Baithuti ba bantši ka Afrika Borwa, kudukudu bao ba tšwago dinagamaeng, ba ingwadiša ka diyunibesithing le ka dihlongweng tše dingwe tša thuto ya godingwana ba hloka bokgoni bja go nyaka tshedimošo. Baithuti ba itemogela bokgobapuku le methopo ye mengwe ya tshedimošo ya tša thuto la mathomo ka yunibesithi goba ka sehlongweng sa thuto ya godingwana.

Tekodišišo ya dingwalwa ka bophara e utollotše gore ka lebaka la tlhokego ya maitemogelo le tsebo, go tšwelela maikutlo a go hloka bonnete, gomme ka go le lengwe maikutlo a a baka letšhogo le go hloka boitshepo. Dingwalwa di tšwela pele go šišinya gore go hloka bonnete le letshogo ge go nyakwa tshedimošo ke lebaka leo le dirago gore baithuti ba romelele mošomo wo o hlokago morero, dikgopolo le maikutlo a moithuti.

Dinyakišišo tše di hlahlilwe ke mokgwa wa Tshepedišo ya go Nyaka Tshedimošo (ISP) wa Kuhlthau (1991; 2004), gotee le magato a mane a dinyakwa tša tshedimošo ao a utollotšwego ke Taylor (1968). Baithuti ba lesomehlano bao ba tšwago dikolong tšeo di bego di sa šome gabotse tšeo di hlokago makgobapuku le methopo ye mengwe ya kabo ya tshedimošo ya thuto ba kgathile tema ka mo dinyakišišong. Tshedimošo e kgobokeditšwe ka go diriša dipoledišano tšeo modiradinyakišišo a sego a ngwala lenaneo la dipotšišo. Dikutollo di utolla gore bakgathatema, ka lebaka la maikutlo a bona a go hloka bonnete, ba tla romela mošomo wo o hlokago dikgopolo le maikutlo a bona.

Ka lebaka la tlhokego ya mabokgoni ao a nyakegago a go nyaka tshedimošo gabotse, bakgathatema ba itemogetše maikutlo a go hloka bonnete le go se lokologe. Inthanete le Google di tšweletše bjalo ka mafelo ao baithuti ba ka rarollago maikutlo a bona a go hloka bonnete. Godimo ga go hloka bonnete, makala a mararo ao a šitišago go hwetša tshedimošo ao a amago baithuti bao ba hlokago maitemogelo a peleng a go šomiša tshedimošo ya thuto a utollotšwe. Wona ke lepheko la tlhokego ya tsebo, la mananeo a tshedimošo le la go kwešiša tshedimošo. Ka mo dinyakišišong tše, mokgwa wo o a šomišwago bjalo ka motheo wa dihlongwa wa go fokotša diabe tša go hloka bonnete fao baithuti ba itemogelago gona ge ba nyaka tshedimošo le ge ba nyaka mešongwana o ka hlangwa. Tirišo ye e lebeletšwego ya mokgwa wo e ka thuša baithuti le banyakišiši ba bangwe go maatlafatša bokgoni bja bona bja go lebelela le go nyaka tshedimošo.

**Mantšu a bohlokwa:** maitshwaro go tshedimošo, go hloka bonnete, go lebelela tshedimošo, ditiro tša tshedimošo, go nyaka tshedimošo, dinyakwa tša tshedimošo .

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## **LIST OF ABBREVIATIONS**

<b>ACS</b>	Affect, Cognition and Sensorimotor
<b>ASK</b>	Anomalous State of Knowledge
<b>ISP</b>	Information Search Process
<b>ITS</b>	Integrated Tertiary System
<b>SANQF</b>	South African National Qualifications Framework
<b>TUT</b>	Tshwane University of Technology
<b>TVET</b>	Technical and Vocational Education and Training
<b>Unisa</b>	University of South Africa

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# CHAPTER 1

## INTRODUCTION, BACKGROUND AND OBJECTIVES TO THE STUDY

### 1.1 Introduction

Uncertainty exists as long as humans exist, hence it is referred to as the ‘ghost at the feast that is always there’ (Wilson 1999:265). Information scientists have acknowledged the role of uncertainty and other related affective factors in the Information Seeking behaviour of users since the 1980s (Kuhlthau 1988; Savolainen 2015a; 2015b).

Kuhlthau is one of the Information Seeking behaviour researchers who has focused a lot of attention on uncertainty as a factor affecting Information Seeking behaviour. In 1991, she developed her ISP model, which is still being used to guide information searching and information literacy studies. In this model, Kuhlthau (1991; 2004) suggests that the users’ information search process moves through a number of stages from the point at which an information need is identified until the required information that would satisfy the identified information needs is retrieved. When confronted with an academic task, Kuhlthau (1991; 2004) observed that students experience feelings of uncertainty, confusion, frustration and doubt. However, feelings of uncertainty eventually make way for feelings of satisfaction or dissatisfaction as they move through the Information Seeking process.

In her observations of first-year students’ Information Seeking behaviour, the researcher noticed that students appear to be fearful and uncertain when they approach the library and have to interact with information resources. DiPrince, Wilson, Karafit, Bryant and Springer (2016:283) allude to the fact that many academic library users, particularly first-year students, are unsure of what the library offers and that the demands, rigour and expectations of academic research leaves them feeling overwhelmed. Therefore, with Kuhlthau’s work and observations in mind, the researcher decided to investigate the Information Seeking behaviour of first-year students at the Polokwane campus of TUT in the Limpopo Province of the Republic of South Africa. The purpose of the current study is to identify and seek ways to minimize the affective aspects caused by uncertainty in the academic seeking and searching behaviour of first-year students when they are confronted with an academic task. Kuhlthau’s ISP model will be used to guide the study.

## 1.2 Background

In South Africa, only 7% of schools have a functional library that provides for the information needs of the learners (Nkondo, Brown, Dick, Hart, Molawa, Nassimbeni, Selete & Teffo 2014:49). This study showed that there were many schools that function with very limited or no information resources. Apart from the fact that many schools do not have functional libraries, many learners also do not have a public or community library within the vicinity of their school, which they could consult when they needed information.

This means that to date, the reading and information needs of the majority of learners remain unprovided for. The lack of experience in using a library at school level makes uncertainty a daunting reality for learners who grew up under these circumstances when they proceed to an institution of higher learning such as a university.

The researcher, a library professional at TUT's Polokwane Campus, observed that students who enrolled at the university displayed a particular pattern of visiting the library in groups after class, especially during the first term. They would approach the library counter as a group and have one spokesperson. Ordinarily, they would move around the library as a group with one person leading the pack. This pattern has been observed year after year by the researcher and it can be related to what McPherson (2015:317) refers to as library anxiety. Library anxiety is described as a range of anxieties, such as fear, nervousness and confusion, that someone experiences when attempting to identify, define and satisfy an information need, especially when that person must use a library and/or its resources for the first time (Blundell & Lambert 2014:262).

For many of these students, their initial responses to the library include fear or feeling lost. Their lack of knowledge about where things are located in the library and, most importantly, where and how to begin their research creates feelings of uncertainty for fear of being labelled as stupid or ignorant. As a result, many of these students shy away from asking for any help or information.

In addition to feeling uncertain due to a lack of experience in using a library, there are a number of library-related factors that seem to contribute to the students' feelings of uncertainty. These include: the size of the library:

- a new environment;
- a lack of skills in using online resources;
- a lack of appropriate information skills; and
- unfamiliarity with Online Public Access Catalogues.

Besides the identified factors, library anxiety may also stem from unfamiliar tasks, barriers with staff, discomfort with the library, lack of knowledge of the library, affective barriers and uncertainty regarding the Information Seeking and retrieval process itself (DiPrince *et al.* 2016:284). Based on the fact that most of the students who enrol at institutions of higher learning have had their primary and secondary education in a school system that lacks access to libraries, it is probable that many of the aspects of library anxiety just mentioned might apply to them.

The heavy dependence and sole reliance on the use of textbooks by both teachers and learners was observed by Mojapelo and Dube (2014). On the other hand, Mahwasane (2008:117) observed that teachers do not see the development of Information Seeking skills as their responsibility. This situation limits the learners in terms of developing the expected Information Seeking and searching skills that are needed for various activities, most importantly, their academic pursuits. This is a daily and constant battle for learners as they endeavour to meet their school, personal and curriculum needs. When learners enrol at an institution of higher learning, they are left with no choice but to engage in more rigorous Information Seeking and searching activities than what they would have been akin to prior to pursuing academic qualifications.

The concept of uncertainty has been widely studied and established in Information Seeking behaviour research. Uncertainty is viewed as a primary source of all aspects of Information Seeking and searching (Wilson, Ford, Ellis & Foster 2002:705). In order to acquire an understanding of how feelings of uncertainty affect the Information Seeking behaviour of school children, Kuhlthau (1991; 2004) developed the ISP model. This model has been used as a valid framework and diagnostic tool for understanding the information search experience of people in a variety of library and information settings (Kuhlthau, Heinström & Todd 2008:1). Taking into consideration TUT's first-year students' initial visit to the library, in which they displayed behaviour patterns suggesting their feelings of uncertainty, the researcher

decided to use Kuhlthau's ISP model as a framework for the current study. This requirement to engage in a more rigorous Information Seeking and searching after enrolling at a tertiary institution is in accordance with the requirements set by the South African National Qualifications Framework (SANQF). According to the SANQF's requirements, a learner who completes grade 12 and enrolls at an institution of higher learning or a university is expected to be proficient amongst others in 'Accessing, processing and managing information in respect of which the learner is able to demonstrate a basic ability in gathering relevant information, analysis and evaluation skills and the ability to apply and carry out actions by interpreting information from text and operational symbols or representation' (SANQF 2012:7).

When considering the fact that many learners have no experience in using a school library or a community library and the fact that teachers do not consider it their task to develop Information Seeking skills, these learners were not able to develop the required skills set out in the SANQF-level descriptors. Their lack of experience and knowledge of libraries could therefore give rise to feelings of uncertainty, fear and anxiety.

However, this situation could be different in the various areas of the country. Since this study is focused on minimising the feelings of uncertainty experienced by first-year students enrolling at TUT's Polokwane Campus, the situation in the Limpopo Province needs to be investigated.

### **1.2.1 Limpopo Province**

Limpopo is one of the nine provinces in South Africa. According to Statistics South Africa (2016), Limpopo has a population of 5.8 million people, of which 618 310 are between the ages 15 and 19. Eighty-seven percent of the people in Limpopo live in rural areas and twenty-three percent live in urban areas. Limpopo is further divided into five districts, namely: Capricorn, Greater Sekhukhune, Mopani, Vhembe and Waterberg. There is a general lack of amenities, such as libraries, in the existing schools in Limpopo. Of the 1 437 schools, only 10.8% have access to some form of a library (Statistics South Africa 2016).

### **1.2.2 Limpopo institutions of higher learning**

Limpopo has a variety of institutions of higher learning, which are spread out throughout the province. The institutions include universities, colleges of agriculture, education and nursing, and the technical vocational education and training colleges known as TVETs. While the universities offer a variety of degrees, diplomas and certificates, the colleges also offer diplomas and certificates upon the completion of courses. These institutions serve a diverse constituency in Limpopo by offering formal university programmes with a vocational and occupational emphasis that include student development and support services.

Limpopo schools are the main feeders of the various institutions of higher learning in the province. Higher learning institutions in the other eight provinces of South Africa also enrol a significant number of students from Limpopo.

### **1.2.3 Information provision at institutions of higher learning**

Information provision at institutions of higher learning vary from institution to institution. The libraries at the various institutions of higher learning provide varied information services that are characterised by comprehensive collections of printed and electronic information resources. The universities and colleges in the Limpopo Province have libraries as their information hubs. They respond to their community's information needs by providing various information resources such as online catalogues, online databases, electronic books, institutional repositories and printed resources. Apart from providing information resources, academic libraries provide a wide variety of services such as library orientation programmes, and induction and information literacy training.

The library staff are available to help all users in answering a variety of information enquiries, encourage the effective utilisation of collections, conduct literature reviews and compile search strategies (Tshwane University of Technology 2017:105). However, any student who aims to maximally exploit the learning resources provided by academic libraries requires a variety of skills, knowledge and attributes.

Despite the support library staff could render and the orientation programmes offered, the researcher observed that students would rather walk around and browse the shelves without

knowing the bibliographic arrangement of the information resources. Other students would be seen frequenting the library and only requesting help when a library staff member offers to assist them. For maximal exploitation of information resources and systems, a student needs to have some or all of the following information skills: Information Seeking and searching skills; knowledge of the available information resources and systems; and an understanding that library staff can assist them in their academic pursuits.

#### **1.2.4 Tshwane University of Technology (TUT)**

TUT has nine learning sites, each with a campus library that offers client services. Of the nine learning sites, six campuses are situated in Gauteng, two in Mpumalanga and one in Limpopo. The study focuses on the students who enrol at TUT's Polokwane Campus, which is based in Limpopo.

TUT's Polokwane Campus was founded in 1995 and serves a diverse constituency in the Limpopo Province by offering formal university programmes with a vocational and occupational emphasis on Student Development and Support Services. The campus offers diplomas and degrees, as well as bridging certificates and certificates of completion, in a wide variety of subject areas to 3 000 students each year. The campus offers qualifications from four of the seven faculties at TUT:

- The Faculty of Economic and Finance offers the National Higher Certificate in Accountancy, the National Diploma in Internal Auditing and the National Diploma in Finance and Accountancy (Public).
- The Faculty of Management Sciences offers the National Diploma in Office Management and Technology, the National Diploma in Human Resources Management, the National Diploma in Management and the National Diploma in Small Business Management.
- The Faculty of Information and Communication Technology offers the National Diploma in Computer Studies.
- The Faculty of Humanities offers the National Diploma in Public Management and the National Diploma in Policing.

Limpopo Province is the main feeder of TUT's Polokwane Campus.

### **1.2.5 Information provision at TUT**

Polokwane Campus Library provides a library and information services with a mandate to support and positively contribute to teaching, research and all scholarly activities within the campus. The library offers the following client services:

- 120-seating study area;
- 160 seating spaces in the iCentre with broadband Internet access;
- printing and photocopying facilities;
- information literacy training;
- circulation services for print resources and online newspapers and magazines;
- access to the institutional repository and a wide variety of online databases;
- structured offering of ILT programmes;
- one-on-one information literacy training; and
- library orientation and induction.

The library and information services have a comprehensive collection of printed and electronic information resources. Information librarians are available to help all users in answering a variety of information enquiries, support them in effectively utilising collections, conducting literature reviews and compiling search strategies (Tshwane University of Technology 2017:105).

### **1.3 Statement of the Problem**

This research focuses on aspects of uncertainty, fear and anxiety in the Information Seeking behaviour of first-year students at TUT in the Limpopo Province of South Africa.

Chowdhury, Gibb and Landoni (2014:576) argued that it is not only the gap in knowledge that causes uncertainty but other complexities associated with the Information Seeking and retrieval process. In a series of studies, Kuhlthau (1991; 2004) found that uncertainty and anxiety can be expected in the early stages of the information search process. As observed, uncertainty in the context of information seeking and retrieval is often associated with negative feelings that result in anxiety, doubt and frustration.



The majority of learners in historically disadvantaged and marginalised rural communities in South Africa, such as Limpopo, lack equitable access to library and information resources, which are indispensable to meet their curriculum obligations and needs of the applicable education system (Mojapelo & Dube 2014:14).

The target student group in this study is former learners from such historically disadvantaged and marginalised rural communities. They all come from a background of dysfunctional school systems that did not provide for information resources or teachers who developed Information Seeking and searching skills. In order to try and satisfy their information needs, the students then navigate their way through various information systems that they may be experiencing for the first time.

Furthermore, in this study, the students are faced with academic tasks requiring them to access and interact with various collections in different formats. This required a significant paradigm shift from being a learner who depended on textbooks for learning to a student who needed to be able to gather relevant information, exhibit analysis and evaluation skills, and have the ability to apply and interpret information. The lack of knowledge and skills the students experience when seeking information to satisfy their information needs, commonly gives rise to negative feelings of uncertainty and library anxiety, which could affect the use they make of the university library. In order to minimise the feelings of uncertainty first-year students at TUT experience when seeking information, the problem to be investigated in this study is how these feelings can affect their Information Seeking behaviour.

#### **1.4 RESEARCH QUESTIONS**

In order to to identify and minimise first-year students' feelings of uncertainty when they first enrol at a tertiary institution, this study plans to investigate how feelings of uncertainty affect the Information Seeking behaviour of first-year students at TUT. With this problem in mind, the following research question was asked: How do feelings of uncertainty affect the Information Seeking behaviour of first-year students at TUT?

The following sub-questions were asked to assist in answering the research question:

- What do students without a background in academic information resources and systems do when they first encounter the academic information resources and systems?
- What do students without a background in academic information resources and systems do and how do they react when they are first given a research assignment?
- How do students without a background in academic information resources and systems perceive and relate to library staff?
- How do students who do not have a background in academic information resources and systems use academic information resources and systems?
- What are the barriers that affect first-year students who do not have a background in academic information resources and systems?

## **1.5 AIMS AND OBJECTIVES OF THE STUDY**

This section outlines the purpose of the study, objectives, research question and the importance of the study.

### **1.5.1 Purpose of the study**

The purpose of the study is to establish and minimise the affective barriers relating to uncertainty in the Information Seeking behaviour of undergraduate students at an institution of higher learning in South Africa, namely TUT. The research is conducted in a qualitative approach to explore the experiences of first year students who lack a background of using academic information resource systems.

A further purpose of this study is to establish whether Kuhlthau's (1991) ISP model can effectively be used to guide a study on how uncertainty affects first-year students who come from a disadvantaged educational background as far as Information Seeking behaviour is concerned.

### **1.5.2 Objectives of the study**

The aim of the study is to identify the affective aspects that act as barriers to first-year students' Information Seeking uncertainty in order to find a means of minimising their feelings of uncertainty.

- Therefore, the objectives of the study were to: investigate uncertainty in the Information Seeking behaviour of first-year students who lack a background in using academic information resources and systems;
- acquire an understanding of students' perception and their experience of the Information Seeking process; and
- acquire an understanding of the influence of the students' context in their Information Seeking endeavours.

A further objective of this study is to develop a model on how to minimise the levels of uncertainty among first-year students at TUT. It is the researcher's hope that the developed model would be used by other institutions of higher learning to minimise the extent of the impact of the affective barriers that causes uncertainty in information seeking, with particular reference to students who have never been exposed to seeking and searching for information in online information systems such as library catalogues and full-text databases.

## **1.6 Importance of the Study**

The study was conducted to contribute to the development of the body of knowledge within the information science field. This study aims to make a theoretical and practical contribution to the field of information-behaviour research.

### **1.6.1 Practical contribution**

This study was conducted with the knowledge that, as Nkondo *et al.* (2014) confirms, correcting the current lack of resources in South African schools will take a long time to achieve. The practical contribution of this study is the identification of three information barriers that students who lack a background in using academic information resources and systems experience during their Information Seeking and searching activities. As such, this

study could support TUT in developing and employing training programmes that could minimise the effect uncertainty has on the Information Seeking behaviour of first-year students.

### **1.6.2 Theoretical contribution**

The theoretical contribution that this study hopes to make to the field of information-behaviour research pertains to the development of the minimising uncertainty model. It is the researcher's hope that such a model could be used to guide other studies that are focused on learning more about the effects of uncertainty on information behaviour and to develop training programmes that are focused on minimising feelings of uncertainty.

The second contribution is that of the many studies that have been conducted on the Information Seeking behaviour of students; no studies have been conducted on affective barriers to information seeking with students who experience an information resource system for the first time at a university. Such students are those who come from a background of limited or no access to systematic information resource provisions such as a library. The researcher acknowledges the study by Adams (2010) on generation Y students. However, it was observed that even though the students in the current study may fall in the same category, Adams (2010) did not profile her sample to select those with a background of academic information resources from those without. Also, Adams (2010:69) assumes that Generation Y students use computer and mobile technology with ease.

### **1.7 Literature Review**

The extensive literature review conducted in this study spans three chapters and covers a broad spectrum of information-behaviour concepts. The concepts discussed include information needs, information seeking, Information Seeking models and student Information Seeking behaviour. For the purposes of this literature review, information searches were conducted using printed books available in library collections, online journals such as *Information Research* and the following electronic databases: Emerald insight, Science Direct, Google Scholar, JSTOR and Ebscohost.

### **1.7.1 Information-behaviour concepts**

Information behaviour is a broad concept formulated by Wilson (1981) that relates to the various reasons why individuals seek, search and use information. In the field of information science, information behaviour as a concept is an umbrella term that expresses the essential features of information needs, information seeking, searching use and related activities such as managing and sharing the information.

### **1.7.2 Student information seeking**

The focus was on students as information seekers. As Baro, Onyenania and Osaheni (2010:109) confirmed, students engage in Information Seeking activities to complete their academic tasks. In order to understand the activities involved in student information seeking and searching, an extensive literature review was conducted in line with the study objectives. The literature review on student Information Seeking behaviour provided a basis for the researcher to support or reject the findings of the current study.

### **1.7.3 Information Seeking models**

In information behaviour research, information seeking manifests as a consequence of an information need when an individual exhibits a certain behaviour geared towards satisfying a need. Researchers, such as Wilson (1981), Dervin (1983), Ellis (1984), Krikelas (1983) and Kuhlthau (1991), developed models that focus on different perspectives of information needs, seeking and user behaviour. Some of the many Information Seeking models have been reported and discussed in the work of Case and Given (2016), and Fisher, Elderez and Mckechnie (2005). The ISP by Kuhlthau (1991; 2004) is the Information Seeking model selected for this study.

Kuhlthau (1989; 1991; 1999) conducted a series of five studies on students' perspective of information seeking in response to a research assignment. These studies culminated in the formulation of the ISP, which is an active process of forming meaning from information from the user's perspective. This process involves the whole experience of a person – feelings as well as thoughts and actions – during information seeking (Kuhlthau 1991:362).

## **1.8 Research Methodology**

A study endeavouring to acquire an understanding of how feelings of uncertainty affect the Information Seeking behaviour of first-year students requires a constructivist research approach – that is, a qualitative study. This is because, as Creswell (2014:246) noted, qualitative research is a means for exploring and understanding the meaning individuals ascribe to a social or human problem.

A study focused on acquiring an understanding of what causes feelings of uncertainty among first-year students requires a research approach in which the students are able to share their experiences of the phenomenon. Therefore, since a phenomenological study is focused on the description of several individuals' lived experiences of a phenomenon, a phenomenological research design was selected.

Two sampling techniques were used to sample fifteen first-year students who had not previously been exposed to libraries and academic information systems. In the first sampling method, a census sampling approach was employed in order to identify potential participants and to alert them to the study. The census sampling procedure was followed by a non-probability sampling method. In order to collect data, a semi-structured interview was conducted with each of the participating students. The researcher transcribed all of the interviews herself.

## **1.9 Ethics**

Based on ethical considerations in social research, the researcher adhered to the ethical principles of voluntary participation, informed consent and no harm to the participants (De Vaus 2001). With these considerations in mind, ethical clearance was sought from both the University of South Africa (Unisa) and the TUT. The ethical clearance certificates appear in Appendix A and B. Furthermore, all the participants were asked to sign a consent form before interviews began. The prescribed TUT consent form were used for this purpose.

## **1.10 Key Concepts**

The key concepts of this study are affective aspects, cognitive aspects, context, information need, information searching, ISP, Information Seeking behaviour, library anxiety, students and uncertainty.

### **1.10.1 Affective aspects**

This is in relation to moods, feelings and attitudes (*South African concise Oxford dictionary* 1999, sv 'affect'). In information behaviour research, affect forms part of the three types of skills – affect, cognition and sensorimotor (ACS) – involved in information seeking and searching. Therefore, affect manifests in terms of feelings and motives (Jakobovits & Nahl-Jakobovits 1990:448).

### **1.10.2 Cognitive aspects**

Cognitive aspects relate to cognition and is defined as a mental action or the process of acquiring knowledge through thought, experience and senses (*South African concise Oxford dictionary* 1999, sv 'cognitive aspects'). In psychology, Cherry (2020) describes cognition as a term referring to the mental processes involved in gaining knowledge and comprehension. These cognitive processes include thinking, knowing, remembering, judging and problem-solving. These are higher functions of the brain and encompass language, imagination, perception and planning.

### **1.10.3 Context**

Context means a particular combination of a person and a situation that forms a frame of an investigation (Case & Given 2016:14). Agarwal (2017) provided a broad definition of context, stating that it is an event and its circumstances that happen in a particular context where there is a seeker, situation surrounding and shared identities.

In information behaviour, in particular information seeking and searching, context remains a source of influence and it enhances the understanding when conducting information behaviour research.

#### **1.10.4 Information behaviour**

‘Information behaviour is the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking and information use’ (Wilson 2000:49). This definition refers to instances when an individual employs their affective, cognitive and sensorimotor structures to engage in activities that translate to looking for and finding information.

#### **1.10.5 Information need**

Wilson (1997:552) defined a need as a subjective experience that occurs only in the mind of the person in need and is therefore not directly accessible to the observer; rather, it can only be discovered by deduction from behaviour or through the reports of the person in need. As such, needs are typically characterised by an inner motivational state that brings about thought and action. Ingwersen (1996:14) stated that the development of a desire for information stems from communication, sensing or thinking and it culminates in a state that makes a person to realise an incompleteness, inadequacy or a knowledge gap. On this realisation, the Information Seeking process begins so that the knowledge gap, incompleteness or inadequacy can be addressed.

#### **1.10.6 Information searching**

Wilson (2000:49) defined information searching as an act of interacting with information systems of all kinds. The interaction involves an individual’s mental structures such as the judgement of the kind of information source to use and the relevance of the data or information obtained. Information searching is the ‘micro-level’ of a behaviour, whereas information seeking can be viewed as the ‘macro level’ of a behaviour when interacting with information.

#### **1.10.7 Information Search Process (ISP)**

The ISP model is a six-stage model derived from a series of five studies conducted by Kuhlthau (1991:361) that investigated common experiences of users in Information Seeking situations.



The ISP is the user's constructive activity for finding meaning from information in order to extend his or her state of knowledge on a particular problem or topic (Kuhlthau 1991:361).

### **1.10.8 Information Seeking behaviour**

Information Seeking behaviour is the 'purposive seeking for information as a consequence of a need to satisfy some goal' (Wilson 2000:49). Therefore, information seeking is the conscious effort to acquire information in response to a gap in one's knowledge (Case 2002:5; Case & Given 2016:6).

### **1.10.9 Learner**

A learner is a person learning for knowledge or skill through experience or study or by being taught (*South African concise Oxford dictionary* 1999, sv 'learner').

### **1.10.10 Library anxiety**

Anxiety is a diffuse, vague, highly unpleasant feeling of fear and apprehension (Halonen & Santrock 1996:584). It is a feeling of general apprehension or dread accompanied by predictable physiological changes (Jerow 1997:433). When applied to libraries, library anxiety can be defined as 'negative and uncomfortable thoughts and feelings experienced by adult learners when using or contemplating using the resources or services of a library' (Golian-Lui & Westenkirchener 2011).

According to Mellon (1986:160), students who experience library anxiety generally feel that their own library use skills are inadequate, whereas other students' skills are adequate. They feel their inadequacy is shameful and that they will reveal their inadequacy if they ask questions.

### **1.10.11 Student**

A student is a person studying at a university or other place of higher education (*South African concise Oxford dictionary* 1999, sv 'student').

### 1.10.12 Uncertainty

‘Uncertainty’ is derived from the word ‘uncertain’, which is defined as not known (*South African concise Oxford dictionary* 1999, sv ‘uncertainty’). Uncertainty in information seeking is defined as a cognitive state that commonly causes affective symptoms of anxiety and a lack of confidence (Kuhlthau 1991:346; 2004:92; Wilson *et al.* 2002:705).

### 1.11 Outline of Chapters

**Chapter 2: a literature review on information behaviour concepts.** The purpose of this chapter is to review literature on information behaviour concepts pertinent to this current study. This includes discussions on information behaviour, information needs, information users, context and information activities. The discussed information activities include information seeking, searching, use and retrieval. The concepts are key to an understanding of how students seek information in an academic setting when they deal with a given academic task and how feelings of uncertainty could affect their Information Seeking behaviour.

**Chapter 3: theoretical framework, the ISP model.** This chapter focuses on models of information behaviour and uncertainty, as well as Kuhlthau’s ISP model, which is the selected conceptual framework for this study.

**Chapter 4: literature review: students’ information behaviour.** The literature review in Chapter 4 introduces students as information users. The discussion addresses their information needs and shows the personal factors that have the potential to affect their information needs. Thereafter, the context in which the students find themselves is described to show the role context has in affecting information behaviour. Lastly, the discussion addresses the various information activities students embark on.

**Chapter 5: research methodology and methods.** Chapter 5 discusses the chosen research method and design, as well as the justification for the ultimate selection. The chapter includes a discussion on the research approach, design, sampling and data management.

**Chapter 6: presentation of the findings.** The empirical findings of the study are reported on in Chapter 6. The reporting is structured according to the semi-structured interview schedule.

**Chapter 7: first-year student uncertainty.** The purpose of this chapter is to discuss the research findings of first-year student uncertainty at TUT. The discussion focuses on the three realms of the ISP model: the cognitive, affective and sensorimotor structures.

**Chapter 8: conclusions, limitations and recommendations.** This last chapter develops a conclusions based on the research questions, summarises the research findings and makes recommendations. Further discussions include the limitations of the research and suggestions for future research.

## **CHAPTER 2**

### **CONCEPTUALISING INFORMATION BEHAVIOUR**

#### **2.1 Introduction**

The purpose of this chapter is to review the literature on information behaviour. The identified concepts pertinent to this current study are information behaviour, information needs, Information Seeking behaviour, uncertainty, information anxiety, information search behaviour, information use and interactive information retrieval. Since certain personal factors and the context in which the information users find themselves influence information behaviour, the concept of student information users and context are also introduced.

#### **2.2 Information Behaviour**

The scientific study of behaviour and mental processes is called psychology wherein behaviour is defined as everything people do that can be directly observed (Halonen & Santrock 1996:5; Santrock 1997:6). The mental processes that give rise to behaviour encompass thoughts, feelings and motives that are experienced privately and cannot be observed directly (Halonen & Santrock 1996:5). It is, therefore, important to acquire an understanding of mental processes in order to understand human actions (Zimbardo, McDermott, Jansz & Metaal 1995:5). The field of study where human behaviour is studied in relation to information is known as information behaviour.

Wilson (2000:49) defined 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.’ In support of Wilson’s definition, Case and Given (2016:370) stated that information behaviour encompasses information seeking, as well as the totality of unintentional behaviour and purposive behaviour. This explains why Wilson (1999:263) viewed information behaviour as being a more general field of investigation and Information Seeking behaviour as a sub-set of the field particularly concerned with methods people employ to discover and gain access to information resources.

In his discussion of his information behaviour definition, Wilson (2000) noted that information behaviour as a concept is multifaceted. The multifaceted nature of information behaviour

becomes evident in Wilson's (1997:552) assertion that the concept 'information need' underlies the problem of Information Seeking behaviour.

Cole (2011:1216) endorsed this view when he alluded that an information need denotes the starting state for someone seeking information. The reason Cole (2012:3) gave was that a gap in knowledge and an understanding is the motivation people think and feel to seek information.

However, Savolainen (2012) later argued that, based on the expectancy-value theory, information needs only partially explain the reasons why people engage in information seeking. Some of the reasons why people engage in information seeking that were identified by Sonnewald and Iivonen (1999:429) include personality, matter, energy, space and time.

Kuhlthau (1991; 2004), through the ISP model, described a reciprocity of mental constructs during an information activity that relates to seeking and searching. Taylor (1968) and Cole (2011) concurred that the need that triggers an information activity resides in the head of the user and, as such, involves cognition and mental processes. Research has shown, according to Nahl (2001), that acquiring information is an interactive, affective-cognitive skill. In turn, Kuhlthau (1991; 2004) suggested that the entire information search process is an integration of three realms consisting of thoughts, feelings and actions of a human being's encounter with information.

Central to a study of information behaviour and its definition is the recognition that information behaviour is the interplay between mental structures that activates a human being to make decisions that will lead to activities such as information seeking, searching, retrieval and use. This view is supported by Meyer (2016) who stated that information behaviour is a mental process with intricate relationships among its core components and their attributes. In considering the multifaceted nature of information behaviour, as well as in an effort to make it easy to understand information behaviour and what it entails, Meyer (2016) identified some of the core components that should be included in an information behaviour model. The components she identified that are important for this study includes the personal component, context, information needs and information activities. With the exception of context, these components are also core to Kuhlthau's ISP model.

## 2.3 Information Needs

An information need is intangible, unknowable and non-specifiable in a query to an information system (Taylor 1968; Belkin, Oddy & Brooks 1982:62). In turn, Wilson (1997:552) defined a need as a 'subjective experience that occurs only in the mind of the person in need and it is not directly accessible to the observer.' According to Hjørland (2010:222), an information need progresses in a relatively independent fashion inside the head of the user and involves cognition. This brings about the recognition of the complexity of the information need concept alluded to by Saracevic, Kantor, Chamis and Trivison (1988:164), Savolainen (2012a:2) and Taylor (1968:180). According to them, there is more to an information need than the words expressing it.

Taylor (1968:182) articulated four levels of an information need, namely: visceral Q1, conscious Q2, formalised Q3 and compromised Q4. At the visceral level, the user recognises the need for information that may be a vague sort of dissatisfaction but which has not yet been formulated as a question (Taylor 1968:182). In turn, the conscious Q2 level is an ill-defined area of indecision and the searcher may talk to someone to sharpen the focus (Taylor 1968:182). At this stage, the expressed need is vague and ambiguous (Taylor 1968; Ikoja-Odongo & Mostert 2006:147). At the formalised Q3 level, the information need is formally stated as a rational statement that is clearly articulated and unambiguous (Taylor 1968; Large, Tedd & Hartley 2001:32; Ikoja-Odongo & Mostert 2006:147).

In a bid to further explain the concept, Cole (2011:1217) used Taylor's (1968) four-level theory of an information need and conceptualised it as the unconscious visceral information need that the user cannot know and specify. Cole (2011:1217) defined an information need as a black box that is surrounded by three categories and a list of eight concepts, namely:

- **Information behaviour.** In this instance, an information need is addressed in terms of the information behaviour that it initiates. That is, the search, the seeking and the use of information.
- **Context.** An information need is produced in users by the context in which the users find themselves, which could be a problematic situation, problem or task.

- **Human condition.** This is the holistic approach to an information need that defines the need for information as fundamental to the human condition. This includes sense-making, evolutionary adaptations and foraging (Cole 2012:65).

Savolainen (2012a) identified three major contexts affecting the formation and satisfaction of an information need. Situation in action is the first context. Savolainen (2012a) advanced the idea that situations in which people experience an information need are bound to concrete requirements and the conditions of human actions. He further posited that an analysis of the situational constituents can be qualified through temporal and spatial constituents rather than approaching them in an undefined way (Savolainen 2012a).

The second information need context identified by Savolainen (2012a) is task performance. According to Byström and Hansen (2005:1053), task performance can be divided into three main parts. These are task construction, task performance and task completion. They also noted that each part can be further subdivided into smaller parts.

Byström and Hansen (2005:1053) and Savolainen (2012a) explained that the task construction on a conceptual level involves comprehending the preconditions and goal for performance and completion in relation to the given assignment. The actual performance of the task consists of practical and conceptual actions taken to achieve the goal. Byström and Hansen (2005:1053) related task performance to the task initiation, topic selection, pre-focus exploration and information collection stages of Kuhlthau's (1991; 2004) ISP. The stages are discussed in detail in Chapter 3. The third part of a task focuses on task completion. Task completion is based on the separate results of the actions taken that are also joined to form a task resolution and that completes the task performance (Byström & Hansen 2005:1054; Savolainen 2012). In reference to the information search process, it is the search closure stage discussed in Section 3.3.1.6.

The third context affecting information needs that was identified by Savolainen (2012a) is dialogue. Dialogue, as postulated by Taylor (1968), manifests in the question negotiation process of the reference interview. Dialogue can also manifest in discussions among peers, as shown by Kuhlthau (2004:46). Taylor (1968:182) provided a debate about the level of specificity in articulating questions, the topic, terminology used in the conversations and the role of the parties involved. A view confirmed by Savolainen (2012a).

Cole (2011) developed a theory of information needs that link information access to knowledge formation rooted in the four-level information need theory developed by Taylor (1968). In his theory, Cole (2011:1227) presented six propositions on which his theory of information needs is based, namely:

- Each information search query submitted to an information system consists of Taylor's four information need Q1-Q4 levels described in Section 2.3. These are the levels that an individual passes through before he or she makes a formal encounter with an information system or services of an information professional (Bruce 2005:7).
- A user's information need does not evolve, only aspects of the topic the user selects to investigate shifts over the course of an information search while the information need remains constant.

According to Taylor (1968), the type of information use evolves through Q1-Q4 levels of an information need. The user's Information Seeking activity progresses through the pre-focus, focusing and post-focusing stages of the information search process (Kuhlthau 2004:44; 1991:363). This, according to Hjørland (2010:222), progresses in an individualistic fashion inside the head of the user.

- The theory takes an Information Seeking perspective on information search that emphasises an information system as a knowledge formation or acquisition system.
- Taylor's Q2-Q3 levels of information need require a social framing input as information message objects such as reports, tests and essays that can be presented.
- At its deepest, the visceral Q1 level information need operates as a human adaptive mechanism due to the fact that it is deep and unspecifiable. The influence is likely to be based on the information seeker's belief system, their ability to cope with uncertainty and their tolerance levels (Kuhlthau & Cole 2012).

Cole's theory of an information need suggests that the processes of seeking, searching, finding and using information generate knowledge that serves to modify the search and connects information to knowledge (Cole 2011:1216; Kuhlthau & Cole 2012).

In his development of the information needs theory, Cole (2011) linked the knowledge part of the student's information search to Kuhlthau's ISP model with particular reference to the



formulation stage of an information search that would support students in formulating a focus of the task at hand. It is during the formulation stage that ideas or questions about the topic occurs to the information seeker to formulate a focus (Kuhlthau & Cole 2012).

Cole (2011:1229) asserted to the existence of a background and a foreground to an information need. He advocated that an information need emerges from the background to form a foreground in the focusing stage (Cole 2011:1229). The background can be elements related to the environmental and personal contexts as alluded to by Robson and Robinson (2013:187).

The users' information need frame is then established and the query becomes connected to the deeper Q1, Q2 and Q3 levels of their information need on the achievement of a focus.

The experience of a need can only be discovered by a deduction from the information users' behaviour or through the reports of a person in need (Wilson 1997:552). This can be influenced by personal, social and environmental factors (Wilson 2016:4). The context in which the information need arises and in which the information will be used is therefore important to consider (Cole 2011:1216). Taking into consideration the context helps to contextualise various information processes that include information seeking and searching (Kari & Savolainen 2007:47).

## **2.4 The Information User**

A user is a person who uses or operates something (*South African Concise Oxford English dictionary 2005, sv 'user'*). In the field of information science, the user is studied to learn about ways in which an individual seeks, searches, retrieves and uses information, including the behaviour they demonstrate while they engage with information.

Paisley (1968) referred to a user as an information processor through his or her behaviour in different environments. The environments may vary from curiosity, voting on a political issue, buying products and finding information in a library (Case & Given 2016:20). A user at a university mostly refers to students and academics. In any information system, the user is an important component.

The conceptual framework proposed by Paisley (1968:4) places the user at the centre of concentric circles to point out that a user functions within a variety of settings or context such as a cultural context, a political system, a membership group, a reference group wherein the user finds models of behaviour, an invisible college of informal communication, a formal organisational setup, the system emphasising roles, a work team, a user's own head, a user being influenced by his or her personality, and a system of perceived relevance of information inputs and uses of information output.

Paisley's (1968) framework was later reviewed by Allen (1969:5) who introduced a new circle and characterised the user as:

- an information processor, relating to the actual use of information by linking what is familiar to what is unfamiliar;
- in connection with a work team who could be fellow students, information specialist, librarians and academics at a university;
- an individual in an organisation;
- a member of a professional society;
- a member of an invisible college; or
- part of a formal information system.

As indicated in Section 2.6.1, the endeavour to consciously acquire information in response to an information need or gap in one's knowledge is information seeking (Case 2002:5; 2016:6). Wilson's (1981) study revealed an association of 'information' and 'need' that had an undertone of a basic need that is divided into three interrelated categories, namely:

- psychological needs, for example, the need for food, water or shelter;
- affective needs such as the need for attainment or domination; and
- cognitive needs such as the need to plan or to learn a skill.

Considering these three interrelated categories of an information need that occur in an individual's mental structures, Wilson (1981:8) suggested that psychological needs may trigger affective or cognitive needs and vice versa.

### **2.4.1 Cognition**

In psychology, cognition is a term used to describe mental events such as perceptions, beliefs, thoughts, ideas and memories (Gerow 1997:7). Cognition includes a broad range of mental processes such as perception, memory, language, problem-solving, reasoning and decision-making (Maitlin 2013:2).

Thoughts are defined as an idea or opinion produced by thinking (*South African concise dictionary* 1999, *sv* ‘thoughts’). Therefore, thinking calls for going beyond the given information. By so doing, this involves choosing among alternatives and engaging in decision-making (Maitlin 2013:409). This mental engagement assists in problem-solving to arrive at a decision. The cognitive process of selecting, organising and interpreting information from the outside world is called perception (Gerow 1997:70; Friedenberg & Silverman 2012:461). Going beyond the information given is the use of previous knowledge to gather and interpret stimuli registered by the senses (Maitlin 2013:35). In information seeking and retrieval, all the interactive communication activities are viewed as cognitive processes (Ingwersen 1996:4). Cognitive uncertainty is associated with judgements about the problem (Wilson *et al.* 2002). For further understanding of cognition, cognitive structures are discussed in the next section.

### **2.4.2 Cognitive structures**

Cognitive structure is a metaphor that describes a set of cognitions or mental representations of objects and events against which incoming data is compared and interpreted (Wortman, Loftus & Marshall 1992:13). As such, the cognitive structure consists of schema, which is a system of organised general knowledge stored in the long-term memory of an individual (Brewer & Nakamura 1984:4; Gerow 1997:215). Therefore, cognitive structures can be referred to as the units in the brain that organises and processes information.

The term ‘schema’ was introduced as a cognitive structure by Head and Holmes (1911:187). Schemas are fundamental cognitive structures as they are acquired in early human development (Dobson & Mastikhina 2015:543). They contain affective characterisation of specific emotions that relates to a stimulus domain (Turk & Salovey 1985:3). Furthermore, schemas are characterised by the influence they have in the activities an individual engages in. As Turk and Salovey (1985:3) put it: ‘Affect affects cognition.’ Piaget (1952) advanced the fact that

knowledge is based on cognitive structures and that an individual's structures develop by accommodating and assimilating information. In this sense, assimilation pertains to the reuse of schemas to fit new information, whereas accommodation refers to modifying a schema under pressure by new environmental elements.

There are various types of schemas that relate to human beings, namely: a person schema, self-schema and a social stereotype. Self-schema is a collection of cognitive generalisations about oneself (Turk & Salovey 1985:3). As such, self-schema guides social and personal experiences.

### **2.4.3 Affective structures**

Affect refers to emotions or desires that influence behaviour (*South African Concise dictionary* 1999, *sv* 'affect'). Affect has been studied in the field of psychology and philosophy and relates to moods, attitudes, feelings and emotions experienced by individuals (Savolainen 2015a:177). Mulligan and Scherer (2012:346) used the term 'emotion' in reference to affective processes. Their effort to define emotions yielded six elements, namely: feelings, emotions, attitudes, mood, affect and temperament.

Maitlin (2013:506) viewed mood as being different to emotion. The reason she gave is that mood is a general long-lasting experience, a reaction to a specific stimulus. In turn, emotion refers to a relatively brief episode of coordinated brain, autonomic and behavioural changes that facilitate a response to an external or internal event of significance to an organism (Friedenberg & Silverman 2012:455; Maitlin 2013:501).

Based on the affect-as-information approach, affect confers value on whatever is in mind at the time, compelled by the information it provides. Therefore, affective feelings are conscious registrations of unconscious appraisals of something as good or bad, which can be pleasant or unpleasant (Clore & Schiller 2016:533). In a way, a show of feelings may be evident in any behavioural activities.

Based on feeling and dispositional theories, moods are 'raw-feelings' that are objectless phenomenal experiences (Siemer 2009:256). Feeling then becomes a subjective representation of an emotion (Savolainen 2015a). The elicitation of emotions is based on the individual's evaluation of their current or remembered circumstances (Savolainen 2015b). This is made

possible through a diversity of evaluative frames of reference used to attach value to the new information or environment (Nahl 2007:24). Following an evaluation of an encounter, evidence based on an individual's display of affective reactions, such as moods and emotions, become clear (Clare & Schiller 2016:532). As such, emotion is an affective reaction to a cognitive appraisal of an evaluated situation or information. In information seeking, the evaluative frames use affective filters to separate what is relevant from the non-relevant information to a search topic (Nahl 2007:24). Affective uncertainty manifests itself in negative feelings such as irritation, frustration, stress, fear, anxiety, tension and confusion. An information seeker will then assume a particular attitude that may be negative, particularly in an uncertain environment. Attitude is a learned predisposition to respond to a particular object in a particular way (Friedenberg & Silverman 2012:450). The above discussion points to the intricate affect-cognition connection.

#### *2.4.3.1 Uncertainty*

Uncertainty is derived from the word 'uncertain', which is defined as 'not known' (*South African concise Oxford dictionary* 1999, sv 'uncertainty'). Uncertainty refers to the state of an organism that lacks information about whether, where, when or how an event has occurred and whether it will occur (Knight 1921). Uncertainty is generally viewed as an aversive state that organisms are motivated to reduce. The current study aims to minimise the uncertainty that prevails in the information seeking and searching activities of first-year students who have not acquired the necessary skills.

Uncertainty is a broad concept. It has been widely explored and is applied differently in a variety of other scientific disciplines such as physics and economics. In the discipline of physics, uncertainty is considered an artifact introduced by imperfect measurements (Ramirez, Jensen & Cheng 2012:99). In the field of economics, Frank Knight (1921) advanced the distinction between uncertainty and risk. He based his argument on the fact that risk can be calculated and be insured against. He further stated that the inherent uncertainty in risk brings about opportunities to create profit.

A connection between information and uncertainty was advanced in the 1940's by Shannon and Weaver (1949:18). Their mathematical theory of communication has been viewed as a massive contribution to various fields including information science. Shannon and Weaver (1949) presented their theory in two opposing perspectives. The first perspective depicts

information as equal to uncertainty and entropy. The other perspective points to information being equated to reduction of uncertainty and/or entropy (Cole 1993:204; Shannon & Weaver 1949:108). Two different kinds of uncertainty – that is, desirable uncertainty and undesirable uncertainty – is alluded to by Shannon and Weaver (1949:109). According to their view, desirable uncertainty is associated with the freedom of choice of the sender that can be related to a choice of information, whereas undesirable uncertainty relates to the noise and possible errors in a message.

In psychology, uncertainty has been studied and connected to cognition, personality, emotion and decision-making (Wakeham 2015:719). The psychological traces of uncertainty can be traced to Shannon and Weaver's (1949:18) attempt to establish the measure of choice involved in the selection of an event.

Uncertainty has also been studied in terms of fuzzy logic and probabilistic theory within the information retrieval field (Wilson, Ford, Ellis & Foster 2002:704). Within decision-making research, uncertainty has also been studied. Based on the premise that uncertainty cannot be completely eliminated, attempts should be made to minimise or reduce it (Wilson *et al.* 2002:705).

The theory of uncertainty reduction has its roots in the work of Berger and Calabrese (1975). Uncertainty reduction theory is based on the initial entry stages of interpersonal interaction that led to the identification of two types of uncertainty, namely: cognitive and behavioural uncertainty (Berger & Calabrese 1975). Though widely cited, the uncertainty reduction theory is criticised for being developed from a quantitative and euro-centric perspective aimed at initial face-to-face interactions (Beard 2015).

Within the information behaviour research, researchers continued to show how information is linked to uncertainty (Belkin, Oddy & Brooks 1982; Kuhlthau 1988; 1991; 2004). Many researchers have studied the relationship between information seeking and uncertainty (Nahl 2004). For example, Kuhlthau's (1988; 1991; 2004) work is based on uncertainty and the role of affect in information seeking. She went on to develop a principle of uncertainty in information seeking. Much of her work, which includes the principle of uncertainty, is discussed in Chapter 3.

Uncertainty has also been defined as a lack of information about an event and has been characterised as an aversive state that people are motivated to reduce (Bar-Anan, Wilson & Gilbert 2009:123). As previously shown in an earlier definition by Knight (1921), uncertainty refers to the state of an organism that lacks information about whether, where, when, how and why an event has occurred or will occur. Uncertainty is generally perceived as a problem because being uncertain refers to being in doubt, which invokes unpleasantness (Lovell 1995:4). A person who is believed to be uncertain is indeed uncertain according to Brasher (2001:478). For the purposes of this study, uncertainty in information seeking is defined as a cognitive state that commonly causes affective symptoms of anxiety and a lack of confidence (Kuhlthau 1993:346; Wilson *et al.* 2002:705; Kuhlthau 2004:92; Chowdhury, Gibb & Landoni 2011:157).

#### 2.4.3.2 *Uncertainty in information seeking*

Uncertainty in information seeking has been widely studied (Bar-Anan *et al.* 2009; Chowdhury & Gibb 2009; Chowdhury *et al.* 2011; Chowdhury *et al.* 2014; Cole 2012; Kuhlthau & Cole 2012; Kuhlthau 1991; 1993; 2004; Wilson 1997).

Wilson and his associates Ford, Ellis, Foster and Spink (2002:704) conducted an extensive analysis of the uncertainty concept and its correlation to information seeking. The work of Wilson *et al.* (2002) combined the problem-solving model by Wilson (1981), the ISP model by Kuhlthau (1991) and the Ellis (1989) model of Information Seeking behaviour. The aim was to operationalise the uncertainty concept and to study its relationship with other information seeking and searching processes. Their study found that the uncertainty concept can be operationalised.

Information seekers can also differ in the degree of uncertainty they have at various stages of the problem-solving process (Wilson *et al.* 2002:712). Wilson *et al.* (2002) also found that a set of affective variables, based on those of Kuhlthau (1991), signify a positive or negative affective orientation towards the solution of the information problem. The positive sign relates to the information seeker's cognitive readiness to engage with the focus of the topic (Cole *et al.* 2015:2255). In their study, Wilson *et al.* (2002) highlighted the problem related to uncertainty ratings by participants due to the affective cognition connection of the uncertainty concept.

Kuhlthau (1991; 1993; 2004), in developing the ISP model, demonstrated the role of affect in information seeking, and library and information use situations. The work of Kracker (2002) is worthy of being mentioned as she explored the work of Kuhlthau (1991; 2004) by teaching the information search process for 30 minutes. Her study revealed that a 30-minute presentation of the information search process can reduce anxiety associated with a research activity. In a follow-up study, Kracker and Wang (2002:303) confirmed that the 30-minute presentation could increase awareness of the affective aspects that are associated with research.

Anderson (2006) engaged in a study based on the role played by uncertainty in judgements of meaning. The results of Anderson's ethnographic study were based on observing two scholars and demonstrated the complexity that surrounds uncertainty. Anderson (2006) further alluded to the holistic experience and the contribution of both positive and negative forms of uncertainty. Uncertainty remains a significant factor in the search process, irrespective of its nature, whether positive or negative (Chowdhury & Gibb 2009:470).

The different types of uncertainty that are associated with information seeking and retrieval were studied by Chowdhury and Gibb (2009). They argued that multiple factors cause uncertainty in information seeking and retrieval, and that uncertainty does not end completely at the end of the search. Chowdhury and Gibb's (2009) study confirmed the association of uncertainty with Information Seeking activities listed in Section 2.6.

Kuhlthau (1991; 1993) had previously suggested that uncertainty gradually decreases as the search progresses. Wilson (2000) and Wilson *et al.* (2002) concurred that uncertainty may emerge during the search that may necessitate further searches.

Uncertainty that may remain after the search process has been completed has been termed 'persistent uncertainty' (Chowdhury *et al.* 2011:157). Chowdhury *et al.* (2011; 2014) argued that uncertainty persists and remains after completion of the Information Seeking and retrieval process. A fact that had been mentioned in an earlier study by Hyldegård (2006a:294) who asserted that students felt uncertain and frustrated at the end of a project.

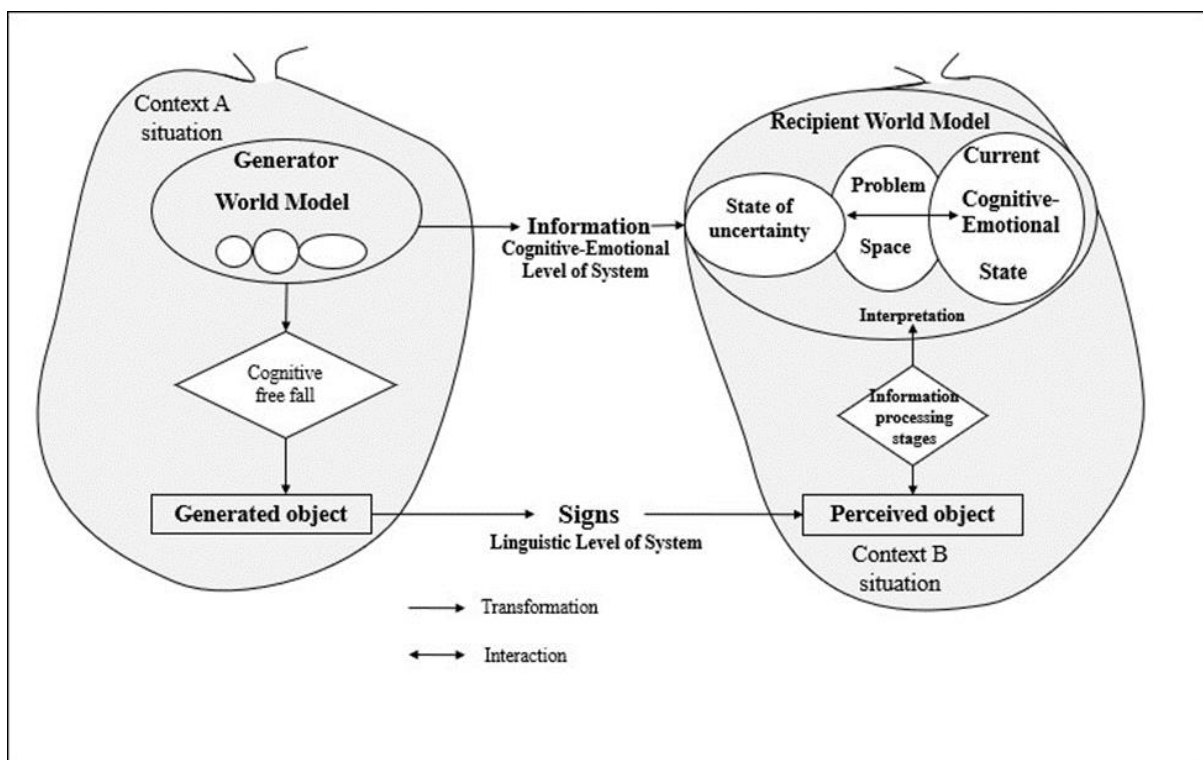
Furthermore, users experience uncertainty at every stage of the ISP due to the complexities and underlying processes in information seeking and retrieval (Chowdhury *et al.* 2011:158). Although they could not justify the reasons for the uncertainty, Chowdhury *et al.*'s (2011)



findings included common Information Seeking activities and problems that cause uncertainty and that vary based on context, which is a main focus for this current study.

Another study that was based on ISP was conducted by Cole and his associates Beheshti, Abuhimed and Lamoureux (2015). They studied how feelings, thoughts and information behaviour lead to the construction of new knowledge. Contrary to the earlier belief that information equals reduction of uncertainty, Cole (1993:203) found that exploration of information increases uncertainty. Reduction of uncertainty occurs later on after the focus formulation of the assignment or task.

Figure 2.1 illustrates the cognitive communication of an information seeker. It shows the cognitive space of how information processing manifests in an individual under the influence of old information they have and a particular context.



**Figure 2.1: The cognitive communication system for information seeking and information retrieval (Ingwersen & Järvelin 2005:33)**

Ingwersen and Järvelin (2005:41) noted that it is the problem state, which may be transformed into a state of uncertainty, that can be solved through communication. What is fundamental in

this situation is for the problem space to transform into the state of uncertainty to activate communication (Ingwersen & Järvelin 2005:40).

#### 2.4.3.3 *Cognitive and affective uncertainty*

There is research evidence that points to the interrelationship of affect and cognition in the context of information seeking (Kuhlthau 1991; 2004; Savolainen 2015c:176). As Turk and Salovey (1985:11) put it: ‘Affect, affects cognition.’ Branscombe (1988:5) asserted that isolating affect and cognition can lead to the concepts being misunderstood. Savolainen (2015b; 2015c) concurred with the view of the intricate relationship between affect and cognition. Uncertainty has both cognitive and affective dimensions (Wilson *et al.* 2002). Kuhlthau (1991:366; 2004:44) assigned a dual role to how she used the concept uncertainty. First, she discussed uncertainty in terms of it being a cognitive state and again as feelings, which is affect.

The uncertainty principle formulated by Kuhlthau (1993:339) sheds some light on affective factors that had previously been regarded as a cognitive process. Within the uncertainty principle context, uncertainty is defined as a cognitive state, whereas the task initiation stage of the information search process is defined as characteristic feeling (Savolainen 2015b; 2015c). Kuhlthau’s (1991; 2004) use of the uncertainty concept could have been informed by the inseparable connection between affect and cognition.

Uncertainty is said to cause affective symptoms of anxiety and a lack of confidence. This varied definition of the uncertainty concept could have emanated from the basis that information seeking is a holistic experience with thoughts, action and feelings interwoven into a complex mosaic rather than separate distinct entities (Kuhlthau 2004). Kracker and Wang (2002:303) pointed to the lack of awareness by information seekers of the focus stage mentioned in the ISP. Students may possibly be unaware of the uncertainty prevailing as they proceed with the information seeking activities. Cognitive uncertainty comes first (Cole 2012:141). The information seeker develops a belief about the incoming environmental stimulus before developing a feeling for it. The feelings may include fear, repulsion, sadness and empathy. The user has to believe that he or she feels uncertain before he or she feels the uncertainty (Cole 2012:141).

The interplay between cognitive and affective factors in the information search process depend on contextual factors such as the requirements of the research assignment at hand, space and time allocated to the information seeking, and the available information (Kuhlthau 1991:363; Savolainen 2015b:194).

This probably explains the lack of explanation of the relationship of feelings and moods, and interest and mood within the ISP. This can also be attributed to what Meyer (2016:9) referred to as a mental process with intricate relationships among its core components and their attributes.

Table 2.1 illustrates the relationship between cognitive and affective factors in information seeking and use. This illustration is a deduction made by Savolainen (2015c:182) from the ISP model. The interrelationship between cognition and affect demonstrates that even though it is possible to discuss them separately, it is best not to consider them in isolation, as discussed in Sections 2.4.2 and 2.4.3.

*Table 2.1: Affective and cognitive factors in information seeking and use (Savolainen 2015b:182)*

<b>Affective and cognitive factors in information seeking and use</b>			
	<b>Cognitive factors</b>	<b>Affective factors</b>	<b>Affective cognitive factors</b>
<b>Stages</b>	<b>Thoughts</b>	<b>Feelings</b>	<b>Mood</b>
Task initiation		Uncertainty	Primarily invitational
Topic selection	Ambiguity	Optimism	Primarily indicative
Pre-focus formulation		Confusing, frustration and doubt	Primarily invitational
Focus formulation		Clarity	Primarily indicative
Information collection	Specificity	Sense of direction / confidence	Indicative and invitational
Search closure		Relief, satisfaction, dissatisfaction	Indicative

#### 2.4.4 Information anxiety

When coping skills are overwhelmed in an uncertain situation, it manifests through anxiety (Grupe & Nitschke 2013). Anxiety is a diffuse, vague, highly unpleasant feeling of fear and apprehension (Halonen & Santrock 1996:584). It is a feeling of general apprehension or dread accompanied by predictable physiological changes (Gerow 1997:433). A study of novice academic library users suggested an association of common feelings of discomfort in information use (Mellon 1986). Kuhlthau (2004:7) posited that anxiety may be an integral part of the Information Seeking process resulting from uncertainty and confusion because humans engage in this process with an existing system of personal constructs built on experiences.

The lack of knowledge of systems and resources can aggravate the feelings of anxiety among information seekers, particularly students who have never experienced information systems and intermediaries used in the provision of information in higher education settings. Based on the fear that was described by the novice library users in Mellon's (1986:163) study, the term 'library anxiety' was coined. According to DiPrince, *et al* (2016:284), and McPherson (2015:318), library anxiety can be attributed to affective barriers, barriers with staff, comfort with the library and knowledge of the library and mechanical barriers, inadequate knowledge of the subject matter and an absence of previous library experience. It is worth pointing out that research anxiety is more than library anxiety (Kracker & Wang 2002:303). Katapol (2010; 2012:5) viewed the library anxiety concept as narrow and suggested that information anxiety is an inclusive concept. She based her argument on the fact that the use of a library is only a part of obtaining information for academic purposes (Katapol 2012:5). Information anxiety focuses on what the student does to obtain information and the feelings they express rather than where the information is obtained. The activities, such as the use of electronic resources, may not require a user to physically visit the library.

The intensity of information anxiety is outlined in the ISP by Kuhlthau (1991; 2004). The process involves the construction of meaning. Uncertainty and anxiety are expected and anticipated as part of the Information Seeking process. In the midst of the uncertainty, the lack of confidence and anxiety, a learner at an institution of higher learning or a university has to engage with formal and informal information resources to satisfy an academic information need. The lack of previous experience in the use of information systems and other intermediaries may point to a need for an enhanced service provision to deal and assist first-

year students in minimising uncertainty in Information Seeking and searching activities and problems.

## 2.5 Context

Context is a component in Meyers's (2016) information behaviour model and is a factor affecting information behaviour. Context plays a significant role that influences subsequent behaviour. Notwithstanding its significance in information behaviour research, context as a concept remains fuzzy and ill-defined among information scientists (Courtright 2007; Dervin 2003; Johnson 2003; Sonnenwald 1999).

Studies in information needs, seeking and use do not clearly articulate the concept of context (Courtright 2007; Dervin 2003; Johnson 2003). In many instances, when information behaviour is studied, context is implied and yet seldom defined (Dervin 2003:112).

Dervin (2003:111) refers to context as an 'unruly beast' to explicitly display its complexity. However, a dictionary definition, which Gaston (2017) adopted, defines context as the circumstances that form the setting of an event statement or idea and in terms of which it can be fully understood.

The literature reviewed alluded to the following references in relation to context:

- *Frame of reference* (Courtright 2007:277);
- *Situation, frameworks of meaning* (Sonnenwald 1999);
- *Setting* (Allen & Kim 2000);
- *Frameworks of meaning* (Cool 2001; Johnson 2003:736);
- *Information use environment* (Taylor 1991); and
- *A container in which a phenomenon resides* (Dervin 2003:112)

Courtright (2007:277) referred to context as a frame of reference for information practices. Whenever context is defined, it is referred to by every attribute of a person such as culture, situation, behaviour, organisation or structure (Dervin 2003). Situation is used interchangeably with context, yet according to Dervin (2003:115), context is larger than a situation and may

consist of a variety of situations. Context remains implicit in many models of information seeking.

Eventually, context enhances an understanding of information behaviour (Johnson 2003). Context provides a background for a study of information behaviour of individuals or groups in a variety of settings. Cole (2011:1219) confirmed that an information need is produced in users by the context in which the users find themselves.

### **2.5.1 Elements of context**

Elements refer to basic constituent part of an aspect (*South African Concise Oxford English dictionary* 2005, *sv* 'elements'). Being a basic constituent means that an element is an essential part of that particular aspect. Sonnenwald (1999:179) identified place, time, goals, tasks, systems, situations, processes, organisations and types of participants as elements within a context. The list is inexhaustible. In literature, situation is often used both as an element of context, as well as synonymous with context (Dervin 2003:115; Johnson 2003:739). The clarification of situation as an element of context is discussed in Section 2.5.1.1.

The difficulty in characterising context, alluded to by Sonnenwald (1999), may be based on the premise that contexts are multi-dimensional and are described by a variety of attributes that can influence the user's information behaviour. Examples of what context include are academia, family life, citizenship and clubs, and each of these contexts have boundaries, constraints and privileges (Sonnenwald 1999). This view is supported by Du Preez (2015) who iterated that multiple contexts can simultaneously influence information behaviour.

Context is emergent and fluid. An observation by Courtright (2007:290) showed the conceptualisation of context as a container as advanced by Dervin (2003:112) that implies stability of context. On the other hand, other studies found that context is a construct that is characterised by activity and constant change (Courtright 2007:290). The existence of a mutual interaction between an information seeker and context also characterises the dynamic nature of context.

### 2.5.1.1 *Situation*

Wang (2011:25) alluded to the elusive nature of the concept situation. In literature, situation and context are shown to have a close relationship and are mostly used interchangeably (Dervin 2003:115; Johnson 2003:739; Wang 2011:25). Johnson's (2003:739) view implied that context is equivalent to a situation based on the elaborated list of situational factors. Within each context, a flow of situations arises (Sonnenwald 1999). A set of related activities characterises a situation. This is why Sonnenwald (1999) argued that a context is larger than a situation. This view is reinforced by Johnson (2003:740) in his view of context as contingency. Contingency specifies situational factors and their relationships to process in a context. Wang (2011) called for a valid differentiation of the situation and context based on the premise that context is an external construct and situation is an internal construct.

## 2.5.2 **Boundaries of context**

The different points of view by various researchers regarding context has been alluded to by Dervin (2003:113). The combination of the personal dimension of an information seeker and context influences the occurrence of information needs and determines behaviour. Within the ambit of all the varied unlimited lists of factors assumed to be context, what remains common in all instances of research is space and time (Dervin 2003:113).

### 2.5.2.1 *Space*

Apart from space being a continuous area or expanse that is free or unoccupied, space can be an interval of time or the dimension of height, depth and width within which all things exist and move (*South African Concise Oxford English dictionary* 2005, *sv* 'space'). In view of this definition, space denotes to be both a concrete and an abstract concept. As an abstract concept, space in information behaviour can be what is referred to by Kuhlthau, Maniotes and Caspari (2015:21), and Cole and Kuhlthau (2012) as the third space. The concrete narrative of space in information can be referenced to physical spaces such as universities, libraries and other areas where social activities are encountered. As an element of context, spaces are not static but dynamic (Ropo & Hoykinpuro 2017:357). Spaces must be treated as an active force because they influence human action.

### 2.5.2.2 *Time*

Time is embedded in all human action (Savolainen 2006:111) and thus linked to situation and context (Savolainen 2006:113). Time becomes an element of context through human practices (Savolainen 2006:113). According to Sonnenwald and Iivonen (1999:436), time is a non-spatial continuum in which actions and events occur. Three temporal aspects related to time are identified by Sonnenwald and Iivonen (1999:436) as an episode (short period of time), an interval (a longer period of time with a distinct starting and ending) and an eon (a long, continuous period of time). In his paper, *Time as a context of information seeking*, Savolainen (2006:110) identified three temporal approaches:

- time as a fundamental attribute of situation or context of information seeking;
- time as a qualifier of access to information; and
- time as an indicator of the Information Seeking process.

Savolainen (2006) observed that Sonnenwald and Iivonen (1999), and Spink, Wilson, Ford, Foster and Ellis (2002) have conducted work in temporal factors of human information behaviour and did not reflect the conceptual nature in detail. Savolainen (2006) further noted the scarcity of conceptual analyses and suggested a systematic approach to temporal issues of information seeking.

### 2.5.2.3 *Organisation*

A dictionary definition of an organisation is that an organisation is an organised body of people with a particular purpose (*South African Concise Oxford English dictionary 2005, sv 'organisation'*). In the subject field of management, an organisation is referred to as a unit wherein more than one person functions to achieve a set of goals (Gibson, Ivancevich & Donnelly 1997:4). This view is supported by Weick (2007:74) who argued that organisations are nets of collective action that are undertaken to shape human lives through continuous communication. The communicative activities occur in a setting within a particular space at a particular time including all other elements of context alluded to by Sonnenwald (1999:179). Gibson *et al.* (1997:4) suggested that organisations are shaped by multiple factors such as personal characteristics, situation and culture.



## 2.6 Information Activities

In information behaviour, a variety of activities manifests when people interact with information. Wilson's (2000:49) definition of information behaviour cited in Section 2.2, encapsulates the essential features of information activities, including active and passive information seeking, information use and communication. In essence, information behaviour explains a variety of actions and processes that human beings go through when they interact with information.

In studying information behaviour, there are activities that are engaged in by people who interact with information. As such, activities happen within the behaviour that can be observed. Information activities refer to a number of actions that take place when an individual interacts with information.

Among the many information activities, Chowdhury *et al.* (2011; 2014) have identified 14 information activities that are relevant to the current study, namely:

- choice of appropriate information channels;
- judging the quality of channels;
- judging the quality of sources;
- searching the chosen information sources or channels;
- formulating a search expression;
- taking a course of action following a search;
- deciding when to stop a search and begin to use the items;
- making use of retrieved items to perform the actual task;
- deciding how many items should be viewed when many have been retrieved;
- deciding which retrieved items should be viewed for their content based on available time;
- deciding what to download and print;
- ensuring that all information required for a given task has been obtained;
- making sure to remain up to date in a given field; and
- making sure to remain competent in the given field in terms of information seeking and retrieval.

The activities Chowdhury (2009:473) and Chowdhury *et al.* (2014:581) identified were a result of an analysis of Ellis's (1989) model of information seeking, and Kuhlthau's (1991; 2004) ISP model, as well as their interactions with academic information users.

### **2.6.1 Information seeking**

Information seeking is a conscious effort to acquire information in response to a need or gap in one's knowledge (Case 2002:5; Case & Given 2016:6). In their discussion of this definition of information seeking, Case and Given (2016) alluded to the complex nature of Information Seeking behaviour by pointing out a variety of Information Seeking scenarios. One of the scenarios they identified is finding information in a library. Also, as Marchionini (1989:54) noted, information seeking is dependent on the user who recognises and interprets the information problem, establishes a search plan, conducts the search and evaluates the results of the search and, if need be, repeats the process again.

In the current study, the information users are first-year students who have no background in using a library or online information system. The context in which they need to seek information is an academic environment where they are given academic tasks to complete. When a task or an assignment is given to a student, they realise their gap in knowledge and their information need becomes apparent.

In an effort to find a path towards satisfying the realised information need, the thoughts focus on comprehending the task and relating it to their prior experience (Kuhlthau 1991:366; 2004:44). The information user, the student in this study, may then interact with manual information systems or with computer-based systems (Wilson 2000:49). Another initial response that an information seeker may engage in could be to seek information through social means such as discussing it with peers.

The previous knowledge of an information user, in this case a student, influences the user's decision on how to proceed in order to satisfy an information need (Lee, Paik & Joo 2012; Zhang, Anghelescu & Yuan 2005).

## 2.6.2 Information searching

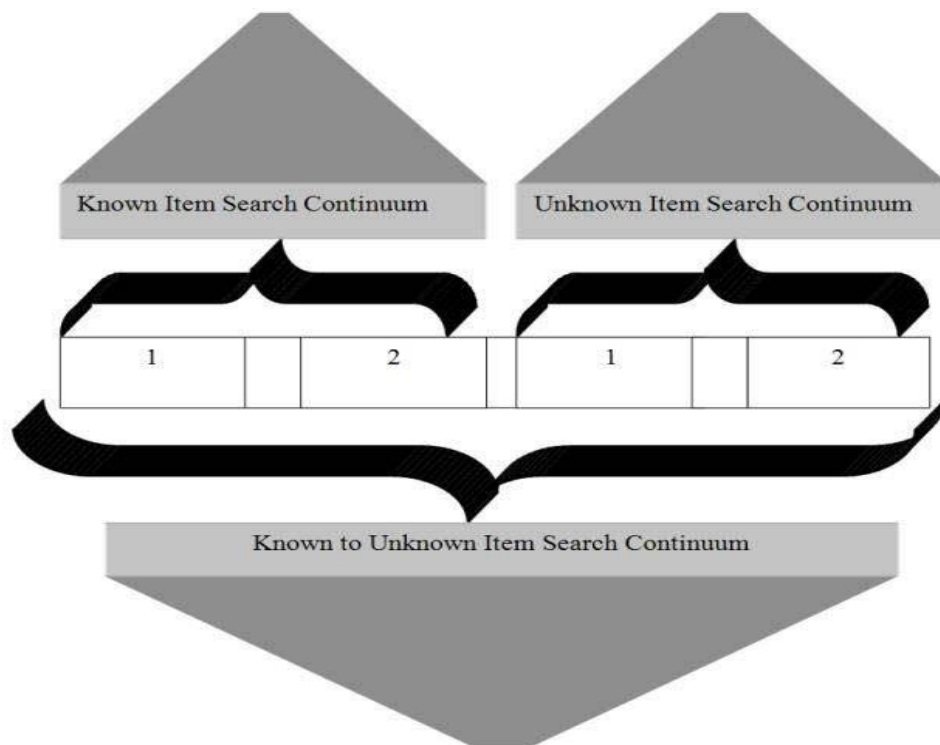
Wilson (2000:49) defined information searching as the ‘micro-level’ of behaviour employed by the searcher when interacting with information systems of all kinds. It consists of all the interactions with the system, whether at the level of human computer interaction or at the intellectual level, which will also involve mental acts such as judging the relevance of data or information retrieved. This also explains why Cole (2011:1219) referred to information search behaviour as a ‘user-information resource system interaction’. During a search, according to Pirolli (2007:65), the effects of the physical and mental acts the user does to incorporate found information into their existing knowledge base may create, elaborate or modify the user’s information need specification.

The essence of an information search is the formulation of a query (Cole 2012:65). This activity requires a particular mindset of the user. It is critical for thoughts to be collected on the needed information. The thoughts must be identified and labelled to map keywords that will satisfy the information need (Cole 2012:66). Whilst this activity happens, there is a possibility for query formulation errors due to the intangibility nature of an information need (Cole 2012:66). According to Taylor (1968), there is a possibility to correct the error of the information search through negotiation during the compromised Q4 level of an information search.

Cole (2011:1218) alluded to two types of information searches, namely:

- a command type of information search wherein the user knows exactly what they want and can describe it; and
- a question type of information search wherein the user questions the system and does not know the answer or the shape of the answer he or she will receive from the system.

In a scheme of the classification of the search concept below, Cole, Julien and Leide (2010) divided the search activity into a known item search, one (1) and two (2), and an unknown item search, one (1) and two (2) continuum.



**Figure 2.2: Known to unknown item search continuum (Cole, Julien & Leide 2010:8)**

Worthy of attention in the above diagram is the unknown item search two phase wherein the user knows only fragments of the topic constituting the knowledge gap or need. This shows how difficult it can be for information users to identify and articulate their information needs (Belkin *et al.* 1982:61; Cole 2011:1218).

Cole *et al.* (2010:1) alluded to the acute nature of information overload. This could be the case with users who do not know what to expect from a variety of information systems with which they have to engage. This means that the mental images of a user about the search are in parts, which fail to correspond to one another (Cole *et al.* 2010:9). As Kuhlthau and Cole (2012) observed, an information overload can act as a barrier to information and be the cause of feelings of uncertainty that have cognitive and affective elements.

The target group of the current study falls within the question type information search where the user questions a system and has no knowledge of the form or shape of the information he or she will receive. In this case, according Hartley and Phelps (2012:114), the user is likely to experience significant levels of fear and anxiety that may lead to a delayed response in terms of addressing their information needs. This is because anxiety may alter decision-making.

### 2.6.3 Information use

The ambiguity of the concept of information use is echoed by Taylor (1986:10-11). Information use is defined as the physical and mental acts involved in incorporating the information found into the person's existing knowledge base, which may involve physical acts, such as marking sections in a text to note their importance or significance, as well as mental acts, such as the comparison of new information with existing knowledge (Savolainen 2009:190; Spink & Cole 2006:28; Wilson 2000:50). This affirms the involvement of cognition in information use because the processes of understanding and learning are key in order for the information user to recognise the applicability of discovered information to the need it has to satisfy (Wilson 2016:3). For the purposes of this study, Taylor's (1986:11) definition of information use is important. He viewed information use as a formal process where new information and existing knowledge construct the foundation that will affect future decisions and actions.

The use that is made of information deals specifically with the systematic or unsystematic way in which users search and use the information in order to satisfy their information needs (Cole 2011:1211; Wilson 1981:7). Furthermore, information use is based on a selection process that is a set of likely and possible alternative responses to the expected environmental stimulus, as well as the user's past experience. The user's state of readiness determines how the new information will be received (Cole 2012:38).

The user's readiness to receive new information is crucial as new information rearranges the structure of the user's expectations. So, also the processing of new information is determined by the user's cognitive and emotional structures. This is because uncertainty influences the constructive processes of information use for thinking, reflecting and learning purposes. As Wilson *et al.* (2002:704) argued, uncertainty is a useful variable to understand Information Seeking behaviour.

Furthermore, information use and human information processing share the assumption that interpreting, relating and comparing the quality of things is fundamental to the information use process (Savolainen 2009:187). Therefore, the information use process constitutes action in the cognitive space of an individual (Ingwersen 1996:5). Also, the use a user makes of information evolves as information seeking progresses (Cole 2011:1222).

When considering the conception of information use as a cognitive process, information use speaks to the interpretation of new data from a given context and the pre-existing knowledge that has been stored in the information user's mental structures and that modifies the user's knowledge structures (Cole 2012:74).

#### **2.6.4 Information retrieval**

Retrieval means to find and extract (*South African Concise Oxford English dictionary* 2005, sv 'retrieval'). It is the process of obtaining something from somewhere. The concept 'information retrieval' was coined by Mooer in 1950. The focus of information retrieval activities at the time was based on indexing documents to support their retrieval from document collections.

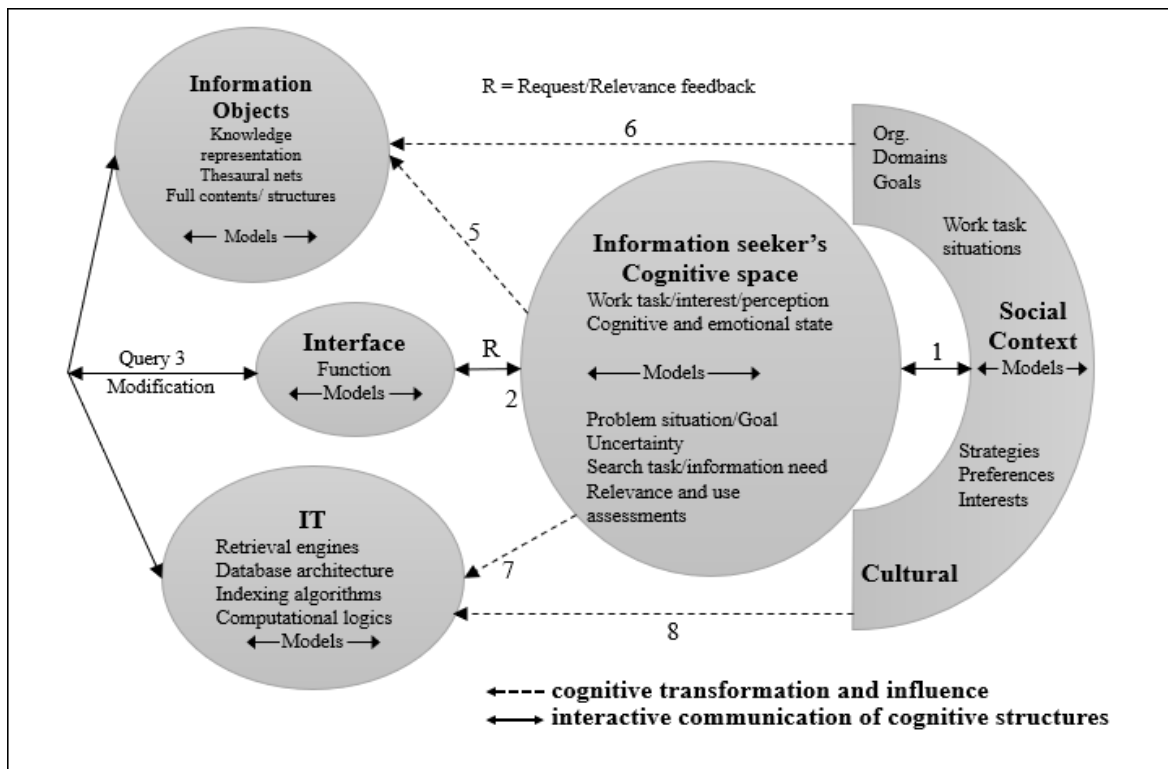
Ingwersen's (1992:49) view of information retrieval concurs with Mooer's view. According to him, information retrieval pertains to the processes involved in the representation, storage, searching and finding of the information a user needs.

Ingwersen (1992:50) postulated four approaches that are essential to all information retrieval processes. These are aboutness, representation, relevance and evaluation. According to him, it is essential that the information retrieval system finds the information in all of the various available formats in the system in order to satisfy the information needs of information users.

Ingwersen and Järvelin (2005:25) noted five interrelated dimensions to information seeking and retrieval. These are:

- In information processing, there is a sender and a recipient of messages.
- Information processing takes place at different levels.
- During communication, actors are influenced by past experiences, time, and organisational and cultural environments,
- Individual actors influence the environment.
- Information is situational and contextual.

In their cognitive framework for information seeking and retrieval, Ingwersen and Järvelin (2005) illustrated information seeking and retrieval as being a cognitive process that involves both cognitive and affective structures.



**Figure 2.3: cognitive framework of information seeking and retrieval (Ingwersen & Järvelin 2005:274)**

Figure 2.3 points to the processes of interaction and perception. The state of uncertainty is evoked by emotional inner person's affective and cognitive structures that receive and interpret the information. These processes are influenced by various contextual attributes such as experience, time and space.

## 2.7 Discussion

In this chapter, the literature reviewed indicates that an information activity is triggered when users experience or identify an information need that reflects a knowledge gap, prohibiting them from dealing with a task or situation. In order to satisfy the identified information needs, the users employ their cognitive structures, affective structures and sensorimotor skills. The interaction between different mental structures and the context in which the information need arose culminates in a set of information activities that lead to information retrieval and use. In the midst of these information activities, an information user may experience affective and cognitive uncertainty. A condition most likely to manifest through information anxiety. The

effect of uncertainty in information behaviour bears adverse consequences for the information user. Uncertainty is unpleasant as it comes about as a result of not knowing or being in doubt. Doubt, fear and apprehension are attributes related to uncertainty and bring about the potential to retard progress in information seeking.

## **2.8 Conclusion**

The purpose of this chapter was to conceptualise information behaviour and to acquire an understanding of the different information behaviour concepts that are important to this study. The identified concepts requiring discussion are information behaviour, information need and Information Seeking behaviour, information search behaviour, information use, and information retrieval.

The discussion shows that feelings of uncertainty, cognition and information anxiety set a backdrop against which the researcher can explore how uncertainty affects the Information Seeking behaviour of first-year students who have no prior knowledge or experience of using online information systems or a library.

The discussion showed that information users, when confronted with a task that identifies a knowledge gap, which represents a need for information experience uncertainty. In order to satisfy their information needs, users then engage in information activities. The activities they engage in include information seeking, searching, retrieval and use. Although feelings of uncertainty could act as a trigger to engage in an information activity, feelings of uncertainty could also act as a barrier to information. When uncertainty acts as a barrier to information, the uncertainty the user experiences manifests through information anxiety. The following chapter, Chapter 3, sets out to review different literature on information behaviour models and Kuhlthau's ISP model.



## CHAPTER 3

### THE ISP MODEL: THEORETICAL FRAMEWORK

#### 3.1 Introduction

In research, models reflect researchers' attempt to simplify reality. In information behaviour, the purpose of a model is to model the activities of a person in relation to information (Wilson 2016:4). Since a model or a conceptual framework is required to guide a study, the purpose of this chapter is to explore the different models of information behaviour, specifically uncertainty models. The selected model that underpins this study, the ISP model developed by Kuhlthau (1991; 2004), will be discussed.

#### 3.2 Models of Information Behaviour

Many models have been developed and published in the past six decades (Case & Given 2016:144). Seventy-two of these models are discussed in *Theories of information behaviour* (Fisher *et al.* 2005). Models are mostly statements often presented in the form of diagrams that attempt to describe an Information Seeking activity, the causes and consequences of that activity or the relationships among stages in the Information Seeking processes (Case & Given 2016:142; Wilson 1999:250).

The many available models are different in the degree to which they specify actions and channels that might be used in information seeking. While other models may suggest how a search might occur or the channels that may be involved, others go on to describe the outcomes of information seeking (Case & Given 2016). Therefore, a model can be general or based on particular content and be characterised by the degree of care taken when it was developed.

The following variations of Information Seeking behaviour models have been identified by Case and given (2016:144-145):

- emphasis on exposure rather than proactive seeking;
- model structure;
- the degree to which the model specifies action or sources that might be used in information seeking and the outcomes of the Information Seeking process; and

- the testability and trustworthiness of the model.

A study that investigates how uncertainty affects the Information Seeking behaviour of first-year students who have no prior experience using a library or an information system requires an Information Seeking model that addresses issues of affect and cognition. Four such models are the ISP model developed by Kuhlthau (1991; 2004), Dervin's (1983) sense-making theory, Wilson's 1996 model of information behaviour and Nahl's (2001) three-dimensional model of information behaviour.

In her model, Dervin (1983) drew on Piaget and Brunner's work on cognitive development theory. According to her, the sense-making theory's focus is both on the cognitive and procedural behaviour influenced by time and space for an individual to construct his or her movement. In turn, Wilson's 1996 model of information behaviour, which was first developed in 1981, was revised a number of times to reflect the trends in Information Seeking theory and practice (Case & Given 2016:162; Wilson 2005:34).

Wilson's information behaviour model is broad and explains in an explicit manner three aspects of information seeking, namely:

- the situation within which the information need arises;
- the barriers that may exist; and
- Information Seeking behaviour itself (Wilson 1997:552).

Case and Given (2016:162), and Wilson (2005:34) mentioned that Wilson's information-behaviour model identifies and recognises that there are different types of search behaviours, namely: passive attention, passive search, active and ongoing search. The different types of search behaviour are also important to consider in the current study.

Nahl (2007:2024) also made a significant contribution to Information Seeking literature in her study of affective factors in Information Seeking behaviour. Her contribution is based on a three-dimensional model proposing that information behaviour is directed by six social communication practices, namely: intending, planning, executing, noticing, appraising and evaluating. The six communication practices operate through three individual procedures and

interact with two types of technological devices. These practices are further classified into two types: when receiving information and when using information (Nahl 2007:2025).

Kuhlthau's ISP model provides a lens through which psychological uncertainty can be explored. Among the many available information behaviour models, the ISP model has been deemed fit for the current study. The researcher identified useful variables for questionnaires that feature in the information search process, allowing data collection pertinent to this study. This is despite the fact that Kuhlthau did not necessarily show the relationship of some of the aspects involved. Savolainen (2015c:184), for example, observed that the relationship between mood and thought is not analysed and developed very well. He also observed that Kuhlthau did not unpack the reasons for the negative feelings, such as apprehension and uncertainty, coexisting with an invitational mood during the first stage. In this study, the ISP model is used as an umbrella framework.

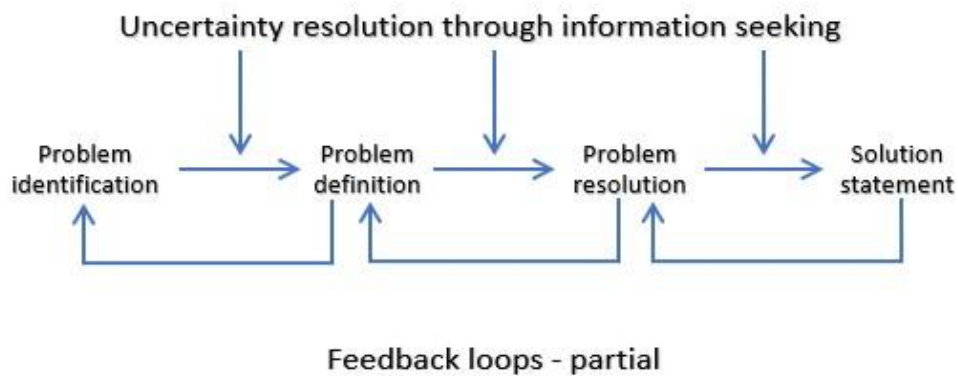
### **3.3 Problem-Solving and Uncertainty Models**

In information seeking, Belkin *et al.* (1982), Chowdhury *et al.* (2011), Chowdhury and Landoni (2009; 2014), and Kuhlthau (1991; 1993; 2004) concurred that uncertainty occurs when a problem has to be resolved in order to close a knowledge gap. In order to acquire an understanding of how uncertainty occurs, this discussion focuses on the problem-solving model developed by Wilson (1999) and the uncertainty model developed by Chowdhury and Landoni (2014).

#### **3.3.1 Wilson's (1999) problem-solving model**

Information seeking happens because of uncertainty (Wilson 1999:265). As shown in Section 2.4.3.1, uncertainty can be affective or cognitive. Also, uncertainty can be quite unsettling, irrespective of it being affective or cognitive.

In his efforts to address uncertainty in information seeking, Wilson (1999:266) referred to uncertainty as a 'problem' in general terms. It was with this in mind that Wilson (1999:266) developed his problem-solving model for information seeking and retrieval. His model is illustrated in Figure 3.1. This was a follow-up to both his 1981 model and later his 1996 model of information behaviour.



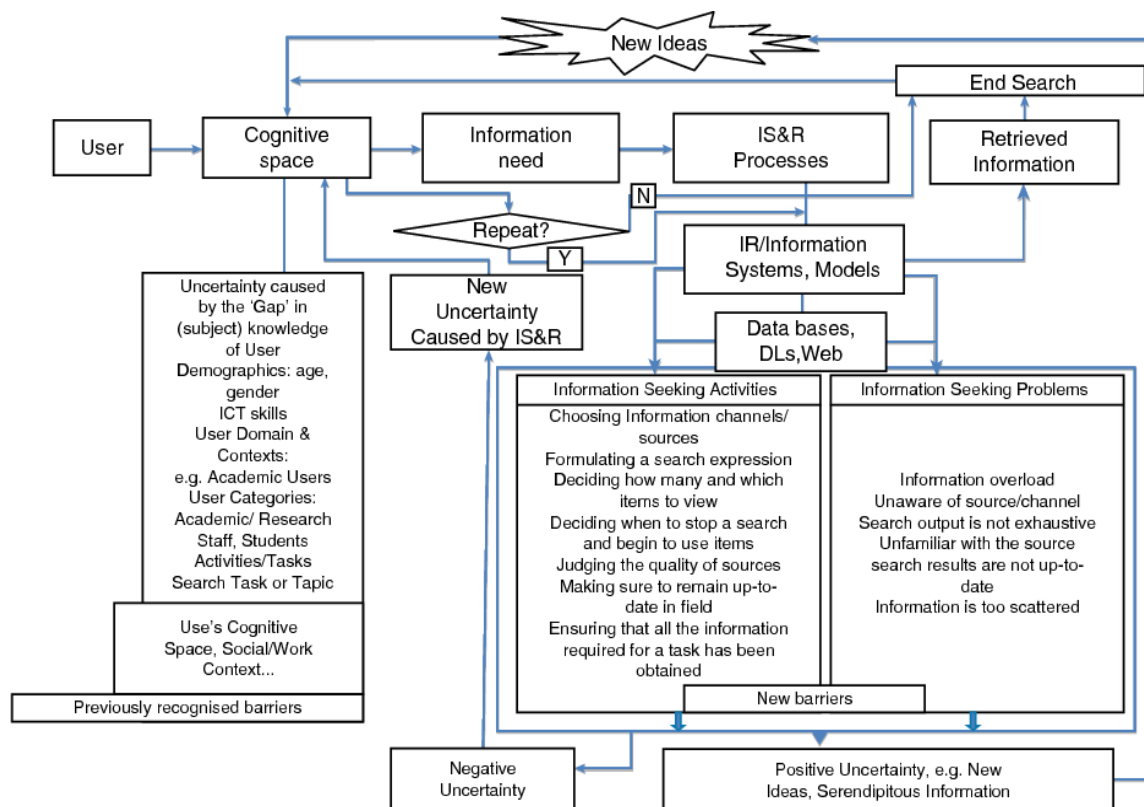
**Figure 3.1: A problem-solving model (Wilson 1999:266)**

Wilson’s uncertainty model was based on an individual information user experiencing uncertainty and the user’s quest to attain certainty. The different stages in the Information Seeking process Wilson (1999:266) identified and illustrated in his model are problem identification, problem definition, problem resolution and the solution statement. In this model, Wilson (1999:266) deals with uncertainty in between every stage with the aim of reducing it while interacting with information sources. The implication is that the uncertainty resolution at any stage creates a forward movement while failure may prompt a return to the previous stage. Unfortunately, this model is silent on issues of affect in information seeking and retrieval.

### **3.3.2 Chowdhury *et al.*’s uncertainty model**

Although they could not justify the reasons for uncertainty, the findings in Chowdhury *et al.*’s (2011) study revealed some common Information Seeking activities and highlighted factors that could be the cause of uncertainty, which include demographic factors.

Subsequent to their studies on uncertainty in information seeking conducted in 2009 and 2011 respectively, Chowdhury, Gibb and Landoni (2014) proposed a model of uncertainty for a better understanding regarding issues that affect users in Information Seeking and retrieval activities. This model has its roots in the work of Ellis (1989) and Kuhlthau (1993), and is depicted in Figure 3.2.



**Figure 3.2: Uncertainty model (Chowdhury, Gibb & Landoni 2014:588)**

In Figure 3.2, Chowdhury *et al.* (2014:589) illustrated that a variety of Information Seeking activities and problems could cause uncertainty. They also showed that uncertainty persists over the course of a series of search sessions. The model was developed to refute earlier claims that uncertainty gradually decreases on discovering information that deals with the knowledge gap. The model further illustrates that uncertainty caused by a knowledge gap occurs in varying degrees through activities such as judging the quality of information sources, choosing information channels, formulating the search expression, deciding what to download and print, and deciding when to stop the search and begin to use the information (Chowdhury *et al.* 2014:589). According to them, uncertainty drives action. For example, uncertainty pushes an information user towards some kind of action that could be accompanied by vague and unclear thoughts about a topic. Information seeking and retrieval combines both the affective and cognitive processes to form part of the whole experience. Based on the background of the students in this study, who are in a state of not knowing and may be uncertain about their uncertainty, it can be suggested that these students' uncertainty reflect cognitive-affective uncertainty.

### 3.4 The ISP Model

The ISP model was developed by Kuhlthau in 1991 while helping students through their research projects (Hyldegård 2006:46; Kuhlthau 2004:29; Navin 2013). It was derived from a longitudinal study involving a series of five studies conducted by Kuhlthau in 1983, 1986, 1987, 1988 and 1989. Throughout these studies, Kuhlthau (1991:361) investigated common experiences of users in Information Seeking situations.

Kuhlthau did this through a close observation of the ways that information users construct knowledge by tying it to what they already know as they pass through various stages of uncertainty and understanding. She found uncertainty and anxiety to be an integral part of the process, particularly in the beginning stages of the information search process. The ISP model hinges on the theoretical foundations of the personal construct theory as developed by George Alexander Kelly (1963) who believed that people's personal constructs or ways of interpreting and explaining events predict their behaviour (Feist & Feist 2002:437; Kuhlthau 1991:362; 2004:91; Wilson 1999:255). The model was selected on the basis that it provides an understanding of the factors that affect Information Seeking behaviour, with particular reference to uncertainty.

The ISP model shows the individual information user's activities by describing thoughts, actions, feelings and strategies commonly experienced in six stages. The stages are initiation, selection, exploration, formulation, collection and presentation (Kuhlthau 1988:2; 1991:366). This general model draws attention to the feelings associated with the various stages and activities involved in the search process (Wilson 1999:255).

The model was later adapted by Kuhlthau when she added a seventh stage called the assessment stage (Cole *et al.* 2015:2250; Fainburg 2009:460; Kuhlthau *et al.* 2015:42). In developing the knowledge construction model, Cole *et al.* (2015:2263) extended Kuhlthau's model by adding components that talk to increased knowledge of an information user's belief system.

Kuhlthau's ISP model has by far been the most heavily cited in studies conducted in an educational context (Case 2012:146; Case & Given 2016:172; Cole *et al.* 2015:2266; Savolainen 2015:176). According to Savolainen (2015:181), the ISP model's strength lies in a

holistic view of how people seek and use information in work task-related contexts. Through the years, the model has been applied in a variety of settings and recently by Meyer and Fourie (2016) in an investigation of information behaviour in creative workspaces in academic libraries.

The model focuses on the information seeker's process of sense-making associated with Information Seeking activities (Hyldegård 2009:143). Previous findings on studies that were based on the model indicated that thoughts move from vague and unclear to a focused point of view (Kuhlthau 1988; 1991; 2004). In turn, feelings change from uncertainty and confusion to increased confidence (Kuhlthau 1988; 1991; 2004).

Furthermore, Kuhlthau (1991:366), and Kuhlthau and Cole's (2012) research also found that the exploration stage is the most difficult stage in the information search process because confusion and doubt mounts until the focus of the topic begins to emerge in the formulation stage. Searchers then proceed with confidence when they have learned about the topic and formed a personal perspective on the topic. During the collection stage, they gather facts about their focus and the last stage is the presentation of what they had learned. This model provides the details of what the information user goes through in order to arrive at the choices they make to satisfy an information need.

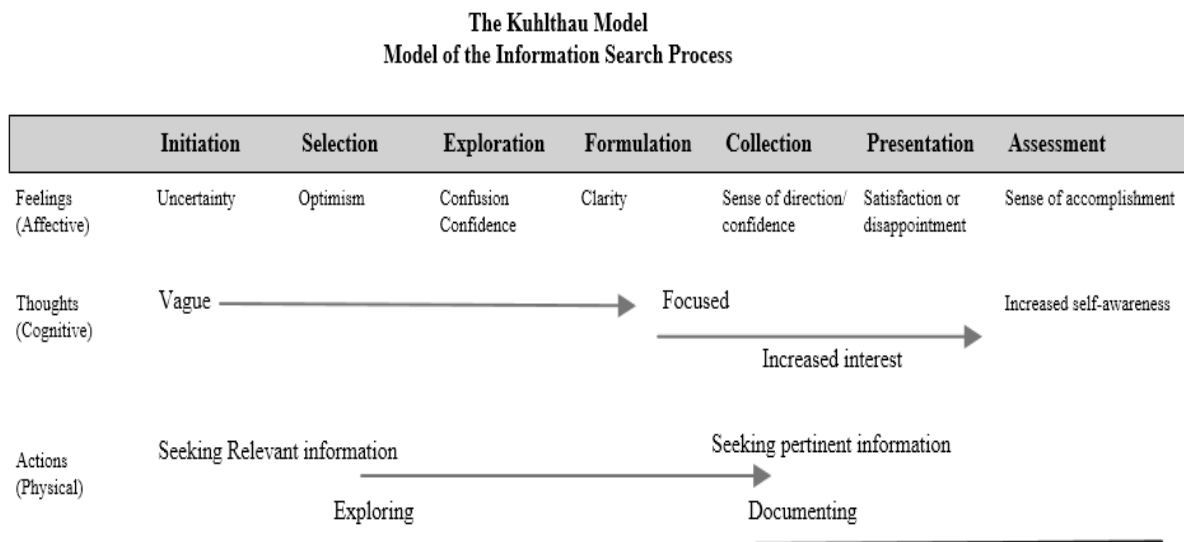
In seeking for information, formulation of an information query requires a particular mindset from the information user (Cole 2011:1217). Users must collect their thoughts of information needed and identify the thoughts with the applicable concepts (Cole 2011:1218).

Kuhlthau's ISP provides the researcher with an understanding of learners' experiences with regards to their Information Seeking and searching activities. This is because it is a useful diagnostic tool that can be applied in an educational context to explain student's Information Seeking behaviour (Case & Given 2016; Kuhlthau, Heinström & Todd 2008:10). The model is also based on the constructivist learning theory, which essentially makes an effort to describe how humans come to know what they know. When a constructivist learning approach is applied in an educational setting, the learning shifts from the memorisation of facts from textbooks to individual investigation of a topic from a variety of sources to the ability to construct a personal perspective (Cole *et al.* 2015:2250). In creating a personal perspective, there is an infusion of newly acquired information and a person's belief system.

In the information search process, the initiation phase of the process is said to be characterised by feelings of uncertainty, as well as vague and general thoughts about the problem area. According to Wilson (1999:255), the initiation phase is associated with seeking background information.

At the initiation point, the task is simply to recognise the need for information (Kuhlthau 1991:366; Wilson *et al.* 2002:705). As Kuhlthau (1991:366) and Wilson *et al.* (2002:705) explained, the task is already in the cognitive state, which commonly causes affective symptoms of uncertainty, anxiety and a lack of confidence to take root. The search process involved continues throughout the different stages in a purposeful pursuit of decreased uncertainty and increased understanding (Kuhlthau 2004:96).

Uncertainty is fundamental to the information search process and features in some way or the other in each of the different ISP stages. According to Wilson (1999:265), uncertainty is the ‘ghost at the feast that is always there’. This study aims to minimise the (‘ghostly’) character of uncertainty. Figure 3.3 illustrates the most recent ISP model.



**Figure 3.3: ISP model (Kuhlthau, Maniotes & Caspari 2015:44)**

The summary of the studies that employed the ISP model is presented in Table 3.1. The format of Table 3.1 provides brief characteristics of the ISP model and shows the population tested in



the development of the model. Furthermore, the researcher reviewed some of the studies conducted by other researchers who applied the ISP. This review includes authors, such as Cole *et al.* (2015), who reviewed the ISP model and used it as a base to formulate the knowledge construction model, illustrated in Figure 3.5.

**Table 3.1: Characteristics of the ISP model**

MODEL NAME and DEVELOPER	CHARACTERISTICS	POPULATION TESTED	REVIEW	NOTES
Kuhlthau's Information Search Process (1991) Developed by Kuhlthau, CC.	The ISP model is a seven stage model that incorporates three realms: the affective (feelings) the cognitive (thoughts) and the physical actions common to each stage (Kuhlthau 2004:44). The stages are initiation, selection, pre-focus selection, focus formulation, collection, search closure and start writing. The ISP model is based on a longitudinal study of secondary students and was later expanded in successive studies by Kuhlthau, Maniotes and Caspari (2015:41). Cole (2015) expanded it even further. It is a process model that complements the Ellis model, though more general than Ellis in drawing attention to the feelings associated with the various stages and activities (Wilson 1999a:255). It is applicable to any domain particularly those in formal or structured learning contexts (Case & Given 2016:152). This is a selected model that underpins this study and is discussed in detail in the sections below.	Academic High school students.  High, Middle, and low achieving high school seniors	Kuhlthau (2004)  Hylegård (2006)  Hyldegård (2009)  Meyers, Nathan & Saxton (2007)  Kuhlthau Heinström and Todd (2008)  Mills, Knezek & Khaddage (2014)  Cole <i>et al</i> (2015)  Kuhlthau, Maniotes and Caspari (2015)	It is a process model based on research that suggests a relationship between process stages and feelings, thoughts and actions.  * Widely cited

The ISP model is general in nature. It addresses the relationship between information search process stages and feelings, thoughts and actions. The current study was conducted in an educational setting to minimise the effect of uncertainty and the related affective aspects in information seeking. Within information seeking, the process of construction involves fitting information of what is known and extending the knowledge to form new perspectives. The pre-focus exploration and focus formulation stages of the information search process fits in well with the constructivist approach to learning (Meyer & Fourie 2016). Uncertainty is most prevalent in the initiation and pre-focus exploration stages (Kuhlthau 2004:44, 47).

### 3.4.1 Stages of the information search process

It is crucial for students at an institution of higher learning to have critical thinking skills throughout the information search process (Kwon 2007:235). Critical thinking skills help students to deal with the analytical and systematic thinking required when using academic libraries, resources and systems. In constructing an information search, people need critical and systematic thinking skills. The ISP model has been divided into distinct stages guided by the idea of phases of construction (Savolainen 2015c:181). Each stage of the information search process is experienced as an increase in understanding, interest and confidence from the initiation to the conclusion of the process. The complexity, dynamism and individualistic nature of the processes between the varied stages was acknowledged by Kuhlthau (2004:94). The stages are described below. In line with the focus of this current study, particular focus has been placed on the thoughts, feelings and moods of an information user in the various stages.

Throughout the six stages of the information search process, only two types of moods are at play, namely: the invitational and the indicative mood. The invitational mood leads to expansive actions, whereas the indicative mood leads to conclusive actions (Kuhlthau 2004:98). Tables 3.2 to 3.7 are representations of Kuhlthau's (2004) findings of what actually occurs inside the information search process. Stage one to six shows evidence of a variety of emotions at play during an information search and, most importantly, the relationship between affect and behaviour. The task, thoughts, feelings, actions, strategies and mood are discussed in each of the stages.

#### 3.4.1.1 Stage 1: task initiation

The task initiation stage gets activated when a person first recognises a need for information to complete an assignment (Kuhlthau 2004:44).

##### a. Task

Based on Table 3.2 below, the task in this stage of the information search process is to prepare for the decision of selecting a topic. In an academic setting, a student recognises this need when the teacher announces a project that will require information from multiple sources (Kuhlthau *et al.* 2015:45). The task initiation stage describes how students react when they first receive an assignment.

**Table 3.2: Task initiation (Kuhlthau 2004:44)**

Task	Thoughts	Feelings	Actions	Strategies	Mood
<b>Stage 1 - Task Initiation</b>					
To prepare for the decision of selecting a topic	Contemplating assignment	Apprehension at work ahead	Talking with others	Brainstorming	Primarily invitational
	Comprehending task	Uncertainty	Browsing library collection	Discussing	
	Relating prior experience and learning			Contemplating possible topics	
	Considering possible topics			Tolerating uncertainty	

b. Thoughts

The thoughts during this initial stage thoughtfully centres around the assignment over a period of time in order to understand the task. As Kuhlthau explained, thinking about the task prompts the information user to relate what they have just recognised as an information need to what they already know. According to her, the link of what is known to what is already possibly known through experience brings about possible topics for consideration in dealing with the task.

c. Feelings

Whilst the thinking is happening, feelings of uncertainty sets in and the user becomes apprehensive because they are faced with a complicated task (Kuhlthau 1991:366; Fainburg 2009:459). Early on in the task, the feelings of uncertainty and apprehension may lead to narrowing rather than broadening the range of alternative viewpoints of the task ahead (Savolainen 2015:184). The effort to link prior experience and the latest information need may be the source of the complication experienced. As Kuhlthau (1991:366) explained, when considering possible topics, the student relates the task to prior experience and knowledge, which forms part of their belief system. At a later stage, Whitmire (2003:133) observed that epistemological beliefs do not seem to influence the information searching.

A possible reason for why students relate the task to their prior experience and knowledge can be attributed to information or library fear that usually manifests through signs of anxiety. As stated by Mellon (1986:162), first time academic library users use terms like ‘scary’ to describe their initial response to the library when they think over the assignment in an effort to comprehend the task before them.

According to Kuhlthau (2004:44), information that does not match prior knowledge prompts users for new ideas and to learn new concepts. This involves a recall of previous projects in which they had gathered information and to identify possible alternative general topics (Kuhlthau 2004:96). Uncertainty is known to cause negative feelings. As observed by Savolainen (2015c:194), Kuhlthau does not unpack the reasons for negative feelings, such as apprehension and uncertainty, coexisting with an invitational mood during the first stage (Savolainen 2015c:184). Based on the premise that the relationship between mood and feelings is not causal, an invitational mood is rather preferred at this stage (Savolainen 2015c:184).

#### d. Actions

Actions during the task initiation stage involves a discussion with others for possible topics and approaches and browsing the library collection (Kuhlthau 1991:366; 2004:44).

#### e. Strategies

The strategies during task initiation include brain storming, discussions, examining possible topics while tolerating uncertainty (Kuhlthau 2004:44). During the first stage of the information search process, Kuhlthau (2004) pointed to information sharing as a strategy but did not take it any further to describe how it unfolds and how the benefits of that occur. When information seekers share information there is an opportunity to enlighten one another on a particular topic.

#### f. Mood

The mood assumed at the task initiation stage is primarily invitational and determines the range of possibilities in a search (Kuhlthau 2004:98; Savolainen 2015c:184). Negative feelings are probably related to the indicative mood. During the initiation stage, an invitational mood opens the possibilities within a comprehensive topic or problem (Kuhlthau 2004:98). This keeps at bay any tendency that may affect an early closure due to insufficient information (Kuhlthau 2004:98). At the task initiation stage, the relationship between thoughts and mood is not explicit so that it can reveal its meaning within the information search process. Savolainen

(2015c:184) posed a question as to why Kuhlthau did not explain why negative feelings, such as apprehension and uncertainty, may appear together with the invitational mood, which is positive in nature, in the task initiation stage. Ordinarily, according to Savolainen (2015:184), negative feelings are more related to an indicative mood.

It is highly likely that at an initiation stage a student can formulate an incorrect query due to the intangible nature of an information need that has just been recognised (Cole 2011:1218). Being fearful, anxious, apprehensive and uncertain due to a lack of prior experience in using complex academic information systems and resources may aggravate the search process. At this stage, the need can be visceral because the user finds it difficult to describe the information gap or need (Taylor 1968:182). The ability to alter the mood is critical throughout the various stages. An invitational mood leads to expansive actions (Kuhlthau 2004:44; Savolainen 2015:181). As Kuhlthau (2004:44) explained, it allows the information seeker to assume a posture of expectancy and enables him or her to take risks and to learn from mistakes.

#### *3.4.1.2 Stage 2: topic selection*

Topic selection alludes to the identification and the selection of a general topic that is to be investigated. The following discussion focuses on the manifestation of thoughts, feelings, actions, search strategies and moods whilst a general topic is selected.

##### *a. Task*

The task at this stage is for the information user to make a choice amongst alternatives. During the topic selection stage, the student weighs the topic against the requirements and the given task criteria. As Kuhlthau (2004) explained, the task at this stage is to choose a general direction. For this purpose, a more indicative stance prompts the decision to be made. Table 3.3 summarises the tasks, thoughts, feelings, actions, strategies and moods the user experiences at this stage.

**Table 3.3: Topic selection (Kuhlthau 2004:46)**

Task	Thoughts	Feelings	Actions	Strategies	Mood
<b>Stage 2 - Topic Selection</b>					
To decide on topic for research	Weighing topics against criteria of personal interest, project requirements, information available, and time allocated  Predicting outcome of possible choices  Choosing topic with potential success	Confusion  Sometimes anxiety  Brief elation after selection  Anticipation of prospective task	Consulting with informational mediators  Making preliminary search of library  Using reference collection	Discussing possible topics  Predicting outcome of choices  Using general sources for overview of possible topics	Primarily indicative

b. Thoughts

Thoughts during the topic selection stage focus on weighing topics against the criteria of personal interest, project requirements, information available and the allotted time. According to Kuhlthau (2004), thoughts students have during this stage also predict the outcome of possible choices the student makes and whether the topic choice has the potential of being successful.

c. Feelings

Feelings of uncertainty continues during the topic selection stage (Kuhlthau 2004:46). Kuhlthau (2004:46) was of a view that uncertainty feelings will only dissipate once a topic has been selected. Fainburg (2009:459) and Kuhlthau (1991:366; 2004:460) explained that this is due to the fact that during this stage, the task is to identify and select the general topic to be investigated and the approach to be pursued. Feelings of uncertainty then often give way to optimism after the selection has been made. Tolerance for uncertainty during this stage is important during the search process. The fluctuation of feelings from confusion, brief elation and sometimes anxiety requires a delicate balance for an information seeker to proceed timeously to the next stage. Kuhlthau (2004:46) observed that confusion features in this stage. She reckoned that such feelings could be based on where and how to locate information while making a preliminary search using the library collection. Therefore, students who lack the

knowledge of where things are located can experience unpleasant feelings at this stage when they need to seek information. This is because this area is ill-defined and no decision is taken yet. Furthermore, the information need in stage two is probably still at the Q2 level of an information need. According to Taylor (1968:182), the information need at a Q2 level is still vague.

Feelings of uncertainty then often give way to optimism after the selection has been made. The reason Kuhlthau (2004:46) gave is that the information seeker is then ready to begin the search. As she explained, the outcome of each possible choice can then be predicted. According to her, the selected topic is deemed to have the greatest potential for success. The criteria for success, like relevance in searching, is absolutely at the discretion and judgement of the information user.

#### d. Action

During the topic selection stage, actions may include making a preliminary search of information. The activities include skimming and scanning for an overview of alternative topics and talking to others about possibilities. In the event that, for some reason or other, selection is delayed or postponed, feelings of anxiety are likely to become more intense until a choice is made (Kuhlthau 2004:46). The intensity of anxiety could be based on considerations in relation to contextual issues such as the availability of time, information and assignment requirements.

#### e. Strategies

The strategies during topic selection are to discuss possible topics, predicting the outcome of choices and using general sources for an overview of the possible topics (Kuhlthau 2004:46). Information that fits into what the user knows is recognised and organised as being relevant or irrelevant (Kuhlthau 2004:96). The prospective topics are then assessed against the criteria of personal interest, assignment requirements, information available and time allotted (Fainburg 2009:459; Kuhlthau 1991:366; Savolainen 2015c:184).

#### f. Mood

The mood during this stage is primarily indicative; a stance that prompts a decision to be made (Savolainen 2015:184). However, in case a user is overly invitational during this stage, there is a likelihood that the user could experience difficulties in settling on a general topic to commence the search (Savolainen 2015:184). The tolerance for uncertainty during this stage is

important for the information user during the search process. The fluctuation of feelings from confusion, brief elation and sometimes anxiety requires a delicate balance for an information user to proceed timeously to the next stage. The mood, attitude to the task, time available and other personal factors may influence the choice of search and strategy (Kuhlthau 2004:46). An overly invitational user is likely to have difficulty settling on a general topic or to begin the search (Kuhlthau 2004:98). On the other hand, an excessively indicative user tends to choose topics without sufficient investigation and reflection, which is likely to present obstacles later on as the search progresses (Kuhlthau 2004:98; Savolainen 2015:184). Kuhlthau (2004:98) explained that at topic selection, whilst an indicative mood prompts a decision to be made, an invitational mood information user is likely to have difficulty in settling on a general topic to begin the search process.

#### *3.4.1.3 Stage 3: pre-focus exploration*

The pre-focus formulation stage is considered the most challenging for information seekers. This stage is defined and characterised by increased uncertainty and high anxiety (Kuhlthau & Cole 2012). The inherent challenges in the pre-focus formulation stage are discussed below, taking into account how the thoughts, feelings, actions, strategies and moods will be expressed.

##### a. Task

The *South African concise Oxford dictionary* (2005:406) defines ‘explore’ as the act of travelling through an unfamiliar area in order to learn about it. Exploration is key in formulating a focus during the search process. Table 3.4 summarises the thoughts, feelings, actions, strategies and moods that will be expressed during the pre-focus exploration stage.



**Table 3.4: Pre-focus exploration (Kuhlthau 2004:47)**

Task	Thoughts	Feelings	Actions	Strategies	Mood
<b>Stage 3 - Pre Focus Exploration</b>					
To investigate information with the intent of finding a focus	Becoming informed about general topic  Seeking focus on information on general topic  Identifying several possible focuses  Inability to express precise information needed	Confusion  Doubt  Sometimes threat  Uncertainty	Locating relevant information  Reading to become informed  Taking notes on facts and ideas  Making bibliographic citations	Reading to learn about topic  Tolerating inconsistency and incompatibility of information encountered  Intentionally seeking possible focuses  Listing descriptors	Primarily invitational

During the pre-focus exploration stage, the intention of the information user is to investigate information with the aim to find a focus among several focuses (Kuhlthau 2004:47).

b. Thoughts

The students' thoughts during the pre-focus exploration stage focus on becoming informed about the general topic (Kuhlthau 2004:47). Kuhlthau (1991:366; 2004:47) explained that in order for an information user to find a focus, their investigation for information involves locating and reading the relevant information to become informed. During this activity particularly for students without a background in using academic information resources and systems, students can be engaged in an unknown item search as alluded to by Cole *et al.* (2010:8) and Cole (2012:71).

c. Feelings

Feelings of confusion, uncertainty, threat and doubt frequently increase at this time (Kuhlthau 2004:47; Savolainen 2015c:185). This is due to the need to synchronise previously held constructs and the new information. The test to relate previously held constructs with the new information occurs at this time, as illustrated in Figure 3.4 (a).

d. Actions

Reading to be informed broadens the information seekers personal understanding (Kuhlthau 2004:47; Savolainen 2015c:185). This means relating the new information to what is already known to form new knowledge. Kuhlthau and Cole (2012) referred to the pre-focus exploration stage as the danger zone where information seekers are likely to tune out to the point of not making it to the next stage called the focus formulation stage.

Kuhlthau and Cole (2012), in accordance with Taylor’s 1968 theory of an information need, alluded to the underlying information barrier during pre-focus formulation. Kuhlthau and Cole (2012) posited that there is a disconnect between conflicting and inconsistent information that attacks prior thinking and beliefs. This could create a barrier to the process of infusing previously held constructs with new information.

Taylor (1968) believed that the user’s inability to specify the visceral information need Q1 could negatively influence knowledge formation, causing doubt, confusion and uncertainty to increase. What makes the pre-focus exploration stage unfamiliar and uncomfortable is the realisation that the task is not only to collect information but to think and produce new ideas (Fainburg 2009:459; Kuhlthau 2004:95). Figure 3.4 illustrates Kuhlthau and Cole’s conception of an information need and how it can be linked to knowledge formulation.

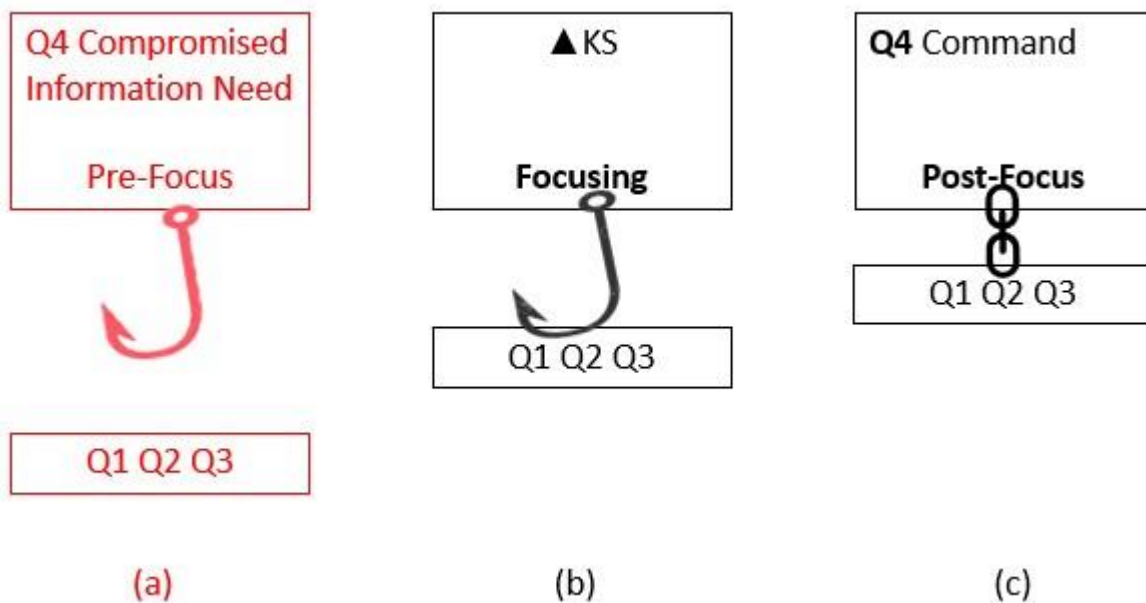


Figure 3.4(a): Pre-focus stage – information need (Kuhlthau & Cole 2012)

The illustration in Figure 3.4(a) shows Kuhlthau and Cole's (2012) conceptualisation of an information need and how it can be linked to knowledge formulation. According to them, information users may find this situation quite discouraging and threatening. Based on Cole (2011; 2012) and Taylor's (1968) theory of an information need, Figure 3.4 (a) depicts a disconnect between a compromised information need Q4 and visceral information need Q1, conscious need Q2 and the formalised need Q3.

As they explained, these kind of circumstances are likely to cause a sense of personal inadequacy, as well as frustration with the system. Therefore, this stage could frustrate information users without prior knowledge of information systems used in an academic institution. Uncertainty and a lack of the required skills to take relevant actions can be a source of discouragement and may cause anxiety (Kuhlthau & Cole 2012).

An inability to express precisely what information is needed makes communication between the information user and the system awkward (Fainburg 2009:459; Kuhlthau 1991:366; 2004:47). At the pre-focus exploration stage, the information user approaches the information system with only a fuzzy idea of the real information need (Kuhlthau & Cole 2012). In terms of Taylor's (1968) levels of information need, Q2-Q3 levels of an information need are still ill-defined. Uncertainty certainly goes up during this stage, particularly when the information user realises that they need to go beyond the obtained information by making an interpretation.

#### e. Strategies

Reading to learn about the topic is a strategy in the pre-focus exploration stage while tolerating the inconsistencies and the incompatibility of the encountered information. As Kuhlthau (2004:47) observed, the students intentionally list descriptors during this stage while seeking possible focuses.

#### f. Mood

Both the indicative and an invitational mood can feature during this stage. However, an invitational mood is preferred during this stage as it opens the search for accomplishing the task and learning about the general topic to form a focused perspective (Kuhlthau 2004:47; Savolainen 2015c:185).

At the pre-focus exploration stage, the evidence of the interplay between the cognitive and affective factors that affect information users can be seen based on the behaviour of the users. The connections of mood and feelings are not specified in the ISP even though mood has been assigned a central role as a primary driver in the model (Savolainen 2015c:185).

However, Kuhlthau (2004:47, 98) observed that the information search strategies in the pre-focus exploration stage foster an indicative rather than an invitational mood. According to her, strategies such as taking detailed notes may prevent the process by stressing a premature closure. The reason she gave is that an indicative mood prompts for collection and the student may then miss reading, an activity that would make collection an informed action. The inherent discomfort that the students experience can then be attributed to limited or a lack of exploration. This is then why both Kuhlthau (2004:47) and Savolainen (2015c:185) reckoned that an indicative mood may be less productive at this stage since it prompts the information user to collect information rather than explore it. The progression to the next stage, the focus formulation, is primarily dependant on the ability to move from the unspecifiable information need to form a focus.

#### *3.4.1.4 Focus formulation*

The focus formulation stage is the turning point of the search process provided that stage 3, the pre-focus exploration, was a success. Kuhlthau (2004:49) noted that uncertainty decreases at the focus formulation stage. The decrease of uncertainty is evidenced by thoughts, feelings, actions, strategies and moods in the following discussion.

##### a. Task

At the focus formulation stage, the task is to formulate a focus from the information encountered (Kuhlthau 2004:49).

**Table 3.5: Focus formulation (Kuhlthau 2004:48)**

Task	Thoughts	Feelings	Actions	Strategies	Mood
<b>Stage 4 - Focus Formulation</b>					
To formulate a focus from the information encountered	<p>Predicting outcome of possible foci using criteria of personal interest, requirements of assignment, availability of materials and time allotted</p> <p>Identifying ideas in information from which to formulate focus</p> <p>Sometimes characterized by a sudden moment of insight</p>	<p>Optimism</p> <p>Confidence in the ability to complete task</p>	Reading notes for themes	<p>Making a survey of notes</p> <p>Listing possible foci</p> <p>Choosing a particular focus while discarding others</p> <p>Combining several themes to form one focus</p>	Primarily indicative

b. Thoughts

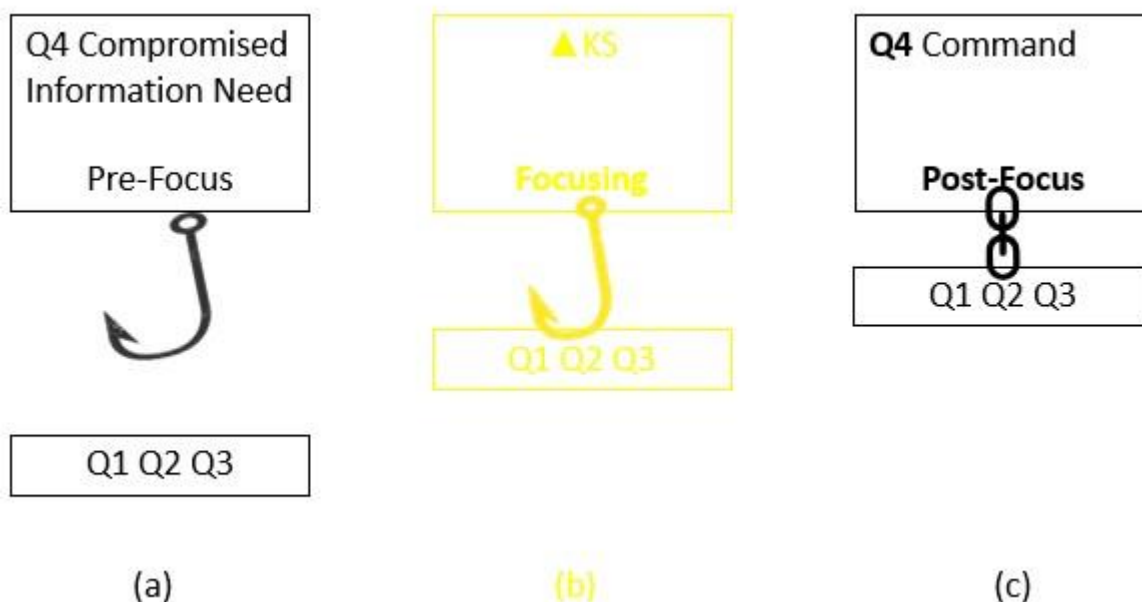
Thoughts involve identifying and selecting ideas from the information to form a focused perspective of the topic at hand (Kuhlthau 1991:368). The success of possible focus formulation is predicted within the criteria of personal and contextual aspects such as interest, task requirements, information available, experience and the time allotted. Although a focus may be formed in a sudden moment of insight, it is more likely to emerge gradually as constructs become clearer and a focused point of view is formed (Fainburg 2009:460; Kuhlthau 1991:368).

According to Savolainen (2009:197), the focus formulation stage is characterised by the use of information in a constructivist manner by specifying the theme selected during the previous stage, which is the pre-focus exploration stage. As Fainburg (2009:460) explained, the information user now has to form a focus on the information encountered in the pre-focus exploration stage.

Formulation occurs when the information user is able to connect the compromised Q4 level of an information need with the Q1-Q3 levels of an information need (Cole 2012:77; Cole & Kuhlthau 2012). Cole's (2012) theory of information need suggests that Figure 3.4 (b) is caused by the engagement of the four levels, Q1-Q4, of an information need. Figure 3.4 (b) shows a slight connection that still requires refinement. The importance of making a detailed judgement of the usefulness of the information is crucial at this stage. The ability to synchronise what is known and new information is crucial at the focus formulation stage.

c. Feelings

Formulation takes place through acting and reflecting (Kuhlthau 2004:95). Fainburg (2009:460), Kuhlthau (1991:367; 2004:95) and Savolainen (2015c:185) reckoned that, for many students, formulation is the turning point of the search process because during this stage, their feelings of uncertainty diminish and their confidence increase. The increase in confidence can be attributed to the action of reading to be informed in the pre-focus exploration stage. The student becomes hopeful at the thought of the progress they have made and the recognition that they can complete the task.



**Figure 3.4(b): Focusing stage – information need (Kuhlthau & Cole 2012)**

#### d. Actions

The action during the focus formulation is to read the notes for the themes from the information encountered (Kuhlthau 2004:48). At this stage, the information has now been located and the student focuses on reading notes for selected themes (Kuhlthau 2004:48). It is at this point that a student must be willing to close some possibilities and give up certain aspects of the topic (Fainburg 2009:460; Kuhlthau 2004:48).

#### e. Strategies

Strategies for choosing a specific focus within the general topic are reading over notes for themes and reflecting, talking and writing about themes and ideas about the topic become more personalised during this stage if construction occurs (Kuhlthau 2004:48, 95).

#### f. Mood

The prevailing mood during the focus formulation is primarily an indicative mood (Kuhlthau 2004:48). An indicative mood in this stage fosters the closure to accomplish the task of narrowing and focusing on the general problem area (Kuhlthau 2004:98). Also, a clear focus guides a students' move to the next stage (Kuhlthau 2004:48). However, when an information user does not form a focus during the search process, they commonly have trouble throughout the remainder of the search and when they begin to write or present their findings. The findings that are likely to be presented could be information that lacks a theme or an argument.

During the focus formulation stage, certain elements of the information users' cognitive structures, such as their memory attention and reasoning that enables a person's understanding, are positive in nature.

According to Kuhlthau (1991:367) and Savolainen (2015c:185), this is because these cognitive elements enable the information user to identify a relevant and focused perspective of the given task. Therefore, an indicative mood is preferred at the formulation stage as it fosters the closure that is essential to accomplish the task of narrowing and focusing the general problem area (Kuhlthau 2004:48, 98; Savolainen 2015c:185).

### 3.4.1.5 Information collection

Information collection is the fifth stage in the information search process during which the user and the information system interact most effectively and efficiently (Kuhlthau 1991:368; 2004:49). This is shown in Table 3.6, which is based on Kuhlthau's (2004:49) findings.

Despite the fact that information collection happens in all the stages of an information search, Kuhlthau elected to have this as a freestanding stage. Wilson (1999:266) questioned her reasons for this decision as she could have decided to make this the ultimate stage, finalising all information. Hence, this stage deals with reading and scrutinising the information that the information user gathered in order to integrate and separate to remain with only relevant information (Savolainen 2009:197). Table 3.6 summarises the thoughts, feelings, actions, strategies prevalent during the information collection stage.

**Table 3.6: Information collection (Kuhlthau 2004:49)**

Task	Thoughts	Feelings	Actions	Strategies	Mood
<b>Stage 5 - Information Collection</b>					
To gather information that defines, extends and supports the focus	Seeking information to support the focus  Defining and extending focus through information  Gathering pertinent information  Organizing information in notes	Realization of extensive work to be done  Confidence in the ability to complete task  Increased interest	Using library to collect pertinent information  Requesting specific sources from librarian  Taking detailed notes with bibliographic citations	Using descriptors to search out pertinent information  Making comprehensive search of various types of material i.e. reference, periodicals, nonfiction, and biography  Using indexes  Requesting assistance of librarian	Combination of indicative and invitational

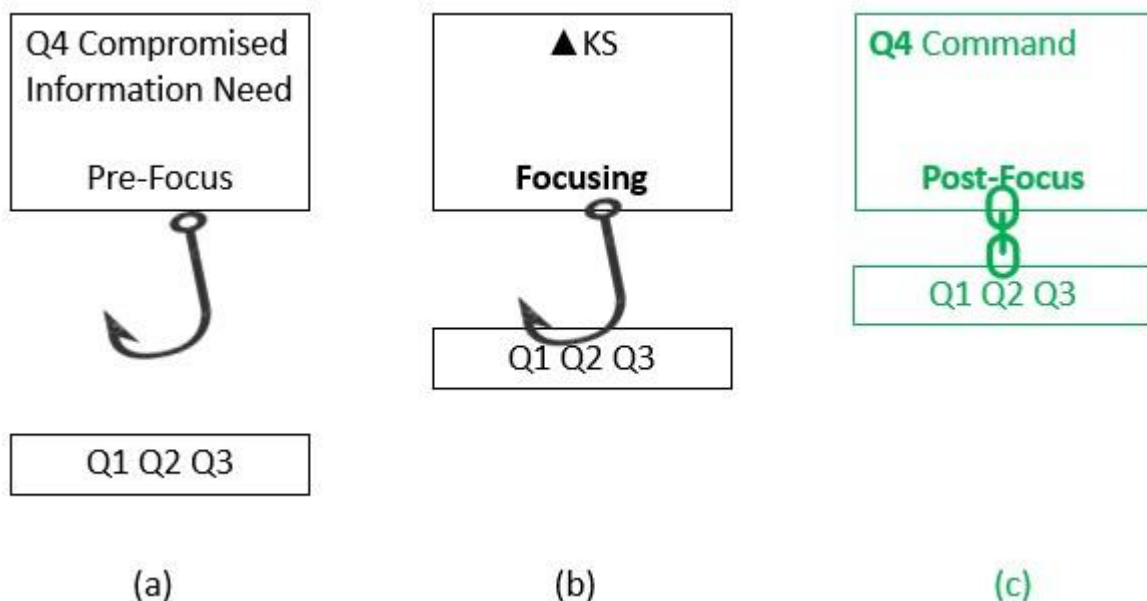


a. Task

The task in the information collection stage is to gather information that defines, extends and supports the focus that was formulated in stage four, the focus formulation (Kuhlthau 1991:368; 2004:49).

b. Thoughts

The information users' thoughts centre on defining information to support the focus, gathering pertinent information and organising information in notes (Kuhlthau 2004:49). At this point, the information user can now use the library to collect the pertinent information by requesting specific information from an information system (Kuhlthau 2004:49). In relation to Taylor's (1968) levels of information need, the information user has now reached the Q4, or the compromised level of an information need, where a question can be presented to an information system. According to Cole (2012:78), and Kuhlthau and Cole (2012), the connection between the Q4 level of information and the Q3, Q2 and Q1 levels of the information need is critical to this stage.



**Figure 3.4(c): Post-focus stage – information need (Kuhlthau & Cole 2012)**

Figure 3.4 (c) shows the connection between all four levels of an information need. The connection portrays the success of a focus formulation (Kuhlthau & Cole 2012). The success of a focus formulation leads the information user to an ability to present their question to an information system.

As Kuhlthau (1991:368; 2004:49) explained, the requests for specific information sources points to the enhanced interaction between the information seeker and the information system. The student now engages in a known item search (Cole *et al.* 2010; Cole 2012:71). At this point, according to Fainburg (2009:460) and Savolainen (2015c:186), thoughts, feelings and actions deal with seeking information to support and define the extent of the information the information user has identified.

#### c. Feelings

The information seeker feels confident as uncertainty subsides. According to Kuhlthau (2004:49), the feelings of confidence are brought about by a deepening sense of interest in the topic.

#### d. Action

The action involves selecting the information that is pertinent to the student's focus and taking detailed notes on that which pertains specifically to the particular focus as general information on the topic is no longer relevant after formulation (Kuhlthau 1991:368; 2004:49).

#### e. Strategies

Kuhlthau (2004:49) explained that using descriptors to search for pertinent information and making a comprehensive search from a variety of information resources available are the strategies employed in the information collection stage.

#### f. Mood

During information collection, the mood that the information user assumes is a combination of indicative and invitational (Kuhlthau 2004:49). The invitational mood can be attributed to the realisation of the extensive work that has been accomplished. On the other hand, the indicative mood can be attributed to the confidence gained on the realisation of the ability to complete the task.

The indicative mood is also effective in the collection stage when the task centres on gathering information specific to the focused perception of the topic as it helps the user to seek closure in preparation for presenting the information during the last stage (Kuhlthau 2004:98;

Savolainen 2015:185). Savolainen (2015:186) posited that unlike the pre-focus exploration and focus formulation stages, the information collection seems to be relatively unproblematic, because the thoughts and actions are in harmony.

3.4.1.6 Stage 6: search closure

The main task for stage six is to conclude the information search for information (Kuhlthau 2004:50; Savolainen 2015:186). During the search closure stage, the information user reaches a new understanding about the topic. The information user is now ready to present or use the findings.

a. Task

The task is to complete the task of searching and to prepare to present or otherwise use the findings.

**Table 3.7: Search closure (Kuhlthau 2004:50)**

Task	Thoughts	Feelings	Actions	Strategies	Mood
<b>Stage 6 - Search Closure</b>					
To conclude search for information	Identifying need for any additional information	Sense of relief Sometimes satisfaction	Rechecking sources for information initially overlooked	Returning to library to make summary search	Indicative
	Considering time limit	Sometimes disappointment	Confirming information and bibliographic citations	Keeping books until completion of writing to recheck information	
	Diminishing relevance				
	Increasing redundancy				
	Exhausting resources				

With a clear direction from the information collected during stage five, the information user may identify a need for any additional information to further support the focus formulated during stage four, the focus formulation stage (Kuhlthau 2004:50).

#### b. Thoughts

The user's thoughts during this stage focuses on identifying the need for any additional information, while taking into consideration the time limit (Kuhlthau 2004:50). The information user's thoughts also focus on a personalised understanding of the topic that was investigated.

#### c. Feelings

The feelings of the information user's experiences during the search closure stage reflects a sense of satisfaction and relief if the search has gone well. Kuhlthau (2004:50) and Savolainen (2015c:186) suggested that the information user would be disappointed if the search did not go well. According to them, the principal factors that determine the success of an information search and when the search can be closed is when the users feel they have put in sufficient effort and that the task requirements have been satisfied and the time allocated has elapsed.

#### d. Actions

During search closure, the actions are to recheck the sources of information that could have been overlooked. The information user then confirms the information and bibliographic citation is done (Kuhlthau 2004:50).

#### e. Strategies

The strategies may include returning to the library to recheck overlooked information whilst considering time limits (Kuhlthau 2004:50; Savolainen 2015c:184). Meanwhile, students focus on the task to complete the search and prepare to present or otherwise use the findings.

#### f. Mood

During this stage, an indicative mood is preferred because it assists the information user in seeking closure (Savolainen 2015c:186). One of the principal factors in deciding to close the search is if a user feels that sufficient effort has been put forth, the assignment requirements have been satisfied and the time allocated has elapsed.

#### 3.4.1.7 Assessment stage

Cole *et al.* (2015:2251) referred to assessment as the seventh stage of the ISP. Although Kuhlthau (2004:51) did not always refer to assessment as a stage, she always pointed to the value of conducting an assessment after the presentation of the findings.

In fact, researchers such as Hyldegård (2006), Savolainen (2015c) and Kuhlthau herself do not refer to the ISP model as a seven-stage model, but as a six-stage model. This is even after the model was adapted by Kuhlthau *et al.* (2015). Meyer and Fourie (2016) reckoned the reason for the continued reference to the model being a six-stage model could be because aspects of the seventh stage are mostly discussed in the sixth stage.

According to Kuhlthau *et al.* (2015:44), the information user experiences a sense of accomplishment and an increased self-awareness during the seventh stage of the information search process. Also, Cole *et al.* (2015:2263) based the seventh stage on the effect the information search process has on the information user, that is an increased knowledge of the user's belief system.

It then becomes the end game for knowledge construction because Cole *et al.* (2015:2263) advanced the fact that:

- a student's belief system is modified as a result of completing an assignment; and
- a student's actualisation of their belief system is due to the new topic information they found and used during the course of completing the assignment.

Both Cole *et al.* (2015:2263) and Kuhlthau (2004) reckoned that the role played by the student's feelings, thoughts and actions are thoroughly described in the six stages of the ISP model. The benefit of an assessment brings forth an awareness and an understanding of an information seeker's own thought processes (Cole *et al.* 2015:2251).

In an institution of higher learning, a first-year student experiencing information systems and resources for the first time may need an information provider to diagnose a zone that requires intervention.

Cole *et al.* (2015:2263) and Kuhlthau (2004:202) reckoned that this will aid information providers in developing a process approach and strategies for an intervention that is intended

to assist the students in achieving an increased knowledge of their belief system. The knowledge construction model depicted in Figure 3.7 shows how Cole *et al.* (2015) developed the knowledge construction model from the information search process.

ISP Stages	1. Initiation	2. Selection	3. Exploration	4. Formulation	5. Collection	6. Presentation	7. Assessment
Feelings	Uncertainty	Optimism	Confusion/ Frustration/ Doubt	Clarity	Sense of direction and confidence	Relief/Satisfaction or disappointment	Sense of accomplishment
Thoughts	General/Vague			Narrowed/clear	Interest up	Clear and focused	Increased self awareness
<b>KC</b>	<b>Implicit 1</b>		<b>Implicit 2 to 1 aspects</b>		<b>Object</b>		<b>Increased Knowledge of belief system</b>
	<b>PRIMING</b>				<b>JIGSAW</b>		
	<b>Implicit 2</b>				<b>Belief</b>		
	Making questions		Making questions		Answering questions		
Actions	Seeking Background information		Seeking relevant information		Seeking relevant or focused information		

*Figure 3.5: Knowledge construction model (Cole et al. 2015:2263)*

Figure 3.7 shows the knowledge construction model. It illustrates that an information seeker's belief system is modified after completing an assignment. The increased knowledge of the student's belief system is based on their Information Seeking and search activities, the use of information and the completion of their task. It is the researchers' view that an increased knowledge of an information seeker's belief system can be attained through Information Seeking, searching and information use activities without completing a task. Exposure and attempts to use resources and systems could alter a belief system.

### 3.5 Uncertainty Principle in the ISP

Kuhlthau (2004) proposed the uncertainty principle based on Kelly's (1963) prototype of the personal construct theory. Kuhlthau (1993:347) also relied on the user's perspective of their information seeking and searching. She further expanded uncertainty as an Information Seeking principle that can be further expanded into six corollaries. Table 3.8 is a summary of the uncertainty corollaries and a brief definition of how users gain an understanding in their search.

**Table 3.8: Uncertainty principle corollaries (Kuhlthau 2004:103)**

<b>Uncertainty Principle Corollaries</b>	
<b>Corollary</b>	<b>Definition</b>
Process	Constructing meaning
Formulation	Forming a focused perspective
Redundancy	Encountering the expected and unexpected
Mood	Assuming a stance or attitude
Prediction	Making choices based on expectations
Interest	Increasing intellectual engagement

The following discussion focuses on the six uncertainty corollaries for information seeking and use.

### **3.5.1 Process corollary**

Process is a series of actions or steps towards achieving a particular end (*South African concise Oxford dictionary* 2006, *sv* ‘process’). The Information Seeking process is commonly experienced in a series of thoughts and feelings that tend to shift from vague and anxious to clear and confident as the search progresses (Kuhlthau 1993:348; 2004:92). As such, the Information Seeking process involves a person in totality. The reason Kuhlthau (2004:93) gave is that the Information Seeking process combines the cognitive and affective processes to form part of the whole experience. The process includes thinking, feeling and acting in the learning process (Kuhlthau 1993:348).

Bruce (2005:9) explained this when she notes that thoughts unfold through actions and feelings evolve throughout the process. However, the process involved is not as clear-cut as the ISP model suggests, rather it is extremely complex, intricate, dynamic and varies from individual to individual (Kuhlthau 2004:94; Navin 2013:6). As Kuhlthau (1993:348; 2004:92) explained, the process is an onward movement of a series of thoughts and feelings from vague and anxious to clarity and understanding.

### 3.5.2 Formulation corollary

The action of formulation is thinking, developing an understanding, extending and defining a topic from information encountered in a search (Kuhlthau 1993:348; 2004:94).

This action of formulation plays a pivotal role in guiding the idea to form a focus from a general topic until a particular perspective is formed as the user moves from uncertainty to understanding (Kuhlthau 2004:95). As Bruce (2005:9) and Kuhlthau (2004:95) explained, the formulation brings to the fore the interpretive and creative tasks of the application of the information encountered. During formulation, the information user goes beyond simply locating the information. According to Kuhlthau (1993:349), the user goes further to interpret the information in a highly individualistic manner.

Also, as Kuhlthau (1993:349; 2004:95) explained, formulation happens through acting and reflecting and is better facilitated by exploring rather than by collecting information. She cautioned that the user could experience difficulties in instances where little formulation is made within the search process and no focus is formed.

According to Kuhlthau (2004), and Kuhlthau and Cole (2012), users often find the period preceding the formulation of focus the most difficult phase in the search process. They observed that, at this point, it is common for uncertainty to increase rather than decrease. Kuhlthau (2004:95) explained that this could be because anxiety and frustration set in when new information users encounter information that is not compatible with their own constructs. Incompatibility can, therefore, delay the entire activity of formulation because anxiety can persist over a longer period (Hartley & Phelps 2012:113). If anxiety persists, it makes it possible for the information user to consider abandoning the search. The ability to tolerate uncertainty is important for formulation within the search process. The strategies information users employ to formulate include talking, writing, browsing, reading and reflecting (Kuhlthau 2004:95). The entire action of formulation provides a framework for the information user to judge the relevance of information whilst moving the search from uncertainty to understanding and to form a focus (Kuhlthau 2004:96).



### **3.5.3 Redundancy**

In the *South African concise Oxford dictionary* (2005), 'redundant' is defined as something that is no longer useful. According to Kuhlthau (2004:96), redundancy verifies that which the information user knows. In order to verify, they sift through information to the point that they recognise information that is relevant against information that is irrelevant.

According to Bruce (2005:10), information that lacks a clear value to a particular information need may be put aside (Bruce 2005:10). Kuhlthau (1993:349; 2004:96) explained that any unique information that does not match existing constructs may require reconstruction for it to be useful. Kuhlthau (2004:96) was of the view that anxiety related to uncertainty may be the underlying cause of the lack of redundancy at the beginning of the search process.

In the early stages of the information search process, Kuhlthau (1991:364) asserted that uncertainty causes discomfort and anxiety, which affects how an information user articulates the problem and how information is assessed for relevance. As information shifts during the stages of the information search process, the balance of redundancy and uniqueness is critical because too much redundancy results in boredom while too much uniqueness causes anxiety (Bruce 2005:10; Kuhlthau 2004:98).

It is essential in the early stages that the information user tolerates uniqueness, which does not fit with the existing constructs because some of the uniqueness takes on meaning as a person builds new constructs (Kuhlthau 2004:98). As constructs are being built, thoughts become clearer and more focused and redundancy may be expected to increase as uncertainty decreases.

### **3.5.4 Mood**

Moods may be thought of as attitudes that determine one's approach to a task at hand (Kuhlthau 2004:98). As Kuhlthau (1993:350; 2004:98) explained, moods are a stance that a user assumes to open or close the range of possibilities in a search.

Bruce (2005:11; Savolainen 2015:184) believed that the role of mood in the ISP is fundamental in that it controls the range within which the cognitive factors can be broadened or narrowed and determines the approach to be taken by the information user.

Throughout the various stages of the ISP model, Kuhlthau (2004:98) alluded to two types of moods in a constructive process, as described by Kelly (1963). These are the invitational mood and the indicative mood.

An invitational mood leads to expansive actions and an indicative mood leads to conclusive actions (Bruce 2005:11; Kuhlthau 2004:98). The invitational mood is most effective in the earlier stages of the search process so that possibilities can be opened to avoid early closure of the seeking and searching due to insufficient information (Kuhlthau 2004:44; Savolainen 2015c:184). In turn, the indicative mood is more appropriate for the tasks at and after midpoint (Kuhlthau 2004:99).

Kuhlthau (2004:99) noted that an indicative mood throughout may result in a lack of construction and learning because it may steer the information user towards premature closure of the seeking and search process. In essence, it is desirable that the nature of the mood varies at diverse stages of the ISP (Savolainen 2015:182). Adoption of a single mood throughout the entire search process can impede progress at certain stages of seeking and searching.

### **3.5.5 Prediction**

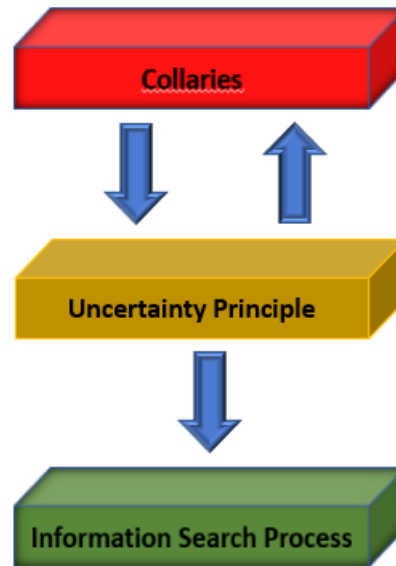
Prediction is derived from the word ‘predict’, which is described in the *South African concise Oxford dictionary* (2005) as something that will happen in the future. When applied to information seeking and searching, prediction is about the choice users find to be relevant or irrelevant in the search process. Therefore, a choice determines what will happen if a particular action is taken (Bruce 2005:11; Kuhlthau 2004:100). The predictions an information user makes are based on constructs formed from prior experiences to determine what will be useful in the Information Seeking and searching process (Kuhlthau 2004:101). In the entirety of the seeking and search process, the information seeker makes predictions on information related to the topic and the process itself. Based on an individual’s ability, the information user determines the sources to be used and the sequence of usage from the sources obtained (Kuhlthau 2004:101; Bruce 2005:11).

### 3.5.6 Interest

The *South African concise Oxford dictionary* (1999) defines ‘interest’ as a ‘state of wanting to know about something’. According to Kuhlthau (2004:101), interest increases as the search process leads to the formulation stage and uncertainty declines. She noted that interest is not maintained at the same level throughout the search process. However, it remains an important factor throughout an information search (Kuhlthau 2004:101). As Bruce (2005:12) explained, interest helps in the approach to be used in processing the information.

During the formulation stage of the ISP, interest increases and encourages the development of intellectual engagement as the construction of new meaning continues (Kuhlthau 2004:102). Even though it may take time for the information user to become intellectually engaged with a topic, higher levels of interest are achieved in the later stages of the search process, particularly when the information user has formed a focus and has a good understanding of the topic with which they are engaged (Bruce 2005:12; Kuhlthau 2004:102).

All the search process corollaries that are fundamental to the uncertainty principle is also fundamental to the ISP. Also, they are highly individualistic and based on previous personal constructs. In a learning process, the corollaries lead to uncertainty. In many ways, corollaries may influence the extent and the level of uncertainty that could be experienced by an information user during an ISP.



**Figure 3.6: Fundamentals of the ISP**

Figure 3.8 illustrates that the corollaries play an important part in influencing the uncertainty that is experienced by an information user during a search process and vice versa, which ultimately plays out in the various stages of the ISP. This is in line with what is alluded to by Nahl (2001), that information behaviour is an integrated hierarchy of sub-behaviours organised into hierarchical levels and domains. The activities discussed in the six corollaries, that is process, formulation, redundancy, mood, prediction and interest, determine a stage for uncertainty and the extent to which uncertainty will play out.

The uncertainty principle and its corollaries provide the necessary base for a learning activity to take place (Kuhlthau 1993:352). Thoughts, actions and feelings are central to any constructive process and are interwoven in a complex mosaic and do not function as separate distinct entities (Kuhlthau 1993:348).

### **3.6 Discussion**

In describing the stages of the information search process, Kuhlthau postulated a process of gradual refinement of a problem area while information searching takes place (Wilson 1999:256).

The review of the literature in this chapter shows the significance that cognition, affect and sensorimotor structures have in information seeking. The fluctuations of thoughts, feelings and moods point out people's capability to construct reality, self-regulate, convert information and perform activities. All the activities in task-based information seeking and searching, show how thinking, acting and feeling are interwoven. Feelings and moods can delay or hasten the action that needs to be taken at any of the six stages of an information search.

The discussion on Kuhlthau's ISP model revealed that using information also involves communicating with others or an information system, reading and understanding. The uncertainty that is common in the early stages of an information search is caused by the introduction of new information that may be in conflict with previously held constructs. Without understanding, locating information cannot create new knowledge. The ability of a student to handle apprehension, confusion and uncertainty has an effect on the information search process, which can either result in failure or success. This includes the extent of the time frames from the beginning to the end of the seeking and the search process. Furthermore, as Kwon (2007:235) observed, the uncertainty and anxiety that is likely to be common to a first-time university entrant may impede the mental processes during the information search process.

### **3.7 Conclusion**

The focus of this chapter was to review the literature of the models of information behaviour that focus on uncertainty. The problem-solving and uncertainty models were discussed. Also, this chapter focused in detail on the ISP as the selected framework that underpins this study.

A description of the ISP model, the stages involved and the uncertainty principle that is fundamental to the model was discussed. The lessons learnt throughout the discussion of the six stages of ISP provide valuable insights of what happens inside the search process and will be useful in the empirical study. Chapter 4 reports on a literature review on the information behaviour of students.

## CHAPTER 4

### INFORMATION BEHAVIOUR OF STUDENTS

#### 4.1 Introduction

The purpose of this chapter is to review the literature on the information behaviour of students as information seekers. In Chapter 2, the different components of an information behaviour definition were discussed. These include the user, the context, information needs and information activities. In that discussion, it was shown that information seekers engage in actions and activities to satisfy an information need that arises from the interaction between elements of the user's context and the user's mental structures.

In order to satisfy their need for information, users then engage in specific information activities. The focus in this chapter is to learn which elements in the student context give rise to their information behaviour and how the interaction between the student's mental structures and context influence the information activities they engage in.

#### 4.2 Background

The focus of the current study is on the information behaviour of learners who have just become students and how their feelings of uncertainty affect their Information Seeking behaviour. So, what is the difference between a learner and a student? A learner is a person learning for the purpose of gaining knowledge or skill through experience or study, or by being taught (*South African concise Oxford dictionary* 1999, sv 'learner'). In South Africa, the term 'learner' is used to describe someone who is enrolled at a primary or secondary school. In turn, a student is a person studying at a university or other place of higher education (*South African concise Oxford dictionary* 1999, sv 'student'). First-year students are therefore students who have to transition from being a learner at school to an independent student at a higher education institution such as TUT.

Many elements in the higher education institution of the students' academic context, such as their discipline of study, curriculum requirements and personal characteristics, influence the information behaviour of students (Korrobilli, Malliari & Zapounidou 2011:155). The students' personal characteristics that affect their information behaviour include their

knowledge and skills, their prior experiences and their affective structures such as their feelings of uncertainty and anxiety.

Among the many reasons that drives students to be information seekers is an information need that motivates them to engage in information activities such as information seeking in order to satisfy their information needs and eventually their academic goal to acquire an academic qualification. It was with this in mind that Baro, Onyenania and Osaheni (2010:109) observed that undergraduate students engage in purposeful Information Seeking activities to complete course assignments, prepare for class discussions, seminars, workshops and research papers. Students engage in information seeking in a quest to overcome the uncertainty they experience upon realising a gap in their knowledge. Based on the constructivist learning theory, students begin the construction of meaning from their previous personal knowledge (Cole *et al.* 2015:2253). For example, the knowledge and experiences the students acquired as learners at school.

The realisation of a gap in the knowledge they have already acquired and the knowledge that they need to acquire to achieve their goal give rise to an information need. The information need the students experience at this stage, according to Taylor (1968), is intangible and visceral, as discussed in Section 2.3 of Chapter 2.

### **4.3 Context of Students**

Information behaviour does not take place in a vacuum (Case & Given 2016). For information behaviour to manifest, there must be circumstances that form a setting for such an occurrence. Wilson (1999:265) argued that uncertainty may be a trigger to create circumstances for information behaviour to manifest.

Paisley's (1968) framework, discussed in Section 2.4, shows a variety of settings that influence information behaviour. The various settings are applicable to students. The combination of uncertainty, task complexity, anxiety and the varied settings may have a different impact on individual students. Individual students are guided by their own cognitive structures that have developed over a period of time as alluded to by Paisley (1968), Allen (1969), and Ingwersen and Järvelin (2005).

### 4.3.1 Situation

Within a context, a flow of situations may arise (Sonnenwald 1999). In the context of students in an academic setting, an information need arises from a given project or an assignment that brings about a simple or a complex task. In academic information seeking, some aspects of the situation may play a more significant role than personal aspects and vice versa.

#### 4.3.1.1 Tasks

A task is defined as a piece of work (*South African concise Oxford English dictionary* 1999, sv 'task'). In the field of software engineering, Hackos and Redish (1998:56) defined tasks as 'a series of actions undertaken in pursuit of a goal'. Furthermore, depending on the task and the requirements set for that task, a task can be either simple or complex (Ingwersen & Järvelin 2005:73, 282). In addition to being simple or complex, Ingwersen and Järvelin (2005:73, 282) noted that there are different types of tasks, namely:

- **Daily life tasks** refer to all kinds of tasks that are not job related.
- **Work tasks** allude to job or a non-job related tasks and can be either simple or complex. The academic tasks students need to complete can be viewed as being work tasks. According to Ingwersen and Järvelin (2005:392), information use is an essential part of work tasks. In instances where the task performer lacks the required knowledge and skills and therefore is not able to solve the work task immediately, the situation can lead to an uncertainty state that may also lead to a search task (Ingwersen & Järvelin 2005:392). This is then why Li and Belkin (2010:1771) viewed a work task as a starting point and a motivation for other types of tasks such as information search and information retrieval tasks.
- **Search task** refers to a task that is carried out in order to find information associated with a work task. Search tasks are either information seeking or retrieval tasks that are carried out to obtain information to fulfil a work task (Ingwersen & Järvelin 2005:389). As Ingwersen and Järvelin (2005:389) observed, search tasks are complex in nature. According to them, this is because they require the information seeker to use their cognitive skills

A task can be viewed from both an abstract and a functional perspective (Byström & Hansen 2005:1051; Ingwersen & Järvelin 2005:73). In its abstract perspective, a task can be a



construction without performance, whereas in its functional perspective, it can be viewed as a series of actions undertaken by an actor (Vakkari 2003:416). Through the ISP model, Kuhlthau (1991; 2004) spelled out aspects of the abstract and functional tasks within the stages of the search process. A detailed discussion of Kuhlthau's (1991; 2004) ISP is in Chapter 3 Section 3.3.

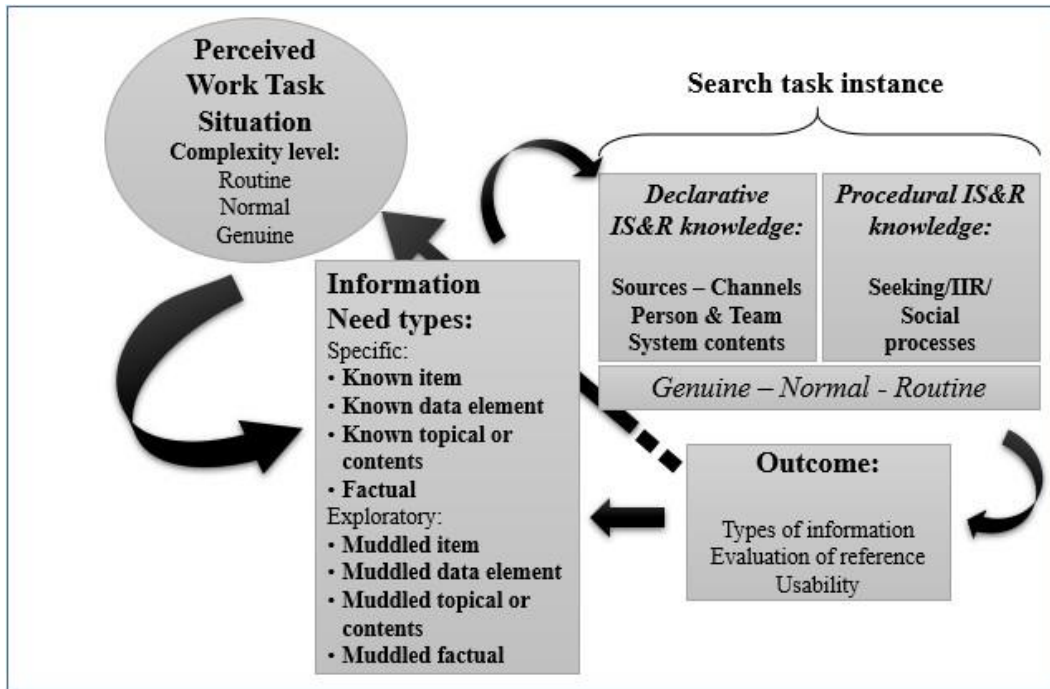
A task can be subdivided into three main parts : task construction, actual performance and task completion (Byström & Hansen 2005:1053). Task construction relates to the task performer comprehending the task from beginning to the end. The actual performance consists of the practical and actual actions that relate to the work task, whereas task completion relates to the separate results of actions taken to form a task resolution.

In an institution of higher learning, such as a university, students are given tasks that require them to consult multiple sources of information. In order to complete the task, students require certain knowledge and skills. In the task framework developed by Ingwersen and Järvelin (2005:285), knowledge types that are important to information seeking and retrieval were identified. These are work task knowledge, problem task solving knowledge, information source and solving knowledge, search task solving knowledge, person and group knowledge, and social interaction skills. Ingwersen and Järvelin (2005:286) argued that problematic situations, such as uncertainty and confusion, may arise from any of the six knowledge types.

The tasks students are given involves search tasks to fulfil a work task (Ingwersen & Järvelin 2005:392). As shown under the discussion on search tasks, an information search task can be complex. According to Byström and Järvelin (1995:192), and Ingwersen and Järvelin (2005:73), task complexity is a factor affecting information seeking and use. This could be true of academic tasks because, as observed by Vakkari (1998:370), academic work constitutes a task in the information seeker's cognitive domain. He also equated task complexity to task uncertainty. Ingwersen and Järvelin (2005:286) and Karlsson *et al.* (2012:581) supported this view when they said that work tasks that cannot be completed immediately give rise to uncertainty. Also, Blundell and Lambert (2014:262) found that students experience information anxiety when performing research tasks.

In Figure 3.1, the search task dynamics, which can either be routine, normal or genuine, are shown. The application mode of the order of the search reflects the knowledge base of the

student. The nature of the level of the complexity is also determined by the knowledge base relating to the Information Seeking and retrieval procedures of the student (Ingwersen & Järvelin 1995:294). Procedural knowledge of information seeking and retrieval is fundamental for a student to deal with task complexity.



**Figure 4.1: Complexity of the search task in connection with perceived work task situations (Ingwersen & Järvelin 2005:295)**

The uncertainty caused by a lack of the required knowledge and skills to deal with the perceived complexity in work and search tasks is likely to cause anxiety. Anxiety is unpleasant and brings about general apprehension and dread. Figure 4.1 depicts Ingwersen and Järvelin (2005:295) belief that procedural knowledge of information seeking and retrieval is fundamental to the successful completion of a search task. In order for students to accomplish an information task, they rely on prior exposure to specific resources (Kuhlthau 1991:362; Olsen & Diekema 2012).

### 4.3.2 Boundaries

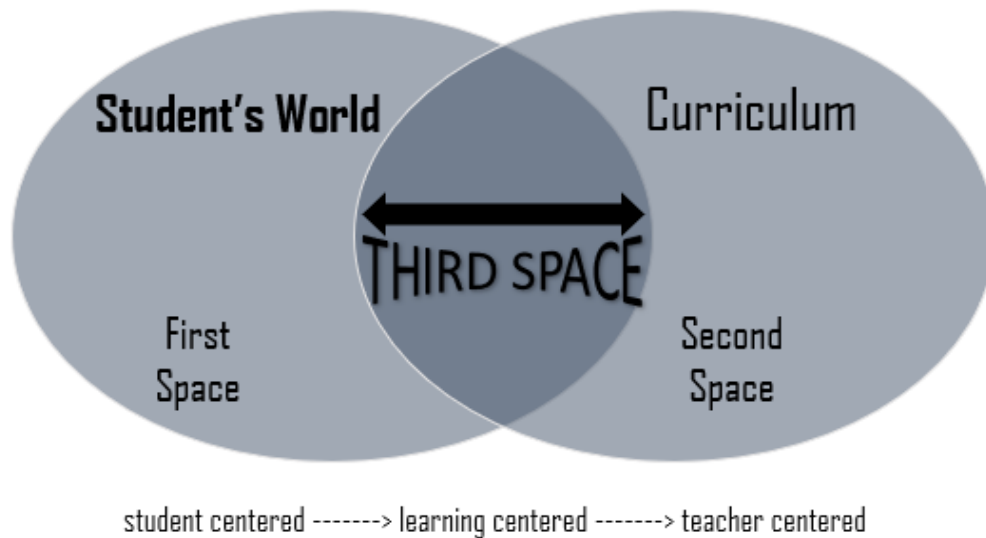
Johnson (2003:739) posited that the student’s individual locus comes into play during information seeking. According to Heinström (2003; 2005), these include personality traits. Other boundaries stem from the student’s prior knowledge (Dervin 1992; Kuhlthau 2004).

In order to understand context even further, it is important to delineate its boundaries. In their effort to delineate the boundaries of context in information behaviour, Agarwal, Xu and Poo (2009) moved away from defining the boundaries of context from a single point of view.

Unlike Courtright (2007), Agarwal *et al.* (2009) broadened the boundaries of context in their contextual identity framework to be inclusive and applicable to any Information Seeking situations. Their approach took into consideration what was earlier said by Ingwersen and Järvelin (2005) that taking context in isolation does not work. The boundaries of context are encapsulated in what Agarwal *et al.* (2009) proposed as the contextual identity framework. The personal context is aligned to the searcher's affective and cognitive viewpoints. The shared context is aligned to shared spaces such as organisations and invisible colleges, as well as others alluded to in Chapter 2 Section 2.4. These were based on the framework developed by Paisley (1968) and advanced by Allen (1969). The context stereotype refers to the environment that surrounds the information seeker.

### **4.3.3 Space**

Johnson (2003:750) posits that an individual is embedded in an information field that provides a starting point for information seeking. The information fields provide space for students to think, move and act in order to satisfy an academic information inquiry. The cognitive state is influenced by the past social and cultural context of an individual (Ingwersen & Järvelin 2005:27). The third space is a psychological term that refers to a space where the curriculum and the student's world occur.



**Figure 4.2: The third space (Kuhlthau, Maniotes & Caspari 2015:26)**

Figure 4.2 illustrates the first space (student world), the second space (school curriculum) and the third space (integration of both the student's world and the curriculum). In this space, personal experience merges with the curriculum to support knowledge creation (Kuhlthau *et al.* 2015). Kuhlthau *et al.* (2015) found evidence that deep learning takes place in the third space. The general overview of space in information seeking has been elucidated in Section 2.5.2.1. The understanding of the concept of space in this current study, which centres around uncertainty and the influence it has on Information Seeking behaviour, is influenced by the work of Kuhlthau (2004), Cole and Kuhlthau (2012), and Kuhlthau *et al.* (2015).

Cole and Kuhlthau (2012), and Kuhlthau *et al.* (2015) advanced the concept of a third space in reference to a space where there is an integration of the curriculum and their personal experiences. In the third space, the student has the flexibility to interpret, make sense of and understand their out-of-school personal experiences while they link it to the curriculum. Based on this discussion, the third space can be called a personal learning environment. The personal learning environment can be influenced by many factors. However, for the purpose of this current study, the focus is on uncertainty, which is a cognitive state that commonly causes affective symptoms of anxiety and a lack of confidence (Kuhlthau 1993; 2004).

The impact of the activities within the third space are fundamental to the creation of new knowledge, as shown in the discussion of the ISP model in Chapter 3. It is the amalgamation of the student's personal experiences and the curriculum that brings forth new knowledge,

which is likely to create a new worldview for the student. However, Kuhlthau and Cole (2012) argued that the possibility exists that students will fail to merge information in the first and second space. This state of affairs could result in a student failing to learn something new and to generate any new knowledge.

Head (2013) found that once freshmen entered college, they are faced with a more complex space of information resources than they are used to. Though physical proximity may be of less importance due to the availability of online resources, other significant factors, such as information overload, and cognitive and affective uncertainty, may take root. Meyer and Fourie (2017) advocated for a thematic consideration of Kuhlthau's work in developing creative workspaces for students, owing to experiences of uncertainty and task complexity.

#### **4.3.4 Time**

The dimension of time is a significant factor in student's information behaviour. The activities involved in information processing uses cognitive structures and requires time for interpretation. Affective load is a concept introduced by Nahl (2005:41) to define multiplied uncertainty resulting from time pressure. The time factor has the potential to intensify uncertainty depending on the extent of the pressure (Nahl 2007:16).

Due to the fact that information processing is time bound, it is crucial for the student to obtain information while it is useful, for example, within particular time bounds. Convenience and ease of use are considered primary factors in undergraduate Information Seeking behaviour (Lee *et al.* 2012; Kommisarov & Murray 2016). The relationship between frequency of use and accessibility is alluded to by Kim and Sin (2007).

#### **4.3.5 Organisation**

The discussion on Paisley's (1968:4) framework as reviewed by Allen (1969:5) in Section 2.4, showed a variety of aspects that inform and shape the information behaviour of a human being, students included. Johnson (2003:750) alluded to the physical context of organisations that stabilises the information field of a user and determines the nature of information users are exposed to. Paisley (1968) and Allen (1969) suggested that the psychological aspects of an organisation, such as the invisible college of informal communication, an individual's own

cognitive structures and an individual's personality, could also influence information behaviour. Students engage in academic information seeking in a school, college and university. Within the ambit of a situation, space, time and an organisation, information activities are manifested.

#### **4.3.6 Rural students' context**

The focus of this current study is on students without prior access to the information acquisitions' systems used in institutions of higher learning. Such students have been found to experience difficulty in using academic libraries and information resources. Studies reveal high levels of anxiety among undergraduate students (Mellon 1986; McPherson 2015:317). Kuhlthau (1991:362) posited that prior experience influences the choices made by an information user. Meyers *et al.* (2007) suggested that students revisit sources that have been helpful in the past.

Students who lack experience in using academic information systems are likely to be threatened by their lack of resource knowledge and the physical environment such as the library collection size and layout (McPherson 2015:319). Source selection can be determined by the task at hand, availability and accessibility of information resources. Personal knowledge and experience play a role in the different ways in which information is sought (Leckie *et al.* 1996:184). In her study, Heinström (2003) concluded that the final impact on information behaviour is the interaction of contextual factors and the five personality dimensions, namely: neuroticism, extraversion, openness to experience, competitiveness and conscientiousness. However, students who lack the fundamental skills of dealing with academic information are always at a disadvantage. Their lack of skills become a stumbling block and hinders their efforts of information seeking and searching.

The challenges discussed in Section 1.2 that ordinarily have an impact on student information behaviour are likely to affect the rural student to a higher degree than it would students who have some experience in academic information resource systems.

## 4.4 Student Information Needs

An information need represents a knowledge gap. In Section 2.3, it was shown that an information need is an intangible, unknowable and non-specifiable query that could be presented to an information system. Since an identified need for information motivates users to actively seek information, information needs are a basic part of information behaviour researcher (Ruthven 2019:77). The place information needs has in studies focusing on students' information behaviour is observable in the work of Kakai, Ikoja-Odongo and Kigongo-Bukenya (2004), Kuhlthau (1991; 2004), Marchionini (1989), Olsen and Dikema (2012), Weiler (2004), and Wu, Dang, He and Bi (2017). Since information needs are only observable in the activities focus on satisfying those needs, most researchers who endeavour to acquire an understanding of the information needs of students rely heavily on Information Seeking behaviour studies.

Wilson (1981; 1997) identified personal, interpersonal and environmental barriers that manifest in the context of an information need as factors influencing information needs. The discussion in Chapter 2 showed that the interplay between elements in the context in which an information need arises and elements in the user's mental structures give rise to information needs. The information needs of students are mostly a result of requirements based on their academic pursuits. This view is supported by studies conducted by Kakai *et al.* (2004) and Baro *et al.* (2010). Examples of the requirements students encounter in their academic pursuit pertain to their need for knowledge and skills to successfully complete academic tasks.

### 4.4.1 Personal factors affecting information needs

In psychology, the study of personality revealed the big five personality traits in human personality, that is neuroticism, extraversion, openness to experience, agreeableness and conscientiousness (Santrock 1997:421). In her study, Heinström (2003; 2005) concluded that the varied personality dimensions – that is, neuroticism, extraversion, openness to experience, agreeableness and conscientiousness – plays a role in information behaviour. Neuroticism is also an element that is highlighted in Kuhlthau's (1991; 2004) ISP model. Biglu *et al.* (2016) and Naveed's (2012) findings support Heinström's findings. Biglu *et al.* (2016) found that neuroticism increases library anxiety among students, whereas Naveed (2012:527) found that information anxiety tends to have a greater impact on female students as opposed to male

students. Therefore, the neuroticism trait, which Biglu, Ghavami and Dadashpour (2016:379) referred to as a human tendency to experience negative emotions like anxiety, depression and anger, is relevant to this study.

Heinström (2005) classified Information Seeking students into two categories, namely: the extrinsically and the intrinsically motivated. She based these categories on the relationship between Information Seeking and personality traits. Heinström (2005) found that extrinsically motivated students work in haste through a task to meet the requirements. However, the intrinsically motivated students search purposively with the intention of gaining knowledge and understanding rather than just collecting information.

A study by Karlsson, Koivula, Ruokonen, Kajaani, Antikainen and Ruismäki (2012:582) found that novice students tend to be superficial when looking for information because they display an uncritical attitude towards the information they encounter. In addition to certain personality traits and attitudes, a myriad of personal factors, some of which are not within the scope of this study, influence the information needs and seeking behaviour of undergraduate students.

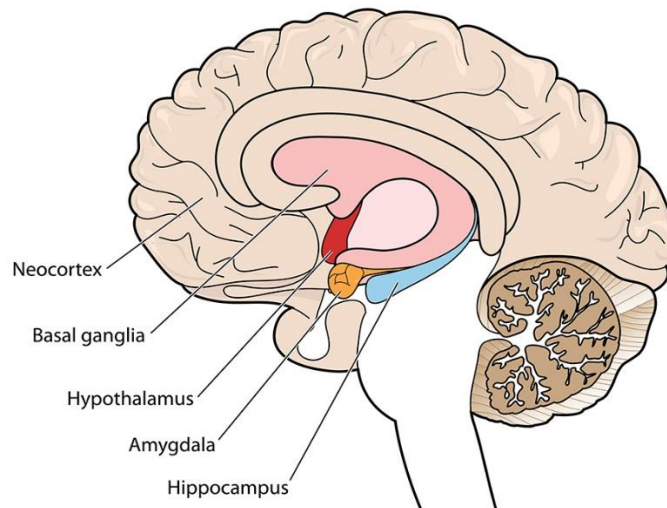
#### **4.4.2 Information anxiety**

Information anxiety is a kind of anxiety. In Section 2.4.4, anxiety was defined as diffuse, vague and highly unpleasant feelings of fear and apprehension. Information anxiety is a kind of anxiety human beings experience in their lives. Like any other form of anxiety, information anxiety manifests in the mental structures of an information user. As such, it plays a significant role in information seeking and searching, as well as in the use of information. Undergraduate students go through and exhibit signs of information anxiety when they engage in information seeking for academic purposes (Blundell & Lambert 2014; Kuhlthau 1991; 2004). Blundell and Lambert (2014) studied information anxiety from an undergraduate perspective. Their study confirmed earlier findings by Mellon (1986) and Katopol (2012).

All human anxiety manifests in the brain of a human being, including information anxiety. Information anxiety manifests through personal affective structures in the brain. Anxiety occurs in the amygdala located in the base of the brain, as shown in Figure 4.3 (Foster, Novic, Scholl & Watt 2012). The amygdala assesses the environmental activities and sends a signal through the nerves to the hypothalamus, another part of the brain located in the limbic structure



of the brain (Foster *et al.* 2012). The hypothalamus activates the pituitary glands also located in the brain. The pituitary glands then activate the adrenal glands. The hormones called adrenalin, non-adrenaline and cortisol are then secreted causing bodily changes that manifest in a fast heart rate and breathing, as well as an increase in blood sugar and blood pressure (Vyner 2018).



**Figure 4.3: Brain showing the amygdala and the hypothalamus (Vyner 2018)**

The brain activities described crystallises the ACS interplay as advanced by Jakobovits and Nahl-Jakobovits (1990:448).

#### **4.4.3 Role of affect in student' information behaviour**

The six types of cognitive structures involved in work and search tasks, as discussed in Section 4.3.1.1, include emotional states of the information seeker, in this case, the student. As pointed out in Section 2.4.3, Mulligan and Scherer (2012:346) used the term 'emotion' to refer to affective processes. In dealing with a simple or complex task, students are susceptible to experiencing the emotional states alluded to in Information Seeking behaviour. Details of students' emotional factors have been mentioned in a series of studies incorporating three realms of activities, namely: the physical, affective and cognitive (Kuhlthau 1991; 2004). As shown in Chapter 3, where the ISP model and the role of affective in the Information Seeking behaviour of students were discussed, Kuhlthau's studies revealed doubt and feelings of anxiety in the initial stages of a task. Ingwersen (1992), and Ingwersen and Järvelin (2005)

supported Kuhlthau's (1991; 2004) view by pointing out that affect plays a significant role in the process of information seeking and interactive retrieval. Kuhlthau (2004:25) also suggested that affect directs cognition. This is in line with an earlier finding by Turk and Salovey (1985:3), who found that affect affects cognition. However, Savolainen (2015c:183) suggested that the interplay between affect and cognition in information seeking may manifest in three kinds of relationships, the strong causality being that cognitive uncertainty causes affective symptoms of uncertainty. The loose causality refers to shifting states of knowledge as the user progresses in a task to satisfy a need.

Also, Savolainen (2015c:183) referred to an associative relationship when negative cognitive and negative affective factors appear together without the presence of a cognition influence affect. This was demonstrated in the ISP discussed in Chapter 3. In turn, Nahl (2001; 2007) also observed the interdependence of the human cognitive and the affective domain in information processing and use.

The emotional responses of students to libraries was studied by Kracker and Pollio (2003). Their findings supported Mellon's (1986) findings. Taking a cue from the definition of library anxiety given in Section 2.4.2, anxiety can be debilitating and harmful to a student's academic career. Naveed (2017:272) alluded to the possibility of anxiety to impeding the information seeking of students in their academic endeavours. Heinström's (2005:240) findings offers a possible explanation. She observed that instances where negative feelings consume psychological energy, negative feelings reduce the energy levels of students in information seeking. Many studies, such as those conducted by Hyldegård (2006), Kracker (2002), Meyers, Nathan and Saxton (2007), Kuhlthau, Heinström and Todd (2008), Chowdhury and Gibb (2009), Mills, Knezek and Khaddage (2014), which are based on Kuhlthau's (1991; 2004) ISP, explains how students are affected by affective factors in information seeking.

The studies reviewed, provide evidence of the inherent negative affect in students information behaviour domain. Affect manifests in physical searching activities when a student goes through a search task to fulfil an information gap. Central to the information search process is the uncertainty that prevails in information seeking. As affective symptoms of anxiety and a lack of confidence are triggered by uncertainty, Kuhlthau's (1993; 1991; 2004) work confirms the uncertainty-anxiety association. In support of Kuhlthau, Savolainen (2016b) also confirmed the interplay of thinking, feeling and acting, that is affect and cognition.

#### **4.4.4 Role of uncertainty in student information needs**

Uncertainty is a significant factor in student information behaviour as it originates from a problem (Wilson 1999:265). Wilson (1999) referred to uncertainty as ‘the ghost at the feast’ as it bears reference to most Information Seeking and retrieval activities.

Kuhlthau (1989; 1991; 1999; 2004), Chowdhury and Gibb (2009; 2011), and Chowdhury *et al.* (2014) confirmed the manifestation of uncertainty in information behaviour in a series of five studies on students’ perspective of information seeking in response to a research assignment. Kuhlthau’s work culminated in the formulation of the ISP, which is an active process of students forming meaning from personal and new information gathered. In her work, Kuhlthau (1993:347) showed how the interaction between cognitive and affective factors play out in the Information Seeking behaviour of students and the resultant unwelcome patterns of uncertainty. On the other hand, Chowdhury *et al.*’s (2014) work culminated in the development of an uncertainty model. Chowdhury and Gibb (2009) argued that different types of uncertainty are associated with information seeking and retrieval and that with the proliferation of new and different search tools, channels and sources, uncertainty, whether positive or negative, continues to be a significant factor in the research process. The six cognitive knowledge types in a task framework alluded to in Section 3.3.1.2 are likely to lead a student to experience uncertainty and confusion (Ingwersen & Järvelin 1995:286). At the level of an information need, both cognitive and affective uncertainty manifests in information activities. In information seeking, during the phase of construction of an information need, uncertainty plays a prominent role. The information need itself progresses in an uncertain terrain until it gets to the level of coming out as a compromised need, as discussed in Chapter 2 Section 2.3.

Chowdhury and Gibb (2009) studied Information Seeking activities, course uncertainty and how they are correlated. This research showed that uncertainty may occur in the course of a number of Information Seeking activities.

#### **4.5 Student Information Activities**

Wilson’s (2000:49) definition of information behaviour encompasses a variety of activities in relation to information. Drawing from Wilson’s definition, it is evident that information

activities, such as information use, information seeking and information retrieval, are complex passive and active processes. These multidimensional processes that occur in the head of an individual includes their thoughts and emotions. As Ingwersen and Järvelin (2005:276) put it, the individual information user, the student, exhibits a cognitive space that developed over a period of time from culture and social experiences. Uncertainty leads a student to engage in information behaviour activities. The manifestations of the activities are influenced by the experiences stored in the cognitive structures of a student.

Case and Given (2016:341) observed that students' varied information activities have been widely studied, predominantly student information seeking. Student information activities are mostly studied due to the close proximity of students to researchers.

#### **4.5.1 Information seeking**

A significant amount of student Information Seeking behaviour research has been conducted and much of the research relates to academia in contexts where library and information services are provided (Baro *et al.* 2010; Colón-Aguirre & Fleming-May 2012; Lee *et al.* 2012; Karlsson *et al.* 2012; Korobili *et al.* 2011; Kuhlthau 1991; 2004; Meyers *et al.* 2007; Mishra *et al.* 2015; Thomas *et al.* 2017; Wu *et al.* 2017). This is in contrast to the context of the rural student discussed in Section 1.2 and Section 4.4.6 who experience academic information resources and systems for the first time at a university.

Among the many factors recorded in literature that play an important role in students' Information Seeking behaviour is the lack and availability of information resources, students' information skills and the means of information retrieval and use. In Information Seeking studies, affective factors pertinent to this study were given prominence by several researchers, including Dervin (1992), Kuhlthau (1991), Nahl (2001; 2007) and Wilson (1981). Of these Kuhlthau's studies particularly focused on students. Drawing from the definition by Case (2002:5), and Case and Given (2016:6), that information seeking is a conscious effort to acquire information in response to a need or a gap in one's knowledge, students also engage in information seeking for academic purposes. Cognitive and affective factors are among the fundamental factors that influence information behaviour among students.

#### 4.5.1.1 Cognitive structures

The cognitive processes of a human being involve a broad range of mental processes such as perception, memory, language, problem-solving, reasoning and decision-making (Maitlin 2013:2). A lack of skills to cognitively process information could act as a barrier to information seeking. A barrier is an obstacle that prevents movement or access (*South African concise Oxford English dictionary* 1999, *sv* ‘barrier’). There is varied terminology within Information Seeking literature that seem to refer to cognitive barriers.

Mellon (1986) described affective and cognitive barriers that affect students’ information seeking and searching under one umbrella term, namely library anxiety. This could be why Biglu *et al.* (2016) referred to library anxiety as a kind of psychological barrier that hinders access to information.

In his study on the cognitive barriers to information seeking, Savolainen (2015b:615) distinguished between barriers that restrain the identification and articulation of information needs and those of selecting and accessing information sources. He, (Savolainen 2015b:616) identified an unwillingness to see ones needs as information needs, as well as an inability to articulate one’s information needs as cognitive barriers related to identification and articulation of information needs.

In a task-based Information Seeking setup like that of students, these barriers can be based on the ambiguities and complexities of the task. Individuals who are unable to articulate their information needs due to insufficient knowledge of the domain reflect a cognitive barrier (McPherson 2015:318).

The cognitive barriers that relate to selecting and accessing information resources identified by Savolainen (2015a:617) include:

- unawareness of relevant information;
- low self-efficacy, a lack of self-confidence and inadequate knowledge of the subject matter (McPherson 2015:318);
- poor or inadequate search skills and a lack of experience in the use of advanced and basic information retrieval systems (McPherson 2015:318; Kommisarov & Murray 2016 ; Savolainen 2015a:617); and

- the inability to evaluate resources and deal with information overload, particularly by undergraduates (Head 2013; Kommisarov & Murray 2016).

The ability to synthesize new information with previously held constructs in order to formulate a focus is a significant cognitive factor as it determines the success and failure of a project or assignment (Kuhlthau & Cole 2012). This view is supported by Head (2013). Unfortunately, as Jakobovits and Nahl-Jakobovits (1990:451) observed, ‘Without affective support, cognitive skills are not acquired.’

In Section 2.4.2, it was indicated that ACS structures are interrelated. Branscombe (1988:5) and Savolainen (2015:179) cautioned against dealing with affect and cognition as distinct entities because they are interwoven and function in partnership with other properties of the mind. A view supported by Forgas (2008:96). This could be because, as noted by Forgas (2008:96), the cognitive affect infusion is attributed to the mechanisms of thinking and judgement. A group of mental processes that features in cognition are attention, memory, beliefs, thoughts, ideas and activities such as perceiving, knowing, understanding and problem-solving (Gerow 1997:7). The manifestation of uncertainty in information behaviour is based on its association with acts of interpretation that happen in the mind.

#### *4.5.1.2 Affective structures*

The origin of affective barriers is linked to negative emotional experiences in situations that cause a student to access information resources or systems (Savolainen 2016a). The work of Nahl (2001; 2007) demonstrated the inseparable synergy that unifies technology and humans. A study by Onwuegbuzie and Jiao (2000) revealed a relationship between academic procrastination and library anxiety. For the purposes of this study, preference is given to the concept information anxiety rather than library anxiety due to its wider scope, as discussed in Chapter 2 Section 2.4.4. Savolainen (2016a) identified three main types of affective barriers in Information Seeking behaviour:

- risk of being exposed to unwanted information;
- risk of excessive psychological costs of information seeking; and
- risk of facing difficulty in using information systems.

The three broad areas articulated by Savolainen (2016a) are typified by a conglomerate of negative emotions such as anxiety, fear, uncertainty, helplessness, reluctance, shame, frustration, confusion, impatience and irritation.

Given (2007) explored the role affect has among students. She suggested that libraries should work towards promoting feelings of joy for the campus, academic work and the library itself.

A study by Mellon (1986:160) found that fear is a negative emotion among students using an academic library for the first time in their Information Seeking endeavours. Biglu, *et al.* (2016:378) mentioned attributes, such as fear and negative self-defeating thoughts, as negative emotions that signal information anxiety. In a context where a student is fearful, coupled with a gap in knowledge, anxiety may set in, resulting in confusion and uncertainty (Kuhlthau 2004:7).

#### *4.5.1.3 The interrelationship of affect and cognition*

Mental structures also play a significant role in the Information Seeking behaviour of users as alluded to by Marchionini (1989:56), Nahl (2001), and Jakobovits and Nahl-Jakobovits (1990). The ACS domains have been suggested in personal information behaviour by Nahl (2001), and Jakobovits and Nahl-Jakobovits (1990:448). The three domains relate to the sum total of activities of the information seeker's ability to employ their mental structures to extract key concepts from the problem and the ability to identify criteria for success during information seeking (Marchionini 1989:56).

The activities involved in the mental structures refer to information processing and are interdependent. Based on the ACS domain, affective skills are linked to the feelings and motives of an information seeker to engage in an information search.

#### *4.5.1.4 Sensorimotor structures*

The keenness of thought, coupled with performing physical activities and the visual identification of and ability to find their way in an information environment, is a sensory skill (Jakobovits & Nahl-Jakobovist 1990:449). The functioning of the sensorimotor structures is facilitated by the brain. Head and Holmes (1911:189) suggested that the sensory cortex stores past impressions and that the impressions may rise into consciousness and form organised models referred to as schema. This view is supported by Brewer and Nakamura (1984:6). The

role of schema is to modify and store impressions created by incoming sensory impulses. As Brewer and Nakaruma put it, ‘Schema are composed of old knowledge.’

#### **4.5.2 Information searching**

Undergraduate students’ search activities have been widely studied by several researchers. These include studies by Colón-Aguirre and Fleming-May (2012), Kuhlthau (1991; 2004), Kuhlthau and Cole (2012), Lee *et al.* (2012), and Thomas, Tewell and Wilson (2017). Lee *et al.* (2012) and Thomas *et al.* (2017) alluded to the view that undergraduate students’ information search activities are multifaceted and affected by the accessibility of and familiarity with resources. Information searching is an activity that begins with a formulation of a query (Cole 2012:65). It constitutes both physical and mental aspects of a student. As the student realises an information gap, their thoughts gather and move through the filters suggested by Taylor’s (1968) information need, as discussed in Section 2.3.

Upon reaching a compromised Q4 level of an information need, students then express their information needs to an information system. Kuhlthau (1991; 2004) highlighted student discussions in the early stages of the information search process as an action towards closing an information gap. This notion is supported by Thomas *et al.* (2017). Students are more inclined to begin their information projects by searching the public Internet sources (Colón-Aguirre & Fleming-May 2012:391). They are said to also focus on sources that are easy to obtain and easy to understand rather than use ‘complicated’ library databases (Colón-Aguirre & Fleming-May 2012:391).

In their study, based in a well-resourced environment that is an institution of higher learning, Kommissarov and Murray (2016) found that students put a high regard on electronic convenience even though they visit the physical library frequently. Olsen and Diekema (2012) found that undergraduates rely on familiar Internet search engines, and prior exposure to specific sources and search engines due to the volume of resources and the complexity of library search tools. A view supported by Kommissarov and Murray (2016). However, Byström and Järvelin (1995:192) asserted that task complexity remains one of the most fundamental factors that affects task performance owing to its multidimensional nature.



### 4.5.3 Information use

Much research in information behaviour focuses primarily on the information needs and information seeking and pay minimal attention to information use (Wilson 1997:569; Kari 2007). On a conceptual level, information use remains ambiguous (Kari 2007). Early references to information use suggested that it is a process beyond information seeking (Wilson 1997:569). However, information use begins once the need is determined and the action to satisfy a goal commences. Based on Cole's (2011) theory of an information need, information use begins as an individual processes the information they possess to incorporate it with new information. Nahl (2007:5) showed the interdependence of the cognitive and affective areas of human beings and identified two types of affect in information use, namely: affective information reception and affective information use.

Savolainen (2009) identified two phases of the concept as the constructivist approach and human information processing. The present study focuses on both approaches. Both approaches incorporate the interdependent elements of cognition and affect that influences uncertainty.

Kuhlthau (1991; 2004) studied students' information use. In her studies, she discovered elements of both physical and cognitive student information use. The physical aspects of information use alluded to are discussions with fellow students, locating relevant information, reading to learn about the topic, making notes, bibliographic listings and searching various types of information resources. The cognitive aspects of information use involve an investigation with an intention to formulate a focus and ultimately a focus of a task at hand.

Information use encompasses both cognitive and affective factors. Kuhlthau (1991; 2004) referred to thoughts, feelings and moods that a student experiences whilst going through the information seeking and searching.

Based on Kuhlthau (1991; 2004), and Kuhlthau and Cole's (2012) research, information use is implied in stages four, five and six of the information search process. It is critical for a student to move from stage three, pre-focus exploration, to stage four, focus formulation, as uncertainty peaks during this time. The use of information is implied as transition from stage three to stage four demands thinking and judgement from the student. This activity calls for the student to be

able to connect prior knowledge with the task at hand (Kuhlthau & Cole 2012). As the student continues with the search of going beyond the given information, the student borrows generic knowledge from adjacent areas in their memory stored in their cognitive structures (Cole 2011:1228). At some point, the information need will be actualised and the information use will cause the compromised information need level to move towards the deeper levels of a student (Cole 2011:1228).

#### **4.5.4 Information retrieval**

Information seeking and information searching involves the retrieval of information sources. In 1950, Mooers coined the term information retrieval. Information retrieval is an activity undertaken by an information user to find sources of information to use to satisfy an information gap. Though information searching and information retrieval are closely related due to the fact that they both involve information, an information user and a system to locate resources, there is a slight difference. Marchionini (1995) suggested that the term ‘search’ relates to some kind of behaviour of an individual locating information. On the other hand, information retrieval is referred to as finding material that is unstructured in nature to satisfy an information need. Information retrieval relates to the extraction of information from a content collection.

##### *4.5.4.1 Interactive information retrieval*

Interactive information retrieval can be viewed as the complex communication activity of a student and an information system at their disposal. Students engage in metacognitive activities to address the perceived information gap. Metacognition is defined as any cognitive process or structure about another cognitive process or structure (Kralik, Lee, Rosenbloom, Jackson, Epstein, Romero, Sanz, Larue, Schnidtke, Lee & McGreggor 2018:730). Metacognition includes reasoning about reasoning and reasoning about learning (Kralik *et al.* 2018:730).

Metacognitive activities in information seeking and retrieval have been noted by Dervin (1992:68). She suggested the repetition of past experiences in an effort to bridge an information gap. Like Dervin (1992:68), Kuhlthau (2004:101) alluded to the formation of new constructs based on prior experience. The impact of students’ use of information retrieval devices to support their uncertainty was tested by Cole (2001). His findings revealed that the effectiveness of the device may be realised if the device is administered late in the research process (Cole

2001:180). The literature reviewed revealed that undergraduate students heavily rely on the web and public search engines for their academic information (Lee *et al.* 2012; Øven 2018).

In studying how freshmen conduct course research once they enter college, Head (2013) found that students are intimidated by the vastness of print and online information resources and are uncertain about how to access and use them. Thomas *et al.* (2017) argued that the first thing students do to begin the interactive information retrieval is multifaceted and highly contextual. They further posited that the reasons why students do not use library resources are contextual in nature (Thomas *et al.* 2017). Other challenges students encounter according to Head (2013), include locating resources. The difficulties students experience in mapping out the inquiry process is another challenge that also confirms the finding of several researchers (Cole 2011; Cole *et al.* 2015; Kuhlthau 1991; 2004; Kuhlthau & Cole 2012). The uncertainty of information access and use that prevails at the time leads students to enquire from lecturers and faculty personnel as a starting point (Kakai *et al.* 2004).

A study by Øven (2018) confirmed that first-year students lack basic information skills and are not cognisant of their lack. As such, students who engage in interactive information retrieval could experience negative affective factors associated with uncertainty.

#### 4.5.4.2 *Barriers to information retrieval*

Search tasks can be complex and challenging for students to the point of developing an information anxiety. Students are driven by the given task to interact with information systems and retrieve information, however, the interactive communication is not without hindrances. Depending on context, students are likely to face the following barriers, among others, in their endeavour to complete a task:

- the articulation of an information need (Taylor 1968);
- the inquiry activity is a problem-solving activity (Wilson 1999);
- affective load (Nahl 2005);
- spatial aspects (Nahl 2007);
- pervasive feelings of uncertainty in the information search process (Kuhlthau 1991:2004);
- experiencing cognitive uncertainty in the inability to map out the entire process of the inquiry (Kuhlthau & Cole 2012); or

- poor search skill in relation to the risk of using unfamiliar information systems (Korobili *et al.* 2011; Savolainen 2016).

The barriers of information retrieval listed above relates to a combination of affective, cognitive and sensorimotor structures of a student. The listed barriers could, to a significant extent, affect how students seek and search for information they require to satisfy their information need.

#### **4.6 Discussion**

This chapter reviewed literature on students' information behaviour, focusing on the student, their information needs, contexts and information activities. Task complexity and information anxiety are some of the aspects that influence students' information behaviour. Pertinent to this study is the role of affect and uncertainty in student information behaviour. The literature reviewed show that anxiety is a cognitive function that occurs in various parts of the limbic structures of the brain. The brain structures function in a systematic way that exudes bodily reactions. The literature review illustrates that student information behaviour is about metacognition.

The applicability of metacognition is evidenced by the significant role played by prior experience in information use. Prior experience is crucial in the choices students make. Student information skills are recorded as poor or low to medium even though students overate themselves. Various elements of context influence the information behaviour of students. The discussion of rural students shows that they enter into universities with a significant knowledge deficit that may limit success in their academic pursuit.

#### **4.7 Conclusion**

The purpose of this chapter was to explore how various components of an information behaviour model affect students' information needs and seeking behaviour. The discussion showed how the interplay between students' mental structures and their context give rise to their information needs, which in turn prompt certain information activities such as seeking, searching, retrieval and use. The role of affect received prominent attention in this discussion. The discussion also showed that all information activities revealed the fluid nature of engaging

with a variety of information sources and the challenges encountered by students. It is the assumption of the researcher that, given the myriad of challenges that students experience when engaged in information seeking and retrieval, students from rural backgrounds may find the processes to be even harder. It is again the researcher's assumption that some undocumented challenges may emerge from this current study. In Chapter 5, the research methods employed in the study will be discussed.

## CHAPTER 5

### RESEARCH METHODOLOGY AND METHODS

#### 5.1 Introduction

The purpose of this chapter is to address the philosophical assumptions and the research methods used in this study. The particular parts of the methods discussed include the research approach, research design, sampling, data collection instrument, and the procedures, reliability and validity of the data analysis methods.

#### 5.2 Background

The philosophical assumptions and research method that is employed in a study should concur with the nature of the study and the methodologies that have typically been used in the specific subject field or discipline.

Nahl (2001:2) alluded to three approaches that are in harmony and relevant to information behaviour. These are the taxonomic, psychodynamic and ethnomethodological approaches:

- The taxonomic approach provides a methodology that permits procedures for the measurement of all elements involved in information behaviour in the three domains of feelings, thoughts and actions (Jakobovits & Nahl-Jakobovits 1990:448; Nahl 2001). The basic focus is to identify the levels and sub-components of information behaviour in the affective, cognitive and sensorimotor domains (Nahl 2001).
- The psychodynamic approach drives the information search process through an awareness of an information need. When information is perceived to be personally relevant, it is adopted by the cognitive domain as part of one's personality structure and, as such, a new dimension of personality is constructed (Nahl 2001). The basic focus of this approach is the resolution of conflict within the self between affective uncertainty and cognitive incomprehension (Nahl 2001). In the case of students, the psychodynamic approach can be linked to what is referred to as the merger between the first space and second space to form the third space of knowing (Kuhlthau & Cole 2012). The first space is the personal knowledge system, the second space is

the school curriculum and the third space is the area of connection for the two spaces. In the third space, new worldviews are constructed (Kuhlthau & Cole 2012).

- Dervin formulated the ethnomethodological approach based on the work of Garfinkel, who founded the ethnomethodological research traditions (Tuominen, Talja & Savolainen 2005:329; Nahl 2001). In investigating sensemaking, Dervin (1992; 1998) developed an approach to describe a gap in cognition when an individual experiences a deficiency in understanding events in their surroundings. The focus of this approach is based on communicative meaning of new information and its role in the lives of users (Nahl 2001). The ethnomethodological approach relates to strategies that are employed in the topic selection of the information search process.

### **5.3 Philosophical Assumption**

Identifying a study's philosophical assumptions are important to ensure the selection of the best research method for the study. This study is aligned with constructivism as a philosophical assumption.

Constructivism is a view of learning that arises from construction and is used to explain how people know what they know. Constructivism tends to manifest when individuals describe their experiences and is associated with qualitative research methods (Creswell 2014:8). As Fainburg (2009:461) put it, information seeking is a learning process. In a learning process, the choices are dependent on personal constructs, which is constructivism.

The theoretical foundations of the information search process, which this study centres around, is based on Kelly (1963) and Bruner's (1973) psychological theories that focuses on the nature of human thinking and learning as a construction process (Savolainen 2015c:181).

In his book *Beyond the information given: studies in the psychology of knowing*, Brunner (1973) describes the construction process as a recursive process. Brunner's (1973) constructivism theory suggests that an individual learns in an active process. The process referred to involves creating new ideas that have a foundation in an individual's past experiences.

Kuhlthau (2004:18) affirmed Kelly's (1963) description of learning as a construction process that evolves naturally through a series of phases. During the learning process, a variety of feelings are commonly experienced in each phase, as shown in Section 3.4.1.

In an effort to address uncertainty and issues of affect in information seeking, the researcher can better achieve the objectives by engaging in a conversation with the participants in a particular context and allowing the individuals to describe their experiences.

Uncertainty itself is a constructive process that takes place in the mind of a human being. To learn about how other individuals progress through uncertainty calls for an interaction between the individual going through it and the person who wants to know.

### **5.3.1 Constructivist approach to learning**

The constructivist perspective of learning offers a view into the user's experience (Kuhlthau 2004:14). The term 'constructivism' refers to the idea that individuals construct knowledge for themselves and form meaning based on their experiences (Brunner 1973; Cole *et al.* 2015:2253; Hein 1991).

The constructive approach is best suited for this study because constructivist learning usually begins with a question, a case, or a problem (Cooperstein & Kocevar-Weidinger 2004:141). For students in an academic setting, Information Seeking construction begins when a research project is given as alluded to in Chapter 4 Section 4.2.

In a constructivist approach, learning moves from experience to knowledge based on the following four aspects:

- learners construct their own meaning;
- new learning builds on prior knowledge;
- learning is enhanced by social interaction; and
- meaningful learning develops through authentic tasks (Cooperstein & Kocevar-Weidinger 2004:142; Hein 1991:1).

Based on the above four aspects, a constructivist approach works best when learners have an opportunity to make sense of the information they have acquired to address a case, a question



or a problem they may be facing (Cooperstein & Kocevar-Weidenger 2004:142). Kuhlthau's (1991; 2004) ISP reveals that information seeking is a process of knowledge construction. Learners and students construct knowledge and obtain meaning from an inquiry. However, in some cases, a learner may fail to derive meaning if they are unable to connect past experiences with the curriculum, as discussed in Section 4.3.3. In a constructivist view, Kuhlthau (2004:25) noted that learning is an active engaging process in which all aspects of experience come into play. The dynamic construction process is driven by feelings interacting with thoughts and actions and commonly experienced in a series of phases with distinct changes in feelings, actions and thoughts (Kuhlthau 2004:25). Kuhlthau (2004) further posited that the process of construction incorporates a cycle of acting and reflecting, feeling and formulating, predicting and choosing, and interpreting and creating.

### **5.3.2 Phases of construction**

Kelly (1963:126) defined constructs as channels in which one's mental processes run. The process of construction is dynamic and driven by feelings interacting with thoughts and feelings (Kuhlthau 2004:25). Kelly (1963) and Kuhlthau (2004:19) described the process of forming new constructs as progression through a series of psychological phases that includes confusion and doubt, mounting confusion and possible threat, a tentative hypothesis, testing, and assessing.

The early phases of construction are characterised as a confusing, perplexing reaction to a vague new idea due to the ill-defined conscious level of need as seen in Chapter 2 Section 2.3. The final stage is characterised by reconstruing, which Kelly (1963:50) defined as placing an interpretation by erecting a structure within a framework of which a substance takes shape or assumes meaning. An information search is a process of construction that involves the whole experience of a person, their feelings, thoughts and actions (Kuhlthau 1991:362).

The information search process at the centre of this study is structured in stages, following the idea of stages of construction (Savolainen 2015c:181). The stages of construction show the information seekers' constructive activities of finding meaning from information to extend the state of knowledge on a particular topic (Hyldegård 2006:51).

## 5.4 Information Behaviour Research

Information behaviour has been widely studied, prompting researchers, such as Vakkari (2008), Julien *et al.* (2011), Given *et al.* (2012), Greifeneder (2014), and Julien and O'Brien (2014), to study the trends and the direction of information behaviour research. Vakkari (2008) observed a decline in the use of theoretical, explanatory and quantitative studies in information behaviour research and alluded to the increase of the use of qualitative research methods. Greifeneder (2014), as well as Julien, Pecoskie and Reed (2011:20), support this view.

Wilson (1999) alluded to the way information behaviour is affected by context. Context has been considered in information behaviour research because it enhances an understanding of the phenomenon. It combines the individual behaviour and that of the social structures that may deeply influence such behaviour (Vakkari 2014). The Association for Information Science and Technology (ASIST) (2014) discussed the various roles of context in information behaviour research and the implications context and its elements have on information behaviour.

The emergence of information behaviour research focusing on affective issues is detailed in the book *Information and emotion: the emergent affective paradigm of information behaviour research and theory* (Nahl & Bilal 2007). The editors of the book attributed its roots to the early works of education and cognitive science. However, Julien *et al.* (2011:21) observed that the use of theory and the consideration of affect is less in research produced by LIS practitioners than it is with LIS researchers. The state of affairs, as Julien *et al.* (2011) cautioned, has a potential to widen the gap between practice and academy, ultimately creating a significant negative impact for LIS education.

The current study's focus is on the role of information seeking and searching uncertainty among first-year students who do not have a background in using academic information resources and systems.

The nature and difficulty embedded in dealing with affect and uncertainty issues of human beings that manifest in a human head could be related to Julien and O'Brien's (2014) findings. Their findings acknowledged the low attention to affective variables in information behaviour research. As Togia and Malliari (2017:58) suggested, the application of survey methods is said to be well known and easily understood. However, especially when considering an earlier

suggestion made by Järvelin and Vakkari (1990), it appears that the natural manifestation of affective issues in human beings calls for the employment of survey methods in the current study. They suggested that nearly all the problems in the information science field be viewed through a survey point of view. This argument is in line with the constructivist approach to learning, which was discussed in Section 5.2.1.

## **5.5 Research Approaches**

The well-known research approaches in human sciences are qualitative, quantitative and mixed methods research. In library and information science research, particularly in the area of information behaviour, the focus is on how individuals interact with information. Various factors discussed in Chapter 2 Section 2.5, such as context, adds to the complexity of users' interaction with the information. In order to explore and gain an in-depth understanding of user's behaviours and attitudes towards information and in line with the philosophical assumptions that underlie the constructivism approach, the qualitative research methodology and methods have been identified for this study. This is because, according to Creswell (2007:40), a qualitative study that employs a phenomenological research design is beneficial in better understanding the phenomenon when quantitative approaches are inadequate or do not fit the problem.

Uncertainty itself is a constructive process that takes place in the mind of a human being. As shown in Section 5.3.1, to learn about how another individual progresses through it calls for an interaction between the individual going through it and the person wanting to know. The discussion of the theoretical framework in Chapter 3 crystallises the decision to opt for the qualitative research method discussed in the next section.

### **5.5.1 Qualitative approach**

Qualitative research can be defined as a field of inquiry that is complex and consists of an interconnected family of terms, concepts and assumptions (Denzin & Lincoln 2005:3). In his analysis of this definition, Creswell (2007:36) noted that the definition is not static but evolves from social construction to interpretivism and to social justice. According to him, a comprehensive definition for qualitative research should indicate the origin, perspective and use of the theoretical lens in qualitative research. Therefore, Creswell (2014:246) defined

qualitative research as a means of exploring and understanding the meaning individuals or groups ascribe to a social or human problem. These combined aspects, namely the origin, perspectives and use of a theoretical lens, are employed by researchers to make sense of and understand people's experiences. This constructivist approach is qualitative in nature and provides the researcher with an interactive platform to understand the setting and context of the participants by visiting their natural context and personally gathering information (Creswell 2014:9).

Apart from the fact that qualitative and quantitative research approaches do not belong to the same basic sets of belief that guides action, Creswell (2007:37-39; 2014:185-186) identified characteristics that are peculiar to qualitative research. These are:

**Natural setting.** Denzin and Lincoln (2005:3) referred to natural setting as a situated activity in reference to the collection of data at a location where the participant experiences the issue at hand. The discussion in Chapter 2 Section 2.5 points to the various aspects to be considered in dealing with the natural setting. In their definition, Denzin and Lincoln (2005:3) stated that in a natural setting, the participant is located in their space and the researcher can observe, interact and interpret to make sense of the kind of meaning participants assign to a phenomenon. A view supported by Creswell (2007:37; 2014:187).

**Researcher as a key instrument.** Creswell (2007:38; 2014:185) alluded to the involvement and role of the researcher. The researcher is viewed as an instrument who becomes present in the lives of the participants and, in keeping with ethical protocols, collects data by either observing behaviour or conducting interviews and employing a variety of interpretive practices (Creswell 2007:37; 2014:185; Denzin & Lincoln 2005:4; Marshall & Rossman 2006:72). In this approach, the researcher remains the key instrument for driving the process by collecting data, examining documents, observing behaviour and conducting interviews. In this study, the researcher was involved in all the processes. In qualitative studies, data is collected from multiple sources.

**Inductive and deductive data analysis.** This refers to the manner in which data is examined and categorised to build themes and patterns for enhanced interpretation. The inductive and deductive analysis of data in the current study is presented in section 5.10.1.

**Participant's meaning.** All of the research is based on understanding the issue being investigated and not the researcher's own perspective. In-depth interviews in qualitative research are meant for the participants to make known their perspective on issues at hand; in this case, uncertainty in relation to information seeking (Marshall & Rossman 2006:101).

**Theoretical framework.** According to Collins and Stockton (2018), a theoretical framework means the way things work. There are various ways in which a theoretical framework can be applied in a qualitative study. The theoretical framework provides a systematic strategy for answering questions in a scientific manner about people in a particular context. The philosophical assumptions of this study, constructivism and the application of the information search process as theoretical framework, provide the structure with which uncertainty in the information seeking of students is explained and understood within the precepts of the qualitative research approach.

**Emergent design.** Creswell (2013:39) posited that qualitative research is not cast in stone. This reflects how flexible qualitative research is and that the plans may change during the process. A shift may occur in the manner in which data is collected while the research is in progress and in the process of the research coming into being. This is unlike a quantitative research paradigm that is structured and rigid (Cypress 2017:254). This normally manifests during the data collection stage wherein the questions may change and the manner of data collection may change.

**Reflexivity.** The researcher reflects on how their background will impact the study (Creswell 2014:186).

**Holistic account.** In accordance to what Creswell (2014:186) said, in order to come up with a holistic account of the problem being studied, qualitative researchers develop a complex picture of the issue being studied drawn from the multiple sources of data and reported from various points of view.

Qualitative research cannot be concluded with a single methodological practice due to its nature of seeking an in-depth understanding of a phenomenon. As a phenomenon, information seeking, uncertainty and the moods that go along with it take place in an interwoven process

that comprises of the mental, physical and perceptual activities alluded to by Kuhlthau (1991:363).

The definitions of affect in Chapter 2 Section 2.4.3 and uncertainty in Section 2.4.3.2 make it clear and support the need for this study to be conducted within the qualitative research methodology and methods protocols. This is because affect manifests internally in an individual without an interaction between the researcher and the participant. Therefore, the researcher will not know how the participant feels or the kind of meaning the participant assigns to affect and uncertainty as they seek information should a different research approach, such a quantitative approach, be followed. As Creswell (2014:246) put it, qualitative research is a means to explore and understand the meaning individuals ascribe to a social or human problem.

Rahman (2017) alluded to the inherent focus of meanings and perceptions in qualitative research and left out issues of context. The one paramount issue of context in this study is that the sample is drawn from students who do not have a background or prior experience in using academic library resources and systems. This is in accordance with the prescripts of the phenomenological research design alluded to by Creswell (2007:120; 2013:104), and Leedy and Ormrod (2010:141).

The researcher acknowledges that elements of context, such as boundaries, space and time discussed in Chapter 2 Section 2.5, have an influence on human information behaviour. In addition to this, the origin of the information search process that underpins this study, which was discussed in Chapter 3, is based on the prescripts of a qualitative research approach. From the available research designs, the phenomenology research design was selected.

### **5.5.2 Phenomenology research design**

Phenomenology is a qualitative research design rooted in the field of philosophy (Creswell 2007:58; 2013:77). The phenomenology research design is used to explore a lived phenomenon to draw its meaning from several individuals (Creswell 2007:57). As Leedy and Ormrod (2010:142) explained, the main purpose of phenomenology is to capture lived experiences and to express them in a language in which the phenomenon is best understood. The phenomenological research design solely depends on interviews. According to Leedy and Ormrod (2010:142), and Creswell (2007:79), the researcher in a phenomenological study

participates by asking questions to the participants so that they describe their experiences about a phenomenon. This study explores uncertainty that, according to Kuhlthau (1991:2004), commonly causes affective symptoms of anxiety and a lack of confidence among students. This is attributed to the fact that the uncertainty can only be observed to a certain extent and a full understanding requires a conversation between the researcher and the individual who experiences it. Also, the role of affect in a human being can only be best explained by the person experiencing it.

The application of the phenomenological research design was preferred for applicability of using a criteria to find and interview individuals who have experienced the phenomenon, that is uncertainty in Information Seeking behaviour.

Furthermore, the context in this study is of importance. The phenomenology research design augurs well with the characteristics of the qualitative research approach discussed in Section 5.4.1. Also, De Vaus (2001:234) explained that the meaning of a phenomenon comes from within its context. The next section discusses context as it is fundamental in information behaviour and of particular interest in this study.

## **5.6 Context**

Context is fundamental in understanding information behaviour. Unlike other forms of research, qualitative research is conducted within its context. The discussion in Chapter 2 Section 2.5 illustrates the immensity of context as a concept and how it has been studied in information seeking and use. In Information Seeking behaviour research, context refers to the information spaces that allow for information activities to occur. The context in which the events occur could be influenced by either the context or situation, sensorimotor activities, or affective matters. Any of these factors tend to influence the behaviour of individuals; in this case, students.

### **5.6.1 Elements of context**

From an inexhaustible list of elements of context, as elaborated by Sonnewald (2007), goals, situation, time, task, systems and processes were found to be well aligned with this study and were discussed in Chapter 2 and 4 respectively. Ingwersen and Järvelin (2005:19) spoke about

actors, referred to as participants in this study, and other components that function as context to one another in the interaction process. The external factors that influence information seeking are referred to as constraints by Fidel and Pejtersen (2004).

#### *5.6.1.1 Situation*

A set of related activities provides a character to a situation (Sonnenwald 2007). The related activities that are likely to characterise a situation for students are a given task, processes, place (for example, a university or the library), time frame of the given task, goals and the system to be applied to achieve a task.

A situation for the current study is characterised by a first-year student who is given a task and expected to engage in unfamiliar processes in an unfamiliar place to achieve a goal using unfamiliar systems. Based on what is shown in Section 4.3, a situation emerges for a students' information need as a result of academic activities.

#### *5.6.1.2 Boundaries*

The boundaries of context are not static, they evolve as the information seeker interacts with information within the varied boundaries that are influenced by a multitude of both internal and external factors and other elements of context.

#### *5.6.1.3 Space*

The general overview of space in information seeking has been elucidated in Section 2.5.2.1. The influence of space and the impact it has on students was discussed in Section 4.3.3.

#### *5.6.1.4 Time*

As with the other elements of context, time has been discussed in Section 2.5.2.2 and 4.4.4. The time dimension is a significant factor in information seeking. However, Savolainen (2006:111) acknowledged the conceptual difficulties brought about by the combination of space and time in discussions of information seeking and use. More often in Information Seeking research, the time factor is not directly expressed though it is always suggested.

In this qualitative case study, it became imperative to collect data from first-year students who had just enrolled and had been given projects that required the use of multiple sources of



information. Their experience was key to the study as all of them had a chance to interact with various sources of information.

## **5.7 Data Collection**

Data collection is the gathering of information using a variety of methods in line with the prescripts of the researcher's worldview, research approach and research design, followed by the data collection methods (Creswell 2014:5). Data collection through survey can take various forms. A multitude of survey methods are available to researchers for use in data collection and all the varied methods have advantages and disadvantages (Maree 2007:156).

In this qualitative case study, the main aim is to learn more about a practice that emerges due to uncertainty among first-year students. Reasons for learning more includes an enhanced understanding of uncertainty among students for improved service provision.

Data collection in a phenomenological study is extensive due to information being drawn from in-depth interviews. A number of activities are involved in qualitative data collection (Creswell 2013:146), as shown in Figure 5.1. The data sources, such as interview schedules, interviews and participant observations, were used in this qualitative phenomenological study as suggested by Creswell (2007:61; 2013:79). Figure 5.1 serves to illustrate the multiple activities that are involved in data collection (Creswell 2013:146). According to Creswell (2013:146), the diagram includes the before and after activities of the actual data collection activities.



**Figure 5.1: Data collection activities (Creswell 2013:146)**

The data collection activities are meant to include the steps for setting boundaries for the study, collecting information through unstructured or semi-structured observations and interviews and documents, as well as establishing a protocol for recording information (Creswell 2014:189). The establishment of the protocols and the data collection activities in the current study began with the university, which registered the researcher as a doctoral student at Unisa. The research ethical clearance given by Unisa is set out as Appendix A. A second research ethical clearance was issued by TUT, from where the sample was drawn, and is set out in Appendix B.

#### **5.7.1 Informed consent**

Besides gaining permission from relevant authorities to conduct research, it was also the responsibility of the researcher to develop an informed consent that provides all the details about the nature of the study.

An informed consent is a written document developed by the researcher to provide information to the research participant (Creswell 2014:96; Brinkmann & Kvale 2015:93). The informed consent provides the participant with the main theme of the study and enough background

information for the potential participant to make an informed decision on whether to participate or not. To better inform the participants, Creswell (2014:96) posited that the informed consent document should include the following: identification of the researcher, sponsoring institution, purpose of the study, benefits of participating, level and type of participant involvement, risks to the participant, confidentiality guarantees to the participant, assurance to the participant that they can withdraw at any time and the provision of names of the persons to contact if need be. The informed consent used in this study is attached as Appendix D.

Despite the fact that the university at which the researcher is registered granted a research ethical clearance for the study, the university at which the sample was drawn requested that the researcher also apply for ethical clearance from them in order to get permission to interview their students. Another requirement was the use of a prescribed consent form by the university where the sample was drawn – set out as Appendix D. The consent forms from the two universities contain similar information and both consent forms comply with the requirements of ethical consent forms stipulated by Creswell (2014). However, due to the requirement of the university where the sample was drawn, that university's consent form was used. It appears in Appendix D.

## **5.7.2 Sampling the participants**

Sampling is a term used to refer to the process of selecting a portion of the population for a study (Maree 2007:79). The selected portion of the population makes up a sample (Leedy & Ormrod 2010:146). There are different types of sampling designs in research classified into two major classes, namely: the probability and non-probability sampling designs (Leedy & Ormrod 2010:205; Maree 2007:172). However, Kumar (2014:234) suggested an additional category of mixed sampling design that includes, according to him, mixed characteristics of both the probability and non-probability sampling designs. A non-probability sampling design was best suited for this qualitative study.

### *5.7.2.1 Non-probability sampling*

Non-probability sampling is a method that comprises a group of sampling techniques available for researchers to use in studying a phenomenon. Furthermore, non-probability sampling relies on available subjects (Babbie 2016:186; Leedy & Ormrod 2010:211; Kumar 2014:242). The

available techniques for sample selection within non-probability sampling are convenience, quota, snowball and purposive sampling.

**Convenience.** It is sometimes referred to as accidental sampling (Leedy & Ormrod 2010:212; Kumar 2014:244). This refers to the convenience of the researcher in locating people within easy reach and is paramount in this sampling strategy (Kumar 2014:244).

**Quota.** Like convenience sampling, easy access to the people is key, however, quota sampling is fundamentally guided by some visible characteristics of the population such as race or gender (Kumar 2014:243).

**Snowball.** It begins with selecting a few participants who will then recruit other participants. Alternatively, the researcher can ask the contact details of other people from the initial participants. It is mainly applicable in instances where it is difficult to find potential participants (Babbie 2016:188; Kumar 2014:244).

**Purposive sampling** is based on the fundamental consideration of the researcher's judgement of who will provide the best information of the phenomenon that is being studied. Purposive sampling is selected for this current study and discussed in Section 5.7.2.3.

A non-probability sampling design does not make use of the random selection of the population elements (Maree 2007:176; Kumar 2014:242). This characteristic of non-probability sampling makes this sampling method relevant to the current study. This is because, as pointed out by Creswell (2013:156) and Kumar (2014:374), purposive sampling is based on the researcher's judgement that the selected individuals can provide the best information on the phenomenon being researched – in this case, uncertainty in the information seeking of first-year students.

Qualitative research mainly occurs in situations that do not permit for the adoption and use of the probability theory and randomness. In this study, the researcher opted to conduct a census sampling and thereafter to employ purposive sampling. The participants were deliberately selected for this study using the non-probability purposive sampling strategy based on their availability and willingness to participate. The non-probability purposive sampling design was intended for use as a mechanism to further draw samples from the census, the total population, to get students who were available and willing to participate further in the study.

### 5.7.2.2 *Census sampling*

The gathering of information about every individual is called a census (Fowler 2009:4). However, Babbie (2016:80-81; 1973:41) referred to a census as a process to select a fraction and to collect data about the members of the population. Based on Babbie's (2016) explanation, a deduction is made that within a bigger group of the population, a census can provide information of the targeted group. In order to include all first-year students in the Faculty of Humanities, a census sampling design was employed. The ultimate goal of employing a census was to precisely identify the population required from the bigger group.

In line with the census sampling design, a questionnaire was used to identify those students within the total population who lack experience in the use of academic information services, resources and systems.

A questionnaire was used for this purpose as it provided the researcher with data extracted from a section of a population that could be used to identify participants who could support the researcher in acquiring an understanding of the phenomenon – in this case, uncertainty. The census sample to whom the initial questionnaire was sent is based on the TUT campus statistics, which is available on the integrated tertiary system (ITS). The census students are registered for one of the following three qualifications: diploma in public affairs, administration of state; diploma in public affairs, local government; and diploma in traffic and municipal police management. Thereafter, a purposive sampling consisting of 15 first-year students who came from a background of a dysfunctional school system that lacked academic information resources and services was drawn.

### 5.7.2.3 *Purposive sampling*

Purposive sampling is sometimes referred to as judgemental sampling (Babbie 2016:187; Kumar 2014:244). In purposive sampling, the researcher's judgement on who will provide the best information is key. As suggested by Babbie (2016:186) and Maree (2007:176), a non-probability purposive sampling design does not make use of random selection of population elements, rather the selection is based on the researcher's knowledge and judgement of the population. Therefore, the participants in the current study were deliberately selected using the non-probability purposive sampling strategy.

Also, the selection was based on the researcher’s knowledge and judgement of the population according to who would provide the best information on the phenomenon being researched.

#### 5.7.2.4 Advantages

One advantage of purposive sampling is that it provides the researcher with a broad spectrum of non-probability sampling techniques to draw from (Sharma 2017:751). Purposive sampling also allows the researcher to select a small number of participants who will provide an in-depth information of the phenomenon that is being researched (Creswell, Plano & Clark 2007:112). It is also viewed as a cost and time-effective sampling technique when it is impractical to conduct a probability sampling.

#### 5.7.2.5 Disadvantages

Purposive sampling design is prone to researcher bias because it is based on the judgement of the researcher (Kumar 2014:244). Also, due to its subjective nature, purposive sampling design may present difficulties in convincing the reader about sample representativeness (Sharma 2017:751).

The number of participants was based on the suggestion of Brinkman and Kvale (2015:140). Another determining factor was the point where the researcher attained data saturation. Table 5.1 illustrates the number of the interview participants, their gender and the qualification they are registered for.

**Table 5.1: Participant profile**

<b>Student</b>	<b>First-year student, Faculty of Humanities</b>	<b>Gender</b>
A	ND: Traffic and Municipal Police Management	Male
B	ND: Traffic and Municipal Police Management	Female
C	ND: Public Affairs, Administration of State	Male
D	ND: Traffic and Municipal Police Management	Male
E	ND: Public Affairs, Administration of State	Female
F	ND: Public Affairs, Local Government	Male
G	ND: Traffic and Municipal Police Management	Female
H	ND: Public Affairs, Local Government	Female
I	ND: Public Affairs, Local Government	Male

<b>Student</b>	<b>First-year student, Faculty of Humanities</b>	<b>Gender</b>
J	ND: Public Affairs, Administration of State	Female
K	ND: Public Affairs, Local Government	Female
L	ND: Traffic and Municipal Police Management	Male
M	ND: Public Affairs, Administration of State	Female
N	ND: Traffic and Municipal Police Management	Female
O	ND: Traffic and Municipal Police Management	Male

The combination of two different sampling designs was necessitated by the nature of the study. Creswell (2014:158) alluded to the clustering of sample designs in case of impracticalities relating to selecting elements of a sample. The relevance of non-probability sampling design to this current study is that it does not make use of random selection of population elements (Maree 2007:176).

Justification of a sufficient sample size in qualitative research remains debatable (Vasileiou, Barnnet, Thorpe & Young 2018). Vasileiou *et al.* (2018) based their argument on a general lack of transparency among qualitative researchers regarding a sample size. However, based on Creswell's (2014:246) explanation, qualitative research's intent is not to generalise the finding, but to explore and understand meanings assigned to a phenomenon – in this case, uncertainty in information seeking. For this reason, the current study bases the determination of a sample size on the concept of saturation coined by Glaser and Strauss (1967). The explanation of data saturation provided by Corbin and Strauss (2008:143) refers to when there is no new data that transpires.

### **5.7.3 The questionnaire**

A questionnaire is one of the data collection instruments in survey research (Leedy & Ormrod 2010:188). It contains questions meant to obtain information from informants (Babbie 2016:248). While the main purpose of the questionnaire is to gather information, the information can be gathered for various purposes. In survey research, a questionnaire may be used for either description, exploratory or explanatory purposes, as well as to determine the unit of analysis (Babbie 1973; Kumar 2014:13). The use of the questionnaire in the current study was to make a descriptive assertion about the population. The questionnaire results

identified the students who lacked previous experience in using academic information resources and systems. Questionnaires can be administered in various ways such as mailing, collective administration, online or administration in a public place (Kumar 2014:178). For the purposes of this study, the questionnaire was administered by way of collective administration in line with Kumar's (2014:179) suggestion. The participants were attending class during a normal class time.

The questions in a questionnaire are either open-ended, allowing the respondent to provide their own answers, or closed-ended, where the respondent selects an answer from a provided list (Babbie 2016:249). A suggestion made by Babbie (2016:258) is to have clear instructions provided on the questionnaire administered to the respondents irrespective of whether it will be mailed, conducted face-to-face or telephonically. Instructions for the participants were provided on the questionnaire answer sheet.

The questions that were asked in the questionnaire are set out in Appendix E. The aim of the questionnaire was to identify the participants that did not have a prior background in using academic information resources and systems. The questionnaire's second objective was to identify the participants who were willing to further participate in the study through face-to-face interviews.

#### *5.7.3.1 Advantages of a questionnaire*

Greater anonymity and cost effectiveness are the main advantages of a questionnaire (Kumar 2014:181). The class distribution of the questionnaire improved the high rate of response and the cost and time effectiveness. Anonymity was achieved in using questionnaires due to the fact that no biographical details were required.

#### *5.7.3.2 Disadvantages of using a questionnaire*

One disadvantage of questionnaires is that they have a low return rate (Leedy & Ormrod 2010:189; Kumar 2014:179). As such, a low response rate may jeopardise the applicability of the findings of the study (Kumar 2014:179).

Another disadvantage is that it has a limited application as questionnaires can only be administered to a literate study population. Further drawbacks include self-selecting bias, a lack of opportunity to clarify issues, no opportunity for spontaneous response and the premise



that a response to a question may be influenced by the response to other questions. Also, a response cannot be supplemented with other information (Kumar 2014:182).

#### **5.7.4 Distribution of the questionnaire**

Upon receipt of the research ethics clearance form from TUT, where the sample was drawn, the researcher liaised with the administrator of the Faculty of Humanities at the Polokwane campus of this university. The faculty administrator's role was to manually distribute and collect the student questionnaire and the informed consent to and from all 189 first-year students in the faculty in accordance with the protocols of census sampling. The distribution of the informed consent at this stage was based on what had been suggested by Hadjistavropoulos and Smythe (2001:164), which is that an informed consent should be an ongoing negotiation between the two parties, the researcher and the participant. It also provided an insight into the study to the participants who were to be interviewed at a later stage. The survey questionnaire was distributed to the various groups over a two-week period as they attended class. This was to ensure that the survey was conducted in class within the university that constitutes the students' natural setting.

The informed consent, together with the questionnaire (attached as Appendix D and Appendix E respectively) was distributed and collected in class by a class representative of the first-year students in the Faculty of Humanities.

##### *5.7.4.1 Handling of the returned questionnaire*

The total number of first-year students in the Faculty of Humanities according to ITS was 189. Out of the 189 distributed questionnaires, the number of responses received were 143. The distribution and subsequent collection of the questionnaires in class had proven efficient timewise. The 75,66% response rate was deemed a success. The questionnaires were sorted by hand based on the responses. Therefore, the inherent challenges of questionnaire distribution and collection in this study were minimised because the distribution and collection were done during class hours and were therefore convenient to both participants and the researcher. Table 5.2 illustrates the entire population that responded to the initial survey with an aim on determining the students who had no previous experience using academic library and information systems.

**Table 5.2: Number of participants who responded**

<b>Participants: Faculty of Humanities</b>			
<b>Category</b>	<b>Consent given</b>	<b>No Consent given</b>	<b>Totals</b>
No access to both school and community/public library	50	24	74
Had access to only community/public library	13	16	29
Had access only to school library	11	10	21
Had access to both school and community/public libraries	9	10	19
<b>Total</b>			143

The questionnaire was only used to determine the existence and the number of students who lacked previous experience in using academic libraries and information systems. Marshall and Rossman (2006:125) alluded to the survey’s fundamental aim, which was to statistically determine the various features in a population.

## **5.8 The Interviews**

In qualitative case study research, multiple data sources are used to collect data (Creswell 2013:105). Of the multiple data collection tools and methods employed in qualitative research, interviews are the most commonly used as a data collection tool (Brinkmann & Kvale 2015:15; King & Horrocks 2010:2; Kumar 2014:176).

The term ‘interview’ refers to a data collection interaction between the researcher who asks questions and the respondent who answers questions (Babbie 2016:528). The questions the researcher asks pertain to the phenomenon under investigation with the purpose to learn and acquire an in-depth understanding of the phenomenon (Maree 2007:87). This is because interviews provide original data about the phenomenon being studied as talking to people provide much more information on the complexities of issues pertaining to a phenomenon that would otherwise not have been known. As such, interviews are an interaction between a researcher and participant that produce knowledge (Brinkmann & Kvale 2015:21). Kvale (1996:1) suggested that talking to people helps to understand their world is best.

Therefore, interviews seem best suited for obtaining an in-depth understanding of an abstract human phenomenon such as uncertainty in information seeking. It was also the opinion of the researcher that the concept that is being studied, uncertainty in the information seeking, is abstract and the best way to understand it was to talk to participants. A further reason for the use of interviews as a data collection tool comes from Brinkmann and Kvale (2015:103). They argued that, unlike other forms of research, interviews manifest within a context. Since context is important in information behaviour studies, it was an important factor to consider. As Brinkman and Kvale (2015:104) explained, the interviewer, interviewee, bodies and non-humans constitute the aspects referred to as an interview context.

Though a survey in the form of a questionnaire could have been used to further collect data other than to statistically determine the numbers, the interviews discussed in the next section were preferred for their ability to provide in-depth information that includes the context.

In qualitative interviewing, there are options to use any of the available types of interviews. Interviews can be structured, semi-structured and unstructured. Structured interviews are predetermined and do not permit for any deviations from the questions (Kumar 2014:384). On the other hand, unstructured interviews, sometimes referred to as open-ended interviews, happen like a regular conversation with little to no preparation (Maree 2007:87). Semi-structured interviews contain aspects of both structured and unstructured interviews (Maree 2007:87). In this study, semi-structured interviews were used because participants were expected to respond to pre-determined questions that followed a defined line of inquiry.

The different types of interviews and their characteristics alluded to by King and Horrocks (2010:2) demonstrates that interviews are not merely conversations but interactions that demand careful planning and knowledge of the interview to be conducted. This view is supported by Brinkmann and Kvale (2015:128). Even though qualitative research interviews are sometimes referred to as informal, Brinkmann and Kvale's (2015:128) suggestion of seven stages of an interview inquiry are meant to assist interviewers not to conduct interviews in a disorganised and unsystematic manner. The stages are:

- thematising;
- designing;

- interviewing;
- transcribing;
- analysing;
- verifying; and
- reporting.

In library and information science research, particularly in the field of information behaviour, interviews are commonly employed (Julien & O'Brien 2014:244). The use of interviews in qualitative research are certainly rooted in the exploration of feelings, perceptions and experiences.

Interviews in qualitative research can take many forms such as focused groups, face-to-face and telephonic (Creswell 2007). For the current study, face-to-face interviews were deemed suitable to diminish the chances of the focus group having a spokesperson, as discussed in Section 1.2.

Yin (2014:110) asserted that even though interviews in qualitative research are focused and provide richer information and personal views about a phenomenon, there are built-in weaknesses. Reflexivity, bias due to poor questioning and recalling in accuracies are some of the weaknesses alluded to by Yin (2014:106). A further weakness was identified by Creswell (2007:140), namely the unbalanced power relations that exist between the interviewer and the interviewee during interviews and the challenges thereof.

Brinkman and Kvale (2015:38) therefore cautioned qualitative research interviewers to think about the unbalanced power relations and to acknowledge the existence of such relations in order to enhance the applied methods and validity of the study. The next discussion is on the interview guide and how it was applied in this current study.

### **5.8.1 Advantages of interviews**

The advantage of using interview guides is that they are useful for collecting in-depth information about a phenomenon. According to Kumar (2014:182), using an interview guide

in a semi-structured interview presents the researcher with a number of advantages such as the ability to clarify questions and to further explain a question when conducting the interviews.

### **5.8.2 Disadvantages of interviews**

On the other hand, interviews also have inherent disadvantages such as the fact that the quality of data depends on the quality of the interaction and the quality of the interviewer as alluded to by Kumar (2014:182). The quality of data may also vary when multiple interviewers are used. Also, due to the subjective nature of interviews, there is a huge possibility of researcher bias. Power dynamics between an interviewer and an interviewee can also be a disadvantage to the entire interview process if not properly addressed. In this current study, power dynamics between the interviewer and interviewee were mitigated due to the researcher, as head of the library, having extremely minimal daily interactions with the students. Furthermore, participants were informed of their freedom to withdraw from the study at any stage.

### **5.8.3 The interview guide**

In the current study, the researcher determined that a semi-structured interview guide was the best data collection instrument. This was because a semi-structured interview guide is flexible and would allow the researcher to probe the participants and to clarify questions when necessary.

The semi-structured interview guide was developed by the researcher, in line with Creswell's (2013:163) suggestion that questions can be open-ended based on the phenomenon being studied – in this case, uncertainty in information seeking. The questions were divided into four sections:

**Section A** dealt with knowledge of the library. The question was meant to establish whether the participant had previously used the library and how they experienced their encounters with the library.

**Section B** focused on interaction with staff. Uncertainty occurs in a number of Information Seeking activities, including communication between staff and information providers.

**Section C** addressed the use of information resources. The use of information resources is core to this current study as uncertainty in information seeking for students is triggered by an information need that originates from an academic need, as shown in Section 4.3.

**Section D** made reference to commonly used words drawn from the ISP model that relate to uncertainty in information seeking. This was to assess whether the first-year students' English language proficiency could have jeopardised the results had the study been conducted using an email survey questionnaire to obtain data regarding uncertainty in information seeking. The interviews were the best method for data collection in this study. The interview guide, which was administered during the interview, appears in Appendix F. The interview guide notes were used together with transcription notes and audio recordings to corroborate the data collected, as advised by Yin (2014:107).

#### **5.8.4 Conducting the interview**

The invitation to the interview was done via email, which has been set out as Appendix G. The participants provided their email addresses in their responses to the initial survey questionnaire. The participants responded to the email and were able to avail themselves during their free periods.

Upon meeting the participants, the researcher gave a brief outline of the study and what the participants were expected to do, as well as what their rights were as a participant in the study. This is in line with Kumar (2014:173), and Brinkmann and Kvale's (2015:93) advice that informing the participants of the purpose of the study and what they are required to do are important determinants of the quality of the data to be collected.

To ensure that the participants were not coerced into taking part, the informed consent was given to them to ensure that they understood what was expected of them. The participants' anonymity was ensured by not requiring them to provide their names on the questionnaire or the consent forms. However, when establishing a rapport prior to the interviews, the researcher asked for the names of the participants for the sake of the interview flow. The explanation of what was to be done in the interview meeting and asking only for the name of the participant was meant to ensure the researcher maintained a balance between professional distance and

personal friendship. This is in line with the caution alluded to by Creswell (2007:140), and Brinkmann and Kvale (2015:97).

TUT's Polokwane Campus library is the natural setting where the participants' uncertainty manifests when they seek information. This was indicated in Section 5.4.1. Therefore, the interviews were conducted in English, the medium of instruction at the university, in room G-122 of the campus library.

Although the participants' ability to communicate in English is quite imperative at university, some of the participants experienced minor challenges with the English language. This was mainly because English is not their native language. In order to mitigate this challenge, it was important to, where necessary, validate statements after responses as suggested by Marshall and While (1994:569). The researcher also employed another suggestion by Marshall and While (1994:569), namely that certain words in the interview guide can be replaced with simple and appropriate ones without aiding participants' comprehension. This is particularly applicable in instances where participants use English as a second language, it may be necessary to adapt to bring about the flexibility inherent in qualitative research. The researcher permitted participants to use both English and Sepedi when they responded.

Brinkmann and Kvale (2015:204), and Creswell (2013:164) suggested that interviews be audio recorded. According to them, the audio recording helps the researcher to focus on the topic and to observe any of the acts during the interview. With this in mind, the interviews were digitally recorded and captured manually on the interview guide for ease of interpretation at a later stage. A digital recorder and the recording application on the researcher's cell phone were used to record the first interview. However, the digital review presented some challenges of an incomplete interview during the second interview and the researcher decided to no longer use the digital recorder. The rest of the interviews were recorded on a cell phone and immediately downloaded onto a folder on an HP Intel laptop to avoid loss of data. Interviews lasted between 21 and 35 minutes. The participants' personalities and their English language abilities determined the length of the interviews.

The following discussion now turns to focus on the several ways in which the critical issues of reliability and validity were considered to enhance rigour within the prescripts of qualitative research methods in the current study.

## 5.9 Reliability and Validity

Among the many key aspects of research, reliability and validity are some of the aspects that must be meticulously considered in qualitative research. According to Creswell (2014:7), Golafshani (2003:597) and Cypress (2017:254), the prevalence of reliability and validity in research has its roots in the positivist worldview of quantitative research.

Within the research methodology, these concepts tend to appear together as reliability and validity even though they are separate concepts and carry different meanings. As such, reliability and validity are discussed in separate sections, namely Sections 5.9.1 and 5.9.2.

### 5.9.1 Reliability

Reliability is defined by Leedy and Ormrod (2010:29) as ‘the consistency with which a measuring instrument yields a certain result when the entity being measured hasn’t changed’. In turn, Kumar’s (2014:380) definition of reliability talks to the accuracy, stability and predictability of a research instrument.

The following discussion is based on the identified criteria that enhance reliability in a qualitative study, namely credibility, transferability, dependability, conformability and authenticity (Kumar 2014:219).

**Accuracy.** In qualitative research, accuracy refers to the ability of the researcher to make a measurement that reflects reality without making a mistake and to be mindful of being biased (Babbie 2016; Kumar 2014). However, Kumar (2014) cautioned that there are factors that affect the reliability of a research instrument that makes it impossible to achieve a hundred percent accuracy. The wording of questions, physical setting, respondents and the interviewer’s mood, as well as the nature of the interaction, are some of the factors that may affect the research instruments’ accuracy (Kumar 2014:216).

**Stability.** In reliability of qualitative research, stability refers to how stable the responses to multiple data set coders are even with repeats over time (Creswell 2013:253; Kumar 2014:215).



**Predictability.** Relates to the level to which the researcher can make a correct prediction. Based on the fact that reliability originates from a quantitative research paradigm, not all researchers agree to its adequacy in qualitative research. This is in line with the argument by Stenbacka (2001:551) that in a naturalistic inquiry, the measurement aspect within the reliability concept makes it irrelevant in qualitative research. However, Creswell (2013:253) alluded to a number of ways in which reliability can be enhanced in a qualitative study such as a good quality tape recording and by transcribing what has been recorded. Therefore, in a qualitative study, according to Creswell (2013:253), reliability can be viewed in reference to the stability of responses to the multiple coders of the data sets.

Reliability of the current study has been enhanced because, even though the survey was distributed in class by the class representative, the researcher personally conducted the in-depth interviews. To further enhance reliability, the interviews were conducted in the library training room used for information literacy training in a bid to provide a naturalistic and comfortable environment for the students. Furthermore, the researcher captured field notes and personally recorded the interviews with a recording device whereafter she transcribed the interviews herself. The procedures reduced the potential unreliability that can be caused by many data collectors.

## **5.9.2 Validity**

The concept of validity in research is also rooted in the quantitative research paradigm. According to Babbie's (2016:148) definition, 'validity' refers to the 'extent to which an empirical measure adequately reflects the concept it is intended to measure'. This definition elicits the underlying background that validity is rooted in the quantitative paradigm where measurement and numbers are fundamental. In this current qualitative phenomenological study, which employed interviews as a data collection mechanism, validity was considered based on the views expressed by participants.

According to Silverman (2016:414), the expressed views can be validated based on the participants' experiences or views, which are an outcome of an interview situation. Silverman's (2016:414) argument supports Maxwell's (2013:121) view that the evidence and the applied research methods validate the study. This is because the evidence was collected from participants as sources of information (Creswell 2013:251; Maxwell 2013:128).

There are eight validity strategies that have been identified by Creswell (2007:207) that are often used by qualitative researchers. Most relevant to this study are the following:

- clarifying researcher bias from the outset; and
- use of multiple and different sources, methods and theories to provide corroborating evidence and to enhance validity (Telis 1997).

The concept of validity is applicable in qualitative research, however, due to the fact that validity in qualitative research does not fit exactly as it would in quantitative research, Guba and Lincoln (1994:114) proposed ways in which validity can be expressed in a qualitative research. They proposed an audit inquiry for qualitative research to determine rigour for qualitative studies. The criteria identified for qualitative studies include credibility, transferability, dependability, conformability and authenticity (Kumar 2014:219). Creswell (1998; 2009) also alluded to the identified criteria to be employed in qualitative studies instead of the concept of validity.

#### *5.9.2.1 Credibility*

Credibility in qualitative research is similar to internal validity in quantitative research according to Kumar (2014:368). Credibility of a study is rooted in the truth of the findings. It is about establishing whether the results of a qualitative study are believable or true from the participants' perspective (Kumar 2014:219). The measures to enhance credibility are in accordance with Creswell's (2013:251) suggestion of triangulation. Triangulation is a technique that involves corroborating evidence from multiple sources. Kumar (2014:386) alluded to different types of triangulation that include, among others, theory and methodology. The ISP model discussed in Chapter 4 is a developed theoretical framework that underpins this current study.

Credibility can be enhanced through sampling protocols. Qualitative research permits a combination of various sampling methods, as shown in Section 5.6.1. This principle was applied in the current study as after the census sampling, the researcher employed the non-probability purposive sampling.

The employment of both census sampling and purposive sampling was to ensure that the inclusion criteria of participants was not missed. The included participants were those that did not have prior access to academic information resources or systems.

Credibility can also be enhanced through data collection tools and methods. The researcher employed a survey questionnaire to support the sampling process and conducted face-to-face interviews using the semi-structured interview guide. Fifteen participants were interviewed within their natural setting. The interviews were audio recorded with the permission of the participants. The audio recordings were then transcribed.

To further achieve and enhance credibility, the data collection in the form of a questionnaire, interviews, the subsequent verbal data transcriptions of the interviews and the corroborated analysis based on the ISP model were employed.

In the current study, the researcher is familiar with the context as a seasoned librarian with more than 20 years' experience providing academic information services to students.

#### *5.9.2.2 Transferability*

Transferability is another technique that enhances rigour in a qualitative study. As Kumar (2014:219) put it, transferability is the degree to which results of a study can be transferred to another context. Transferability is judged by whether the findings can be applicable in other contexts. The sampling exclusions meant that not all first-year students were eligible to participate; only those who lacked a background in using academic information systems could participate. The study can be transferred to students who had a previous background of academic information resources and systems.

#### *5.9.2.3 Dependability*

Dependability is a concept used in qualitative research in reference to the degree to which the reader can make certain that the findings occurred as the reader says they did (Maree 2007:305). Dependability is a concept used in qualitative research while reliability is used in quantitative research (Golafshani 2003:601; Kumar 2014:219). The researcher aimed to achieve the dependability of the study by employing member checking (Maree 2007:305). Member checking is a technique used to validate identified themes with the participants (Maree 2007:305).

To further enhance dependability, the researcher provided (see the preceding sections of this chapter) detailed descriptions of the research methods that were applied in the current study. The research materials used, such as the digital voice recorder, are to be kept safe in accordance to the research data management prescripts of Unisa and TUT. The researcher personally conducted the interviews and self-analysed the data. There was no third party involved in the data collection, transcription and analysis. These measures ensured consistency.

#### *5.9.2.4 Conformability*

According to Kumar (2014:219), a similarity exists between conformability in qualitative research and reliability in quantitative research. Conformability refers to the extent to which results of a qualitative inquiry can be confirmed by others.

Conformability in a study has to depict some extent of neutrality by the researcher to lessen researcher bias. Elo, Kääriäinen, Kanste, Pöikki, Utrainen and Kyngäs (2014:2) alluded to conformability as the likelihood of two or more independent people finding harmony in the data accuracy and the data meaning. An audit trail and triangulation are used to assess conformability in a qualitative inquiry (Anney 2014:279). In the current study, the essence of the findings was based on empirical evidence.

A complete audit trail that involves the techniques for rigour assessment in a qualitative study was observed in this current study.

As per the practice of Unisa's Department of Information Science, this study is subjected to external examiners to examine the entire thesis, details of data collection processes, data analysis and interpretation for conformability.

#### *5.9.2.5 Authenticity*

Denzin and Lincoln (2005:207) alluded to authenticity based on its criteria. The five criteria they identified include fairness, ontological, educative, tactical and catalytic authenticity.

**Fairness.** This refers to the quality of balance in terms of the views, claims, concerns and voices of the participants that should be evident in the text (Denzin & Lincoln 2005 :207).

**Ontological.** This alludes to the manner in which the research will raise the level of awareness among the participants (Denzin & Lincoln 2005:207).

**Educative.** This refers to the manner in which the research will help the participants to develop and expand their horizons (Denzin & Lincoln 2005:207).

**Tactical.** This is related to the way in which the research will prompt the participants to act (Denzin & Lincoln 2005:207).

**Catalytic.** This alludes to the manner in which participants will be stimulated to take some action (Denzin & Lincoln 2005:207).

A clear thread of argument is presented throughout the thesis. An attempt has been made in this current study to carefully consider the aspects of authenticity that forms part of qualitative study as suggested by Kumar (2014:219). Also, thorough attention has been paid to the theoretical attention of the study as suggested by Jones (2013). The findings will be published in a peer-reviewed journal in accordance with the post-examination phase of the Department of Information Science's Masters and Doctoral Studies guidelines.

## **5.10 Data Analysis**

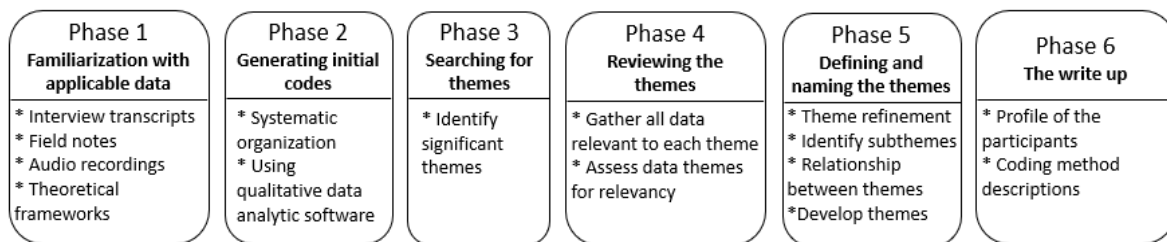
In qualitative research, the collected data only produces meaning after the data analysis is done. Data analysis is a term used in reference to the activities that begin with the preparation and organisation of the data so that meanings can be drawn from the raw data (Creswell 2013:180). This process involves bringing together all different data tools that relate to the study. Whereas the case study research design is applicable to both the qualitative and quantitative research methods, the data analysis differs significantly.

Qualitative data analysis demands a careful consideration of its prescripts to enhance reliability and validity, while sifting through large amounts of data and maintaining clarity of thought may present a complex state of affairs for the researcher. The complexity of data analysis procedures is acknowledged by Thorne (2000). Braun and Clarke (2006:4) concurred with this view. For the novice researchers, Braun and Clarke (2006) recommended thematic analysis as a basis for learning qualitative data analysis approaches. According to Braun and Clarke

(2006), thematic analysis is a method of identifying, analysing and reporting patterns within data. Thematic analysis is inherently flexible and can be applied to different theoretical frameworks.

In a qualitative case study, data analysis begins with the organisation of the details about the case with the facts arranged in a logical order (Leedy & Ormrod 2010:138). Also, analysis can continue whilst data is being collected, particularly when conducting interviews (Creswell 2014:195). Meanwhile, in quantitative research, this approach may not be feasible. The thematic data analysis procedures conducted in this study were drawn from Braun and Clarke’s (2006) six-phase framework that includes becoming familiar with the data, generation of initial codes searching for themes, a review of themes, definition of themes and the write up of the report.

### 5.10.1 Data analysis framework



**Figure 5.2: Data analysis framework**

As shown in Braun and Clarke (2006), and Clarke and Braun (2013) suggested familiarisation with the data. In the current study, the researcher familiarised herself with all data forms that comprised of interview transcripts, field notes, audio recordings and the reviewed literature of the theoretical framework – that is, the ISP model. During this stage, the researcher made additional notes that created an impression whilst familiarising herself with the data.

The second phase relates to the initial coding of the data (Braun & Clarke 2006; Clarke & Braun 2013). The essence of data coding is that data should be converted into meaningful segments or a category. Based on the data analysis framework initial data codes were used to create categories drawn from the research question (Braun & Clarke 2006; Clarke & Braun

2013). Only important features from the research question were extracted to form the initial codes. The initial codes guided and crystallised what the study was trying to achieve.

The third phase refers to searching of themes and coding the information to identify similarities in the data (Braun & Clarke 2006; Clarke & Braun 2013). In qualitative research, themes are broad units of information that consist of several codes clustered together to form a common idea (Creswell 2013:302). The relevance of the themes to the research question is key. During this phase, themes referred to were drawn from the data tools. For the current study, the researcher obtained the themes from the audio recordings, the interview transcripts and what was mentioned in literature. The themes were based on notable statements that were repeated by participants in the interviews and that had been referred to in the literature review, particularly the theoretical framework, ISP model.

Reviewing the themes is the fourth phase of the framework of thematic data analysis by (Braun & Clarke 2006; Clarke and Braun 2013). This phase requires the researcher to apply their mind and assess what will work following the various coding phases. The responsibility of the researcher was to assess whether the themes made sense, the data supported the themes, there were any emerging subthemes and to identify the relationship between the themes.

Creswell (2013:185) alluded to the use of pre-existing codes and encouraged researchers not to be rigid but to be accommodative to emerging codes. Pre-existing codes were used in the current study, while taking into consideration that qualitative studies are emergent. Therefore, additional emerging codes were also considered. The pre-existing codes of this study were based on the themes on the questionnaire of the interviews.

The fifth phase is to define and name themes as suggested by Braun and Clarke (2006), and Clarke and Braun (2013). This phase is meant to identify categories to cluster the data into meaningful groups, identifying the main themes that will emerge from all the data tools, including field notes and interviews as suggested by Braun and Clarke (2006), and Kumar (2014:317). The intention is to identify and highlight significant statements that relate to the topic and to separate the relevant topics from the irrelevant ones.

The identified statements in the current study were grouped into meaning units as suggested by Braun and Clarke (2006), Leedy and Ormrod (2010:142), and Creswell (2007:61). This was

done to provide an understanding of how the participants experienced their Information Seeking activities. The patterns were identified by scrutinising the themes and patterns that characterises uncertainty more broadly.

The sixth phase suggested by Braun and Clarke (2006) and Clarke and Braun (2013) is the writing up. The writing up phase is the narrative analytic report that involves the knitting together of the various data collected and analysed. This is reflected in Chapter 6 (research findings on first-year students' uncertainty) and Chapter 7 (Polokwane campus's first-year students' uncertainty).

### **5.11 Discussion**

In any kind of scholarly research, there are varied methods and procedures that can be applied by researchers. In this chapter, the researcher carefully selected the methods and procedures that have been applied. The selection of methods and procedures were guided by the constructivist philosophy. The constructivist philosophy, which is the consideration of the abstract nature of uncertainty that is being studied, led the researcher to opt for a qualitative research methodology within the case study research design. The phenomenology research design is flexible and allows for a variety of methods to collect data. The census sampling approach has proven beneficial in terms of identifying the participants who lack previous experience in using academic library information systems.

Whereas the initial questionnaire distributed to participants was crucial to the data collection process, the interviews with the participants were fundamental and key to the entire data collection process. The views and perceptions of the participants were captured as notes and in recording devices for establishing themes for analysis to produce meaning. The discussion on interviews illustrates the bounds within which qualitative case study data collection should occur.

### **5.12 Conclusion**

The chapter's intent was to present details on the research methodology and procedures applied. The objectives of this research were to understand the areas that are most articulated in uncertainty, to identify areas of concern and to explore ways to minimise aspects of



uncertainty in students' information seeking and searching. In view of the criticism against qualitative research for lack of scientific rigour, this chapter shows that data collection with the consistent application of analytical procedures and careful consideration of reliability and validity issues can achieve expected levels of scientific rigour. In Chapter 6 the research findings on first-year students' uncertainty will be presented.

## CHAPTER 6

### RESEARCH FINDINGS ON FIRST-YEAR STUDENTS' UNCERTAINTY

#### 6.1 Introduction

The study proposes to minimise feelings of uncertainty among first-year students at TUT that has the potential to negatively influence their Information Seeking behaviour. The purpose of this chapter is to analyse and discuss the data that has been collected through qualitative interviews, as shown in Chapter 5. The presentation in this chapter includes the corroboration of the various evidence gathered throughout the study and the application of the theoretical framework, ISP.

#### 6.2 Context

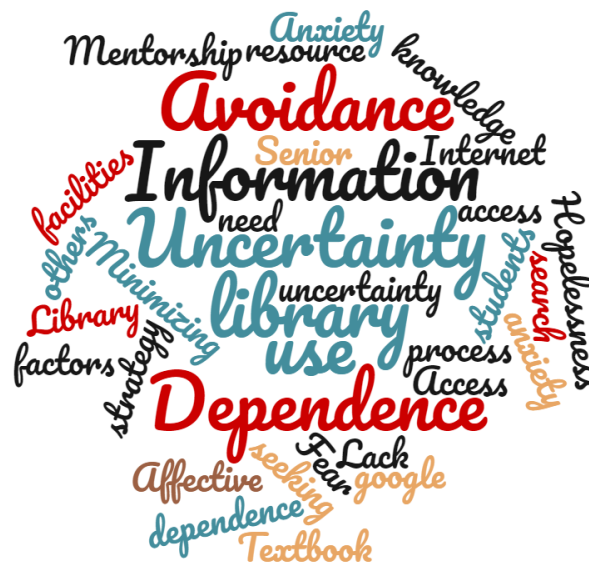
As shown in Chapter 1 Section 1.4.1, the purpose of the study is to identify and minimise the uncertainty that causes affective factors in the information seeking of first-year students at an institution of higher learning. The discussions in Section 2.4.3.1 and Section 2.4.3.4 detail what uncertainty is and how it affects students' Information Seeking behaviour. As alluded to by Savolainen (2015c:194), the reciprocity of affective and cognitive factors, particularly in the information search process, depends on the context in which the information needs arise. One such contextual issue that gives rise to the students' feelings of uncertainty pertains to their lack of prior experience in interacting with academic information resources. This was discussed in Chapter 1 Section 1.4.1. Another contextual consideration is based on the third space alluded to by Kuhlthau *et al.* (2015:26). Third space is an area where the student world and the curriculum integrate.

#### 6.3 Presentation of findings

The findings presented in this chapter are based on the thematic analysis framework by Braun and Clarke (2006), and Clarke and Braun (2013). The presentation has been based on the following four themes: knowledge of information resources and systems, communication with staff, use of information resources and affective factors influencing the participants' information seeking. Each question from the four themes has been presented and analysed. Since Kuhlthau (1991; 2004) asserted that the ISP model is a metaphor and does not manifest

in a linear progression, the analysis of each question is based on the stage the participants' responses relates to.

In qualitative research, additional themes are included to reflect the views of the participants and to avoid using only pre-determined themes (Creswell 2013:185). New themes, namely Internet and Google use, textbook dependence and mentorship, emerged from combining priori and posterior codes from the data, and are also presented and analysed.



*Figure 6.1: Uncertainty themes*

### **6.3.1 Knowledge of information resources and systems**

Students are challenged by a lack of knowledge of information resources and systems, as well as a lack of literacy and retrieval skills to access information in the library (Mahwasane & Mudzielwana 2016). Students' knowledge of information resources was crucial for this current study. It was also borne in mind that the participants have no previous experience using any academic information resources or systems. Their accounts supported the researcher in identifying those factors that contributed to the participants' uncertainty when searching for information in TUT's library platforms.

### *6.3.1.1 Use of the university library*

A pioneering study by Mellon (1986) found that students using the academic library for the first time have to put up with and suffer library anxiety due to various reasons, which include a lack of library skills on how to find material and an inability to conduct research. Among others, library anxiety is one of the reasons students avoid using the library.

Research, such as the one conducted by Komissarov and Murray (2016), posited that students do not necessarily use the library to access information resources that would support them in their academic endeavours. In order to learn whether the participants did use the university library and for what reason, the following question was asked: do you use the university library?

The question was meant to put the participant at ease and to display that the interview is about them and their information activities in the library. The question was also formulated to allow the participants to explain their experiences in using academic information resources.

In response to this question, three participants, namely participant C, N and I, indicated that they do not use the university library. However, further probing revealed that they were avoiding the library because they did not have the required knowledge and skills to use the library. In her own words, Participant N said, 'I am afraid to come to the library and just look around, not finding what I am looking for while seeing people knowing and finding what they want.' All other participants responded that they do use the library, though some indicated that this is not always the case.

The participants who use the library indicated various reasons for why they use the library. The reasons they gave varied from access to information, studying and relaxation to a place for meeting with their friends. These responses were despite the fact that they were experiencing a library for the first time. Also, the practice to meet with friends and socialise is not uncommon among students (Given 2007:170).

### *6.3.1.2 Feelings of a lack of knowledge*

This question was meant to explore the feelings of students when they use the library. Mellon's (1986) findings show that a lack of knowledge of how to use the library brings forth affective feelings among students. Her findings endorsed Kuhlthau's view (2004:92) that uncertainty is

a cognitive state that causes affective symptoms of anxiety and a lack of confidence. Byström and Hansen (2005:1054) asserted that the know-what and the know-how relating to prior knowledge and the experience of students in their Information Seeking pursuits is quite critical and yet comes across as challenging for most students. Therefore, in order to find out how the participants' feelings about using the library affect the use they make thereof, the following question was asked: when you realised that you were not sure about where to find information in the library, how did you feel?

In describing their feelings, 13 participants used words such as 'sad', 'uncomfortable', 'difficult', 'not a good feeling', 'awkward', 'shocked', 'mixed feelings', 'shaking', 'traumatised', 'useless', 'worried' and 'feeling like less of a student'. All these expressions relate to the affective symptoms triggered by uncertainty in information seeking.

However, unlike the other 13 participants, participants D and G's comments revealed that they felt good because they were at university to learn new things. According to Biglu *et al.* (2016:379), anxiety can be affected by stable characteristics in an individual's personality traits. The seemingly calm responses by participant D and G could be attributed to the fact that they may have been set apart by their personality traits.

#### *6.3.1.3 Finding information*

In developing the ISP model, Kuhlthau (1991; 1993; 2004) demonstrated the role of uncertainty in situations of information seeking and library searches among students.

Given the peculiarity of the focus group of this current study, that they have no previous experience in using academic information resources and retrieval systems, it was important to find out how they find the information they need. Therefore, the following question was asked: how do you go about finding the information you require?

The responses to this question revealed that first-year students who have not previously used academic information resources and systems attempt to find information by:

#### *6.3.1.4 Using the Internet and Google*

Participants A, D, I, M, N and O responded that they turn to the Internet and Google for the information they need. In addition, participant N indicated that Google Scholar was the only

option and that there was no way she would go to the library because in the library ‘I do not know where to start,’ she said. As such, uncertainty plays a role in deciding on the channel of information to be used to address an information need.

#### *6.3.1.5 Conducting a physical search of the library*

In their attempts to find information, participants F, K and L said that they went directly to the library shelves and started searching row-by-row without making attempts to ask for help. All participants found it difficult to physically search the library. The shelves challenged them and made it very difficult to find the information they needed. This could be why most of the participants noted that they found searching for books as being time consuming and why they found using the Internet to be a better option.

#### *6.3.1.6 Dependence on others*

Participant B, C, E, G, H and J said that they asked senior students and classmates with whom they worked in group assignments. They also noted the receptionist. Further probing elicited that by ‘receptionist’, participants referred to a library staff member situated at the circulation counter next to the library entrance. Other participants, like Participant M, indicated that they started with the Internet then asked for help from library staff should their information needs not have been met. However, these findings are consistent with an observation made by Kommissarov and Murray (2016), who found that beginning an Information Seeking activity with the Internet is not uncommon among undergraduate students.

#### *6.3.1.7 Library knowledge*

Knowledge of information resources and systems become crucial when seeking for information that would provide in an information need. The students’ information need generally originates from a given assignment or a class task, as shown in Section 4.3. This is when a gap between personal experience of resources and systems, and knowledge is likely to manifest. In order to establish whether the participants were knowledgeable about how to use the library, the following question was asked: how knowledgeable are you about using the library?

The participants’ responses revealed that two participants, Participant I and J, did not seem to let uncertainty become a hindrance in their pursuit of finding information. Participants I and J actually welcomed the assignments given and appeared comfortable with the impending information needs. They were happy because, in Participant I’s own words, it ‘shows we are

doing something at school and I am confident because I trust myself'. This finding endorses Heinström's (2005) finding that there could be a relationship between information seeking and personality traits.

Participants like I and J are motivated to learn and are not merely concerned with collecting information to satisfy an information need. These two participating students' responses seem to indicate that the prevalence of uncertainty in their information needs will not hamper them in reaching their goal as they have trust in themselves. The significance of uncertainty among students like Participant's I and J may be viewed as minimal or positive; a kind of uncertainty that enhances the motive to know more and to continue the search. Kuhlthau and Cole (2012) alluded to the positivity of uncertainty and its importance in the creation of new ideas.

In contrast to Participant I and J's responses, participants A, B, C, D, E, F, G, H, K, L, N and O used words such as 'uncomfortable', 'not a good feeling', 'sad', 'awkward', 'shocked and shaking', 'frustrated' and 'afraid and running around'.

These participants also indicated that they avoided going to the library because they were worried and unable to express their frustration and discomfort when they needed to visit the library. The discomfort expressed by these 12 participants illustrates the prevalence of a lack of knowledge and an inability to use resources among first-year students.

Participant M appeared to be comfortable at first, saying that she has knowledge of the library's resources and systems, and that it was not a big issue to address their information needs. However, further probing elicited that Participant M was referring to the theory that was discussed in the library orientation session. Further probing revealed that she hadn't tried using any of the library systems and resources because of time restrictions. Also, she did not know how to use the systems and it made her feel bad.

#### *6.3.1.8 Feelings related to a lack of skills*

The abundance of print and online sources in an academic library overwhelmed most of the first-year students in Head's (2013) study. This was due to the students being unsure of how to access and use the sources. According to Head (2013), the students tend to realise soon after an academic assignment is given how unprepared and unskilled they are. In order to find out more about the participants' feelings upon realising that they do not have the skills to engage

in the various formats of information resources, the following question was asked: how did you feel when you realised you did not have the required knowledge and skills to effectively search for information that is available in the library?

While answering the question, the researcher observed that 60% of the participants were not enthusiastic and looked somewhat disheartened. They expressed these feelings in their responses with sentiments such as ‘lack of confidence’, ‘worried’, ‘not a good feeling’, ‘not feeling alright’, ‘ashamed’ and ‘feeling bad’. In the words of participant F, ‘I was under pressure and I needed the information.’ In turn, Participant I said, ‘Not having the skills for information makes me feel like I am old fashioned.’ The responses to this question elicited a range of affective factors that are commonly experienced in information seeking (Kuhlthau 1991; 2004; Savolainen 2016).

#### *6.3.1.9 Suggestion for finding information*

Various academic libraries apply a variety of methods to enable users to use the library resources and to acquire information literacy skills (Omeluzor, Akibu, Dika & Ukangwa 2017). Given that the participants came from a background of complete ignorance with regards to academic information resources and systems, it was assumed that even their challenges would be unknown. In order to give the participants an opportunity to suggest the kind of help they needed to find information, the following question was asked: what can the library do to better support you in finding the information you need?

Suggestions from most participants were that they experience a need for someone to teach them everything about the library. Only one participant suggested that high schools must have libraries so that they have knowledge of libraries when they register at a university. Some participants indicated that they needed someone to interact with them as they walked into the library, and ask them if they are first-year students and the kind of help they require. In the words of Participant L, ‘Library staff can ask us if we are first-year students and ask what we want or, alternatively, let us try to search and when they realise that we struggle, they must come and assist because some of us are scared to ask.’ The matter of having someone walking around in the library to spot a student who is struggling is not uncommon in academic libraries. For example, Trout, Pancini and McCormack (2014) reported on the appointment of student rovers to help new students with their basic library-related inquiries. They also found that it helps to alleviate some of the information access barriers experienced by new students.



## **6.4 Communication with Staff**

Students view librarians, or library staff, as not receptive and that creates fear among students (Biglu *et al.* 2016:378). Fear is among the affective symptoms that are caused by uncertainty. In information seeking, fear affects users' ability to effectively communicate with library staff to express their information needs.

Therefore, the inclusion of questions that relate to communication with staff was to discover what kind of perception the participants have of library staff, who are the ones most likely to assist with their information needs.

### **6.4.1 Request for assistance from staff**

When seeking information, students can interact with manual systems, electronic systems and human beings who are deemed fit to assist. In order to find out how the participants perceived the library staff, the following question was asked: please share your experiences of asking a library staff member for support when searching and retrieving information that was required to complete an assignment?

In their responses, Participant A, E, J, L and M noted that they had communicated with the library staff and were satisfied with the assistance they received. However, despite having had a good interaction with library staff, Participant D was not pleased with the outcomes thereof as he could not access the information he was looking for.

On the other hand, Participants B, C, F, G, H, I, K, N and O advanced various reasons for not attempting to communicate with the library staff. The reasons they gave included: 'I was afraid', 'I felt useless because I did not get information at high school about libraries' and 'I did not know who to ask'. In her expression of not wanting to communicate with library staff, Participant H said, 'I did not want them to laugh at me or that every time I come to the library they would say, there comes that one who does not know how to use the library.' The sentiment expressed by Participant H shows that she feared being ridiculed.

Participant K was one of the participants who indicated that she did ‘not know who to ask’ as a reason for not talking to library staff. However, at the end of the interview, just like the other participants, she had an opportunity to ask the interviewer a question. She asked: ‘Are you guys going to help us learn how to do research and to locate the right information?’ Her question suggests that not only did she not know who to ask, she did not know what and how to ask. When considering Taylor’s (1968) theory of an information need, the participant could have been operating at the visceral level, as discussed in Section 2.3.

## **6.5 Use of Information Resources and Systems**

When students seek information, the information search process tends to manifest when the task is initiated by the lecturer. Kuhlthau *et al.* (2015:44) reported that students described affective factors that relate to uncertainty as being depressed and overwhelmed when a teacher announced an assignment that needed more than one source of information.

The significance of Kuhlthau’s (1991; 2004) ISP model in the current study is that a cognitive task construction is merged with the individual’s thoughts, feelings and actions, as well as the use of information resources and systems.

In terms of the ISP model, task construction occurs within the first four phases of the information search, namely the initiation, topic selection, pre-focus formulation and the focus formulation phases. The crux is on stage three, the pre-focus formulation stage, and stage four, the focus formulation stage. According to Heinström (2005), the knowledge of the procedural criteria of the way a task is supposed to be performed in the actual context is also important. It then becomes important to know how the students who never learned how to use academic information resources and how to navigate their information-searching process conduct an information search.

In this section, Questions 6.5.2 and 6.5.3 were meant to find out if the participants attempted to use other available resources and systems besides those available in the library to satisfy their information needs. The questions also focused on establishing whether the participants learnt from their experiences of searching for information. On the other hand, Questions 6.5.4 through to 6.5.7 afforded the participants the opportunity to make suggestions to improve in the areas concerned and the actual areas they needed assistance in.

### **6.5.1 Research assignment feelings and information seeking**

A given assignment initiates task construction (Byström & Hansen 2005:1053). This is made up of thinking about what needs to be done in view of the task ahead. In dealing with an Information Seeking task, prior experience is of vital importance. However, in the current study, the participants do not have prior experience in using academic information resources and systems, and the assumption is that they would feel uncertain because of their lack of knowledge of available resources in the library. It was also assumed that they would be uncertain about how to approach and complete a cognitively challenging task. Therefore, the participants were asked to explain their feelings when they are given a new research project. They also needed to explain how they would go about finding information that could support them in completing a task. This includes an explanation of the keywords they would use when searching for information in the library catalogue or full text databases. An observation by the researcher was that, even though participants explained how they dealt with the task, many were at pains to do so.

Throughout the information search process phases, task performers experience a range of emotions, develop strategies and take particular actions. These include thoughts, feelings, actions and strategies.

#### *6.5.1.1 Thoughts*

When the task begins in information seeking, thoughts focus on understanding the task and trying to relate what they know with the task (Kuhlthau 2004). Uncertainty sets in upon the realisation of an information need. Participant I and K expressed their uncertainty. In the words of Participant K: ‘What comes to mind first is where am I going to get the information?’ The participant’s response shows that she was unable to relate to prior experience because it was non-existent. Kuhlthau (1991; 2004) suggested that thoughts relate to prior experience and learning in order to prepare for a task ahead.

#### *6.5.1.2 Feelings*

The participants responded in ways that showed feelings of uncertainty and used words such as ‘curious’, ‘stressed’, ‘confused’, ‘scared’ and ‘lost’ to describe their feelings when the assignment was announced. In participant K’s words, ‘I can’t really explain the feeling, but I

don't like those kinds of assignments.' In this case, the participant's uncertainty can be twofold: she was unable to locate and use resources, and her lack of previous experience of completing similar assignments.

#### *6.5.1.3 Actions*

Actions during the initiation stage include discussing possible topics with others and browsing the library collection (Kuhlthau 1991:366; 2004:44). The actions the participants took involved asking library staff, senior students, peers, and other friends and family who had been to university on how to go about an assignment. Although the library appears not to be the first point of reference for students dealing with an assignment, a few participants reported that they started by going to the library and when they failed to find the information they needed, they resorted to using the Internet and Google.

#### *6.5.1.4 Strategies*

The initiation stage strategies Kuhlthau (1991; 2004) identified include brainstorming, discussing and examining possible topics while tolerating uncertainty. Most of the participants indicated that they turn to the Internet and Google for all the information. The participants also used group communication as a strategy to enlighten one another either on how to locate the information or on the topic.

The responses to this question demonstrated the participants' discomfort in their quest to look for information to complete a task. Many participants indicated their discomfort as they muddle through the books and information on the Internet and write what they can to present as an assignment. Their lack of knowledge and prior experience in using academic information systems and resources drives them to be dependant of various people. As discussed in Chapter 3 Section 3.3, the information search process is not a linear but an iterative process. Based on the responses provided, it seems as if the participants struggled in an area identified by Kuhlthau (2004:95), and Kuhlthau and Cole (2012) as an information barrier.

### **6.5.2 Use of online information resources**

Kommisarov and Murray (2016) found that when undergraduate students seek information, they rate electronic convenience very high even though they visit the physical library. However, Whitmire (2003:128) observed that their epistemological beliefs, being what they

know, was also found to be a determinant in undergraduate information seeking. Therefore, it was important for the researcher to find out about the areas that students find easy and difficult. The participants were therefore asked the following question: how easy or difficult is it for you to find information using an online database or library catalogue?

The responses to this question confirmed Kommissarov and Murray's (2016) findings. Eight out of the fifteen participants responded that it was easy to find information using an online database. However, it was evident that they responded to this question thinking of accessing information from Google. In the words of Participant B: 'It was just easy, you type the word and get the information.' Further probing revealed that none of the participants knew what an online database was and only two participants were aware of the online library catalogue.

In relation to this question, all who responded that it was easy seemed relaxed and cheerful when giving their responses. Participant D said, 'It was very easy because when you look for something you definitely get it.' Contrary to the participants who found it easy, there were a few participants who found it difficult. The various reasons for their difficulties stem from being computer illiterate, Internet illiterate, the number of sources that were required and a lack of knowledge of finding information sources.

All these factors combined, particularly the use of a number of sources and a lack of knowledge of finding information sources, can reflect an information barrier as alluded to by Kuhlthau and Cole (2012). Information barriers manifest at the realisation that information must be found and used to produce some ideas in an effort to construct the task. An information barrier reflects high uncertainty, which produces anxiety (Kuhlthau & Cole 2012). Anxiety can, in turn, lead to a halt in learning.

### **6.5.3 Access to and use of information**

When taking into consideration that the participants have zero background in completing an assignment that requires a number of sources and are expected to engage with information resources and systems they are unfamiliar with, it is more than probable for both cognitive and affective uncertainty to take root. In order to establish how the participants find information that is required for an academic assignment, the following question was asked: did you find the information you were looking for in the library? Please explain your answer.

Many of the participants responded that they found the information they were looking for without further elaborations. While responding to this question, they seemed relaxed and showed some confidence that was not observed during Question 6.5.1. However, Participant H, I and K alluded to their struggle in finding information. In her own words, Participant K said, 'I did find information but not all, but I just carried on with what I got.' Participant N also said that she had found some information but she knew it was not good enough.

All these reasons pertain to the difficulties in gaining access to information and can be attributed to uncertainty due to a lack of prior exposure to academic information resources and systems. According to Kuhlthau and Cole (2012), the difficulties in exploring information for a given topic causes anxiety.

The response provided by Participant K confirms Kuhlthau (2004:95), and Kuhlthau and Cole's (2012) assertions that students view their tasks as gathering information and completing their task without reaching a particular focus. In this manner, the student fails to break through the information barrier and is likely to produce a theme less presentation when the task is handed in.

#### **6.5.4 Information access suggestion**

In responding to the question on whether they had any suggestions in the assistance they required to find information for their academic information needs, Participant D, J, L and M did not have any suggestions. However, Participant M, though without a particular suggestion, indicated that she needed help.

Participant O's suggestion was that the library should keep prescribed books for their modules. The suggestion for help from senior students was mentioned by Participant C. The need for training by library staff was suggested by Participants A, B, E, F, G, I and N. Their requests varied from locating relevant books and other reliable information, as well as relevant information for the assignment, to finding things online, knowing where in the book to look for the assignment information and everything about information. In a further explanation as to why he needed training, Participant I stressed that he wanted to be independent and learn how to find the information for himself because, 'I am not a baby'. In his suggestion for

training, Participant A stressed the fact that the trainers should be patient with students, because some of them are not fast learners.

The suggestion for prescribed books for modules and to be shown where in the book the assignment information is relates to the observation made by Mojapelo and Dube (2014:13). They observed a dependence and sole reliance on the use of textbooks by both teachers and learners in rural high schools. It is this situation that limits the learners in terms of developing the requisite information skills needed for various activities and, most importantly, their academic pursuits.

### **6.5.5 Too little information obtained**

Information users' thoughts during stage three, the pre-focus formulation stage, of the ISP model are centred around being sufficiently informed of the general topic (Kuhlthau 2004). Obtaining too little information may result in an absence of harmony between prior knowledge and information from different sources, leading a student to think that there is no information for their topic. This is because uncertainty can lead to an information barrier that leads to anxiety, as alluded to by Kuhlthau and Cole (2012), and Kuhlthau *et al.* (2015). The participants were therefore asked: what is your suggestion for possible assistance regarding too little information obtained?

Most participants responded that there should be people to assist and that the library staff should just provide more information resources. According to Participant G, there should be people who can ask students what they are struggling with. Participant F responded that they needed assistance with regards to the use of different sources as they do not want to use the wrong textbook or a textbook that has less information, while Participants C and L would rather ask other people for help.

Here again, the responses to this question revealed the entrenched use of textbooks among the students. Participants F, G, H, J and M suggested that the library should have all the books for all the modules and all the courses and that there should be books set aside that talk about a particular assignment. The use of a textbook tends to nullify the activities that happen between stages three, the pre-focus formulation stage, and stages four, the focus formulation of the information search process. The request for books that talks about a particular assignment

shows that a student expects to be given a book or an information resource with answers to the given assignment or research project. This kind of student is likely not to reach stage four of the information search process because a textbook is to provide answers.

### **6.5.6 Too much information obtained**

Information users deal with information selectively (Case 2016:122). Dealing with too much information requires a student to go beyond the located information to select what is relevant for the task at hand. During stage three of the information search process, the pre-focus formulation stage, it is crucial for students to form a personal point of view (Kuhlthau 2004:47).

The likelihood of getting too much information is high when taking the responses provided in Section 6.5.1 into consideration. In that section, most of the participants indicated that they use Google for the information they require and that they use the Internet more than the library's resources. Unfortunately, when they are unable to deal with too much information and form a personal point of view, their uncertainty levels rise. Therefore, in order to establish the kind of assistance required in how participants deal with too much information, the following question was asked: what is your suggestion for assistance in dealing with too much information? The interpretation of the participant's responses to this question were based on their actions, mood and strategies.

#### *6.5.6.1 Actions*

The actions that are taken in this stage involves locating relevant information, reading to become informed and taking notes on facts and ideas. Many participants did not mention reading to be informed, but rather just getting the information from the Internet and Google. This is in accordance with what Kuhlthau (2004) said about many students only seeing their tasks as gathering information and completing their tasks without reading to be informed.

#### *6.5.6.2 Mood*

The mood in stage three of the information search process is said to be primarily invitational (Kuhlthau 2004:47). This is because uncertainty levels go up during stage three and can either have a positive or negative effect. When the uncertainty level goes up during stage three, it is the invitational mood that manifests. In an observation made by Savolainen (2015c:183), the unexplained simultaneous manifestation of uncertainty can be viewed as being negative and an



invitational mood as being positive. However, due to the anomaly he observed, Savolainen (2015c) suggested a link to the contextual factors affecting information seeking. In the current study, the contextual aspects can be attributed to situational factors such as tasks and their relationships to the information search process.

Most of the participants said that they would ask someone for help. They seemed untroubled about having to deal with too much information. The demeanour of most participants seemed to suggest that they were questioning the relevance of the question, because it should have been obvious that, in the case of too much information, somehow it must be reduced. Although they were certain that they needed someone like a library staff member or a senior student to help them with a summary, they were oblivious and uncertain of how crucial the creation of that summary was to their learning expedition. Most of the students are likely not to break through the information barrier in order to formulate a focus because they cannot summarise their own work.

#### *6.5.6.3 Strategies*

Only Participants H, L and N alluded to reading and writing from their mind, implying that they summarised the information themselves. Participant M's response was that someone must help her to summarise too much information. Participants H, L and N had an idea of the need to work and interact with the information located. By reading and writing from their minds, they will experience and learn how to tolerate inconsistencies and incompatibilities of the information they had found. They are also likely to break through the information barrier and be able to formulate a focus, which is stage four in the ISP.

In response to this question pertaining to dealing with too much information, Participants D, E, J and K did not suggest anything. The likelihood was that they were not cognisant of the kind of help they needed because they initially said it was easy to find information. This assumption is based on their responses to Question 6.5.2 that 'when you search the Internet for something, you definitely find it and you find straight information'.

Participant K was the only participant who did not make any suggestion and alluded to the difficulties she experienced in accessing information. The difficulties the participants experienced in accessing information could be linked to the potential difficulties an information

user experiences when formulating an information need, particularly the visceral Q1 level of an information need.

### **6.5.7 General academic assignment assistance**

Conducting a work task, such as an academic assignment, requires a know-how and know-what (Byström & Hansen 2005:1054). In order to establish whether the student had the know-how of how to approach an academic task and to afford them an opportunity to respond with rather than having to focus on a particular aspect of information use and resources, they were asked the following question: what kind of help (in general) would you recommend to assist you in dealing with an academic assignment?

The participants' responses varied from getting help from library staff or senior students to fellow students in a group or mentors. Most of the participants indicated that they needed help, but were not overly concerned about who would provide the help.

Only two participants, that is Participant C and E, said that they had no suggestion but highlighted the fact that they needed help. Extensive particular responses were given by Participants L and N. Participant L responded: 'I want library staff to teach me how I can start an assignment, what kind of information and what kind of subtopics I can generate.' Participant N said, 'I want to be taught how to access all resources that are available and to get to know if all the sources are valid.'

## **6.6 Affective Factors**

In information seeking, moods and attitudes tend to influence cognitive aspects such as personal knowledge and information content (Kuhlthau 1991:363; 2004). In this section, the emotions and feelings of the participants are explored. The difficulty of investigating the students' cognitive thoughts and affective feelings is acknowledged by Kuhlthau (1991:363). It is for this reason that participants were asked to describe their feelings when seeking information that would address their information needs.

The respondents were asked the following question as a precursor to Question 6.6.1: In relation to your given research project, what would you say are the feelings of uncertainty you are experiencing, namely anxiety, fear, apprehension, confidence, anger or being overwhelmed?

The essence of the question was to gain an added impetus during the data analysis by comparing how they responded to the three themes of the questionnaire in relation to how they rated themselves. Uncertainty in information seeking causes the affective factors to manifest during the various stages of the ISP model.

The participants' responses could be analysed in terms of knowledge of information resources and systems, communication with staff and the use of information resources. These concepts are discussed in detail in Section 6.6.2.1 through to 6.6.2.7.

### **6.6.1 Self-definitions when dealing with a research task**

The question was meant for the student to self-evaluate so that the researcher does not formulate opinions about how they would fare in the analysis. Of the seven concepts, none of the participants described themselves as apprehensive or having feelings of anger when dealing with an academic project. However, three new concepts emerged, namely feeling bored, being annoyed and feeling good.

#### *6.6.1.1 Uncertainty*

In information seeking, uncertainty has both cognitive and affective dimensions (Wilson *et al.* 2002). According to Kuhlthau (1991; 2004), uncertainty about information tasks causes negative affective symptoms. In turn, negative affective symptoms may hamper the thinking skills and abilities of an information user (Kwon 2007:238).

Participant B's response to the question was that 'uncertainty' best describes him when dealing with an academic assignment. Table 6.1 provides an analysis of participant B's responses and illustrates the influence of affect and cognition in her information seeking. Based on the reason for the concept selection, Participant B understood what was meant by uncertainty.

**Table 6.1: Task uncertainty**

<b>Participant</b>	<b>Response</b>	<b>Knowledge of information resources and systems</b>	<b>Communication with staff</b>	<b>Use of information resources</b>
Participant B	It's uncertainty, because I'm not sure of what I'm writing about.	I could not associate myself with library activities, duties, doing assignments and all, so it was difficult.	I was so afraid of like new people asking for help and surely because I do not know much. It was my first time and where I come from, they don't do that.	Okay, first thing is to use the computer in the library, search for the books that are allocated to that subject.

The expression of fear in Participant B's response and her lack of confidence in using information resources demonstrate the holistic experience of thoughts, actions and feelings as they are articulated by Kuhlthau (1991; 2004) in the ISP. In relation to Participant B's response to knowledge of information resources and systems, her inability to associate with library activities and duties in doing assignments point to both affective and cognitive uncertainty. Her response demonstrates that she is not yet at the initiation stage of task construction, but is battling with how to approach the information resources and systems. However, instead of comprehending the task ahead, the lack of experience and knowledge divert her thoughts to dealing with the knowledge and experience deficits. Her fear of asking for help compounds the level of uncertainty being experienced. Her inability to associate herself with the duties of doing assignments can be related to the cognitive aspects of task construction. She says, 'I could not associate myself with library activities, duties, doing assignments and all, so it was difficult.'

#### 6.6.1.2 Anxiety

The analysis of data pertaining to anxiety appears in Table 6.2 and was discussed under the headings Thoughts and Actions.

**Table 6.2: Anxiety**

<b>Participant</b>	<b>Reasons</b>	<b>Knowledge of information resources and systems</b>	<b>Communication with staff</b>	<b>Use of information resources and systems</b>
A	It is my first time doing a university assignment.	I feel curious. I lack confidence and I feel curious. I do not know what to do.	I was assisted by staff.	I need someone to help me.
O	It is one of the reasons I use the Internet; it is because I am shy.	I feel like I do not know much and I lack a lot of information.	It never came to me to talk to staff.	I feel lost and don't know actually where I can find the information.

Participant A and O identified the concept ‘anxiety’ as being the best concept to describe them when dealing with an academic assignment. In defining anxiety, Participant A said, ‘Anxiety is when you have something that worries you,’ while Participant O said, ‘Actually anxiety is fear’. Both participants had a fair understanding of the concept meaning. As discussed in Section 2.4.4, anxiety is highly unpleasant and brings about feelings of fear and apprehension.

a. Thoughts

Kuhlthau (2004:101) asserted that what is useful in information seeking emanates from constructs formed through prior experience. Participant A’s comment in Table 6.2 shows that he is unable to relate his thoughts to prior experience, because he has no prior experience, hence he opted for assistance.

b. Action

Although both Participants A and O may experience delays in formulating an information need and therefore move from a conscious Q1 level to a compromised Q4 level of an information need, which could be used in an information system, participant A may be slightly ahead of

Participant O in overcoming feelings of uncertainty. The notable difference between the two participants is that Participant A took action by asking for help, whereas Participant O did not. However, Participant O relied on previous constructs based on his use of the Internet.

### 6.6.1.3 Fear

The analysis of data pertaining to the concept ‘fear’ is based on participants’ responses in. In the ISP model, uncertainty that is accompanied by fear and apprehension is experienced in the first three stages – that is, the initiation stage, the topic selection and the pre-focus exploration. The analysis of the concept ‘fear’ is based on the following headings: thoughts, feelings, actions and strategies.

**Table 6.3: Fear**

<b>Participant</b>	<b>Responses</b>	<b>Knowledge of information resources and systems</b>	<b>Communication with staff</b>	<b>Use of information resources and systems</b>
Participant F	Whenever they give me assignment, I'm stressing cos' I wanna make sure that I pass assignment.	It was awkward since it was my first time. I have since asked my friend, he helps me to get the information.	Hmm, as for now I did not ask any library staff, I've just asked one of my lecturers.	I have to go to library and look at information so I have to understand the topic of the project and develop strategies.
Participant G	Because, as I said, that already everything it's new, like the assignment I'm given in, in	It feels good everything is new. When you come from a different place	I did not ask any library staff. I felt like ke (I am) useless, cos' a ka gwetsa (I did not get) enough information	I feel stressed and confused.

Participant	Responses	Knowledge of information resources and systems	Communication with staff	Use of information resources and systems
	<p>different way, like you have to go and find more, more and plenty of information and they will say that you must put it on, in your own words like you read first, then you can put it in the assignment. So, you have to use your own words.</p>	<p>you must learn new things.</p>	<p>from, from school, from where I come from. I felt not so good.</p>	
Participant H	<p>Because I had fear that this library is like, what if I don't get information I want so I will feel like so it means I will fail, when I do something that I don't know.</p>	<p>I was shocked, I had mixed feelings and I was shaking.</p>	<p>That ones in the library, I didn't talk to them. Even if I can ask them, they will laugh at me or maybe they will think like that cos' maybe if I can ask them, every time when I enter here they will say okay this one or that one don't know anything about libraries.</p>	<p>I feel like this, yhoo, these people, like they give me a lot of work, like this work that they, they have given me it will cost me to go to library when I know I don't know everything about library ...</p>

<b>Participant</b>	<b>Responses</b>	<b>Knowledge of information resources and systems</b>	<b>Communication with staff</b>	<b>Use of information resources and systems</b>
Participant L	What if I do not get the relevant information?	Worried, I kept worrying because I do not know how to find the books. I do not have that experience of what book I can use.	They were friendly, they asked me what I want, then yah, I got the help I needed.	I felt like, yah, I should work hard because it's for the first time I get an activity here.

a. Thoughts

The first three stages of the information search process require thoughts in comprehending the task, the selection of a topic and an engagement in pre-focus formulation. Participant G shows that there is no option but to go to the library to find information, understand the topic and develop search strategies. Participant G's reaction can be understood in terms of Burke *et al.*'s (2019:167) explanation of how a human body reacts to fear. According to them, feelings of fear is immediate and the human body's response to fear reflects a fight-or-flight reaction. As they explained, a flight reaction is reflected in the realisation that there is work to be done and the user decides to 'fight' feelings of fear. When Participant G was confronted with an academic assignment that needed to be handed in, her fight response became observable when she engaged in task construction by seeking information that would satisfy her information need.

b. Feelings

Feelings of uncertainty are characterised by feelings of confusion, doubt and threat. Participant G, H and L felt threatened. As shown in their responses in Table 6.3, they were concerned about what they would do if they did not obtain relevant information. All of the participants



expressed their feelings of fear as feeling ‘awkward’, ‘stressed’, ‘confused’, ‘shocked’ and ‘having mixed feelings’.

All the expressions mentioned by the participants feature strongly in the initiation, topic selection and pre-focus exploration stages of the information search process. A deduction of Participants G, H and L’s responses in Table 6.3 suggest that their negative feelings could be rooted in their lack of knowledge and their belief that using an information system is complicated and that that they would not be able to obtain information.

#### c. Actions

Reading to become informed is one of the actions a user embarks on when they experience feelings of uncertainty. Despite the purpose of reading to alleviate feelings of uncertainty, Participant G’s references to reading and writing in her own words alludes to being stressed and confused. Based on Kuhlthau and Cole’s (2012) description of the pre-focus exploration stage thinking blocks, resulting from feelings of high uncertainty, an information barrier broods that has both cognitive and affective elements. As discussed in Section 4.4.3, a students’ inability to combine information that is already known with new information to form a new meaning becomes a barrier to information.

#### d. Strategy

Although the participants expressed their experiences of dealing with an academic assignment as that of fear, they all had alternative ways of addressing their information need. In response to the question asked in Section 6.5.3, Participant G indicated that ‘it is impossible that there is no one in the group that does not know,’ while Participants F and H asked a friend and a peer they saw in class for help.

#### 6.6.1.4 Confidence

In responding to the question of what concept best describes them when dealing with an academic assignment, Participants C, D, E, I and N thought that ‘confidence’ best described them.

Confidence is viewed as an affective factor influencing information seeking. In the information search process, the student’s feelings of confidence start to develop at stage four, that is the focus formulation stage, and the development of their confidence levels continue during

information collection. Confidence is associated with clarity of thought and focus formulation. The analysis of data pertaining to confidence appears in Table 6.4.

**Table 6.4: Confidence**

<b>Participant</b>	<b>Responses</b>	<b>Knowledge of information resources and systems</b>	<b>Communication with staff</b>	<b>Use of information resources and systems</b>
Participant C	It is a positive feeling; your confidence will push you.	Eish, it was not a good feeling. Finding a library at tertiary level while you did not have it in high school, eish, it is not easy.	I didn't get the information that I wanted. It seemed like the lady there, they didn't know some of the books that I was looking for.	Okay, I think the best solution is to communicate with the staff member of the library.
Participant D	When you trust yourself, you have confidence in everything that you do and you do it well.	I felt very good. Yah, I felt very good when I found the library.	The treatment that I got from her was good. But the, I was not pleased with the main business that I went for because I didn't get all the information that I went for.	I will go to Internet. Most of the time I go to Google when looking for more information.
Participant E	I only have confidence. If you know that you can do something it becomes	I felt sad, but then I asked around. I spoke with the receptionist there.	He did help me. So, we asked the relevant textbook that we can use for some, information on the assignment	Now when I get a book in the library, first thing first, I go through the table of contents and I

<b>Participant</b>	<b>Responses</b>	<b>Knowledge of information resources and systems</b>	<b>Communication with staff</b>	<b>Use of information resources and systems</b>
	easier for you to do.		because we can't do it.	check the topic that is related to my assignment or my school work and then I go straight to that content.
Participant I	When I do an assignment, I firstly see the positive side of me. I give it my positive side.	I have never used the library before. I feel traumatised.	I never spoke to them. I'm kind of person that would try things when they get hard when I struggle, I ask for help.	I feel scared, so I use Google to get more information.
Participant N	There are many sources that I can use like the ERC, ask other students or mentor.	I feel I am less of a student because I do not know how to locate information.	The first time I came, I only saw one person. That person just was going out, I was like, okay, which means there no assistance here, then I left.	I start to think of how am I gonna get this information for this project . The only thing that comes in my mind is like the Google, the Internet. I do not go to the library because I do not know how to use it.

The discussion that related to confidence in Table 6.4 is focused on the participants' expressed thoughts, feelings, strategies and actions. Participants C, D, I and N were self-trusting and took comfort in the availability of the Internet and Google. The confidence alluded to here bears no connection to the actual task construction. In consideration of these participants' responses, their feelings of confidence seem to tilt towards personal self-confidence in knowing another avenue to find information other than struggling at the library.

Although the participants felt bad about not knowing the academic information resources and systems and the use thereof, they seemed not to be worried. As shown in Table 6.4, Participants C, D, E and I were self-trusting. Participant D said, 'When you trust yourself, you have confidence in everything you do and you do it well.' The participants' responses illustrate that they deflected on their feelings of confidence and personal characteristic to deal with the academic assignment. According to Kwon (2007), confidence is beneficial in dealing with an academic task because it reduces anxiety and other negative affective factors.

a. Thoughts

When Participant C was confronted with an academic assignment, he opted to seek help, whereas Participants D, I and N relied on the Internet and Google. Although uncertainty sets in at the initiation stage, these participants' positive dispositions lead to high ambition and begin with the task construction.

It is probable that their information needs are at a compromised Q4 level. This is because they put their information need in the hands of an information system that is the Internet and Google.

b. Feelings

Only Participant I said that he felt a bit scared and traumatised when he was confronted with an academic assignment. However, even though he felt uncertain, which is a negative feeling, he said, 'I give it my positive side'. All of the other participants appeared calm and unworried in their demeanour and seemed comfortable in responding to the question.

c. Strategy and action

Participants C, D, E and N said that they would use the Internet to deal with their academic assignments and seemed comfortable knowing that they could access information on the

Internet. Though confident, Participants C, D and E asked for help from library staff. Only participant I indicated that he would rather struggle than ask for help as a first option.

#### 6.6.1.5 Overwhelmed

When something has a strong emotional effect on someone and they feel completely defeated, they are overwhelmed (*South African concise Oxford dictionary 2005, sv 'overwhelmed'*). The analysis of the data pertaining to the concept overwhelmed is summarised in Table 6.5.

**Table 6.5: Overwhelmed**

<b>Participant</b>	<b>Response</b>	<b>Knowledge of information resources and systems</b>	<b>Communication with staff</b>	<b>Use of information resources and systems</b>
Participant K	I don't know, this thing is just too much for me. Doing research, finding information ...	It makes me feel useless, because I do not know how to find information. Even if I end up finding the information, it takes a long time.	I haven't asked anyone. I don't know who I should ask.	The first thing that comes to my mind is like where I'm going to find the information?. I don't know. I can't really kind of explain that feeling but I don't like those kinds of assignments.

The discussion and further analysis of the data presented in Table 6.5 are focused on thoughts, feelings and strategies as nuanced in the information search process. As shown in Table 6.5, Participant K described her experience when dealing with an academic assignment as feeling overwhelmed. Her feelings of being overwhelmed is reflected in her comment: 'This thing is just too much for me.' Her response of feeling completely defeated in dealing with her assignments show that she has a good understanding of the concept.

#### a. Thoughts

Participant K's response of being overwhelmed by doing research and finding information occupied her thoughts a while longer as she pondered where and how she would get the information. When considering the predicament Participant K faced, it seems that her information need was at the visceral Q1 level. Her task construction activity might have been delayed while thinking about where and how to find the information. Task construction occurs in the first four stages of the information search process.

#### b. Feelings

Feelings of uncertainty sets in when Participant K realised that she did not know the information resources or how to use them. Her feelings of uncertainty manifest through her expression of feeling overwhelmed. Although the choice of information sources and channels form part of the overall task construction, being overwhelmed may cause her to lose interest. As such, her feelings of being overwhelmed may also delay her engagement with the actual information search process for the given assignment. Her feelings of defeat made her feel useless and she had no intention to ask for help.

#### c. Strategies

Participant K seems to have found it difficult to articulate her information need. Her responses were consistent with Kuhlthau and Cole's (2012) suggestion that an inability to articulate an information need is one of the worst information barriers a student can experience. Based on Participant K's responses, it seems that she found it difficult to identify and articulate her information need or knowledge gap. This is further reflected in the fact that, even though she felt overwhelmed, she did not opt to communicate her uncertainty to library staff, her peers or senior students.

Participant K is likely not to achieve the focus formulation stage in her information search process. In her response to Question 6.5.3, she said, 'I couldn't find information even if I typed the keyword of the thing I am looking for I can't seem to find it. I just carried on with what I have.' Her position illustrates how affective uncertainty creates an information activity barrier that occurs prior to the commencement of the task construction.

In Kuhlthau and Cole's (2012) view, an information barrier occurs during the transition from the pre-focus exploration stages to the focus formulation stages of the ISP.

6.6.1.6 *Bored and annoyed*

The terms ‘bored’ and ‘annoyed’ have not previously been used to describe feelings in the information search process. Despite not being given these terms to describe her feelings of uncertainty when confronted with an academic assignment, Participant M used the words ‘bored’ and ‘annoyed’ in her responses. Considering *South African Concise Oxford Dictionary’s* (2005) definitions for these terms, being annoyed means something made her angry, whereas being bored means she was involved in a dull and uninteresting activity that could cause feelings of weariness.

Participant M’s feelings of being bored and annoyed are in line with a suggestion made by Kuhlthau (2004:101) that personal interest has a role to play in task construction. Table 6.6 shows the responses provided by Participant M.

**Table 6.6: Bored and annoyed**

<b>Participant</b>	<b>Response</b>	<b>Knowledge of information resources and systems</b>	<b>Communication with staff</b>	<b>Use of information resources and systems</b>
Participant M	Hmm, I feel so bored, annoyed. I don't know, but especially when I don't get information, I get so annoyed ... me not getting information of what I need.	I do not know how to use the library website. It makes me feel bad.	It was great. She was very kind and helping.	It was very difficult. I had to go check almost all of the books and there are many, there are a lot.

The analysis of participant M’s responses is focused on her thoughts and actions.

a. Thoughts

Participant M's response that she was 'bored' and 'annoyed' shows a lack of interest. Her lack of interest in an academic assignment is likely to hinder her from thinking about the assignment and comprehending the task ahead. Based on Kuhlthau's (2004:101) view, interest fluctuates throughout the search process. It seems as if Participant M experienced a lack of interest and boredom during the initiation stage of the information search process. Boredom, as suggested by Kuhlthau (2004:96) and discussed in Section 3.4.3, could be the result of too much redundancy.

b. Action

Even though Participant M sought help, it seems as if she did not experience pleasure in dealing with the academic assignment. This assumption is based on her response pertaining to the use of information resources. She said, 'It was very difficult and I had to check all the books and there were many'.

c. Good

When asked what word best described them when dealing with an academic assignment, Participant J responded that she felt 'good'. Despite having maintained that she felt good when confronted with an academic task, Participant J later said that she felt overwhelmed and further explained her feelings in her native Sepedi language. She said, 'Ke fela like o tlaletse ke dilo around wena.' The literal translation of her explanation is: I feel like there is just a lot of things around me. Apart from saying that she felt bad not knowing how to use the library, Participant J felt 'good' about an academic assignment. Although a bit overwhelmed, her thoughts were conditioned to comprehend the task ahead.



**Table 6.7: Good**

<b>Participant</b>	<b>Response</b>	<b>Knowledge of information resources and systems</b>	<b>Communication with staff</b>	<b>Use of information resources and systems</b>
Participant J	Overwhelmed . Okay, sharp, overwhelmed ... ke he o fela like otlaetse ke dilo around wena.	I felt bad not knowing how to use the library. Ah, it is not easy.	I went to the assistant, told her the topic of my assignment and she, she got the book for me to read. Our communication was fine.	Uh, the minute they give me the research project, it is like I know I still have a lot of, a lot of work to do so I need to go and find more information.

## **6.7 Internet and Google Use**

Internet and Google use is the first theme that emerged during data analysis. The analysed data showed that the Internet and Google seemed to have assisted participants in dealing with their uncertainty. All the participants reported to have used the Internet and Google at some point in dealing with their information needs. Most participants began addressing their information needs by searching the Internet and Google while a few reported to have started their information searches by browsing the library shelves. This was despite the fact that they had no understanding of the bibliographic arrangement of print resources. The participants' use of the Internet and Google is discussed in more detail in Section 7.3.1.

## 6.8 Textbook Dependence

Textbook dependence emerged as a theme requiring consideration when the empirical data was analysed. A textbook, as defined by *South African Concise Oxford Dictionary* (2005), is ‘a book used as a standard work for the study of a particular subject’.

The analysed data showed that the participants were familiar with the use of textbooks, as opposed to using multiple sources of information. The following statements emerged throughout the interviews and most of the participants were settled on using textbooks to address their information needs:

- ‘They must show me which book to use, said Participant A.
- ‘When I spoke to the receptionist, I asked for a relevant textbook that I can use for my assignment,’ remarked Participant B.
- ‘Library staff must give me a reliable book; they must tell me which pages I can get the information,’ Participant C noted.
- ‘When you get a book, you want to know exactly where to find the information you need,’ Participant D remarked.
- ‘I want to be shown a relevant textbook and where to get relevant information in the book,’ said Participant G.
- ‘When there is an assignment, books must be put aside in the library,’ Participant H.
- ‘When I show the library staff the topic, they must give me the textbook that they think will help me,’ said Participant M.
- ‘There should be textbooks for all courses and all modules in the library,’ Participant O noted.

Based on these statements, it seems as if the participants struggled with the assimilation of information from various information sources.

## 6.9 Mentorship

A mentor is an experienced person who trains and counsels a new student (*South African concise Oxford dictionary* 2005, sv ‘mentor’). Students learn from their peers and friends about

their information and research needs (Murphy 2016:153). Mentorship is the third theme that emerged during data analysis and is discussed in more detail in Section 7.8.

The following are verbatim quotes that reflect the participants' sentiments in this regard:

- 'I asked a senior student for help,' Participant A stated.
- 'Mentors must show me how to write an assignment and how to study,' Participant B remarked.
- 'I want someone to teach me how to find information – a lecturer or a second-year student,' said Participant C.
- 'A senior student directed me on how to find information in the library,' Participant D responded.
- 'I asked someone in the group to share ideas with me,' noted Participant E.
- 'I asked a student to teach me how to use the computer,' said Participant F.
- 'For general assistance we should have mentors,' Participant G remarked.
- 'For general assignments, maybe there should be those people like mentors. Mentors will teach what I need to do to find information,' said Participant H.
- 'I asked fellow students on how to find information,' Participant I stated.
- 'I asked someone I saw in class to help me find the information,' Participant J said.

The quotations pertaining to mentorship are a further indication of how feelings affect Information Seeking behaviour. These quotations are also indicative of a need for information literacy training, which is focused on minimising the students' uncertainty.

## **6.10 Discussion**

The findings show that the affective uncertainty the participants experienced pertain to a background where they were not exposed to and did not use academic information resources and systems. This finding endorses Savolainen's (2016) view that external events trigger affective uncertainty, whereas cognitive uncertainty occurs internally.

However, the findings also show that the feelings of uncertainty the participants experienced manifested in various ways and were dependent on the individual participant. Whereas some of the participants were negatively affected in the sense that they did not find the information

they needed, others were able to break through the uncertainty barriers and to turn their feelings of uncertainty into an opportunity to learn from their experiences. This is also reflected in the comments of those participants who referred to themselves as being confident when dealing with an academic assignment. These participants seemed to have been positively affected by their feelings of uncertainty.

Prior to the task construction stage and before the search process began, the participants experienced affective uncertainty due to their lack of knowledge of information resources and systems. The observation was made when asking Questions 6.3.1.4 and 6.3.1.5. This was most evident in the participants' responses as most of their responses began with the word 'eish' – a colloquial exclamation – followed by deep breathing and the shaking of their heads before providing an answer. It was observed that the participants' lack of knowledge of the way an academic assignment task is supposed to be performed had an impact on them.

The observed challenges the participants seemed to experience were based on their lack of knowledge and use of information resources and systems. Based on their responses, it seemed like most participants opted to collect information from the general topic and skip the pre-focus formulation and the focus formulation stages. This is evidenced in the responses of those participants who wanted to be given a textbook and be shown the pages where they could get the answers. Those who opted to use Google and responded that it was easy, said that with Google you get the answers right away.

The challenges the participants experienced in articulating their information needs were observed. These are linked to the participants' preference to use the Internet and Google to address their information needs. Even with the use of the Internet and Google, the difficulties they experienced in formulating an information need was still observed. Another observation is that the uncertainty the participants experienced due to a lack of knowledge and experience in using information resources and systems may differ in terms of the level of uncertainty they experienced at the articulation of their information needs and the uncertainty they experienced during the pre-focus stage of the information search process. It was also found that students find peer assistance useful in their Information Seeking endeavours.

## **6.11 Conclusion**

The intent of the chapter was to present the findings and corroborate the evidence obtained from qualitative interviews with the theoretical framework, the ISP. The presented data was based on the following themes: knowledge of academic information resources and systems, communication with staff, use of academic information resources and systems, and affective barriers in information seeking.

The data presented in this chapter provides a context for the discussion in the next chapter. The purpose of Chapter 7 is to provide a discussion based on the themes that will culminate in illustrating the limitations and conclusions, as well as the recommendations of the study.

## **CHAPTER 7**

### **POLOKWANE CAMPUS'S FIRST-YEAR STUDENTS' UNCERTAINTY**

#### **7.1 Introduction**

The aim of this chapter is to discuss the research findings of first-year students' uncertainty during their Information Seeking activities. In Chapters 2 and 3, information behaviour concepts and the theoretical framework, namely the ISP was discussed respectively. In this chapter, the focus is on the findings pertaining to the Polokwane campus's first-year students' uncertainty as a factor affecting their Information Seeking behaviour. The influence of context on the students' information seeking and searching behaviour is also discussed. The chapter ends with the discussion on the manifestation of uncertainty among first-year students on the Polokwane campus.

The discussion of the thematic analysis of the empirical data constitutes the information user's personal dimension and was based on the three realms of the information search process, namely the cognitive, affective and sensorimotor.

#### **7.2 Background**

Thinking and feeling are steps in the Information Seeking processes. Due to the fact that thinking and feeling are unrecognisable processes that manifest in an individual, only the subsequent actions of an individual can be observed. Depending on their experience of using information and searching for information, individual user's thought processes and feelings could be different.

The researcher assumed that first-year students registered at TUT's Polokwane Campus who had no prior background or knowledge of using academic online information retrieval systems experience feelings of uncertainty. In turn, the uncertainty is reflected in the use they make of the information resources in an academic library. Based on this assumption, the first-year students who have no prior background in using information systems are presumed to begin their Information Seeking activity from a deficit position because of their lack of knowledge of the academic information resources and systems.

It is the argument of this thesis that the students who lack a background in or knowledge of using academic information resources and systems may take longer if at all to formulate a focus of a topic. The students could also take longer to progress from Q1-Q4 levels of an information need, as identified by Taylor (1968), to form a compromised form of an information need.

In accordance with Kuhlthau and Cole's (2012) suggestion, the students who have no prior background in using a variety of academic information resources may also form part of the group of users who are thrown out of the learning loop when they engage in Information Seeking activities. The following discussion will thematically discuss the empirical findings of the study in terms of the influence context has on the information behaviour of TUT's first-year students who are registered at the Polokwane Campus, their cognitive and affective uncertainty and the affective Information Seeking barriers they encounter. Lastly, a conceptual framework will be proposed that could be used to study first-year students' uncertainty when they are confronted with an academic assignment and need to seek information from the resources that are available in an academic library.

### **7.3 The Influence of Context in Information Behaviour**

Context comprises of a variety of elements that play a significant role in the Information Seeking behaviour of users, as reported in Section 2.5. In Section 4.3, it was shown that certain elements in a context, for example, the academic tasks given by lecturers, could prompt an information need. The findings showed that multiple contexts influenced the participating first-year students' information needs. The unavailability of academic information resources and systems in the participating first-year students' socio-cultural context affected their knowledge of such resources and, as a result, they lacked the required skills to use them.

Now, due to the interplay between the participating students' context, namely tasks requiring completion and their mental structures (cognitive and mental structures), the participants identified an information need. In turn, the identified information need motivated them to seek and search for information.

Unfortunately, these participants seemed to lack the knowledge and skills to effectively search for information that would satisfy their information needs. Therefore, in order to satisfy their

needs, they followed alternative routes such as asking a friend or a library staff member. The following discussions focus on the various alternative routes the participants embarked on to satisfy their information needs.

### **7.3.1 Internet and Google use**

In an attempt to deal with their uncertainty regarding the use of academic information resources and systems, one of the participant's preferred route was to use the Internet and, more specifically, Google. The analysed data showed that the Internet and Google seemed to have assisted the participants in dealing with their uncertainty.

The use of the Internet and Google is a theme that emerged when the data was analysed, as alluded to in Section 6.7. Although all the participants gravitated towards the use of the Internet and Google to address their information needs, only a few indicated that they found using the Internet and Google to search for information easy and that they retrieved the information they needed. This was to suggest that they got information instantly. These findings endorse Komisarov and Murray's (2016:429) findings, who found that undergraduate students begin their information searches on Google. They also found that students resort to the Internet and Google to avoid having to use the library because it is convenient.

However, despite acknowledging that they used Google to search for information, most of the participants gave reasons for being unable to find all the information they needed such as not knowing how to use a computer and that they were unable to formulate search terms for their information need.

Participant K's response to Question 6.5.3 clearly illustrates the problems the participants experienced. She said, 'I found some of the information and some I could not find. Even if I typed the keyword of the thing I am looking for, I can't seem to find it ... I just carry on with what I have.' Her response is indicative of her inability to form a focus of a topic for which she needed information. The challenges in forming a focus of a topic the participant experienced seem to confirm Kuhlthau (1991; 2004), and Kuhlthau and Cole's (2012) findings. They found that during the pre-focus exploration stage, the task is to look for information with an intent to form a focus and that this stage is the most difficult stage in the Information Seeking process.



To this end, students who are unable to focus their information searches tend to be anxious during the third stage of the information search process, namely the pre-focus exploration stage.

In line with Kuhlthau and Cole's (2012) observation, the participants, due to their inability to focus their feelings of anxiety, were then forced out of the learning process. This is because when no focus is formulated, students cannot move to stage four of the information search process, namely the focus formulation stage. Ultimately, the work submitted by students like Participant K will be sub-standard evidenced by the information collected and by being themeless.

### **7.3.2 Textbook use**

Another contextually rooted avenue in the participants' information-searching process is reflected in their use of textbooks. Textbooks are the best known, if not the only known, information source that contains the information the participants need. Therefore, in this instance, the participants seemingly wanted to use their textbooks in an attempt to address their information needs.

The responses recorded in Section 6.8 reflect the participants' dependence on textbooks. Textbooks are contextually rooted and the participants' best known, or the only known, source of information that has the potential to address academic-related information needs. This could be because, as observed by Mojapelo and Dube (2014:14), the majority of teachers and learners in historically disadvantaged and marginalised rural communities in South Africa lack equitable access to library and information resources, which are indispensable in meeting their curriculum obligations and needs.

The deeply entrenched practice of using textbooks is because teachers present lessons from the textbooks. On the other hand, institutions of higher learning and universities use the knowledge construction process meant to shift students from school textbook learning to a constructivist way of learning. In the constructivist way of learning, a student applies prior knowledge and curriculum knowledge for interaction and integration to create new knowledge. Failure by students to construct new knowledge means that no learning has occurred.

Participant G's comment, 'I want to be shown a relevant textbook and where to get relevant information in the book,' seems to suggest that the participants struggled with the assimilation of information from various information sources.

This could be because the participants' use of textbooks fits in with what they already know. What the participants were akin to is that in a textbook there are answers to their information needs. The participants' use of textbooks shows that their thoughts and the actions taken are seemingly influenced by contextual aspects that relate to their prior experiences.

Also, some of the participants even requested library staff to provide them with both a textbook as well as the page number where the answers to their task could be found. This request suggests the participants were not comfortable in using the index in the textbook to access the required information. Therefore, the participants' reliance on textbooks and their inability to use the textbook's index may negatively affect their information-searching skills.

Owing to the fact that a participant may not engage in a constructive process of finding new meaning, the participants may not extend their knowledge. The participants may also not learn information seeking and searching skills and might therefore not be able to participate in a series of choices involved in the information search process.

### **7.3.3 Help from others**

In Section 6.9, it was shown that the participants appeared to depend on others for help in dealing with the uncertainty they experienced when addressing their information needs. The analysed data indicated that participants needed to have mentors. Most of the participants expressed a need for an opportunity to have either a mentor or a student assistant to help them in their Information Seeking endeavours when they were interacting with information resources and systems.

Bodemer (2014:162) urged academic libraries to take cognisance of peer helpers and the significant role they play in the life of undergraduate students. Bodemer (2014:162) further asserted that peer helpers can provide peer reference and instruction in academic libraries, provided it is correctly implemented and monitored.

## **7.4 The Information User**

As shown in Section 2.4, the information user is the information processor. In order to process the information, users employ their mental processes to interpret and create new knowledge. This was discussed in Sections 2.4.1, 2.4.2 and 2.4.3 respectively. Kuhlthau (1991; 2004) suggested that the mental processes involved in the processing of information manifest through the intricate relationship of the cognitive, affective and sensorimotor structures. The cognitive structures relate to the information users' thoughts on the process and the content of the information search. The users' feelings are associated with the affective aspects of information seeking while the action taken relates to the sensorimotor aspects. In an academic set-up, an information need triggers the mental processes to begin the processing of information.

## **7.5 Information Needs**

Uncertainty in information seeking stems from an information need. The activities that come about due to an information need are influenced by the context within which the information need arises. Section 4.3 shows the context and origin of a student's information needs, whereas Section 4.4 discusses the various other personal aspects that influence the information behaviour of students.

Most of the participants did not attempt to communicate with staff in order to seek support when searching for information that would support their information needs. It seems as if most of the participants avoided interacting with library staff because they were afraid to do so. For example, Participant B said, 'I was so afraid as it was my first time,' and Participant H said, 'I did not ask as every time I come to the library the staff will say, "There comes the one who does not know the library"'. These sentiments are indicative of how fear can act as a barrier to the required information.

However, taking a cue from Taylor's (1968) theory of articulating an information need, the participants seemed to have been operating between visceral information needs Q1 level, the conscious information needs Q2 level and the formalised information needs Q3 level. Talking to others and asking for support is one of the actions users take during the initiation stage of the information search process and it helps them to develop their focus of the topic.

Although most of them did not interact with the library staff about their information needs, they did interact with their peers, senior students and group mates. The participants' behaviour in this regard was in line with what could be expected of them during the focus formulation stage of their information search process.

The participants seemingly did not reach the compromised Q4 level of an information need. This is because, as suggested by Taylor (1968), the compromised Q4 level calls for an interaction to improve the understanding of the task.

Savolainen (2012) suggested that dialogue is a contextual element that affects information needs. He understood dialogue as a written or spoken conversational exchange between two or more individuals. To enhance understanding of a task, a conversation must occur. By talking to their peers about the task prompting their information needs, the participants engaged in a conversation.

As suggested by Taylor (1968), such a conversation takes place when the users have reached the formalised information needs Q3 level. In turn, when applied to Kuhlthau's (1991; 2004) ISP model, this kind of communication is evident during the first and second stages of the information search process – that is, the initiation and the topic selection stages.

The lack of communication between most of the participants and staff could have been the result of affective uncertainty based on feelings the participants identified as fear. Some of the participants opted not to communicate with the library staff because they seemingly did not perceive the library staff as being receptive. Their decision could also be because of their own disposition of not knowing how to articulate their information need. The participants who did attempt to interact with staff reported a good interaction. However, a good interaction may or may not yield the desired results of satisfying an information need. As shown in Section 6.4, one participant noted that they had a good interaction that did not yield the desired information need result.

However, the participants who communicated with staff or peers and whose communication seemed to have been successful were able to move from the visceral information need Q1 level to the compromised information need Q4 level in terms of the articulation of their information needs. Through the communication with staff, some contextual elements became obvious in

the manner in which the participants presented their information needs to library staff. One such example pertains to the participants' request to be handed a textbook and to be shown the page where the answers were.

The negative emotions of fear and anxiety the participants experienced, acted as barriers to information. This is evidenced in Participant H's association of her lack of knowledge with shame and her decision to hide her shame by not acknowledging that her information need had not been met. As suggested by Savolainen (2016a), users embark on this kind of behaviour to avoid the risk of excessive psychological cost.

### **7.5.1 Finding information**

The findings show that participants dealt with their uncertainty when they opted to use the Internet and Google, and asking senior students, classmates and library staff for support. In turn, some participants attempted to conduct a physical search of the library to find information. They reported to have been exhausted by browsing the many shelves available in the library due to the fact that they did not understand the arrangement of books on the shelves. Their attempts to deal with their uncertainty in this manner was therefore not successful. These participants' feelings of uncertainty could be put to their lack of information literacy skills as they most probably were not able to search the library catalogue. Further examples of how the participants' lack of information literacy skills affected their Information Seeking behaviour are reflected in their dependence on each other to incidentally locate a relevant textbook whilst being engaged in a group assignment. When they encountered the source of information, participants also complained about the tedious work of finding information by tracing it from the contents page of a book. When all else failed, participants opted to use the Internet and Google. The use of the Internet and Google to seek for academic information has become common place for the participants, as shown in Section 6.7.

### **7.5.2 Access to information**

Irrespective of whether the participants responded that it was easy or difficult to find information, all of them indicated that they struggled to retrieve the information they needed. As noted in Section 1.2, the researcher observed that the first-year students, when they were looking for information, formed groups either behind a computer or between the shelves. The

students seemed to feel more secure in groups and it could be a way of dealing with their uncertainty and any other affective information barriers they might be dealing with. In addition, when taking into consideration Savolainen's (2012) assertions, the coming together of participants to search for information in groups could be that they may not fully have grasped the requirements of the task. Consequently, participants seemed to work through their task without a plan and submit whatever they have.

The majority of the participants said that online information access was easy. However, considering that they preferred to use Google, the participants' responses were related to their use of Google. The responses further indicated that they focused on gathering information and completing the task. According to Kuhlthau (1991; 2004), and Kuhlthau and Cole (2012), the practice of gathering and completing seem to nullify the need to engage in the pre-focus exploration stage of the information search process. In this manner, the gathering and completing of a task shows that there could only have been minimal or an insignificant level of learning. As suggested by Kuhlthau (1991; 2004), knowledge formation only occurs when a student breaks through the information barrier that occurs in the pre-focus exploration stage and achieves a focus in the focus formulation stage of the information search process.

Despite reports that it was easy to find information online, some of the participants reported that they found it difficult to access online, as well as print information resources. Even though it was difficult, they had some information to work with. Furthermore, their acknowledgement that it was difficult to find information online could mean that they tried to engage with the information rather than collect information to complete a task. Participant N alluded to noticing that the information she got 'was not good enough'. Participant K also said, 'I found information but not all, but I just carried on with what I got.' Participant K and N described some level of interaction with the information they had found. Both, Participants K and N realised that they were not able to adequately satisfy their information needs. Had they not explored the information at hand, it would not have been possible for them to identify the shortcomings of the information they had gathered.

Alternatively, Participant N's response that the information she got 'was not good enough' could have been the result of an ill-defined information need. Obtaining some information illustrates that she was able to get to the compromised information need Q4 level. Even though Participant N may have reached the compromised information need Q4 level, she still needed

to connect with the preceding Q1, Q2 and Q3 levels of an information need, as discussed in Section 3.4.1.3 and illustrated in Figure 3.4.

Participant N may have been unable to connect the various information need levels, that is the visceral QI to the compromised Q4 levels of an information need. The participants' inability to connect the different information need levels could have resulted in an increase in their uncertainty levels. In turn, the participants' who found it easy to retrieve information seemingly did not go through the pre-focus exploration and the focus formulation stages. Even those who attempted seemed to have failed. In order to assist the participants, an induction into the use of information is crucial.

## **7.6 Cognitive and Affective Uncertainty**

As discussed in Section 2.4.3.3, users' cognitive and affective mental structures are involved in information seeking and use. The interplay between the cognitive and affective structures influences the information seeking and use activities.

The participants were given a work task in class. The given task prompts the minds of individuals to begin to evaluate the situation the individual faces. As such, the work task requires the individual to make a decision on when and how to begin the project and the kind of information sources to use.

The Information Seeking process that begins thereafter reflects an interwoven process that combines their cognitive and affective mental structures to address the information needs. This is in accordance with Kuhlthau's (2004) uncertainty definition that uncertainty is a cognitive state that causes affective symptoms. The discussion in Sections 2.4.3.2 and 2.4.3.3 shows the interrelationship of affect, cognition and motivation in sensorimotor structure. Even though the cognitive and affective aspects that manifest during information seeking and use are naturally fused, the discussion is separate with occasional overlap. The following discussion will focus on the participants' cognitive and affective uncertainty.

### **7.6.1 Cognitive uncertainty**

In Sections 2.4.1 and 2.4.2 it was indicated that information seeking, information use and related activities are seen as cognitive processes. The cognitive processes that occur in an individual's brain are neurobiological. The cognitive mental processes are responsible for the processing of information. In the information search process suggested by Kuhlthau (1991; 2004), the cognitive activities begin at the initiation stage with thinking about the task in order to comprehend it. However, the cognitive activities are at their peak during the third stage, namely the pre-focus exploration stage. The participants' ability to move from the initiation stage to the pre-focus exploration stage is affected by their knowledge of information resources, library knowledge, use of the university library, use of information resources and systems, and their use of online resources. This will be the focus of the following discussions.

#### *7.6.1.1 Knowledge of information resources*

Knowledge of academic information resources and systems is imperative for the success of students' academic Information Seeking activities, particularly at an institution of higher learning or at a university. Section 5.7.2 shows that the targeted group for this current study was participants who had no knowledge of using academic information resources and systems. The participant selection criteria was in line with the study objectives and the research questions set out in Sections 1.4.2 and 1.4.3 respectively. As shown in Section 6.3.1, the participants have no knowledge of using academic resources and systems and most of them avoided using the library and its systems.

#### *7.6.1.2 Library knowledge*

The participants had no knowledge of using a library until they were confronted with an academic assignment, which required them to use the library. What's more, the majority of the participants were surprised by their lack of knowledge of using the library and, as a result, they were distressed. When taking into consideration that it was their first encounter with the library, it can be assumed that they probably experienced a variety of emotions, which include assuming a particular mood. The participants' expression of being surprised, distressed and tired of trying to find information that is relevant to their needs are in line with Kuhlthau's (1991; 1993; 2004) observation that an individual's mood determines the individual's state of readiness to deal with a task.



The findings reported on in Section 6.3.1.4, showed that the participants, in order to comply with the tasks they were given and because of their feelings of uncertainty, were motivated to find alternative ways to get access to the information they required such as asking friends or a librarian.

Their use of the Internet and Google could also be indicative of this behaviour as they are more comfortable and have experience in using these resources. This is in line with Savolainen's (2015b) suggestion that motivational elements can be based on a situational stage that has specific requirements. The participants' lack of knowledge of the library could have made them assume an indicative mood and, as such, closed the possibility of using the unknown library resource and its systems in favour of using the Internet and Google. A few of the participants appeared calm and confident despite their lack of knowledge.

When taking into account that Participant I and J expressed feelings of being confident when dealing with an academic task, they seem to have assumed the invitational mood. According to Kuhlthau (1991; 1993; 2004), an invitational mood facilitates the opening up of possibilities to continue with the task. Participant I described himself as a 'self-starter', meaning he was feeling confident that he would be able to find the information required and successfully complete his task. Despite feeling confident, he felt a bit traumatised because he had never used a library and was not able to deal with his feelings of uncertainty.

#### *7.6.1.3 Use of the university library*

The participants do use the library albeit for various reasons. Though using the library seemed to be a daunting task to some of the participants due to their lack of knowledge and skills, some of the participants used alternative methods to get access to the information they required in order to deal with their task uncertainty. These alternative means included asking a friend or a library staff member to help them. Apart from using the library to get access to information, most of the participants used the library as a study place where they could bring their own notes to work on their academic tasks. Also, some of the participants avoided using print sources in the library due to a lack of knowledge.

Furthermore, some of the participants seemed to believe that using the library is simply going in and out of the library building to either look for friends, meet with friends or to relax. The

participants who do not own a personal computer or a smart phone used the library's computers to access the Internet and Google while others used the library to relax and meet with friends.

This kind of behaviour suggests that the participants were uncomfortable and fearful to tap into the unknown territory of information resources and systems. The participants seemed to be content, when not attempting to deal with unknown systems, to walk in and out of the library without getting involved in activities they are not confident in. The students' heavy dependence on electronic resources for various reasons has been alluded to by Karlson *et al.* (2012:578), and Kommissarov and Murray (2016:429).

The reasons the participants gave for using the library did not include the use of the library's online information resources or systems. Avoiding the use of the library's online resources could most probably reflect the participants' uncertainty that is seemingly routed in feelings of inadequacy.

#### *7.6.1.4 Use of information resources and systems*

Participants who did not have a background in using academic information resources and systems seemed to struggle to find and use information resources in an academic library setting. For example, they did not seem to know what an online database was. Some of the participants acknowledged having an idea on how to search the library catalogue and how to locate books. In academic information seeking, it is imperative to know what and how to use information resources and systems. Most participants, due to their shortcomings, relied on others, as well as the Internet and Google, to help them satisfy an information need.

The findings show that the participants who had not previously used academic information resources and systems, did not know what an online database and an online library catalogue were. As such, it was expected that they, due to the social cultural context from which they came, would not know how to use the online database and the online library catalogue.

In relation to the online library catalogue, some of the participants suggested that they had an idea of how to search the catalogue in order to locate a book. Although they were able to explain what needed to be done to locate a book, they admitted that they had not tried to do it themselves. The possibility is that the participants had learnt some information skills theoretically during a library orientation session, but had not applied the skills they had learnt.

Furthermore, the participants who had indicated that it was difficult to use an online database actually referred to using Google as they also reported on their lack of knowledge of using computers, the Internet and multiple sources for an assignment. Unfortunately, the participants were unable to distinguish between using Google and a full-text database. For example, Participant I said, 'You type the word and get the information,' to explain how he sought for information on Google. The participant did not realise that searching for information in an online database required more steps than a Google search did. This could be indicative of how Google provided the participants with a kind of safety net to retrieve information that was relevant to their information needs because they did not know that they could retrieve more relevant information using an online database.

Whereas the participants seemed to have been satisfied with the information they had obtained from Google, those who found it difficult to use online databases acknowledged that they did not know how to use a computer. Therefore, their lack of computer skills had the potential of acting as an information barrier. Onwuegbuzie *et al.* (2004:37) referred to Information Seeking challenges that are derived from computer-related problems as mechanical barriers to information.

Students who are unable to use library computers may experience high levels of anxiety. Kuhlthau and Cole (2012) suggested that information barriers are more prominent during the third information search stage – that is, the pre-focus exploration stage. According to them, information barriers have both affective and cognitive elements that have the potential to push the information seeker to a complete halt in thinking. Some of the participants were able to formulate their information need to the point of a compromised information needs Q4 level. They only experienced a problem when they attempted to use a library resource to address their information needs.

The difficulties they experienced could mean that they encountered negative affective barriers such as library anxiety. Consequently, participants who experience library anxiety tend to avoid using the library. Also, due to the difficulties of using online resources manifesting in the initial stages of the Information Seeking process, participants are likely to opt for other ways of finding information rather than to stop looking for information. As such, affective barriers, such as library anxiety, does not seem to prevent the Information Seeking process from

continuing. For instance, affective-related barriers seem to have compounded the participants' who had no background in using academic information resources and systems during the Information Seeking process. This was because, when using information, a conflict could occur as the participants were unable to make sense of what information fitted what they already knew.

Participants could also have experienced high levels of anxiety when trying to tolerate the inconsistencies and incompatibility they encountered when dealing with information and information systems.

### **7.6.2 Affective uncertainty**

In information behaviour cognition, affect and acting have an intricate relationship and are central to the Information Seeking process. Kuhlthau (2004), and Ingwersen and Järvelin (2005:274) suggested that affect and cognition seem to function together in the process of interpreting information to address an information need. To establish how affect and cognition affected the participants' Information Seeking behaviour, the following discussion will focus on their feelings pertaining to their lack of knowledge and skills in their given academic tasks.

#### *7.6.2.1 Lack of knowledge*

The participants expressed a wide range of feelings of discomfort during the interviews that manifested when they realised that they were uncertain about where to find information in the library. Feelings of discomfort in information seeking reflect the affective factors that influence information behaviour as encapsulated in Nahl and Bilal's (2007) book. The participants in the current study do not seem to be an exception. Also, the feelings of discomfort experienced by participants corresponds to the elements of uncertainty suggested by Kuhlthau (1991; 2004).

#### *7.6.2.2 Lack of skills*

Whenever the participants had to communicate their feelings when discussing their information search process, they expressed negative affective feelings that seem to be common in information seeking. For example, most of the participants were apathetic when they realised that they did not have the required skills to effectively search for information in the library. Some of the participants even said that they trusted their character, meaning that they felt confident in dealing with the uncertainty of finding information. However, when they realised

that they did not have the required skills, they expressed feelings of shame and indicated that they felt like ‘old-fashioned people’. These findings support Kuhlthau’s (2004) acknowledgement that feelings are central to the construction process in information seeking.

#### 7.6.2.3 *Research task*

Most participants who did not have a background in using academic information resources and systems reported a wide range of discomfort and unpleasantness when the lecturer first announced a task. Most of them were worried about where they were going to find the information and how they were going to use it. In order to figure out what they needed to do, they had to think and take some action while experiencing particular feelings towards the given task.

#### 7.6.2.4 *Thoughts*

The participants’ thoughts seemed to be focused on the system they needed to use in obtaining the information rather than trying to comprehend the actual task that was given. Due to their uncertainty, brought about by the absence of previous experience, it seems as if the participants’ thoughts were focused on first identifying where their information needs could be addressed rather than how to approach their information needs. Participant K’s response illustrates the fact that ‘where’ to find information preceded ‘how’ to find information. Therefore, it seems as if the participants experienced affective uncertainty when confronted with an academic task.

Their experiences were contrary to the uncertainty context discussed by Kuhlthau *et al.* (2015:44), which tends to be more focused on the cognitive aspects of uncertainty in that the apprehension emanates from what is expected of students in terms of the task that had just been announced. It appears that the thoughts of a student who lacks experience could remain at the visceral Q1 level and conscious Q2 level of an information need longer before it reaches the formalised Q3 level and the compromised Q4 level to initiate a dialogue and the subsequent presentation of an information search to a system or a mediator.

#### 7.6.2.5 *Feelings*

When a task was given, the participants expressed feelings of discomfort. They expressed their discomfort by using words such as ‘stressed’, ‘confused’ and ‘scared’. The words that were used to express their discomfort could be indicative of their lack of knowledge and skills in

using the library. In addition, their feelings could be related to their feelings of uncertainty, as they perceived using the information systems as complicated. Most participants opted to ask for assistance from someone to deal with their uncertainty.

#### *7.6.2.6 Actions*

Due to uncertainty and a lack of previous experience, the participants opted to ask for help, which included senior students, peers, assignment group mates and library staff. Most of the questions the participants asked were directed at where they could find information. In fact, the participants wanted to be given a book and to be shown where in the book the answers were. The participants exhibited communication acts that seem to be similar to the communication acts Kuhlthau (1991; 2004) indicated take place during the initiation stage and the topic selection stage.

Also, some of the participants attempted to find the information they needed by actively browsing the library's shelves. As described in Section 7.5.1, the participants moved from shelf to shelf and row by row until they exhausted themselves without having satisfied their information needs. Ultimately, most participants resorted to using the Internet and Google to retrieve information that was relevant to their information needs. The participants' actions reveal that even though they may have experienced delays while thinking about where to get the information, there was some kind of progression in their thoughts and they moved from the visceral Q1 level of information need to the compromised Q4 level of an information need.

#### *7.6.2.7 Strategies*

The strategies employed by the participants were based on their hopes that they would find someone to help them identify and find the information they needed. It is believed that when the participants asked for help, particularly from task group members, peers and senior students, they had an opportunity to enhance and sharpen their understanding of the topic. The strategies they used are similar to the strategies employed during the first three stages of the information search process as identified by Kuhlthau (1991; 2004), which include brainstorming and discussing while examining possible topics.

## **7.7 Affective Information Seeking Barriers**

Participants without a prior background in using academic information resources and systems are affected by affective factors in a number of ways when they are engaged in an Information Seeking activity. This could be put to their lack of knowledge and skills of academic information resources and systems, in communication with staff and the use of information resources and systems. The information barriers they experienced manifested in their expression of uncertainty, anxiety, fear, confidence, being overwhelmed, bored and annoyed, and feeling good.

### **7.7.1 Uncertainty**

As shown in Section 6.6.1.1, Participant B's information searching seemed to have been affected by feelings of uncertainty. This could be put to her unfamiliarity with the sources of information and the use of technology. Although feelings of uncertainty can be expected at the early stages of an information search when the user is articulating an information need, Participant B's response reflect her inability to associate with library activities and the execution of an information task such as an academic task. As explained by Kuhlthau and Cole (2012), uncertainty rises during stage three, the pre-focus formulation stage, and may have either a positive or a negative effect on the information user. Unfortunately, it seems as if Participant B was affected by negative uncertainty. Other than being unfamiliar with the information resources and systems, Participant B alluded to not knowing what she was writing about. This could suggest that she encountered an information barrier and, in line with Kuhlthau and Cole's (2012) suggestion, was pushed out of the learning loop.

### **7.7.2 Anxiety**

Anxiety, with a particular reference to information anxiety, was discussed in Section 3.3.2. Participants A and O indicated that they experienced anxiety when dealing with an academic assignment. The anxiety they experienced manifested in their thoughts and actions. Participant A was anxious because this was his first time doing a university task and he did not know how to use academic information resources. Drawing from his response, his thoughts seemed to be pre-occupied by the contextual constraints related to his prior experience.

Participant A's lack of experience had the potential to delay his progress towards addressing his academic task related information needs. This is in line with Kuhlthau (2004) and Taylor's (1968) suggestion that an information need is addressed within a framework of an individual's background and knowledge. In turn, Participant O dealt with his feelings of uncertainty by using the Internet and Google. He thought it was better for him to use the Internet and Google rather than asking anyone for help because, by using the Internet, he could avoid communicating with library staff and running the risk of feeling ashamed. The manner in which he dealt with his uncertainty is in line with Savolainen's (2016b) suggestion that the users who tend to consider feelings of inadequacy as being shameful, do not ask questions that could expose them.

### **7.7.3 Fear**

Feelings of uncertainty accompanied by fear and apprehension are experienced during stages one to three – that is, the initiation topic selection and the pre-focus exploration stages in the information search process. However, in an academic setting, even if a student experiences feelings of fear, it is imperative for them to make sense of their situation and engage in the task. Some of the participants – that is, Participants F, G, H and L noted that they were afraid of doing an academic task. Their feelings of fear were reflected in their thoughts, the expression of their feelings and the actions they took to deal with their fear.

#### *7.7.3.1 Thoughts*

Participants F and G's thoughts were focused on whether they would pass the task and how awkward it was for them to engage in an academic assignment for the first time. Furthermore, Participants H and L required to be made aware of the available resources and how to use them.

These participants' thoughts seemed to be focused on how to obtain information. It appears that Participants H and L pondered more on how to access information than on the task itself.

The participants' thoughts were not the thoughts that are generally expected during the initiation stage and the pre-focus exploration stages of an information search. According to Kuhlthau (1991; 2004), the users' thoughts are generally focused on comprehending the topic and not how and where to find information.



### *7.7.3.2 Feelings*

When given the academic task, Participants' F, H and L experienced feelings of shock and stress. The feelings they described seem to pertain to their lack of experience, knowledge and the use of academic information resources and systems.

Also, their feelings of stress and confusion seem to be rooted in their beliefs that using the library's resources is complicated and that they would find it difficult to obtain the information they needed. These feelings are different to the feelings Kuhlthau (1991; 2004) found users experience during the initiation stage of an information search. She observed that feelings of uncertainty, accompanied by apprehension, confusion and anxiety, leads to doubt setting in during the initiation stage and that the uncertainty feeling subsides during the topic selection stage but increases again during the pre-focus exploration stage.

### *7.7.3.3 Actions*

Participants F and G knew what actions to take in order to satisfy their information need – that is, to use the library's resources and to read more to be informed about the topic. Despite knowing that they needed to seek and use information, these two participants were fearful that they would not be able to obtain the required information.

Their responses seem to indicate that they were more concerned about how to find the information they needed than working on the task itself. Although these participants were able to focus on how to find the information they needed when they were confronted by an information task, they did not focus on formulating the task's topic. As a result, their feelings of fear could have delayed their engagement in the actual task.

## **7.7.4 Confidence**

A few of the participants saw themselves as being confident when dealing with an academic assignment. It seems as if their feelings of confidence enabled them to avoid information barriers such as feeling ashamed, which the other participants encountered at the thought of communicating with library staff. Actions, such as communicating with library staff or talking to others and browsing the collections, are actions associated with the first three stages of the information search process. The participants who reported feeling confident likely felt this way due to self-trust and their abilities to deal with the academic task they were given. This is

opposed to the feelings of confidence Kuhlthau (1991; 2004) observed, which only manifest during the fourth stage of the information search process. According to her, the first three information search stages, the stages in which the participants claimed they were confident, are characterised by feelings of frustration and a lack of confidence. According to Kuhlthau (2004), feelings of confidence are based on clarity of thought that comes from success after the focus formulation is achieved.

#### *7.7.4.1 Thoughts*

The findings suggest that some of the participants had moved from the visceral Q1 level to the compromised Q4 level of their information needs. The compromised Q4 level of an information need implies that the user is able to present the information question to an information system. This assumption is evidenced in the participants' ability to search for information on the Internet and Google and to use printed material. Also, Participant E's request to be directed to the relevant textbook for her task could also suggest that she had articulated her information need in the form of a question when she communicated with library staff. This could mean that she had reached the compromised Q4 level of an information need. Furthermore, Participant E's question could also mean that she was making the connection between new information and her existing knowledge.

#### *7.7.4.2 Feelings*

Participant C and E experienced negative feelings when they reported feeling 'a bit traumatised', 'sad' and 'not having a good feeling' when they were confronted with their academic task. Notwithstanding their negative feelings, which are common in the initiation stages of the information search process, it seems as if their disposition of being confident helped them to communicate with staff in order to deal with their uncertainty. Also, their communication with library staff reflected some of the actions that form part of the initiation stage in Kuhlthau's (1991; 2004) ISP.

#### *7.7.4.3 Actions and strategies*

Some of the actions and strategies that are associated with the first three stages of the information search process involves using the reference collection and locating information (Kuhlthau 2004). The actions and strategies the participants embarked on during the first three information search stages include communicating with the library staff, using print resources and searching the Internet and Google.

Although some participants opted to search, the Internet and, more specifically, Google because they did not know how to use the library, their Information Seeking strategy still reflects their inability to precisely express an information need. If the participants' information needs were not met, this could be because the participants did not articulate their information needs precisely when they communicated with the library staff or the information system.

### **7.7.5 Overwhelmed**

Participant K seemed overwhelmed when she was working on her academic task. She expressed her feelings of being overwhelmed when she said, 'This is just too much for me.' Her feelings of being overwhelmed also manifested in her comments that she had no idea of where to find the information she needed and how to begin the task.

#### *7.7.5.1 Thoughts*

Participant K's comments seem to indicate that she was stuck in the visceral Q1 level of an information need and that she was seemingly struggling to proceed to the compromised Q4 level of an information need. She felt useless and was not confident enough to ask anyone for help. The confusion, frustration and lack of confidence she experienced are characteristic of the first three stages of Kuhlthau's (1991; 2004) ISP. An intervention is crucial for participant K to be assisted in reaching a compromised Q4 level of an information need.

#### *7.7.5.2 Strategies*

Participant K was unable to articulate her information need either to an information mediator, such as a library staff member, or an information system. Therefore, like all other participants who alluded to uncertainty, fear, anxiety and confidence, she opted to use the Internet and Google to address her information need. Due to the fact that Participant K did not ask anyone for help, she reported that her attempts to obtain information from the Internet and Google did not satisfy her information needs.

### **7.7.6 Bored and annoyed**

The feelings of apprehension and uncertainty are common in the initial stages of the information search process (Kuhlthau 1991; 2004). Participant M's feelings of apprehension

and uncertainty during the initial stages of her information search were expressed as being 'bored' and 'annoyed'. Apart from becoming 'bored', the process of browsing the shelves also seemed to have 'annoyed' her. It is only when she realised that the strategy was not effective that she approached the library staff for help.

Participant M seemed to have been 'bored' and 'annoyed' because she did not know how to use the library and particularly because she perceived that she may not get the information she was looking for. As she reported, she started by physically browsing the shelves and then realised how difficult it was to get access to the information following this strategy. Participant M was 'bored' and 'annoyed' seemingly due to her lack of knowledge and her inability to access to information she needed. Owing to her feelings of boredom, Participant M was likely to delay dealing with the task because her thoughts were focused on being 'bored' and 'annoyed'.

It also seems as if Participant M lost interest in the Information Seeking activity because she was not familiar with the library system and could not find the information she required. Therefore, instead of addressing the problem and asking for support to complete the task at hand, she became bored and annoyed. This could be because she tried to find information on her own from a library system that she was not familiar with and lost interest in the activity. This assumption is in line with Savolainen's (2016b) observation that users who experience a problem in searching for information in an information system could develop negative feelings.

#### **7.7.7 Good**

Participant J used the word 'good' to explain her feelings when dealing with her academic task. It seems that she opted to use the word 'good' to reflect on her positive disposition towards the work at hand. Despite reporting that she felt good, she also reported that she felt overwhelmed with the amount of work that needed to be done in order to successfully complete her academic task. Considering her conflicting reports of feeling 'good' and 'overwhelmed', Participant J seemed to have had mixed feelings.

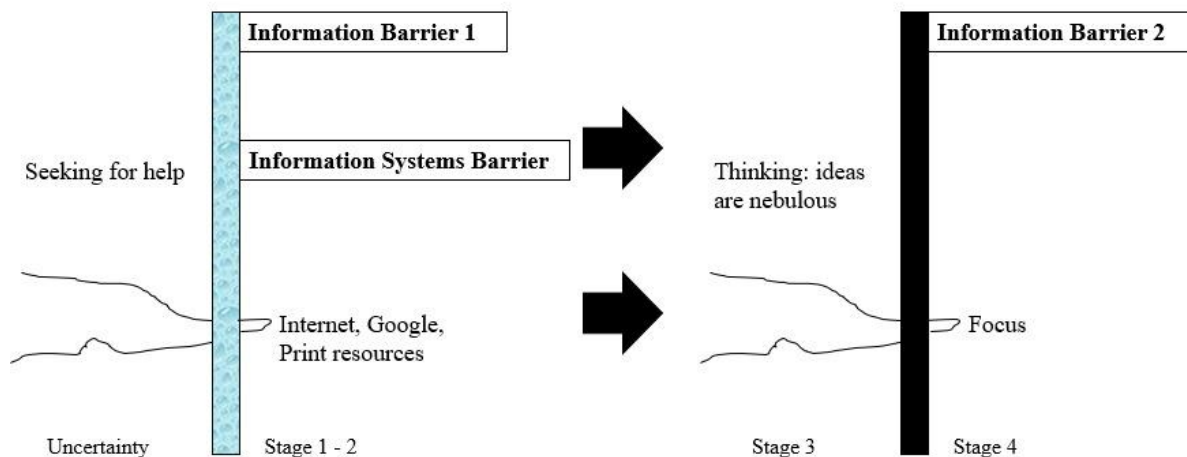
Her feelings of being overwhelmed and confused are much like Participant K's feelings who also reported feeling overwhelmed by her academic tasks. These are in accordance with feelings are common in the initial stages of the information search process. Despite reporting

similar feelings, their attitude towards their given academic task was different. Whereas Participant K experienced her feelings of being overwhelmed negatively by feeling hopeless, Participant J exhibited a positive disposition and approach to her task. She was hopeful that she would be able to complete her task.

Participant J realised that it is difficult to use the library but did not shy away from asking for assistance from the library staff and communicated her topic. She appeared to be aware of the significance of communicating with the staff about her topic. Her ability to communicate with the library staff to request support is indicative of the progress she was making in her information search process. This is because the first three stages of the information search process involve communication with mediators and talking to others.

## **7.8 Manifestation of Student Uncertainty**

The findings reveal that participants' who had no prior background or experience in using academic information resources and systems struggled to begin a work task as an academic assignment. This is because, when they were given a task, they reported experiencing affective barriers such as uncertainty, stress and worry. Some of the participants were even overwhelmed by their tasks. Furthermore, some of the participants seemed to have experienced these negative feelings as barriers to information as they did not know how to access and use the library and other academic information resources that are available in an academic library. As suggested by Kuhlthau and Cole (2012), users are likely to view their feelings of uncertainty as a barrier to information. According to them, feelings of uncertainty that act as barriers to information only become a problem when the user is unable to cross the barrier and get access to information. Although some of the participants in the current study were able to cross their uncertainty-related barriers, the findings reveal that some of the students were unable to do so. This manifested when some of the participants approached the library staff to ask for support, whereas the rest of the participants avoided asking the library staff for help. This is shown in Figure 7.1, which is adapted from Kuhlthau and Cole (2012).



**Figure 7.1: Manifestation of Student Uncertainty**

Figure 7.1 indicates that uncertainty sets in when the assignment is given. This is prior to stage one of the information search process. When the participants realised that they were experiencing a barrier to information, irrespective of whether the experienced barrier was due to their lack of knowledge and experience of using library systems or not, they sought help. The help provided supported these participants in breaking through the information barriers they experienced to some extent. The partial breakthrough came when the participants suddenly remembered to ask someone for information, or were directed to obtain information from the Internet and Google or other print resources such as books.

Obtaining information from the Internet and Google could have provided temporary relief to the first information barrier the participants encountered. Unfortunately, the participants encountered another barrier during the first two stages of the information search process. The barrier was brought about by the participants' lack of knowledge of using a computer and how to access information sources that are arranged in a bibliographic system.

The next barrier the participants encountered manifested when they arrived at the pre-focus exploration stage of the information search process. According to Kuhlthau and Cole (2012), this is generally the first barrier to information users' experience. During the pre-focus exploration stage, the participants' uncertainty could increase as they try to develop a focus of the task. Finding a focus is personal as it is an individual's way of learning by merging experience and new information.

All the participants seemed to have struggled to locate information. This is illustrated in Figure 7.1 and depicted in information barrier one and the information systems barrier. Very few participants alluded to the challenges relating to the actual task construction itself. What has been drawn from this, is that most participants do not know that finding information to complete an assignment does not represent the end of an information task. They needed to interact with the information, synthesise it and formulate a perspective. Only two participants seemed to have had some kind of an idea that an academic assignment requires one to develop strategies to address it.

Figure 7.1 shows that the participants could have been operating between the visceral Q1 level of information need and the compromised Q4 level of an information need. Also, they seemed to be moving between the initiation stage (stage one) and the pre-focus exploration stage (stage three) of the information search process.

In his discussion on the different levels of an information need and where they map onto the different stages of the information search process, Cole (2012) implied that stage one to stage three of the information search process occurs within the visceral Q1 level of an information need. The participants in the current study seemed to have moved to the unconscious Q2, formalised Q3 and compromised Q4 levels of an information need even though they did not move through all the information search process stages. This is because when an information need is at a compromised Q4 level, a participant can present a request to an information system even though it may be done many times using different keywords. Also, arriving at a compromised information need Q4 level does not require a user to be able to use and apply the information that is retrieved, which is the requirement to reach the final information search stage.

Besides their lack of knowledge and experience in using academic information resources and systems, the affective factors experienced by the participants do not seem to be different from those of the users modelled by Kuhlthau (2004) in her ISP model. However, the negative feelings the participants experienced due to their lack of knowledge and experience in using academic information resources could act as a barrier to information in the beginning stages of a task construction. The barriers they experienced may depend on a number of contextual and personal factors such as the time it may take to get assistance from a senior student and to gather up the courage to approach library staff for support.

## **7.9 Discussion**

The discussion throughout this chapter shows that participants require help prior to the beginning of the task. All cognitive, affective and sensorimotor aspects that participants engaged in relates to their contextual background. The uncertainty barrier relates to where, how and what information resources are located and used. Participants seemed to have spent time pondering how to locate information, use online resources, write an academic assignment and how to use multiple information resources. All these have the potential to negatively affect the outcomes of their academic tasks.

The findings revealed that, even though some of the participants opted to use the Internet and Google as a way of avoiding the library systems, they seemed to still find it difficult to address their information needs. Poorly articulated information needs may fail to yield the desired results to satisfy an information need.

The findings also revealed that affective feelings, such as uncertainty, anxiety, fear, being overwhelmed, bored and annoyed, can act as barriers to information that affect first-year students' information seeking. The findings also showed the interplay between the cognitive, affective and sensorimotor mental structures of the students and elements in the context and that each aspect has a role in the information seeking and information use of first-year students.

## **7.10 Conclusion**

The intention of this chapter was to discuss the data presented in Chapter 6 and is based on the information behaviour concepts presented in Chapter 2 and the information search process discussed in Chapter 3. The main aim was to unpack and contextualise the findings reported on in Chapter 6. The discussion focused on the influence of context on information behaviour and the interplay between cognitive and affective aspects in information seeking. The affective barriers affecting information seeking were also discussed. The discussions culminated in the manifestation of student uncertainty in the form of information barriers depicted in Figure 7.1. Chapter 8 will address the conclusions, limitations and recommendations of the study.



## **CHAPTER 8**

### **CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS**

#### **8.1 Introduction**

This chapter intends to discuss the conclusions of the research questions formulated in Chapter 1. The limitations of the study will follow the conclusions to the research questions. Thereafter the suggestion for further research is made and the value of the study will be discussed. The final summary and comments will conclude the chapter.

#### **8.2 Conclusions to the Research Questions**

In Chapter 1, it was suggested that many students' initial experiences using the library is characterised by fear and feeling lost. This could be because they feel uncertain about where things are located in the library and how to use the library's resources and systems – that is, a lack of knowledge and skills. For the participants in the current study, it appears that, because of their lack of knowledge and experience, uncertainty, which is a cognitive state that causes affective factors, begins to manifest even before the actual academic task begins. By the time participants engage in an academic task, it is already burdensome. Taking this into consideration, the following research question was formulated to explore the areas of uncertainty: How can feelings of uncertainty, which could affect the Information Seeking behaviour, that causes affective factors in the Information Seeking behaviour of first-year students at TUT be minimised?

The following sub-questions were asked in order to answer the research question above:

- What do students who have no prior background in using academic information resources and systems do when they first encounter the academic information resources and systems?
- How do students without a prior background in using academic information resources and systems react when they are given a research assignment?
- How do students without a background in using academic information resources perceive and relate to library staff?

- How do students who have no prior background in using academic information resources and systems use academic information resources and systems?
- What are the barriers that first-year students who have no prior background in using academic information resources and systems experience when seeking and searching for information?

The sub-questions were addressed theoretically and empirically in order to answer the main research question.

### **8.2.1 Research question one: what do students who have no prior background in using academic information resources and systems do when they first encounter the academic information resources and systems?**

The reported factors that affect students' information needs and seeking behaviour mainly pertain to their cognitive (i.e., knowledge and skills) and affective (i.e., feelings) structures, which in turn motivates them to seek information from other resources than the library. Although not reported by the participants, the development of their knowledge and skills were influenced by their contextual and socio-cultural backgrounds where they had limited or no access to libraries and where teachers did not necessarily consider the training of such skills as being important. The specific factors include:

#### *8.2.1.1 Use of the library*

The literature review and the findings reveal that many undergraduate students often felt lost and overwhelmed by their new environment and the library building. As such, they avoided using information resources that are available in the library.

#### *8.2.1.2 Library knowledge*

Based on the participants' background, the findings reveal that, although they had no knowledge of a library, they were surprised and shocked about their lack of knowledge. Lack of knowledge of a library or an academic information resource can be a hindrance in a student's academic pursuits.

### 8.2.1.3 Access to information

The findings and the literature review suggest that the participants seemed to experience challenges relating to their access to information. The first obstacle the participants were faced with was their feelings of uncertainty, an affective structure that set in when they realised their information needs. Thereafter the participants realised that they were uncertain on how to use the library, they lacked the skills to search the collection and most were uncomfortable to communicate with the staff to request assistance. All these factors combined seemed to have made dealing with an academic information need a daunting task. When the participants embarked on an Information Seeking activity, they seemed to oscillate between affective and cognitive uncertainty, which may be unpleasant.

The training and assistance suggestions that the participants made further reflect their uncertainty, as well as their need to have their feelings of uncertainty minimised and to ensure their access to information. Although some of the suggestions were not specific with regards to the kind of assistance they required, some specific suggestions were made such as to be shown a page in a book that has the assignment information. The participants needed help from senior students and in the form of direction boards.

Most participants suggested training on locating relevant books and other reliable information. This suggestion is indicative of the participants' uncertainty due to their lack of knowledge and prior experience in using academic information resources and systems. Some participants suggested a need for being provided with relevant information for the assignment and shown where in the book they could find the information they needed. This suggestion also points to the fact that the participants were unaware of the activities that should enable them to satisfy the need for an academic assignment that requires using multiple sources of information. The suggestion for help with all online searching demonstrates a need to be assisted in dealing with what Onwuegbuzie *et al.* (2004:37) has termed 'mechanical anxiety'. These students need more assistance that relates to computers and online services.

Participants' request to be taught everything about information also highlights their awareness of a need for assistance. It was therefore concluded that the participants' realised and acknowledged the vastness of the academic information available and their lack of skills and knowledge. Participant I also demonstrated a yearning to be independent and to be able to locate, use and evaluate information adequately to satisfy his information needs. The

participants' suggestions to improve the library services that are rendered reveals a need for a holistic intervention that relates to the entire information seeking and information use activities induction.

#### *8.2.1.4 Finding information*

Due to the fact that the participants lacked the knowledge to use the library, finding information was not easy for them. Owing to their shortcoming, participants expressed experiencing library and information anxiety, hence they opted to use the Internet and Google. Their preference for using the Internet and Google was based on the finding that they thought searching the Internet and Google was an easy way to find information. Participants alluded to just typing and getting the information; an implication that the information found is not evaluated or synthesized.

On account of their experiences, the participants suggested that they needed training so that they could have the skills required to find information within the library systems. Most of the participants suggested that they would prefer student assistants to assist them in navigating the academic library and information systems. The knowledge of academic information resources and systems is crucial for students at an institution of higher learning or at a university. Even though the findings reveal that the participants associated the library with their academic activities, they opted to use the Internet and Google to address their uncertainty of not knowing academic information resources and systems because they had prior experience in using the Internet and Google to access information. Therefore, they appeared to be comfortable in using the Internet and Google as they had some successes. However, they did not realise that the quality of the information or the type of information they retrieved may not be applicable to their need and that they could get more relevant information if they searched elsewhere. Although some of the participants attempted to engage in the technical process of retrieving books and other information resources, most of the participants' attempts proved to be futile.

#### *8.2.1.5 Lack of knowledge feelings*

Owing to a lack of knowledge, the participants felt uncomfortable. The findings concur with findings reported on in the literature review, which states that undergraduate students, particularly the ones in their first year of study, experience discomfort when they have to use the library. The findings endorse the discussions in the literature review concerning library and information anxiety.

#### *8.2.1.6 Lack of skills feelings*

The realisation of the lack of skills to effectively search for information in the library was another source of displeasure for the participants. They were ashamed of their lack of skills and, as such, did not have the confidence to attempt a library information search. These findings crystallise what is in literature, which states that first-year students sometimes retreat and present sub-standard academic tasks even when they know they could have done more.

### **8.2.2 Research question two: how do students without a prior background in using academic information resources and systems react when they are first given an academic task?**

The findings of the current study show that the participants experienced feelings associated with uncertainty and anxiety when an academic assignment was first given. The findings further reveal that, while some participants seemed to be less thrilled and were bothered by academic assignments, a few participants were not bothered. Although some participants were not bothered by the academic task they were given, they also expressed some kind of discomfort, which could be a reflection of their lack of knowledge and skills in using academic information resources and systems. Some of the participants were unable to even explain their feelings. However, they did note that they did not like those kinds of assignments. The findings and literature review allude to the apprehension experienced by students at a given academic task. Therefore, the unpleasantness associated with the apprehensive feelings could be a negative contributor to their information seeking and searching process, especially when considering the information barriers they faced. This was illustrated in Figure 7.1. Participants who lacked a background in using academic information resources and systems could in addition experience contextual challenges such as the time allotted to the task by delaying their information-searching activities that manifests in the first three stages of the information search process.

#### *8.2.2.1 Research assignment feelings*

The findings and literature concur on the feelings the students experienced when confronted with a research assignment. The participants' responses were similar to the responses provided in Section 8.2.2. This seems to suggest that the discomfort experienced at the announcement of the assignment remains with the participant from the onset of the Information Seeking process through to the pre-focus exploration stage. Therefore, it depends on the level of

discomfort and anxiety that a participant will experience, which will determine how the information seeking and searching will progress.

Based on the reported levels of anxiety the participants experienced, two categories of students could be identified. The first category of students were those participants who experienced high levels of anxiety with a likelihood of being pushed out of the learning loop when they were not able to achieve a focus. The suggestion is that minimal to no learning occurs when a focus is not achieved when dealing with an academic task. The second category relates to the participants who experienced low levels of anxiety and who were able to break through the information barrier at the pre-focus exploration stage of an information search to achieve a focus. The achievement of a focus suggests harmony of the first space (i.e. the individual's knowledge system) and the second space (i.e. the school curriculum), creating a link in the third space to construct new world views.

### **8.2.3 Research question three: how do students without a background in using academic information resources and systems perceive and relate to library staff?**

The findings and literature review suggest that most of the participants avoided requesting assistance from library staff. Their avoidance appeared to originate from the feelings of uncertainty they experienced, which causes affective factors such as fear and a lack of confidence. The circumstances surrounding the avoidance of communication with library staff for assistance validates what was shown in the literature review. The findings also confirm the researcher's initial observation that students, particularly first-year students, are afraid to approach library staff because they do not know how to use the library.

The participants who avoided seeking help from library staff seemed to prefer to hide their lack of knowledge. It further seems that the participants who avoided communication with library staff also viewed the psychological cost associated with exposing their lack of skills higher than the opportunity to learn something new. In so doing, the participants missed an opportunity to learn about academic information resources and systems from reliable sources.

#### **8.2.4 Research question four: how do students who do not have a background in using academic information resources and systems use academic information resources and systems?**

The findings suggest that students who lack a background in using academic information resources and systems avoided using the library's information resources due to their lack of knowledge of the library and using multiple information resources. As such, they opted to use the Internet and Google. The findings concur with suggestions in the literature that students mostly depend on the Internet and Google to address their information needs. However, because the participants in the current study lacked experience in dealing with academic information resources, they were at risk of using any of the freely available information sources without evaluating the accuracy and relevance of such a resource. Also, it was probable that the participants could have addressed their academic task information need by simply collecting and completing the task information without formulating a focus.

##### *8.2.4.1 Use of information resources*

The findings seem to suggest that the participants understood online resources as being references to the Internet and Google. Due to their lack of experience in using academic information resources and systems, this was to be expected as they would not have known any other online resource other than the Internet and Google. With the exception of one participant, the participants did not know about the online library catalogue. Also, they did not know what a bibliographic database was and that these provide access to electronic resources. Considering the participants' contextual background highlighted in Section 1.2, this was also expected. The use the participants made of the information they gathered could manifest in the amount of information resources obtained. This has a relation also to the manner in which the participant progressed from Q1-Q4 levels of an information need and how the information need was articulated.

##### *8.2.4.2 Obtaining too little information*

The findings show that obtaining too little information seemed to have been influenced by the uncertainty that sets in when the assignment is given, as illustrated in Figure 7.1, which leads to the first information barrier. Most of the participants' suggestions were focused on how to locate information resources and their need to be assisted by others. Although one participant, Participant F, suggested assistance is required on how to deal with multiple sources, some

participants did not have any suggestions relating to obtaining too little information. All the suggestions they made seemed to suggest that they were oblivious to the construction of the task that lay ahead. This could be put to their lack of experience in using academic information resources and systems.

#### *8.2.4.3 Obtaining too much information*

Most of the participants reported that it was easy to obtain information. However, their responses were based on obtaining information from the Internet and Google. There is a lot of information available on the Internet and Google. Information seekers have to decipher the information obtained. However, the participants seemed to accept any information they found and appeared to trust whatever information they found. In the focusing stage, it is expected that users are able to use their compromised Q4 level of information need to command a query to an information retrieval system. However, the reported findings suggest that the participants found it challenging to deal with too much information. This is despite the fact that some of the participants did not seem to be aware of their challenges. A few participants did not make any suggestion on how to deal with too much information. In fact, it seems as if they did not know what to do with the obtained information. In turn, some of the participants indicated that they would go to someone for help on how to summarise the information they had obtained. Also, some indicated that they would write the summary on their own. However, a few of the participants indicated that they needed to be taught how to look for information and how to evaluate it.

As shown in Section 6.5.6, the participants appeared to not be too concerned about obtaining too much information. The researcher's observation is that these participants' mood could have been indicative. As Kuhlthau (2004) suggested, an indicative mood leads to conclusive actions.

Participants seemed untroubled by having retrieved too much information because having too much seemed to be better than having too little information. In fact, they appeared excited to have obtained too much information and, as such, could have closed their information search too early because the Internet and Google instantly provides a lot of information. Because they had retrieved a lot of information, these participants did not see the need to continue searching. They were oblivious to their need to synthesise the information to be informed and to form a personal perspective.



The findings indicated that the participants were either dependant on self or others as a strategy to deal with too much information. The participants who were dependant on others and asked the library staff to summarise the information for them could not have made it through the information barrier suggested by Kuhlthau and Cole (2012). This suggests that they would not have been able to do the work themselves.

#### *8.2.4.4 General academic task assistance*

The findings show that the participants needed to be helped by library staff, senior students, fellow students, mentors or anyone who could help them find and access various sources of information. Even the participants who had no suggestions on how the library could support them indicated that they needed help.

Participants L and N seemed to realise that there is more to an academic assignment than finding information and just completing the work. Their suggestion was to be taught about resources and systems, and how to access and use information. Both their suggestions show that participants have a kind of understanding that there is some process between finding information and completing an academic assignment.

#### **8.2.5 Research question five: what are the barriers that first-year students who have no prior background in using academic information resources and systems experience when seeking and searching for information?**

The personal barriers the students reported on were all affective barriers rooted in their cognitive structures, which reflect a lack of knowledge, skills and experience. The feelings they experienced include uncertainty, anxiety, fear, being overwhelmed, bored and annoyed, as well as having mixed feelings.

##### *8.2.5.1 Uncertainty*

The participants experienced uncertainty prior and during the first stage, the initiation stage, and the third stage, the pre-focus exploration stage of the information search process. In her studies, Kuhlthau (1993; 2004) observed that uncertainty manifests during the initiation stage of the information search process. However, there is a slight difference between Kuhlthau's observations and the findings in the current study. The current findings seem to suggest that the participants' uncertainty manifested even before the initiation stage of the information

search process. This is because the participants seemed to struggle with a few questions such as ‘How can I find information?’, ‘Where can I find information?’, and, ‘Who can help me find the information?’ This kind of affective uncertainty seemed to have manifested due to the participants’ lack of experience in using academic information resources and systems. As such, the participants were also emphatic to their need for training and the opportunity to be helped by someone or to be taught.

#### *8.2.5.2 Anxiety*

It can be concluded that anxiety can be expected in the initial stages of the information search process. The anxiety referred to by participants seemed to be associated with the cognitive uncertainty they experienced due to their lack of knowledge and experience in using academic information resources and systems.

#### *8.2.5.3 Fear*

The findings and the literature review show that fear can also be expected in the initial stages of the information search process. The fear the participants’ experienced appears to stem from their lack of knowledge of academic information resources and systems. This is manifested in their thoughts on how to find information. It can be concluded that, because of the fear they experienced, the participants’ feelings were marred by discomfort and worry. Even though some participants were aware of the actions they had to take, they felt fear because they lacked the knowledge and skills to use the academic information resources and systems.

#### *8.2.5.4 Confidence*

Although the participants defined themselves as feeling confident when confronted with an academic task and despite not being sure of where to find information in the library, they alluded to having had bad feelings. Even though the participants felt confident, it could be concluded that the feelings of discomfort they expressed arose from the fact that they lacked knowledge of academic information resources and systems.

#### *8.2.5.5 Overwhelmed*

The findings reported on in Section 6.6.1.5 suggest that Participant K was overwhelmed by all aspects of information seeking and searching that were related to her academic task. Based on her feelings of being ‘overwhelmed’, it can be concluded that she was thrown out of the learning loop.

#### 8.2.5.6 *Bored and annoyed*

One of the participants acknowledged feelings of being bored and annoyed when dealing with an academic task. Also, he was not pleased with the work at hand. The concepts ‘bored’ and ‘annoyed’ show that this participant had elicited an emotion that is unpleasant, uninteresting and irritating. Considering the participant’s reasons for being bored, it seems as if the negative emotions he experienced arose from the fact that he had no knowledge and skills to obtain the information that he required. Consequently, this participant’s thoughts and actions were likely to make her approach the task at hand with no enthusiasm. Therefore, it is also imperative to provide an opportunity for bored and annoyed participants to minimise their uncertainty and other negative affective factors they may experience.

#### 8.2.5.7 *Mixed feelings*

One participant used the word ‘good’ when expressing her feelings when dealing with an academic assignment. However, shortly after saying that she felt good, she mentioned that she was overwhelmed but okay and was feeling bad at her lack of knowledge of using the library. Thus, it can be concluded that the participant experienced mixed feelings with a positive disposition towards the work at hand. The finding reveals that the origin of the negative bad feelings pertains to a lack of knowledge and experience in the use of academic information resources and systems.

### **8.3 Concluding Answer to the Overall Question**

The main research question that was to be answered was how could Information Seeking uncertainty that causes affective factors among first-year students be minimised? The findings show that the participants’ information searching was influenced by affective factors induced by uncertainty even though they had an alternative to their uncertainty in the form of the Internet and Google. However, the relief from the stress and related anxieties of using the Internet and Google was probably brief. As the participants continued with the academic task, they were likely to experience other bouts of uncertainty characterised by anxiety and fear, particularly when they interacted with the obtained information to form a focus. The uncertainty experienced in the context before the beginning of task construction may differ from the uncertainty experienced at stage three of the information search process, the pre-focus exploration stage.

The difference may be explained based on the premise that the uncertainty causing affective factors before the task initiation stage was triggered by external factors of what the participants saw and perceived (i.e., the physical library, the staff and the information systems).

The uncertainty the participants experienced during the pre-focus exploration stage was rooted in their cognitive structures. It was triggered by internal events relating to the progression levels of an information need to the point where there is harmony between the participant's prior knowledge and new knowledge to form a personal perspective. In order to minimise the uncertainty experienced by participants, a thematic analysis of the empirical data was employed. The employed themes were knowledge of information resources, communication with staff and the use of information resources to determine the manifestations of uncertainty.

### **8.3.1 Knowledge of information resources**

It can be concluded that the participants acknowledged that their lack of knowledge of academic information resources and prior experience of such resources was a problem and challenged them. A further conclusion is that the unpleasant feelings they experienced, such as feelings of uncertainty, fear and anxiety during their information seeking and searching endeavours, was due to their lack of knowledge. Hence, participants suggested that other people should help them.

#### *8.3.1.1 Mentorship*

It can be concluded that even though the participants could be taught or inducted on the academic information resources and systems, they may still need more assistance. Such assistance could be the kind of assistance provided by trained mentors such as senior students and peer helpers. The inclusion of mentors in the induction or training could be more beneficial to participants as they could have access to a mentor as a helper while learning how to help themselves. Also, the inclusion of mentors in the induction or training is in line with the participants' suggestions that they need mentors to minimise the uncertainty they experienced while dealing with their academic information needs.

### **8.3.2 Communication with staff**

It can be concluded that all the participants experienced feelings of uncertainty, anxiety and fear. Therefore, the affective barriers they experienced were characterised by fear, anxiety and uncertainty. As such, the experienced affective factors could have been the reason why the participants avoided communication with staff when they sought help in dealing with their academic information needs. Responses, such as the one provided by Participant H that ‘every time when I enter the library the staff will say, ‘this one or that one don't know anything about libraries’ seem to be in line with the suggestion by Savolainen (2016) that information seekers are affected by the risk of excessive psychological costs.

### **8.3.3 Use of information resources**

The participants seem to have struggled whilst using academic resources. This could be put to the fact that they had no previous experience in using academic information resources and systems and their lack of knowledge prompted feelings of uncertainty. Although a few participants realised their need to synthesize information for an academic assignment, the findings indicate that most of the participants did not. Most participants appeared to think that dealing with an academic assignment involves only a simple act of gathering information about a topic. By not interacting with the information, these participants could miss forming their own point of view.

#### *8.3.3.1 The Internet and Google*

The findings of the current study and the literature review concur on the use the participants made of the Internet and Google in order to find information that was supportive of their academic information needs. The participants in the current study seemed to also use the Internet and Google as a default platform for information access to curb the uncertainty they experienced when using other information resources and systems. Many online academic resources are embedded in the Internet, therefore, induction on the use of the Internet and Google becomes an integral part of the learning that participants must have.

#### *8.3.3.2 Textbook use*

It can be concluded that participants viewed a textbook as an indispensable information source for their academic tasks. This could be because they knew the value of a textbook and had

experience in using it. Therefore, it is important for them to be taught about other information resources so that they may know them and learn how to use them.

#### **8.3.4 Affective barriers**

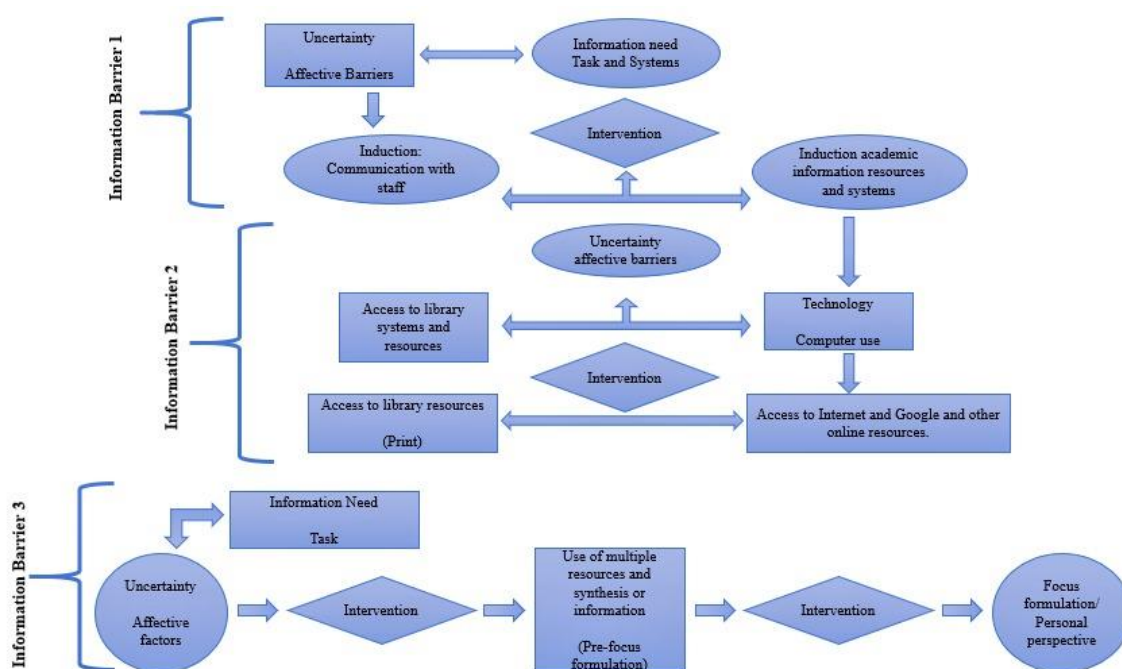
In the information search process, Kuhlthau (1991; 2004) appeared to consider mostly the cognitive attribute that gives rise to feelings of uncertainty. However, the use of library information systems also requires physical actions, which in turn could also give rise to certain affective factors such as feelings of uncertainty. The findings illustrate the role affective phenomena play in information seeking. Furthermore, the findings show that affective phenomena has the potential to act as a barrier even before the actual task construction begins. The implication is that by the time they engage in a task the Information Seeking process is already burdensome. This is due to their lack of knowledge.

It is the argument of this thesis that the students who lack the required knowledge and experience to use academic information resources and systems may take even longer to formulate an information search focus, if any, and to progress from a Q1 level of an information need to a Q4 level to form a compromised form of an information need.

Therefore, in order to minimise students' uncertainty, they need to be taught information literacy skills so that they would be able to deal with the negative attributes associated with information seeking.

#### **8.3.5 Minimising uncertainty model**

The literature review and findings of the current study allowed the researcher to develop a model that could be employed to minimise students' uncertainty. The model addresses the three information barriers that were identified in Figure 7.1. The researcher anticipated that before a participant begins with the task, they would experience challenges related to their lack of knowledge of academic information resources and systems. Participants experienced certain feelings regarding their own knowledge and skills, as well as the library systems and the task. The expressions of the affective barriers experienced are similar on information barrier one, two and three. These feelings are represented as Information Barrier 1, Information Barrier 2 and Information Barrier 3 in Figure 8.1 below.



**Figure 8.1: Minimising uncertainty model**

The expressions of affective barriers experienced are similar on information barrier one, two and three. In information barrier one, the students do not know the different kinds of academic information resources and systems that are available to assist them in dealing with their information needs. An intervention to assist students is required to minimise the affective barriers, such as uncertainty, fear and anxiety, they experience due to their lack of knowledge of academic information resources and systems. While they still experience uncertainty, fear and anxiety, they opt to use the Internet and Google as an escape. The findings reveal that the use of the Internet and Google presents another set of challenges that relates to the mechanical use of computers. An intervention at the point of computer use challenges is deemed fit to minimise the extent of the affective barriers. In order to address information barrier three, which manifests when participants realise that they experience challenges with the use of multiple sources of information to synthesize the information to form a personal perspective, an intervention is also required.

An induction training course, which should consider the three information barriers the participants' experienced and that are presented in the model, may provide students with 'prior knowledge' when they are faced with an information need. It is hoped that such an induction course would rather close the existing vacuum in the students' knowledge and experience base

when they first register as first-year students. The induction course could create a knowledge and experience foundation that could become a source of information to tap into when they need to move through the four levels of an information need, which was articulated by Taylor (1968), and when they engage with information systems to seek and search for information. As such, the induction course should enhance their Information Seeking skills and may ultimately form part of their Q1-Q4 levels of an information need. This should reduce high anxiety levels since the levels of compatibility and inconsistencies of old information and new information could be reduced. In this way, the students who had been inducted would be able to tap into the information they had learned to formulate a better-compromised form of their information need.

Kuhlthau (2004) and Kuhlthau *et al.* (2015) suggested various interventions that are appropriate for students at different stages of the information search process. However, this study suggests that, based on the fact that these participants do not seem to even know the value of communicating with staff, it is best to gradually introduce them to the academic resources and systems. In that way, it could eliminate the uncertainty caused by a lack of knowledge of resources and systems. It is therefore imperative to include the teaching of how to locate and use academic information resources and systems.

#### **8.4 Limitations of this Study**

As it is with every other study, the section on limitations of the study is aimed at indicating the weaknesses of the current study. This relates to the potential shortcomings of a study. The limitations in the current study manifests in both the literature review and the empirical study.

The study was based on interviews to solicit the prevalence of uncertainty among first-year students regarding their knowledge and use of academic information resources and systems and their communication with library staff. The study also focused on the barriers that impact first-year students who lacked experience in using academic information systems. The study did not explore the positive effects of uncertainty among students.

Information used was based only on responses provided by the participants. Also, the participants were drawn from a small sample from one campus of one university. The study



did not explore any written academic tasks by the participants. The participants excluded students who had a background experience in using academic information resources prior to their enrolment at the university.

Fluency in the English language could have been a limitation in the current study. The participants responded to the interview questions set out in English, a second and, in some cases, a third language for some participants. In addition, the use of clichés by participants could have established an inaccurate interpretation. An example is the response provided by Participant J when she said that she could be best described by the word ‘good’ when dealing with an academic task and further that she felt overwhelmed at the same time.

Also, in retrospect, the researcher regrets not having included a question in the structured questionnaire such as:

- When do you know that you have collected enough information for your assignment?
- After collecting information, what do you do?

These questions would have, to some extent, unpacked certain sections relating to the third information barrier illustrated in Figure 7.1. Also, the scope of discussions could have been limited owing to the fact that the researcher is a novice and this is the first doctoral degree research embarked upon.

## **8.5 Recommendations**

The recommendations include additional activities that precede the activities in the ISP model. The study identified various areas in which the offered library and information services to first-year students could be enhanced:

- The first identified gap, which was also confirmed by findings, is that participants do not know how to use academic information resources and systems. It is therefore recommended that first-year students without the knowledge and skills to use academic information resources and systems be taught and trained on the academic information resources to minimise uncertainty.
  - Information literacy skills programmes focused on library skills, information-searching skills and information evaluation is recommended. An adequately

designed teaching module will be of vital importance to guide anyone, such as library staff or senior students, in teaching. Knowledge of academic information resources and systems, knowing the benefits of communication with staff and the ability to use multiple information sources could minimise uncertainty.

- The second identified gap is that the participants avoid requesting assistance from staff. The recommendation hereto is to induct first-year students in the various services provided by library staff for them to be aware of the benefits inherent therein. It is further recommended that senior students should be trained and appointed as mentors for the first-year students. This recommendation could cater for students who feel or perceive library staff to be non-receptive and intimidating. It is also recommended that the library and information services provide electronic information boards in the library.

Based on the findings and the fact that the participants' thoughts were mostly preoccupied by where and how to access information for their academic assignments, it is only probable that it may be a challenge for participants to engage in the information search process and to achieve a focus. It is therefore recommended that the participants be made aware of and taught the information search process.

Unlike the teaching of the information search process by Kracker (2002), the participants in the current study require teaching to acquire knowledge of the various academic information resources and system and the help that can be found in communicating with staff. The knowledge of academic information resources and systems appear to be critical activities that need to precede the information search process for participants to achieve a focus. The information search process cannot be separated from the knowledge of academic information resources and systems. The findings of the current study make it clear that without the knowledge of academic information resources and systems, there is a likelihood that participants will submit substandard work without a theme or a personal perspective. It is therefore recommended that when universities conduct information literacy training, they should profile the students upon arrival to enhance their information literacy and library skills prior to their engagement with academic activities.

The teaching of first-year students who lack experience in using academic information resources and systems could minimise most of the barriers associated with uncertainty and enhance the output regarding academic tasks.

## 8.6 Future Research

Future research that focuses on the information use of students without a prior background in using academic information resources and systems is required in order to identify further pitfalls and/or shortcomings. From this study, it was found that the challenges experienced by participants are related to their lack of knowledge and use of academic information resources and systems. Participants seemed to also struggle with the use of multiple sources of information. Future research projects could include:

- **A longitudinal study on the use of information found on the Internet and Google.** Due to the increasing use of the Internet and Google, it is imperative to learn more about how students obtain information from the Internet and Google and how they evaluate and use the information.
- **Focus formulation.** A study can be conducted to learn how students who do not have prior experience in using academic information resources and systems create new knowledge. Such a study should answer the following question: do students who lack the knowledge and the skills to adequately use information resources and systems achieve a focus? The study could reveal the effect a lack of knowledge of the use of academic information resources and systems has on students' Information Seeking behaviour.
- **Positive uncertainty.** The existence and effect of positive uncertainty among first-year students who lack an experience in using academic information resources and systems could be explored.
- **The perception of participants towards the information search process .** Such a study could reveal the perceptions participants have regarding the information search process as there could be a mismatch between perception and experience of what the students go through when they embark on information seeking and searching.
- **Mentors.** A significant number of participants obtained help from senior students and suggested that mentors be appointed to help them address their information needs. Therefore, a study is needed to explore the kind of assistance senior students or mentors

provide and whether their support would be helpful. Such a study should address the following question: what and how are the senior and fellow students teaching first-year students when they themselves do not know anything? It will be important to study the kind of knowledge shared by untrained senior students.

- **A study that includes both advantaged and disadvantaged students.** Such a study should be done to establish if there is a difference in their knowledge and skills and their uncertainty experiences.

Future studies should include bigger samples from various universities and other institutions of higher learning to assist and enhance students with the knowledge they need in using the library and academic information resources.

## **8.7 Value of the Study**

The value of a study of this nature is twofold, namely the contributions it makes to practice and the theoretical contribution it makes to the field of knowledge; in this instance, Information Seeking behaviour.

### **8.7.1 Practical contribution**

Universities in South Africa, like the Tshwane University of Technology provides information literacy training to first year students. Evidence from this study indicates that it may be necessary to profile the students in order to efficiently train the students who lack a background of using library and other academic information systems. They lack experience because they have never been exposed to libraries and academic information systems. Therefore, participants venture into academic activities ill-prepared and without Information Seeking skills. The practical value of this study therefore lies in the identification of the three information barriers that are encountered by first-year students who have no knowledge and experience in using a library or an academic information system. The three information barriers identified prompt the suggestion on an induction course that would be focused on minimising uncertainty.

Figure 7.1 leads to Figure 8.1. It is also probable that those participants who opted to do their work with the information they had may have been pushed out of the learning loop due to the information barrier suggested by Kuhlthau and Cole (2012). Participants may also experience

high uncertainty caused by conflicting and inconsistent information. The strategies in the pre-focus exploration stage involves reading to learn about the topic, tolerating inconsistencies and incompatibilities of the information obtained and intentionally seeking for possible focuses (Kuhlthau 2004:47). In order to assist participants who do not have a background in using multiple academic information sources, Kuhlthau *et al.* (2015) suggested an intervention designed to assist students in moving from the pre-focus formulation stage to the focus formulation stage.

Therefore, the current study was conducted against the backdrop of the ISP model that was developed by Kuhlthau (1991;2004). The findings reveal that participants without a background in using a library and academic information systems experienced bouts of unpleasantness during their Information Seeking activities, particularly before the actual task begins. Therefore, it is imperative to introduce participants, probably in a staggered manner, into the world of information seeking to minimise the effect their uncertainty has on their Information Seeking activities.

### **8.7.2 Theoretical contributions**

This study contributed to Information Seeking behaviour research by acquiring some understanding of how uncertainty affects students who come from a disadvantaged background with regards to Information Seeking behaviour. Furthermore, the findings supported the researcher in developing a model that could support researchers in understanding the various information barriers disadvantaged students encounter. As such, the model could guide the development of an information literacy programme or induction courses that are focused on minimising uncertainty among first-year students, who have no background in using academic information resources and systems, when confronted with an information task.

The suggested model, the minimising uncertainty model, is an adaptation of Kuhlthau and Cole's (2012) model. The model of minimising uncertainty in the Information Seeking behaviour of first-year students could be utilised by universities as a framework for their intervention programmes.

## **8.8 Summary and Final Comments**

This qualitative study explored how feelings of uncertainty affected the Information Seeking behaviour of first-year students who registered at TUT's Polokwane Campus. The 15 participants had no prior experience in using academic information resources and systems at an institution of higher learning or anywhere else, including their high school experience. The study showed that the participants encountered various information barriers, which will affect their Information Seeking behaviour in various ways. These findings, in combination with an extensive literature review, supported the researcher in adapting Kuhlthau and Cole's (2012) model to a new model that can be used to not only guide future studies of this nature but also to develop induction courses that are focused on minimising first-year students' uncertainty when they are confronted with an information task.

## REFERENCES

- Adams, L. 2010. Uncertainty in the information seeking behaviour in the virtual playground of Generation Y at Stellenbosch University. *Innovation* 40:68-81.
- Agarwal, NK. 2017. *Exploring context in information behaviour: seeker, situation, surrounding and shared identities*. California: Morgan & Claypool Publishers.
- Allen, TJ. 1969. Information needs and uses. *Annual Review of Information Science and Technology* 4:3-29.
- Anderson, TD. 2006. Uncertainty in action: observing information seeking within the creative processes of scholarly research. *Information Research* 12(1)  
<http://InformationR.net/ir/12-1/paper283.html> (Accessed 12 November 2018).
- Anney, VN. 2014. Ensuring the quality of findings of qualitative research: looking at trustworthiness criteria. *Journal of Emerging Trends in Educational Research and Policy Studies* 5(2):272-281.
- Babbie, ER. 1973. *Survey research methods*. California: Wadsworth Publishing Company.
- Babbie, ER. 2016. *The practice of social research*. 14th ed. Boston, MA: Cengage Learning.
- Bar-Anan, Y, Wilson, TD & Gilbert, TD. 2009. The feeling of uncertainty intensifies affective reactions. *American Psychological Association* 9(1):123-127.
- Baro, E, Onyenania, GO & Osaheni, O. 2010. Information seeking behaviour of undergraduate students in the humanities in three universities in Nigeria. *South African Journal of Library and Information Science* 76(2):109-117.
- Beard, R. 2015. *The critique of uncertainty reduction*. [Poster]. Scholars week: Western Washington University. <https://cedar.wvu.edu/cgi/viewcontent.cgi?article=1084&context=scholwk> (Accessed 11 April 2019).
- Belkin, NJ. 1978. Information concepts for information science. *Journal of Documentation* 34:55-85.
- Belkin, NJ, Oddy, RN & Brooks, HM. 1982. ASK for information retrieval part 1: background and theory. *Journal of Documentation* 38(2):61-71.
- Berger, CR & Calabrese, RJ. 1975. Some explorations in initial interaction and beyond: towards a developmental theory of communication. *Human Communication Research* 1(2):99-112.
- Bergman, MM. 2011. The good, the bad, and the ugly in mixed methods research and design. *Journal of Mixed Methods Research* 5(4):271-275.

- Biglu, M, Ghavami, M & Dadashpour, S. 2016. Big five personality factors and library anxiety. *Journal of Behavioural and Brain Science* 6(9):377-385.
- Blundell, S & Lambert, F. 2014. Information anxiety from the undergraduate student perspective: a pilot study of second semester freshmen. *Journal of Education for Library and Information Science* 55(4):261-273.
- Bodemer, BB. 2014. They CAN and they SHOULD: undergraduate providing peer reference and instruction. *College & Research Libraries* 75(2):162-178.
- Bostick, SL. 1992. The development and validation of the library anxiety scale. PhD thesis, Wayne State University, Detroit: MI.
- Boyd, A. 2004. Multi-channel information seeking: a fuzzy conceptual model. *Aslib Proceedings* 56(2):81-88.
- Branscombe, NR. 1988. Conscious and unconscious processing of affective and cognitive information, in *Affect, cognition and social behaviour: new evidence and integrative attempts*, edited by K Fiedler & J Forgas. Toronto: CJ Hofgre:3-24.
- Brasher, DE. 2001. Communication and uncertainty management. *Journal of Communication* 51(3):477-497.
- Braun, V & Clarke, V. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3(2):77-101.
- Brewer, WF & Nakamura, GV. 1984. The nature and functions of schemas, in *Handbook of social cognition* edited by Wyer RS & TK Srull. Hillsdale, NJ: Lawrence Erlbaum Associates Publishers: 118-160.
- Brinkmann, S & Kvale, S. 2015. *Interviews: learning the craft of qualitative research interviewing*. 3rd ed. Los Angeles: Sage.
- Bruce, H. 2005. Personal, anticipated information need. *Information Research* 10(3):1-17. <http://InformationR.net/ir/10-3/paper232.html>. (Accessed 29 March 2017)
- Brunner, JS. 1973. *Beyond the information given: studies in the psychology of knowing*. London: Ruskin House.
- Burke, A, Austin, T, Bezuidenhout, C, Botha, K, Du Plessis, E, Jordaan, E, Lake, M, Makhafula, K, Makhubela, M, Moletsane, M, Nel, J, Pillay, BJ, Stein, DJ, Ure, G, Von Krosigk, B & Vorster, A. 2019. *Understanding Psychopathology: South African perspectives*. 3rd ed. Cape Town: Oxford University Press Southern Africa.
- Byström, K & Hansen, P. 2005. Conceptual framework for tasks in information studies. *Journal of the American Society for Information Science and Technology* 56(10):1050-1061.



- Byström, K & Järvelin, K. 1995. Task complexity affects information seeking and use. *Information Processing & Management* 31(2):191-213.
- Case, DO. 2002. *Looking for information: a survey of research on information seeking, needs and behaviour*. Bingley: Emerald Group Publishing.
- Case, DO. 2007. *Looking for information: A survey of research on information seeking, needs and behaviour*. 2nd ed. Bingley: Emerald Group Publishing.
- Case, DO. 2012. *Looking for information: a survey of research on information seeking, needs and behaviour*. Bingley: Emerald Group Publishing.
- Case, DO & Given, LM. 2016. *Looking for information: a survey of research on information seeking, needs and behaviour*. 4th ed. Bingley: Emerald Group Publishing.
- Chen, S, Yao, N & Qian, M. 2018. The influence of uncertainty and intolerance of uncertainty on anxiety. *Journal of Behaviour Therapy & Experimental Psychiatry* 61:60-65.
- Cherry, K. 2020. What is cognition? <https://www.verywellmind.com/what-is-cognition-2794982> (Accessed 26 October 2020).
- Chowdhury, S & Gibb, F. 2009. Relationship among activities and problems causing uncertainty in information seeking and retrieval. *Journal of Documentation* 65(3):470-499.
- Chowdhury, S, Gibb, F & Landoni M. 2011. Uncertainty in information seeking and retrieval: a study in an academic environment. *Information Processing and Management* 47:157-175.
- Chowdhury, S, Gibb, F & Landoni, M. 2014. A model of uncertainty and its relation to information seeking and retrieval (IS&R). *Journal of Documentation* 70(4):575-604.
- Clarke, V & Braun V. 2013. Teaching thematic analysis: overcoming challenges and developing strategies for effective learning. *The Psychologist* 26(2):12-123.
- Clore, GL & Schiller AJ. 2016. New light on the affect-cognition connection, in *Handbook of emotions*, edited by LF Barret, M Lewis & JM Havlind-Jones. 4th ed. New York: Guilford Press:532-546.
- Cole, C. 1993. Shannon revisited: information in terms of uncertainty. *Journal of the American Society for Information Science* 44(4):204-211.
- Cole, C. 2001. Intelligent information retrieval part IV: testing the timing of two information retrieval devices in a naturalistic setting. *Information Processing & Management* 37(1):163-182.

- Cole, C. 2011. A theory of information need for information retrieval that connects information to knowledge. *Journal of American Society for Information Science and Technology* 62(7):1216-1231.
- Cole, C. 2012. *Information need: a theory connecting information search to knowledge formation*. Medford, NJ: Information Today, Inc.
- Cole, C, Beheshti, J, Abuhimed, D & Lamoureux, I. 2015. The end game in Kuhlthau's ISP model: knowledge construction for grade 8 students researching an inquiry based history project. *Journal of Association for Information Science and Technology* 66(11):2249-2266.
- Cole, C, Julien, CA & Leide, JE. 2010. An associative index model for hypertext internet search based on Vannevar Bush's Memex machine: an exploratory study. *Information Research* 15(3):1-20. <http://InformationR.net/ir/15-1/paper435.html> (Accessed 26 August 2018).
- Collins, CS & Stockton, CM. 2018. The central role of theory in qualitative research. *International Journal of Qualitative Methods* 17:1-10.
- Colón-Aguirre, M & Fleming-May, RA. 2012. "You just type in what you are looking for": undergraduates' use of library resources vs. Wikipedia. *Journal of Academic Librarianship* 38(6):391-399.
- Cool, C. 2001. The concept of situation in information science. *Annual Review of Information Science and Technology* 35:5-42.
- Cool, C & Belkin, NJ. 2011. Interactive information retrieval: history and background, in *Interactive information seeking, behaviour and retrieval*, edited by I Ruthven & D Kelly London: Facet:1-14.
- Cooperstein, SE & Kocevar-Weidinger, E. 2004. Beyond active learning: a constructive approach to learning. *Reference Services Review* 32(2):141-148.
- Courtright, C. 2007. Context in information behaviour research. *Annual Review of Information Science and Technology* 41(1):273-306.
- Creswell, JW. 2007. *Qualitative inquiry and research design: choosing among five approaches*. Thousand Oaks: Sage.
- Creswell, JW. 2013. *Qualitative inquiry and research design: choosing among five approaches*. Los Angeles: Sage.
- Creswell, JW. 2014. *Research design: qualitative, quantitative, and mixed methods approaches*. Los Angeles: Sage.

- Creswell, JW & Miller, DL. 2000. Determining validity in qualitative inquiry. *Theory into Practice* 39(3):124-130.
- Creswell, JW & Plano Clark, VL. 2007. *Designing and conducting mixed methods research*. Thousand Oaks: Sage.
- Cypress, BS. 2017. Rigor or reliability and validity in qualitative research: perspectives, strategies, reconceptualization and recommendations. *Dimension of Critical Care Nursing* 36(4):253-263.
- De Vaus, D. 2001. *Research design in social research*. Los Angeles: Sage.
- Denzin, NK & Lincoln, YS (eds). 2005. *Handbook of qualitative research*. Thousand Oaks: Sage.
- Dervin, B. 1983. An overview of sense-making research: concepts, methods and results to date. International Communication Association annual meeting Dallas, TX: 3-15.
- Dervin, B. 1992. From the mind's eye of the user: the sense-making qualitative, quantitative methodology, in *Qualitative research in information management*, edited by JD Glazier & RR Powell. Englewood, CO: Libraries Unlimited:61-84.
- Dervin, B. 1998. Sense-making theory and practice: an overview of user interests in knowledge seeking and use. *Journal of Knowledge Management* 2(2):36-46.
- Dervin, B. 2003. Given a context by any other name: methodological tools for taming the unruly beast, in *Sense-making methodology reader: selected writings of Brenda Dervin*, edited by B Dervin & L Foreman-Wernet. Denver, CO: Hampden:111-132.
- DiPrince, E, Wilson, A, Karafit, C, Bryant, A & Springer, C. 2016. Don't panic! Managing library anxiety with a library survival guide. *Reference and User Services Quarterly* 55(4):283-292.
- Dobson, KS & Mastikhina, L. 2015. Concepts and methods of cognitive therapies, in *International encyclopedia of the social & behavioural sciences*, edited by JD Wright. 2nd ed, Vol. 4. Oxford: Elsevier: 542-547.
- Du Preez, M. 2015. The role of social networks in consulting engineers' collaborative information behaviour. PhD thesis, University of South Africa, Pretoria.
- Ellis, D. 1989. A behavioural model for information retrieval system design. *Journal of Information Science* 15(4/5):237-247.
- Elo, S, Kääriäinen, M, Kanste, O, Pöikki, T, Utrainen, K & Kyngäs, H. 2014. Qualitative content analysis: a focus on trustworthiness. *Sage Open*:1-10.

- Erfanmanesh, M, Abrizah, A & Karim, NHA. 2012. Development and validation of the information seeking scale. *Malaysian Journal of Library and Information Science* 17(1):21-39.
- Fainburg, LI. 2009. Information seeking and learning: a comparison of Kuhlthau's information seeking model and John Dewey's problem solving model. *New Library World* 10(9/10):457-466.
- Feist, J & Feist, GJ. 2002. *Theories of personality*. 5th ed. Boston, MA: McGraw Hill.
- Fidel, R & Pejtersen, AM. 2005. Cognitive work analysis, in *Theories of information behaviour*, edited by KE Fisher, S Erdelez & LEF McKechnie. Medford, NJ: Information Today: 88-93.
- Fisher, KE, Elderez, S & McKechnie, L (eds). 2005. *Theories of information behaviour*. Medford, NJ: Information Today.
- Forgas, JP. 2008. Affect and cognition. *Perspectives on Psychological Science* 3(2):94-101.
- Foster, GL, Novic, AM, Scholl, JL & Watt, MJ. 2012. The role of the amygdala in anxiety disorders, in *The amygdala – a discreet multi-tasking manager*, edited by B Ferry. London: Intech Open: 61-102.
- Fowler, FJ. 2009. *Survey research methods*. Los Angeles: Sage.
- Fraser, K & Bartlett JC. 2018. Fear at first sight: library anxiety, race and Nova Scotia. *Theory & Research* 13(2):2-22.
- Friedenburg, J & Silverman, G. 2012. *Cognitive science: an introduction to the study of the mind*. Los Angeles: Sage.
- Gaston, NM. 2017. Contextualizing information behaviour: a methodological approach. *Journal of Critical Library and Information Studies* 1(1):1-33.
- Gerow, JR. 1997. *Psychology: an introduction*. New York: Longman.
- Gibson, JL, Ivancevich, JM & Donnelly, JH. 1997. *Organizations: behaviour, structure, processes*. Chicago: Irwin.
- Given, LM. 2007. Emotional entanglements on the university campus: the role of affect in undergraduates' information behaviour, in *Information and emotion: the emergent affective paradigm in information behaviour research and theory*, edited by D Nahl & D Bilal. Medford, NJ: Information Today: 161-175.
- Glaser, B & Strauss, A. 1967. *The discovery of grounded theory*. Chicago, IL: Aldine.
- Golafshani, N. 2003. Understanding reliability and validity in qualitative research. *The Qualitative Report* 8(4):597-606.

- Golian-Lui, LM & Westenkirchener, S. 2011. Library issues in the adult online education, in *Encyclopedia of information communication technologies and adult education integration*, edited by VX Wang. Hershey, PA: IGI Global. 485-505.
- Greifeneder, E. 2014. Trends in information behaviour research. *Information Research* 19(4). <http://InformationR.net/ir/19-4/isis/isis13.html>. (Accessed 29 May 2019).
- Grupe, DW & Nitschke, JB. 2013. Uncertainty and anticipation in anxiety: an integrated neurobiological and psychological perspective. *Nature Reviews Neuroscience* 14(7):488-501.
- Guba, EG & Lincoln, YS. 1994. *Handbook of qualitative research*. Thousand Oaks, CA: Sage.
- Hadjistavropoulos, T & Smythe, WE. 2001. Elements of risk in qualitative research. *Ethics and Behaviour* 11(2):163-174.
- Halonen, JS & Santrock JW. 1996. *Psychology: contexts of behaviour*. Boston, MA: McGraw Hill.
- Hartley, CA & Phelps, EA. 2012. Anxiety and decision-making. *Biological Psychiatry: a Journal of Psychiatric Neuroscience and Therapeutics* 72(2):113-118.
- Hackos, JT & Redish, JC. 1998. *User and task analysis for interface design*. New York, NY: Wiley.
- Head, AJ. 2013. Learning the ropes: how freshmen conduct course research once they enter college, Project Information Literacy Research Report: Passage Studies Report 2. The Information School, University of Washington.  
[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2364080](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2364080) (Accessed 29 May 2019).
- Head, H & Holmes, G. 1911. Sensory disturbances from cerebral lesions. *Brain* 34(2/3):102-254.
- Heale, R & Twycross, A. 2018. What is a case study? *Evidence Based Nursing* 21(1):7-8.
- Hein, GE. 1991. Constructivist learning theory, in CECA (International Committee of Museum Educators) Conference, Jerusalem, Israel, 15-22 October 1991. Massachusetts: Lesley College. <http://www.exploratorium.edu/IFI/resources/constructivistlearning.html> (Accessed 9 July 2017).
- Heinström, J. 2003. Five personality dimensions and their influence on information behaviour. *Information Research* 9(1) <http://informationr.net/ir/9-1/infres91.html> (Accessed 28 May 2019).

- Heinström, J. 2005. Fast surfing, broad scanning and deep diving: the influence of personality and study approach on student information seeking behaviour. *Journal of Documentation* 61(2):228-247.
- Heinström, J. 2006. Broad exploration or precise specificity: two basic information seeking patterns among students. *Journal of the American Society for Information Science and Technology* 57(11):1440-1450.
- Hjørland, B. 2010. The foundation of the concept of relevance. *Journal of the American Society for Information Science and Technology* 61(8):217-237.
- Hyldegård, J. 2006. Collaborative information behaviour – exploring Kuhlthau’s information search process model in a group-based educational setting. *Information Processing and Management* 42(1):276-298.
- Hyldegård, J. 2006b. Using diaries in group based information behaviour research – a methodological study, in *Proceedings of the first IiX Symposium on Information Interaction in Context, Copenhagen, 18-20 October 2006*. Copenhagen: Royal School of Library Science:261-274.
- Hyldegård, J. 2009. Beyond the search process – exploring group members’ information behaviour in context. *Information Processing and Management* 45:142-158.
- Ikoja-Odongo, R & Mostert, J. 2006. Information seeking behaviour: a conceptual framework. *South African Journal of Library and Information Science* 72(3):145-158.
- Ingwersen, P. 1992. *Information retrieval interaction*. London: Taylor Graham.
- Ingwersen, P. 1996. Cognitive perspective of information retrieval interaction: elements of a cognitive IR theory. *Journal of Documentation* 52(1):3-50.
- Ingwersen, P & Järvelin, K. 2005. *The turn: integration of information seeking and retrieval in context*. Dordrecht: Springer.
- Jakobovits, LA & Nahl-Jakobovits, D. 1990. Measuring information searching competence. *College & Research Libraries* 51(5):448-462.
- Järvelin, K & Vakkari, P. 1990. Content analysis of research articles in library and information science. *Library and Information Science Research* 12(4):395-421.
- Jiao, QC & Onwuegbuzie, AJ. 2004. The impact of information technology on library anxiety: the role of computer attitudes. *Information Technology & Libraries* 23(4):138-142.
- Johnson, JD. 2003. On contexts of information seeking. *Information Processing and Management* 39(5):735-760.

- Jones, J. 2013. Authenticity and scientific integrity in qualitative research. *Journal of Obstetric, Gynecologic & Neonatal Nursing* 42:401-401.
- Julien, H & O'Brien, M. 2014. Information behaviour research: where have we been, where are we going? *Canadian Journal of Information and Library Science* 38(4):239-250.
- Julien, H, Pecoskie, J & Reed, K. 2011. Trends in information behaviour research 1999-2008: a content analysis. *Library and Information Research* 33:19-24.
- Kakai, M, Ikoja-Odongo, R & Kigongo-Bukenya, IMN. 2004. A study of the information seeking behaviour of undergraduate students at Makerere University, Uganda. *World Libraries* 14(1): article 161.
- Kari, J. 2007. Conceptualizing personal outcomes of information. *Information Research* 12(2). <http://InformationR.net/ir/12-2/paper292.html> (Accessed 03 February 2019).
- Kari, J. 2010. Diversity in the conceptions of information use. *Information Research* 15(3): <http://informationr.net/ir/15-3/colis7/colis709.html> (Accessed 11 April 2019).
- Kari, J & Savolainen, R. 2007. Relationships between information seeking and context: a qualitative study of internet searching and the goals of personal development. *Library and Information Science Research* 29(1):47-69.
- Karlsson, L, Koivula, L, Ruokonen, I, Kajaani, P, Antikainen, L & Ruismäki, H. 2012. From novice to expert: information seeking process of university students and researchers. *Procedia – Social and Behavioral Sciences* 45:577-587.
- Katapol, PF. 2010. Information anxiety, information behaviour, and minority graduate students, [Poster presentation], in *Proceedings of the 73rd Annual Meeting of the Association for Information Science and Technology, "Navigating streams in an information ecosystem", Pittsburgh, PA, 22-27 October 2010*. 47. [http://www.asis.org/asist2010/proceedings/proceedings/ASIST\\_AM10/openpage.html](http://www.asis.org/asist2010/proceedings/proceedings/ASIST_AM10/openpage.html) (Accessed 11 April 2019).
- Katapol, PF. 2012. Information anxiety and African American students in a graduate education program. *Education Libraries* 35(1-2):5-14.
- Kelly, GA. 1963. *A theory of personality: the psychology of personal constructs*. New York: WW Norton & Company.
- Kim, KS & Sin, SJ. 2007. Perception and selection of information sources by undergraduate students: effects of avoidant style, confidence and personal control in problem-solving. *Journal of Academic Librarianship* 33(6):655-665.
- King, N & Horrocks, C. 2010. *Interviews in qualitative research*. London: Sage.
- Knight, FH. 1921. *Risk, uncertainty and profit*. New York: Reprints of Economic Classics.

- Komissarov, S & Murray, J. 2016. Factors that influence undergraduate information seeking behaviour and opportunities for student success. *Journal of Academic Librarianship* 42(4):423-429. <http://dx.doi.org/10.1016/j.acalib.2016.04.007> (Accessed 29 May 2019).
- Korobili, S, Malliari, A & Zapounidou, S. 2011. Factors that influence information seeking behaviour: the case of Greek graduate students. *Journal of Academic Librarianship* 37(2):155-165.
- Kracker, J. 2002. Research anxiety and students' perception of research: an experiment. Part I. Effect of teaching Kuhlthau's ISP model. *Journal of the American Society for Information Science and Technology* 53(4):282-294.
- Kracker, J & Pollio, HR. 2003. The experience of libraries across time: thematic analysis of undergraduate recollections of library experiences. *Journal of the American Society of Information Science and Technology* 54(12):1104-1116.
- Kracker, J & Wang, P. 2002. Research anxiety and students' perceptions of research: an experiment. Part II. Content analysis of their writings on two experiences. *Journal of the American Society for Information Science and Technology* 53(4):295-307.
- Kralik, JD, Lee, JH, Rosenbloom, PS, Jackson, PC, Epstein, SL, Romero, OJ, Sanz, R, Larue, O, Schmidtke, HR, Lee, SW & McGreggor, K. 2018. Metacognition for a common model of cognition. *Procedia Computer Science* 145:730-739.
- Kuhlthau, CC. 1988. The information search process of high, middle and low achieving high school seniors. *School Library Media Quarterly* 17 (4):224 -426.
- Kuhlthau, CC. 1989. Information Search Process: a summary of research and implications for school library media programs. *School Library Media Quarterly* 18(1):19-25.
- Kuhlthau, CC. 1991. Inside the search process: information seeking from a users' perspective. *Journal of the American Society for Information Science* 42(5):361-371.
- Kuhlthau, CC. 1993. A principle of uncertainty for information seeking. *Journal of Documentation* 49(4):339-355.
- Kuhlthau, CC. 1999. Accommodating the users Information Search Process: challenges for information retrieval systems designers. *Bulletin of the American Society for Information Science* 25(3):12-16.
- Kuhlthau, CC. 2004. *Seeking meaning: a process approach to library and information services*. Westport, CT: Libraries Unlimited.



- Kuhlthau, CC & Cole, C. 2012. Third space as an information system and services intervention methodology for engaging the user's deepest levels of information need, in *Proceedings of the 75<sup>th</sup> American Society for Information Science and Technology* 49(1):1-6. <https://onlinelibrary.wiley.com/doi/full/10.1002/meet.14504901074> (Accessed 11 April 2019).
- Kuhlthau, CC, Heinström, J & Todd, RJ. 2008. The 'Information Search Process' revisited: is the model still useful? *Information Research* 13(4).  
<http://www.researchgate.net/publication/268510128> (Accessed 6 June 2016).
- Kuhlthau, CC, Maniotes, LK & Caspari, NK. 2015. *Guided inquiry: learning in the 21st century*. Santa Barbara: Libraries Unlimited.
- Kumar, R. 2014. *Research methodology: a step-by step guide for beginners*. 4th ed. Los Angeles: Sage.
- Kvale, S. 1996. *Interviews: an introduction to qualitative research methods*. London: Sage.
- Kwon, N. 2007. Critical thinking disposition and library anxiety: a mixed methods investigation, in *Information and emotion: the emergent affective paradigm in information research and theory*, edited by D Nahl & D Bilal. Medford, NJ: Information Today:235-241.
- Large, A, Tedd, LA & Hartley, RJ. 1999. *Information seeking in the online age: principles and practice*. London: KG Saur.
- Leckie, GJ, Pettigrew, KE & Sylvain C. 1996. Modelling information seeking of professionals: a general model derived from research on engineers, health care professionals and lawyers. *Library Quarterly: Information, Community, Policy* 66(2):161-193.
- Lee, JY, Paik, W & Joo, S. 2012. Information resource selection of undergraduate students in academic search tasks. *Information Research* 17(1): <http://InformationR.net/ir/17-1/paper511.html> (Accessed 19 March 2019).
- Leedy, PD & Ormrod, JE. 2010. *Practical research: planning and design*. Boston, MA: Pearson.
- Li, Y & Belkin NJ. 2008. A faceted approach to conceptualizing tasks in information seeking. *Information Processing & Management* 44(6):1822-1837.
- Li, Y & Belkin NJ. 2010. An exploration of the relationships between work task and interactive information search behaviour. *Journal of the American Society for Information Science and Technology* 61(9):1771-1789.

- Lovell, BE. 1995. A taxonomy of types of uncertainty. PhD thesis, Portland State University, Oregon.
- Mahwasane, NP. 2008. Provision of library services to disadvantaged children in rural areas of Limpopo. M Inf. dissertation, University of South Africa, Pretoria.
- Mahwasane, NP & Mudzielwana, NP. 2016. Challenges of students in accessing information in the library: a brief review. *Journal of Communication* 7(2):216-221.
- Matilin, MW. 2002. *Cognition*. 5th ed. Tokyo: Harcourt College Publishers
- Maitlin, MW. 2013. *Cognition*. 8th ed. Tokyo: Wiley.
- Malanga, DF. 2015. Factors hampering the provision of references and information resources in the Malawian school libraries, in *Proceedings of the World Library and Information Congress and 78th IFLA General Congress and Assembly, Cape Town, 15-21 August 2015*. [https://www.ifla.org/files/assets/reference-and-information-services/publications/malanga\\_-ifla\\_full\\_paper-ifla\\_format.pdf](https://www.ifla.org/files/assets/reference-and-information-services/publications/malanga_-ifla_full_paper-ifla_format.pdf) (Accessed 22 October 2018).
- Manning, CD, Raghavan, P & Schütze, H. 2008. *Introduction to information retrieval*. Cambridge: Cambridge University Press.
- Marchionini, G. 1989. Information seeking strategies of novices using a full-text electronic encyclopaedia. *Journal of the American Society for Information Science* 40(1):54-66.
- Marchionini, G. 1995. *Information seeking in electronic environments*. NY: Cambridge University Press.
- Maree, K (ed). 2007. *First steps in research*. Pretoria: Van Schaik.
- Marshall, C & Rossman, GB. 2006. *Designing qualitative research*. 4th ed. Thousand Oaks, CA: Sage.
- Marshall, C. & Rossman, GB. 2011. *Designing qualitative research*. 5th ed. Thousand Oaks, CA: Sage.
- Marshall, SL & While AE. 1994. Interviewing respondents who have English as a second language: challenges encountered and suggestions for other researchers. *Journal of Advanced Nursing* 19:566-571.
- Maxwell, JA. 2013. *Qualitative research design: an interactive approach*. 3rd ed. Los Angeles, CA: Sage.
- McPherson, MA. 2015. Library anxiety among university students: a survey. *International Federation of Library Associations and Institutions IFLA Journal* 4(4):317-325.
- Mellon, CA. 1986. Library anxiety: a grounded theory and its development. *College & Research Libraries* 47(2):160-165.

- Meyer, A & Fourie, I. 2017. Thematic analysis of the value of Kuhlthau's work for the investigation of information behaviour in creative workspaces in academic libraries. *Information Research* 22(1). <http://www.informationr.net/ir/22-1/isic/isic1626.html> (Accessed 31 October 2018).
- Meyer, HWJ. 2016. Untangling the building blocks: a generic model to explain information behaviour to novice researchers. *Information Research* 21(4):1-17. <http://www.webcitation.org/6mHhVYy54>. (Accessed 31 October 2017)
- Meyers, EM, Nathan, LP & Saxton, ML. 2007. Barriers to information seeking in school libraries: conflicts in perception and practice. *Information Research* 11(2):1-14. <http://www.informationr.net/ir/12-2/paper.html> (Accessed 18 June 2016).
- Mills, LA, Knezek, G & Khaddage, F. 2014. Information seeking, information sharing, and going mobile: three bridges to informal learning. *Computers in Human Behaviour* 32:324-334.
- Mishra, J, Allen, D & Pearman, A. 2015. Information seeking, use and decision making. *Journal of the Association for Information Science and Technology* 66(4):662-673.
- Mojapelo, SM & Dube, L. 2014. Information access in high school libraries in Limpopo Province, South Africa. *South African Journal of Library and Information Science* 80(2):8-16.
- Mooers, CN. 1950. The theory of digital handling of non-numerical information and its implications to machine economics, in *Association for Computing Machinery Conference, 28-29 March 1950, Rutgers University, New Jersey*.
- Mulligan, K & Scherer, KR. 2012. Toward a working definition of emotion. *Emotion Review* 4(4):345-357.
- Murphy, J. 2016. Enhancing the student experience: a case study of a library peer mentor program. *College and Undergraduate Libraries* 23(2):151-167.
- Nadeem, M, Ali, A, Maqbool, S & Zaidi, SU. 2012. Impact on the anxiety of the academic achievement of students having different mental abilities at university level in Bahawalpur (Southern Punjab) Pakistan. *International Online Journal of Educational Sciences* 4(3):519-528.
- Nahl, D. 2001. A conceptual framework for explaining information behaviour. *Studies in Media & Information Literacy Education* 1(2):1-15.
- Nahl, D. 2004. Measuring the affective information environment of web searches, in *Proceedings of the American Society of Information Science and Technology* 41(1):191-197.

- Nahl, D. 2005. Affective load, in *Theories of information behaviour*, edited by KE Fisher, S Erdelez & LEF McKechnie. Medford, NJ: Information Today:39-43.
- Nahl, D. 2007a. Social-biological information technology: an intergraded conceptual framework. *Journal of American Society and Technology* 58(13):2021-2046.
- Nahl, D. 2007b. The centrality of the affective in information behaviour, in *Information and emotion: the emergent affective paradigm in information behaviour research and theory*, edited by D Nahl & D Bilal. Medford, NJ: Information Today:3-37.
- Nahl, D & Bilal, D (eds). 2007. *Information and emotion: the emergent affective paradigm in information behaviour research and theory*. Medford, NJ: Information Today.
- Naveed, MA. 2017. Information seeking anxiety: background, research, and implications. *International Information & Library Review* 49(4):266-273.
- Navin, KM. 2013. *An explanation and critique of Kuhlthau's Information Search Process*. <https://kristanavin.weebly.com/uploads/1/8/4/6/18469220/navinkrista-03.docx> (Accessed 16 July 2016).
- Nkondo, M, Brown, A, Dick, A, Hart, G, Molawa, S, Nassimbeni, M, Seleti, J & Teffo, LJ. 2014. *Library and Information Services Transformation Charter*. Pretoria: Department of Arts and Culture (DAC) and National Council for Library and Information Services (NCLIS).
- Noble, H & Smith, J. 2015. Issues of validity in qualitative research. *Evidence Based Nursing* 18(2):34-5.
- Olsen, WM & Diekema, AR. 2013. "I just Wikipedia it": information behaviour of first-year writing students, in *Proceedings of the American Society for Information Science and Technology* 49(1). <https://doi.org/10.1002/meet.14504901176> (Accessed 28 May 2019).
- Omeluzor, SU, Akibu, AA, Dika, SI & Ukangwa, CC. 2017. Methods, effects and challenges of library instruction in academic libraries. *Library Philosophy and Practice*. <http://digitalcommons.unl.edu/libphilprac/1465> (Accessed 19 June 2019).
- Onwuegbuzie, AJ & Jiao, QG. 2000. I'll go to the library later: the relationship between academic procrastination and library anxiety. *College and Research Libraries* 61(1):45-54.
- Onwuegbuzie, AJ, Jiao, QG & Bostic, SL. 2004. *Library anxiety: theory, research and applications*. Lanham, MD: Scarecrow Press.
- Øvern, KM. 2018. Information use among first year students in health sciences: is an intervention needed? *LIBER Quarterly: The Journal of the Association of European Research Libraries* 28(1):1-28.

- Paisley, WJ. 1968. Information and uses. *Annual Review of Information Science and Technology* 3:1-30.
- Peng, L & Zhizhong, L. 2019. Task complexity: a review and conceptualization framework. *International Journal of Industrial Ergonomics* 42(6):553-568.
- Perkins, DN. 1991. What constructivism demands of the learner? *Educational Technology* 31(9):18-21.
- Piaget, J. 1952. *The origins of intelligence in children*. New York: International University Press.
- Pirolli, P. 2007. *Information foraging theory: adaptive interaction with information*. Oxford: Oxford University Press.
- Provincial Review Limpopo. 2016. *The real economy bulletin: provincial review 2016*. Pretoria: TIPS:34-47.
- Rahman, MS. 2017. The advantages and disadvantages of using qualitative and quantitative approaches and methods in language “Testing and Assessment” research: a literature review. *Journal of Education and Learning* 6(1):102-112.
- Ramirez, AJ, Jensen, AC & Cheng, BAC. 2012. A taxonomy of uncertainty for dynamically adaptive systems, in *Seventh International Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS), Zurich, Switzerland, 4-5 June 2012*, edited by L Baresi & L Müller. Passau, Germany: Conference Publishing Solutions:99-108.
- Robson, A & Robinson, L. 2013. Building models of information behaviour: linking information seeking and communication. *Journal of Documentation* 69(2):169-193.
- Ropo, A & Hoykinpuro, R. 2017. Narrating organizational spaces. *Journal of Organizational Change* 30(3):357-366.
- Ruthven, I. 2019. The language of information need: differentiating conscious and formalized information needs. *Information processing and Management* 56(1):77-90.
- Santrock, JW. 1997. *Psychology*. Madison, WI: Brown and Benchmark.
- Saracevic, T. 1996. Relevance reconsidered, in *Information Science: Integration in Perspectives. Proceedings of the Second Conference on Conceptions of Library and Information Science (CoLIS 2), Copenhagen, Denmark, 14-17 October 1996*, edited by P Ingwersen & NO Pors. Copenhagen: Royal School of Librarianship:201-218.
- Saracevic, T, Kantor, P, Chamis, AY & Trivison, D. 1988. A study of information seeking and retrieving 1: background and methodology. *Journal of the American Society for Information Science* 39(3):161-176.

- Savolainen, R. 2006. Time as a context of information seeking. *Library & Information Science Research* 28(1):110-127.
- Savolainen, R. 2009. Information use and information processing: comparison of conceptualizations. *Journal of Documentation* 65(2):187-207.
- Savolainen, R. 2012a. Conceptualizing information need in context. *Information Research* 17(4):1-13. <http://InformationR.net/ir/17-4/paper534.html>. (Accessed 10 October 2018).
- Savolainen, R. 2012b. Elaborating the motivational attributes of information need and uncertainty. *Information Research* 17(2): <http://InformationR.net/ir/21-3/paper720.html>. (Accessed 29 October 2018).
- Savolainen, R. 2015a. Approaching the affective factors of information seeking: the viewpoint of the information search process model. *Information Research* 20(1). <http://InformationR.net/ir/20-1/insic2/insic28.html> (Accessed 11 April 2018).
- Savolainen, R. 2015b. Cognitive barriers to information seeking: a conceptual analysis. *Journal of Information Science* 4(5):613-623.
- Savolainen, R. 2015c. The interplay of affective and cognitive factors in information seeking and use: comparing Kuhlthau's and Nahl's models. *Journal of Documentation* 71(1):175-197.
- Savolainen, R. 2016a. Approaching the affective barriers to information seeking: the viewpoint of appraisal theory. *Information Research* 21(4). <http://information.net/ir/21-4/insic/insic1603.html> (Accessed 27 September 2018).
- Savolainen, R. 2016b. Conceptual growth in integrated models for information behaviour. *Journal of Documentation* 72(4):648-673.
- Savolainen, R. 2018. Pioneering models for information interaction in the context of information seeking and retrieval. *Journal of Documentation* 74(5):966-986.
- Shannon, C & Weaver, W. 1949. *The mathematical theory of communication*. Urbana, IL: University of Illinois Press.
- Sharma, G. 2017. Pros and cons of different sampling techniques. *International Journal of Applied Research* 3(7):749-752.
- Siemer, M. 2009. Mood experience: implications of a dispositional theory of moods. *Emotion Review* 1(3):256-263.
- Silverman, D (ed). 2016. *Qualitative research*. Los Angeles: Sage.
- Somekh, B & Lewin, C (eds). 2011. *Theory and methods in social research*. 2nd ed. Los Angeles: Sage.

- Sonnenwald, DH. 1999. Evolving perspectives of human information behaviour: contexts, situations, social networks and information horizons, in *Exploring Contexts of information behaviour: Proceedings of the Second International Conference on Information Needs, Cambridge, MA, 7-9 December 1981*, edited by T Wilson & D Allen. London: Taylor Graham:176-190.
- Sonnenwald, DH & Livonen, M. 1999. An integrated human information behaviour research framework for information studies. *Library & Information Science Research* 21(4):429-457.
- South African concise Oxford dictionary*. 1999. Sv 'affect', 'cognitive', 'learner', 'student', 'thoughts', 'uncertainty'. The Dictionary Unit of South African English. Cape Town: Oxford University Press Southern Africa.
- South African concise Oxford dictionary*. 2005. Sv 'user'. The Dictionary Unit of South African English. Cape Town: Oxford University Press Southern Africa.
- South African Qualifications Authority. 2012. *Level descriptors for the South African National Qualifications Framework*. Waterkloof: SAQA.
- Spink, A & Cole, C. 2005. Human information behaviour: integrating diverse approaches and information use. *Journal of American Society for Information science and Technology* 57(1):25-35.
- Spink, A, Wilson, TD, Ford, N, Foster, A & Ellis, D. 2002. Information seeking and mediated searching study part 3. *Journal of American Society for information Science and Technology* 53(9):716-727.
- Statistics South Africa. 2016. Media release: Limpopo community survey 2016 results. <http://www.statssa.gov.za/?p=7988> ( Accessed 10 May 2017).
- Stenbacka, C. 2001. Qualitative research requires quality concepts of its own. *Management Decision* 39(7):551-555.
- Taylor, RS. 1968. Question-negotiation and information seeking in libraries. *College and Research Libraries* 29(3):178-194.
- Taylor, RS. 1986. *Value-added processes in information systems*. Norwood, NJ: Ablex.
- Taylor, RS. 1991. Information use environments, in *Progress in communication sciences* 10, edited by B Dervin & M Voigt. Norwood, NJ: Ablex:217-255.
- Tellis, WM. 1997. Application of case study methodology. *The Qualitative Report* 3(3):1-19.
- Thomas, S, Tewell, E & Willson, G. 2017. Where students start and what they do when they get stuck: a qualitative Inquiry into academic Information Seeking and help-seeking practices. *Journal of Academic Librarianship* 43(3):224-231.

- Thorne, S. 2000. Data analysis in qualitative research. *Evidence Based Nursing* 3:68-70.
- Togia, A & Malliari, A. 2017. Research methods in library and information science, in *Qualitative versus quantitative research*, edited by S Orlazoglu. <https://www.intechopen.com/books/qualitative-versus-quantitative-research/research-methods-in-library-and-information-science> (Accessed 19 December 2019).
- Trout, D, Pancini, G & McCormack, R. 2014. Using mobile peer mentors for student engagement: student rovers in the learning commons. *Higher Education Research and Development* 33(3):595-609.
- Tshwane University of Technology. 2017. *Student diary with rules and regulations: 2017*. Polokwane.
- Tuominen, K, Talja, S & Savolainen, R. 2005. The social constructionist viewpoint on information practices, in *Theories of information behaviour*, edited by KE Fisher, S Erdelez & LEF McKechnie. Medford, NJ: Information Today:328-333.
- Turk, DC & Salovey, P. 1985. Cognitive structures, cognitive processes and cognitive-behaviour modification 1: client issues. *Cognitive Therapy and Research* 9(1):1-17.
- Vakkari, P. 1998. Growth of theories on information seeking: an analysis of growth of a theoretical research program on the relation between task complexity and information seeking. *Information Processing & Management* 34(2-3):361-382.
- Vakkari, P. 2003. Task-based information searching. *Annual Review of Information Science and Technology* 37(1):413-464.
- Vakkari, P. 2008. Trends and approaches in information behaviour research. *Information Research* 13(4). <http://informationr.net/ir/13-4/isic08.html> (Accessed 19 July 2019).
- Vakkari, P. 2014. When context matters: from context to contextual analysis. In, *2014 ASIS&T SIG-USE Symposium: Context in Information Behaviour Research: 1-4* <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.673.6099&rep=rep1&type=pdf> (Accessed 30 April 2021).
- Vasileiou, K, Barnnet, J, Thorpe, S & Young, T. 2018. Characterising and justifying sample size sufficiency in interview bases studies: systematic analysis of qualitative health research over a 15-year period. *BMC Medical Research Methodology* 18:148.
- Vyner, H. 2018. How the amygdala affects anxiety. *Calm Clinic*. [www.calmclinic.com/anxiety/amygdala](http://www.calmclinic.com/anxiety/amygdala) (Accessed 3 May 2019).
- Wakeham, J. 2015. Uncertainty: history of the concept. *International Encyclopaedia of the Social and Behavioural Sciences* 24(2):716-720.



- Wang, P. 2011. Information behaviour and seeking, in *Interactive information seeking behaviour and retrieval*, edited by I Ruthven & D Kelly. London: Facet:15-41.
- Weick, KE. 2007. *Sensemaking in organizations*. Thousand Oaks, CA: Sage.
- Weiler, A. 2004. Information seeking behaviour in generation Y students: motivation, critical thinking and learning theory. *Journal of Academic Librarianship* 31(1):46-53.
- Whitmire, E. 2003. Epistemological beliefs and the information seeking behaviour of undergraduates. *Library and Information Science Research* 25:127-142.
- Wilson, TD. 1981. On user studies and information needs. *Journal of Documentation* 37(1):3-15.
- Wilson, TD. 1997. Information behaviour: an interdisciplinary perspective. *Information Processing and Management* 33(4):551-572.
- Wilson, TD. 1999. Models of information behaviour. *Journal of Documentation* 55(3):249-270.
- Wilson, TD. 2000. Human information behaviour. *Information Science* 3(2):49-55.
- Wilson, TD. 2005. Evolution in information behaviour modelling: Wilson's model, in *Theories of information behaviour*, edited by KE Fisher, S Erdelez & LEF McKenzie. Medford, NJ: Information Today. 31-43.
- Wilson, TD. 2016. A general theory of human information behaviour. *Information Research* 21(4):1-15. <http://InformationR.net/ir/21-4/isic/isic1601.html> (Accessed 29 May 2019).
- Wilson, TD, Ford, N, Ellis, D, Foster, A & Spink A. 2002. Information seeking and mediated searching: part 2. Uncertainty and its correlates. *Journal of American Society for Information Science* 53(9):704-715.
- Wolfe, JA, Nel, T & Drueke, J. 2010. The role of academic reference librarian in the learning commons. *Reference & User Services Quarterly* 50(2):108-113.
- Wood, RE. 1986. Task complexity: definition of a construct. *Organisational Behavior and Human Decision Processes* 37(1):60-82.
- Wortman, CB, Loftus, EF & Marshall, ME. 1992. *Psychology*. New York, NY: McGraw Hill.
- Wu, D, Dang, W, He, D & Bi, R. 2017. Undergraduate information behaviours in thesis writing: a study using the information search process model. *Journal of Librarianship and Information Science* 49(3):256-268.
- Yin, RK. 2014. *Case study research: design and methods*. 5th ed. Los Angeles: Sage.
- Zhang, X, Anghelescu, HGB & Yuan, X. 2005. Domain knowledge, search behaviour and search effectiveness of engineering and science students: an exploratory study.

*Information Research* 10(2). <https://files.eric.ed.gov/fulltext/EJ1082015.pdf> (Accessed 12 April 2019).

Zimbardo, P, McDermott, M, Jansz, J & Metaal, N. 1995. *Psychology: a European text*. London: Longman.

## APPENDIX A



### DEPARTMENT OF INFORMATION SCIENCE ETHICS REVIEW COMMITTEE

28 June 2019

Dear Mrs Rirhandzu Sharon Mhinga

**Decision:**

**Ethics Approval from 28 June 2019 to 28 June 2024**

DIS Registration #: Rec-280619

References #: 2019-DIS-0023

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**Minimizing uncertainty in the information seeking behaviour of first students at Tshwane University of Technology.**

Qualifications: Doctoral Study



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## APPENDIX B



### Research Ethics Committee

The TUT Research Ethics Committee is a registered Institutional Review Board (IRB 00005968) with the US Office for Human Research Protections (IORG# 0004997) (Expires 30 Jan 2020). Also, it has Federal Wide Assurance for the Protection of Human Subjects for International Institutions (FWA 00011501). In South Africa it is registered with the National Health Research Ethics Council (REC-160509-21).

November 15, 2019

Ref #: REC/2019/09/005 Name: Mhinga RS Student #: 31677223, UNISA
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Ms RS Mhinga  
C/o Prof PG Underwood  
Department of Information Science  
University of South Africa

Dear Ms Mhinga,

<b>Decision: Gatekeeper Permission: Final Approval</b>
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**Name:** Mhinga RS  
**Project title:** *Minimizing uncertainty in the information seeking behaviour of first year students at TUT*  
**Qualification:** Doctor of Philosophy and Literature, University of South Africa.  
**Promoter:** Prof PG Underwood  
**Co-Promoter:** Dr M Du Preez

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

- **University of South Africa (UNISA), Ethics Letter**
  - The REC took note of the ethical clearance granted by the UNISA Department of Information Science Ethics Review Committee [Ethical Clearance Number: 2019-DIS-0023; dated 28 June 2019].



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APPENDIX C

APPENDIX C

**TEMPLATE DOCUMENTS**

**PARTICIPANT INFORMATION SHEET**

Ethics clearance reference number:

Research permission reference number (if applicable):

08 June 2019

Title: Minimizing uncertainty in the information seeking behavior of first year students at Tshwane University of Technology

**Dear Prospective Participant**

My name is Rirhandzu Sharon Mhinga and I am doing research with PG Underwood, a professor in the Department of Information Science towards a PhD, at the University of South Africa. We are inviting you to participate in a study entitled Minimizing uncertainty in the information seeking behavior of first year students at Tshwane University of Technology

**WHAT IS THE PURPOSE OF THE STUDY?**

This study is expected to collect important information that could assist the researcher develop a model to minimize the information seeking uncertainty among students, with particular reference to students who come from a school system that is without adequate provision of school libraries or any other information resource or service at their disposal.

**WHY AM I BEING INVITED TO PARTICIPATE?**

You have been selected because you have been deemed fit to provide the best information needed for the study. You are a first year student, you went through high school without a library and had no opportunity to engage in using academic information resources and systems. The faculty of Humanities provided a platform for the researcher to interact with you

for this research. One hundred (100) students will receive the online survey and ten (10) will be selected to participate in the follow-up interviews.

### **WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?**

In the initial stage of the study, you will be required to respond to an online questionnaire that will be sent to you by the researcher. You may be invited to a face-to-face interview as a follow-up to the questionnaire you would have responded to. The researcher will make herself available at a location convenient to you, most probably a TUT Library training room should you be selected to be interviewed. This will be a once-off activity and will not take more than 60 minutes of your time. Your responses will be recorded on the interview answer sheet, and if you agree also on a voice recording device.

If you decide to take part in the study you will be required to

- sign a consent form
- respond to an online questionnaire
- participate in a face-to-face once-off interview with the researcher. You will be required to provide your opinions and insights of the study theme.

### **CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?**

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason. Your withdrawal will in no way influence your continued care and relationship with the library and information services of the university.

### **WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?**

The benefits for participating in the study are that, you will make an invaluable contribution towards the minimization of uncertainty in the information seeking behavior of first year students. This can also be an eye-opener to the participant as this may be an area in your student life that has never been addressed.

**ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?**

The study and interview procedures involve no foreseeable physical discomfort or an inconvenience to you.

**WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?**

Please note that anonymity and confidentiality of participants will be protected by the researcher during the project, be advised that there is an inherent limitation to anonymity and confidentiality regarding interview sessions. Nobody outside the study panel and the research ethics committee will be able to connect any answer to you.

You have the right to insist that your name will not be recorded anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

Your answers may be reviewed by people responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Review Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

The results of this study may be published in a scientific journal or presented at scientific meetings, without revealing the identity of any research participant.

**HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?**

Hard copies of your answers will be stored by the researcher for a minimum period of five years in a locked filing cabinet at the TUT Polokwane campus library or for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Indicate how information will be destroyed if necessary hard copies will be

shredded and/or electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant software program in line with the research data management policies of the Tshwane University of Technology.

### **WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?**

Please note that you will **not** be paid to participate in the study. However, you will receive light refreshments after the interview.

### **HAS THE STUDY RECEIVED ETHICS APPROVAL**

This study has received written approval from the Research Ethics Review Committee of the Faculty of Humanities, Department of Information Science at Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

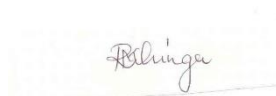
### **HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?**

If you would like to be informed of the final research findings, please contact Rirhandzu Sharon Mhinga on 0823734539 or [mhingars@gmail.com](mailto:mhingars@gmail.com). The findings will be accessible for five years from the date of the publication of the thesis..

Should you have concerns about the way in which the research has been conducted, you may contact PG Underwood, 0846503091 [pgunderwood@wol.co.za](mailto:pgunderwood@wol.co.za) and Dr M Du Preez at 082 664 1972, [mately@dupre.co.za](mailto:mately@dupre.co.za) if you have any ethical concerns.

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.



Rirhandzu Sharon Mhinga



## CONSENT TO PARTICIPATE IN THIS STUDY

I, \_\_\_\_\_ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the responses I will provide during the interview session.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname..... (please print)

Participant Signature.....Date.....

Researcher's Name & Surname.....(please print)

Researcher's signature.....Date.....

**TEMPLATE PERMISSION LETTER**  
**(CHANGE AS REQUIRED & PRINT ON ORGANISATION'S LETTERHEAD.)**

**Request for permission to conduct research at Tshwane University of Technology**

Minimizing uncertainty in the information seeking behavior of first year students at Tshwane University of Technology

Dr Henry D. Mason

Chair: TUT Research Ethics

HoD: Academic Assessment Unit

012 382 5073 masonh@tut.ac.za

Dear Dr Mason

I, Rirhandzu Sharon Mhinga am doing research with PG Underwood a Professor in the Department of Information Science towards a PhD at the University of South Africa. We are inviting you to participate in a study entitled Minimizing uncertainty in the information seeking behavior of first year students at Tshwane University of Technology.

The aim of the study is to develop a model on how to minimize the information seeking uncertainty among students, with particular reference to students who come from a school system that is without adequate provision of school libraries or any other library and information services at their disposal.

Your company has been selected because there is a huge cohort of students that are enrolled at Tshwane University of Technology who come from schools without adequate information resources and they experience academic information systems for the first time at university. This study deals with their information seeking uncertainty.

The study will entail participation by students by responding to an online questionnaire and a follow-up face to face interview

The benefits of this study are that it will make an invaluable contribution towards minimizing uncertainty in the information seeking behavior of first year students. The study and the procedures to be followed involve no foreseeable risks and physical discomfort to the participant.

Feedback procedure will entail an opportunity for participants to contact the researcher if they would like to be informed about the final research findings.

Yours sincerely

Rirhandzu Sharon Mhinga



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Head of Library : TUT Polokwane Campus

## APPENDIX D



**Tshwane University  
of Technology**

*We empower people*

Library and Information services LIS)

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Polokwane Campus

## APPENDIX D

- **INFORMATION LEAFLET AND INFORMED CONSENT**

**PROJECT TITLE: Minimizing uncertainty in the information seeking behaviour of first year students at Tshwane University of Technology.**

Primary investigator: Ms RS Mhinga MIKM, Stellenbosch University

Study leader: Prof PG Underwood, MInfsc, Department of Information Science, UNISA Pretoria

Co-study leader: Dr M du Preez, DLit et Phil, Department of Information Science, UNISA, Pretoria

- Dear Potential research participant,

You are invited to participate in a research study that forms part of my formal PhD studies at the University of South Africa.

This information leaflet will help you to decide if you would like to participate. Before you agree to take part, you should fully understand what is involved. You should not agree to take part unless you are completely satisfied with all aspects of the study.

### **WHAT IS THE STUDY ALL ABOUT?**

This study is about uncertainty in the information seeking behaviour of students who come from a school system that is without adequate provision of school libraries or any other information resource or services at their disposal. The study is intended to explore uncertainty among first year students without an experience of academic information systems and to develop a model that will assist academic information providers to minimize the existing uncertainty in the information seeking behaviour of students. Uncertainty and anxiety in

information seeking has been suggested to be the reason students' submit work that lacks a theme, a perspective and is without a particular point of view.

This study is imperative when taking into account Nkondo *et al* (2014) observations that correcting the situation of lack of resources that currently prevails in South African Schools will take a long time to achieve. This means that institutions of higher learning will continue to enrol unexposed learners who lack the requisite information seeking skills.

Tshwane University of Technology has been selected because the researcher has observed that there is a huge cohort of students that are enrolled for various qualifications who come from schools without adequate information resources and they experience academic information systems for the first time at the university.

## **WHAT WILL YOU BE REQUIRED TO DO IN THE STUDY?**

If you decide to take part in the study, you will be required to do the following:

In the initial stage of the study you will be required to respond to a questionnaire that will be distributed manually in class. You may be invited to a face-to-face interview as a follow-up to the questionnaire you would have responded to if you wish to further participate in the study. For the interview, the researcher will make herself available at a location convenient to you, most probably at the TUT Polokwane campus training room. This is where the interview will take place. This will be a once off activity and will not take more than 60 minutes of your time.

If you decide to take part on the study you will be required to:

- Respond to the first year student brief survey (to be distributed in class).
- To sign this informed consent form (to be distributed in class).
- Participate in a face-to-face interview (when you have indicated your availability and willingness to participate in the informed consent form).
- During the interview, you will be required to provide your opinions and insights based on the study theme.
- Your responses will be recorded on the interview answer sheet and also on a recording device.
- Your responses will be collected anonymously and the data will be treated confidentially. The researchers undertake not to engage in any activities aimed at identifying participants' personal information, for example, name, surname or IP address. The results of this study will be reported as summaries in which no individual's answers can be identified.

## **ARE THERE ANY CONDITIONS THAT MAY EXCLUDE YOU FROM THE STUDY?**

You will not be eligible to participate in this study if you had access to a library or other information resource services at your disposal prior to enrolling at TUT.

## **CAN ANY OF THE STUDY PROCEDURES RESULT IN PERSONAL RISK, DISCOMFORT OR INCONVENIENCE?**

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

### **WHAT ARE THE POTENTIAL BENEFITS THAT MAY COME FROM THE STUDY?**

The benefits for participating in the study are that, you will make an invaluable contribution towards the ways in which academic information providers can minimize information seeking uncertainty for first year students. Also this can be an eye-opener to the participant as this may be an area in your student life that has never been addressed.

### **WILL YOU RECEIVE ANY FINANCIAL COMPENSATION OR INCENTIVE FOR PARTICIPATING IN THE STUDY?**

Please note that you **will not** be paid to participate in the study. However, you will receive light refreshments at the end of the interview.

### **WHAT ARE YOUR RIGHTS AS A PARTICIPANT IN THIS STUDY?**

Your participation in this study is entirely voluntary. You have the right to withdraw at any stage without any penalty or future disadvantage whatsoever. You don't even have to provide the reason/s for your decision. Your withdrawal will in no way influence your continued care and relationship with the Library and Information Services at the Tshwane University of Technology, Polokwane Campus. Note that you are not waiving any legal claims, rights or remedies because of your participation in this research study.

### **HOW WILL CONFIDENTIALITY AND ANONYMITY BE ENSURED IN THE STUDY?**

All information obtained during the course of this study is strictly confidential. The study data will be coded so that it will not be linked to your name as it is not a requirement to participate. Your identity will not be revealed while the study is being conducted or when the study is reported in scientific journals. All the data sheets that have been collected will be stored in a secure place. Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.

Survey Questionnaire: All your answers will be anonymous and confidential.

### **IS THE RESEARCHER QUALIFIED TO CARRY OUT THE STUDY?**

The researcher is a qualified librarian who has previously completed a Master's degree study similar to this research study. Also, the researcher comes from the same geographical region as you. This means that she deeply understands your cultural context and can fluently speak the local languages.

## **HAS THE STUDY RECEIVED ETHICAL APPROVAL?**

Yes. The UNISA department of Information Science ethics review committee has granted the researcher a written approval, REF: 2019-DIS-0023.

All parts of the study will be conducted according to internationally accepted ethical principles.

## **WHO CAN YOU CONTACT FOR ADDITIONAL INFORMATION REGARDING THE STUDY?**

- The primary investigator, Ms RS Mhinga, can be contacted during office hours at Tel (015) 287-0748, or on her cellular phone at 082 373-4539. The study leader, Prof PG Underwood can be contacted during office hours at Tel (021) 761-8463. Should you have any questions regarding the ethical aspects of the study, you can contact the chairperson of the TUT Research Ethics Committee, Dr HD Mason, during office hours at Tel (012) 382-5073, E-mail [Masonh@tut.ac.za](mailto:Masonh@tut.ac.za). Alternatively, you can report any serious unethical behaviour at the University's Toll Free Hotline 0800 21 23 41.

## **DECLARATION: CONFLICT OF INTEREST**

The final results of the study will only be published in a peer reviewed journal in accordance with UNISA guidelines for Doctoral degrees as set out in MDSCHL 2019.

This research study was funded by the researcher. No publication prohibitions, conditions or limitations are applicable to the researcher.

## **A FINAL WORD**

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

---

## CONSENT

I hereby confirm that I have been adequately informed by the researcher about the nature, conduct, benefits and risks of the study. I have also received, read and understood the above written information. I am aware that the results of the study will be anonymously processed into a research report. I understand that my participation is voluntary and that I may, at any stage, without prejudice, withdraw my consent and participation in the study. I had sufficient opportunity to ask questions and of my own free will declare myself prepared to participate in the study.

Research participant's name: \_\_\_\_\_ (Please print)

Research participant's signature: \_\_\_\_\_

Date: \_\_\_\_\_

Researcher's name: \_\_\_\_\_ (Please print)

Researcher's signature: \_\_\_\_\_

Date: \_\_\_\_\_

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## APPENDIX E



## APPENDIX E

### First year (2020) student brief survey

Dear Student

This survey forms part of a doctoral research project undertaken under the auspices of the department of Information Science at the University of South Africa by Ms RS Mhinga. The topic of the research is very important for all students due to their engagement in academic work – at a personal level as well as for society. Kindly complete the information below if you are interested in participating in the project.

**TOPIC:** Minimizing uncertainty in the information seeking behavior of first year students at Tshwane University of Technology.

If you decide to further participate, please provide your email address in section 5 of this form.

<b>2020 FIRST YEAR INITIAL SURVEY</b>	
<b>Question</b>	<b>Response</b>
1. Did your high school have a library?	
2. Did you have a public/ community library close to your school?	
3. If you reply yes to question 2, Did you reach the library in A) Five minutes' walk B) 30 minutes' walk C) One hours' walk	
4. If you reply yes, to question 2, did you use the public or community library for school projects?	
5. Were you able to find the information you needed to complete an assignment in that library? Please explain your answer.	
<b>Note: If you decide to further participate in this study, kindly provide your email address/s</b>	1.

**APPENDIX F**

*APPENDIX F.*

**Interview Guide**

**Date**

**Time**

**Place: Room G 122 Polokwane Campus Library**

**Interviewer: .....**

**Interviewee: .....**

**QUESTIONS PREPARED FOR INTERVIEWS ON UNCERTAINTY IN INFORMATION SEEKING BEHAVIOUR OF FIRST YEAR UNIVERSITY STUDENTS:**

Ms RS Mhinga, a librarian at Tshwane University of Technology, Polokwane campus

The interview below is part of a doctoral research project undertaken under the auspices of the department of Information Science at the University of South Africa. The topic of the research is very important for all students due to their engagement in academic work – at a personal level as well as for society.

Your input will be critical in this respect.

The research will follow all the ethical norms set by the University of South Africa, Information Science department as well as the ethical rules of the Tshwane University of Technology.

Thank you for participating. I hope you enjoy the experience.

**SECTION A: Knowledge of information resources and systems**

Do you use the TUT Library? Please explain your answer.

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.....  
.....  
.....

When you realized you were not sure ( uncertain) about where to find information in the library, how did you feel?

.....

How did you go about finding the information you required?

.....

.....  
How knowledgeable are you about using the library?  
.....  
.....

How do you feel when you realise you lack the required knowledge and skills to effectively search for information that is available in the library?  
.....  
.....  
.....

What do you suggest the library can do to better support you in finding the information you need?  
.....  
.....

**Section B: Communication with staff**

Please share your experiences of asking a library staff member for support when searching and retrieving information that is required to complete an assignment?  
.....  
.....  
.....  
.....

**SECTION C Use of information resources and systems**

You are given a new research project, how do you feel? Explain how you go about finding information in the library that could support you in completing the task. (eg. the keywords you will use when searching the library catalogue or a full text database.)  
.....  
.....  
.....

.....  
.....  
How easy or difficult is it for you to find information using an online database or library catalogue?

.....  
.....  
Did you find the information you were looking for in the library? Please explain your answer.

.....  
.....  
What is your suggestion about assistance in finding information for your research project?

.....  
.....  
What is your suggestion about assistance regarding too little information obtained?

.....  
.....  
What is your suggestion about assistance regarding dealing with too much information?

.....  
.....  
What kind of help in general would you recommend to assist you in dealing with an academic assignment?

**SECTION D Affective factors of uncertainty**

In relation to your given work, what would you say is,

- Uncertainty

.....

- Anxiety

.....

- Fear

.....  
• Apprehension

.....  
• Confidence

.....  
• Anger

.....  
• Overwhelmed

.....  
Of the above definitions, which one best defines your experience in dealing with your given research project and why?

.....

## APPENDIX G

### Email to students

#### *Appendix G*

Dear Student

You have been selected and are invited to participate in a face to face interview for my research project on “Minimizing uncertainty in the information behaviour of first year students at TUT’.

This interview is a follow up to the brief student survey that you responded to in class about two weeks ago. During the interview you will be required to provide your opinions and insights about the study theme. The interview will not take more than 60 minutes of your time.

Please respond to this email and indicate time slot wherein you will be available to be interviewed.

<b>Mondays</b>	<b>Tuesdays</b>	<b>Wednesday</b>	<b>Thursdays</b>	<b>Fridays</b>
09h00-10h00	09h00-10h00	09h00-10h00	09h00-10h00	09h00-10h00
10h00-11h00	10h00-11h00	10h00-11h00	10h00-11h00	10h00-11h00
11h00-12h00	11h00-12h00	11h00-12h00	11h00-12h00	11h00-12h00
12h00-13h00	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>

Interviews are scheduled to begin on **Monday 02 March 2020 until Friday 13 March 2020.**

The venue for the interview is ***Room G-122, Polokwane campus Library***

Please note that you will receive **light refreshments** at the end of the interview.

Thanking you

Mhinga Rirhandzu S.

Researcher