

**Information Behaviour of Nigerian Undergraduates in the World
of Web 2.0: The Case of Federal University of Petroleum
Resources, Delta State, Nigeria, a Specialized University**

**Submitted in fulfillment of the requirements of the degree of Doctor of
Philosophy in the Department of Library and Information Science
University of the Western Cape, Bellville, South Africa**



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May, 2015

DECLARATION

“I declare that the thesis **Information Behaviour of Nigerian Undergraduates in the World of Web 2.0: The Case of Federal University of Petroleum Resources, Delta State, Nigeria, a Specialized University**, is my own work, that it has not been submitted before for any other degree or assessment in any other university and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.”

Signature 



Date: 25th May, 2015

Supervisors

Dr. Sandy Edna Zinn

Prof. Genevieve Hart

DEDICATION

I dedicate this research work to all those who genuinely carry the longing within them to educate the “total man” with deep passion, and who work tirelessly to grow human potentialities so that the world could be a better place for one and all.



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My sincere appreciation goes to my supervisors Dr. Sandy Zinn and Prof. Genevieve Hart, for seeing me through the PhD journey painstakingly and diligently. Prof. Hart worked very hard to encourage the broadening of my intellectual horizon, and Dr. Zinn would always lovingly point me to the fine details in the research work.

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To my parents, Mr and Mrs Igberaese Okoh, I will keep appreciating you for your loving support right from my cradle which I can still count on in my adulthood.

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ABSTRACT

The study investigated the information behaviour of Nigerian undergraduates with a focus on online media, especially Web 2.0. Nigeria has a laudable vision tagged *Nigeria Vision 20:2020* (NV 20:2020), which is to be one of the top 20 knowledge economies by the year 2020. To achieve this grand feat, the nation requires a skilled population with 21st century graduate attributes who are information literate. That is, graduates who possess the competencies and high capabilities to effectively use and disseminate information for optimum service delivery in this epoch of information proliferation and technologies that are yet evolving. To ascertain the preparedness of Nigeria for the laudable Vision 20:2020, the research work investigated the information behaviour of Nigerian undergraduates using a specialized university, the Federal University of Petroleum Resources, Effurun, as the case study site. The university was established in 2007 to meet the demands of the petroleum industry which is the largest in Nigerian in terms of Gross Domestic Product (GDP).

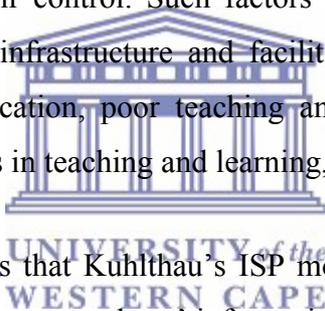
Kuhlthau's Information Seeking Process (ISP) Model was the primary theoretical framework employed for the investigation. The model consists of seven non-linear phases which are Initiation, Selection, Exploration, Formulation, Collection, Presentation and Assessment. The model also acknowledges three realms of experience in the processes of information behaviour: the affective (feelings), the cognitive (thoughts) and the physical (actions) common to each stage. In addition, ACRL information literacy standards (American Library Association, 2000; ACRL, 2002) which have a common ground with Kuhlthau's ISP model - the cognitive aspect of learning- was also used to evaluate students' information literacy skills level.

Four research questions which focused on the information needs, information resources and infrastructure, information seeking process and barriers to information seeking were answered in the case study that used both quantitative and qualitative research methods in three phases as follows: Phase one was a quantitative questionnaire survey of a total of 808 students in 100 and 300 levels; Phase two was an analysis of policy documents such as the Library Guide, Course Synopses for *General Studies and Entrepreneurship Program*, Use of Library and Study Skills (GSE 104) course outline, and the university website: www.fupre.org.ng, face-to-face interviews with the University Librarian, two librarians,

Head of Web Unit, ICT section, three telephone discussions with the University Librarian and open-ended interviews with twelve lecturers; and Phase three entailed two large group discussions with students, examination of three assignments and journaling exercises.

The study achieved its purpose of exploring the information behaviour of undergraduates. It revealed that students need information both for academic purposes and in their everyday life experiences. At least two out of three students own smart phones, in addition to the few who own Java phones that are also Internet compliant while about one out of two own a laptop. They employ Web 2.0 tools both for entertainment and academic purposes.

Students' information handling skills were poor; and there was copious evidence of widespread plagiarism which, in practice, seems to be an acceptable norm. However the study unravelled some factors responsible for the poor information literacy skills of students which are not readily within their control. Such factors are poor curriculum and learning content, inadequate information infrastructure and facilities, lack of policy regarding 21st century information literacy education, poor teaching and learning methods, and lack of policy on the use of Web 2.0 tools in teaching and learning, among others.

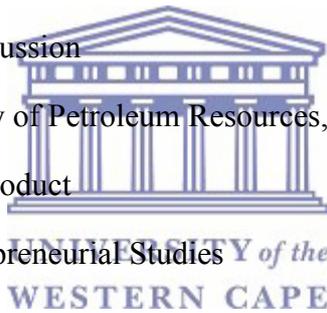


A key observation of the study is that Kuhlthau's ISP model takes for granted the context dependent realities that may impact on students' information search process and by extension information literacy skills. To forestall this limitation, the Theory of Change (QEDC: 2008) can be employed for the evaluation of the teaching and learning process, and intervention by stake holders; while Shor's theory and practice of critical education (2012) advocates the revision and reconstruction of curriculum, and how to empower education through critical and democratic pedagogy for social change. When the underlying factors affecting the information literacy acquisition are addressed through these models, then the ISP model will be a veritable tool to study the ISP of Nigerian students.

The study recommends a guided approach to teaching and learning; categorical policies on teaching style, a Learning Management System (LMS), Web 2.0 tools and information literacy education; regular information literacy education and in-service programmes for the teaching staff; urgent acquisition of information infrastructure, facilities and e-resources; and moderate lecture schedules that allow students ample time for self-learning, amongst others.

LIST OF ACRONYMS AND ABBREVIATIONS

ACRL	Association of College and Research Libraries
ALA	American Library Association
APU	Academic Planning Unit
CIBER	Centre for Information Behaviour and the Evaluation of Research
DASs	Department of Academic Standards ()
ECAR	EDUCAUSE Centre for Applied Research
EEE	Electrical Electronics Engineering
ELIS	Everyday Life Information Seeking
FBMs	Faculty Board Meetings
FGD	Focus Group Discussion
FUPRE	Federal University of Petroleum Resources, Effurun, Delta State, Nigeria
GDP	Gross Domestic Product
GES	General and Entrepreneurial Studies
GI	Guided Inquiry
HFGDP	Hewlett Foundation's Global Development Program
HOTS	Higher Order Thinking Skills
IB	Information Behaviour
ICTs	Information and Communications Technologies
IFLA	International Federation of Library Associations and Institutions
IL	Information literacy
ISP	Information Search Process
ISU	Information Seeking Model
KE	Knowledge Economy
LMS	Learning Management Systems

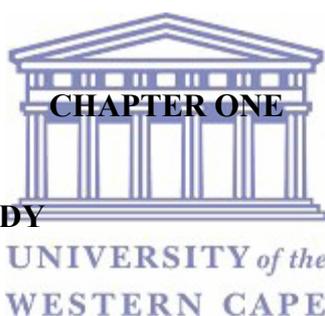


LOTS	Lower Order Thinking Skills
NPC	National Planning Commission
NRI	Networked Readiness Index
NTWGs	National Technical Working Groups
NUC	Nigerian Universities Commission
NV20: 2020	Nigeria's Vision 20:2020
PhD	Doctor of Philosophy
PNG	Petroleum and Natural Gas
QEDC	Quality Education in Developing Countries
SUG	Students Union Government
UK	United Kingdom
USA	United States of America



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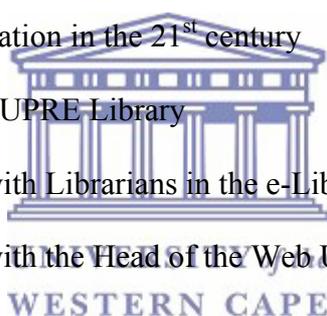


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CHAPTER ONE

BACKGROUND TO THE STUDY

1.1 INTRODUCTION

The purpose of the research is to investigate the information behaviour of Nigerian undergraduates with particular focus on the online media, especially Web 2.0, namely the evolving interactive World Wide Web. Based on nine years of classroom experience with undergraduates in Nigeria and China, the researcher is concerned about the way undergraduates interact with information, irrespective of the context, either digital or print. As Information and Communications Technologies (ICTs) are fast evolving, information handling competencies, including computer and Web literacy skills, of undergraduates are increasingly becoming issues of urgent concern in the context of Nigerian higher education and Nigeria's vision of becoming one of the largest 20 economies in the world by the year 2020.



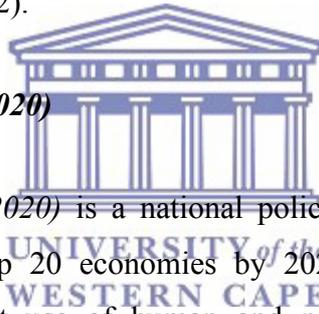
In order to explore the information behaviour of Nigerian undergraduates in the world of Web 2.0, the researcher uses the Federal University of Petroleum Resources, Effurun, Delta State Nigeria, as the case site. The choice is informed by the fact that the specialized university, which is the only one of its kind in Nigeria and Africa, was established in 2007 primarily to meet the demands of the petroleum industry in terms of the production of manpower and expertise. In Nigeria, the petroleum industry is the largest industry and the main generator of its Gross Domestic Product (GDP). Therefore, due to the strategic position of the specialized university in national development, the researcher found it most appropriate as a case site.

1.2 BACKGROUND AND RATIONALE OF THE STUDY

The section describes Nigeria, tertiary education in Nigeria; and discusses the rationale of the study.

1.2.1 SOME BACKGROUND ON NIGERIA

Nigeria is a federal constitutional republic modelled after the United States (Mwalimu, 2007:6), with the executive power exercised by the President. The West African country is made up of 36 states and a Federal Capital Territory, Abuja; it is divided into six geo-political zones. Nigeria has an area of 923,768 square kilometres, including about 13,000 square kilometres of water. Yoruba, Igbo and Hausa are the primary ethnic groups in the country. The nation's primary natural resources consist of natural gas, petroleum, tin, iron ore, coal, limestone, niobium, lead, and zinc. Nigeria has the tenth largest oil reserve in the world which is about 36.2 billion barrels. Natural gas reserve is estimated at 182 trillion cubic feet; this is the seventh largest reserve in the world and the largest in Africa (Library of Congress, 2008). The Nigerian economy is mixed with well-developed financial, legal, communications, and entertainment sectors. The population was estimated at 162,470,737 people in 2011 (World Bank, 2012).



Nigeria Vision 20:2020 (NV20:2020)

Nigeria Vision 20:2020 (*NV20:2020*) is a national policy objective designed to drive the country up to the league of top 20 economies by 2020. The two broad objectives of NV20:2020 is to make efficient use of human and natural resources to achieve rapid economic growth; and translate the economic growth into equitable social development for all citizens (National Planning Commission (NPC), 2010:2). The vision considers education as an instrument for human development and thus plans to improve on education curricula with emphasis on ICTs and focused skills acquisition and development. There are 29 National Technical Working Groups (NTWGs) responsible for the realisation of NV20:2020, two of which are Education and Information and Communications Technologies (ICTs).

Nigeria: Towards a Knowledge Economy

A Knowledge Economy (KE) is one in which the government, organizations and the citizenry profusely utilize knowledge for greater economic, social and personal development. For effective acquisition, utilization, sharing, creating and recycling of knowledge, the role of ICTs cannot be overstated. Thus, knowledge and ICTs are the key drivers in a Knowledge

Economy (Krubu, 2009; and Krubu & Krubu, 2010). In order to understand the state and status of a nation within the global KE context, there are key performance indicators.

One example is the Networked Readiness Index (NRI) which measures the degree to which economies across the world leverage ICT for enhanced competitiveness. The Global Information Technology Report 2012 ranks the NRI of 142 countries. Sweden leads the rankings with Singapore second. In sub-Saharan Africa, the level of ICTs readiness is still quite low. South Africa is leading but ranks 72nd in the world. Nigeria ranks 112th.

A further analysis of the same report provides the data in Table 1.

Table 1: Nigeria in the global information technology context Adapted from Global Information Technology Report 2012

Serial No.	Indicator	Rank /142 countries	Value
1.	Tertiary education gross enrolment rate, %	110	10.3%
2.	Quality of management schools	80	4.0 (scale of 1-7)
3.	Gov't procurement of advanced technology	105	3.2 (scale of 1-7)
4.	Mobile network coverage, % population	97	90.0%
5.	Int'l Internet bandwidth, kb/s per user	138	0.1 (scale of 1-7)
6.	Accessibility of digital content	108	4.3 (scale of 1-7)
7.	Quality of educational system	65	3.8
8.	Adult literacy rate, %	124	60.8%
9.	Mobile phone subscriptions/100 population	122	55.1%
10.	Individuals using Internet, %	85	28.4%
11.	Households with personal computer, %	97	15.4%
12.	Households w/ Internet access, %	93	9.0%
13.	Broadband Internet subscriptions/100 population	124	0.1 (scale of 1-7)
14.	Mobile broadband subscriptions/100 population.	88	1.0 (scale of 1-7)
15.	Use of virtual social networks	66	5.2 (scale of 1-7)
16.	Internet access in schools	104	3.3(scale of 1-7)

1.2.2 TERTIARY EDUCATION IN NIGERIA

Universities, Polytechnics, Colleges of Education, Monotechnics, and Innovative Enterprises Institutions (IEIS) make up the tertiary education in Nigeria. In line with NV20:2020, the primary aim of tertiary education in Nigeria is the production of highly skilled, knowledgeable, competent, conscientious and globally competitive citizens. In 2010, the overall tertiary enrolment stood at 1,691,141 students with 1,014,337 of these at universities (Shu'ara, 2010:12).

The history of Nigerian universities dates back to 1948 with the establishment of the University College, Ibadan, affiliated to the University College London (Nwagwu and Agarín, 2008). Since then, the birth of other universities was spurred by an ever-growing need for tertiary education.

According to the Education Profile of Nigeria by the United States Diplomatic Mission to Nigeria (n.d), Nigerian universities are categorized into three as follows:

- *Federal universities:* This category of universities is owned/funded by the federal government and they are of three generations:



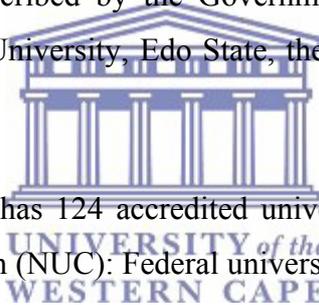
First Generation universities: Based on the recommendation of the Ashby Commission set up by the British Colonial Government to study the needs for university education for Nigeria, five universities in this group were established between 1948-1965; the University of Ibadan, being the first.

Second Generation universities: As the population increased in Nigeria, there was a great need for scientific and technological developments, this served as the catalyst to the establishment of 12 additional universities in various parts of the country between 1970 and 1985.

Third Generation universities: Addressing special needs in the areas of technological and agricultural demands gave rise to the establishment of 10 additional Universities between 1985 and 1999.

However, from 2000 to 2012, the federal government established 10 additional universities in the category of federal universities which includes the site for the study.

- *State Universities:* As a result of pressures on State Governments from indigenous students who could not readily get admissions to any of the Federal universities due to limited admission space, it became imperative and urgent for some State Governments to invest in the establishments of Universities, hence the widespread emergence of state universities.
- *Private Universities:* In 1993, in order to give recognition and encouragement to private participation in the provision of university education, the Federal Government enacted a law allowing private sector involvement in the establishment of universities, following guidelines prescribed by the Government. Consequent upon this policy decision, the Igbinedion University, Edo State, the first private university in Nigeria was founded in 1999.



As at October 22 2012, Nigeria has 124 accredited universities grouped as follows by the National Universities Commission (NUC): Federal universities- 37; State universities-37; and Private universities-50.

1.2.3 RATIONALE OF THE STUDY

The first pillar of NV20:2020 is to guarantee the well-being and productivity of the people with education as the bedrock; and the key philosophy informing the educational goal is to establish a modern and vibrant education system that ensures the maximum development of the potentials of individuals and promotes a knowledge-driven society (National Planning Commission, 2010:147). To attain the vision, the nation requires a human capital base that is well educated and skilled enough to create and use knowledge for greater social and economic development. This demands building strong and innovative systems and institutions of which the universities are a critical part. Consequently, Nigerian universities are expected to create the learning environments that aid the development of the requisite skills and capabilities that empower undergraduates to participate in the process of nation

building. Infrastructural provision and education in the benefits of ICTs are crucial to achieving this objective.

ICTs generally, and Web 2.0 in particular, though still evolving, have changed the way and manner of teaching, learning and even interacting. Besides, the world of academia is now in a phase where students are encouraged to find information on their own rather than relying heavily on the traditional method of transfer of information from teacher to student. In this context, the Internet is a crucial channel of information (Tella, Tella, Ayeni, & Omoba, 2007; Mohd Saad, 2008; Nkomo, 2009; Krubu & Krubu, 2010; Niemand 2010; Krubu & Osawaru, 2011; Adetimirin, 2012).

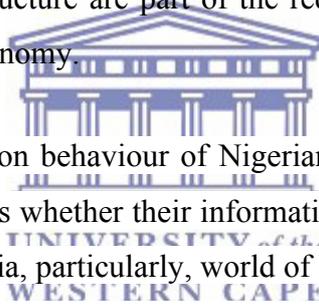
Web 2.0 is an Internet resource that comprises online tools such as emails, search engines, social networking sites, user created Web sites, online surveys, wikis, podcasts, databases, self-publishing platforms, tagging, social bookmarking, RSS feeds, learning management systems, all of which include free and open source and much more. Web 2.0 offers an online medium where people meet, read, converse and write; it has influenced the behaviour of Internet users in an unprecedented manner.

As information behaviour is a subjective sense making process, in this era of globalization and internationalization, the demand to keep abreast of trends in technological advancement, life-long learning and information literacy skills are a key part of the graduate attributes and skills set required by the work place in Nigeria. These requirements impose on Nigerian undergraduates the need to know how to interact with information, that is: firstly how to articulate information needs; how and where to look for information amidst the increasingly diverse array of sources; how to critique and select appropriate information; and how to use information for personal and organizational development. These skills must be seen against the background of optimal participation in the Knowledge Economy of NV20:2020.

Given the overriding importance of ICT within the nexus of higher education and the thrust of human capital development initiatives in Nigeria, the timing of the research work with its focus on online media, especially Web 2.0, is of great significance.

1.3 PROBLEM STATEMENT AND RESEARCH QUESTIONS

The fundamental question of the research is to explore whether the Nigerian undergraduates have the ability and requisite skills to use resources available in the 21st century for personal and academic development, which translates to national development with NV20:2020 in view. The Federal Ministry of Youth Development noted in 2008 that Nigeria's population is dominated by young people who are under 35 years old; they account for about 50 per cent of the country's population. Igwe (2011) strongly feels that in the year 2020, these young people will be the key drivers of the economy and will be the leaders in businesses and public services. However, to be a key driver in a knowledge economy places a huge demand on the prospective participants to be at the forefront in terms of the knowledge and skills required to be relevant in such an epoch; this was emphasized by (World Bank, 2004:2) when mention was made of the fact that a skilled population that is able to use and disseminate knowledge, and dynamic information infrastructure are part of the requirements set by the World Bank for transition to a Knowledge Economy.

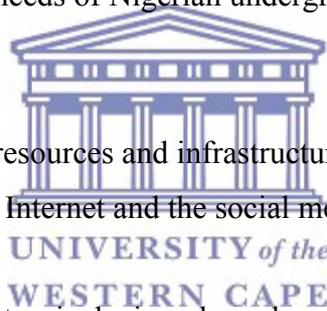


The question about the information behaviour of Nigerian undergraduates has already been raised. A more specific question is whether their information behaviour is a subjective sense-making process in the online media, particularly, world of Web 2.0. This question is not only relevant to Nigeria. In their investigation on the 21st century skills of undergraduate students in science and technology in Thailand, Kunakornsakul and Pinit (2012:291) discovered that their information literacy (IL) skills were low when put to test; however, the authors noted that information literacy skills (IL) are the most valuable skills in the 21st century identified by the global community as the driving tool of success in the digital epoch. The skill is crucial in this era especially as Web 2.0 hinges on personalization, social interaction, collaboration, active participation and communication via technical devices. Baro and Fyneman (2009:672) in their study on information literacy among undergraduates in Niger Delta University, Nigeria, found out that undergraduates actually have a high and unrealistic perception about their information literacy skills, but when put to test it was contrary. This was similar to the outcome of the research work on the information behaviour of the researcher of tomorrow at the University College London (University College London, 2008:19).

The researcher's nine years classroom experience with undergraduates in terms of their information handling skills irrespective of the context is subjective and needs to be explicated in order to decipher the intrinsic and extrinsic factors that impact on their information behaviour in addition to understanding how they relate with the dynamic world of ICTs, particularly Web 2.0. This premise cannot be taken for granted because its underlying objective is crucial to the realization of the future aspiration of NV 20:2020.

It is against this backdrop that the research work seeks to investigate the information behaviour of Nigerian undergraduates, but with a particular focus on their interaction with online channels, especially Web 2.0. The project is guided by the following research questions and sub-questions embedding the processes which are addressed by Kuhlthau's ISP model and the ACRL information literacy competencies:

- 1) What are the information needs of Nigerian undergraduates in terms of their academic work and everyday life?
- 2) What are the information resources and infrastructure available to undergraduates?
 - a. What access to the Internet and the social media do students have off and on campus?
 - b. What personal electronic devices do undergraduates have and use?
 - c. What online electronic resources such as full text databases are available via the library and other information centres?
 - d. What information literacy education is available to undergraduates?
- 3) What are the information seeking processes of Nigerian undergraduates?
 - a. How do they go about defining and articulating their information needs?
 - b. How do they identify, evaluate and select likely information sources?
 - c. What techniques do they use to search for relevant information in the identified information sources?
 - d. How do they explore a problem and thereby formulate and deepen a focus?
 - e. How do they engage with and analyse the information in their sources?
 - f. How do they synthesise information from various sources?



- g. Are they able to articulate, organise, synthesise for onward presentation or communication?
 - h. On completion of an assignment, do they reflect on and assess and adjust their information behaviours?
 - i. Are they aware of the ethical, legal and social issues surrounding the use of information and ICTs, either as an individual or as a member of a group?
- 4) What are the barriers that undergraduates experience in their information seeking?

1.4 KEY CONCEPTS, THEORIES AND STANDARDS UPON WHICH THE RESEARCH IS FASHIONED

This section, in brief, discusses the concepts, theory and standards that frame the research study.

1.4.1 CONCEPTS

Concepts are fluid; they connote meanings that are context defined in the field of Library and Information Science. Hence, the need for clarifications!



Information

According to Bateson (1972:459), “information is a difference that makes a difference”. It is the answer to any gap in knowledge and understanding. In information behaviour research, the term, information “is generally assumed to cover all instances where people interact with their environment in any such way that leaves some impression on them—that is, adds or changes their knowledge store” (Bateson, 1972:459)

Information Behaviour

Information behaviour is a concept that incorporates information needs and uses and information seeking and gathering (Menzel, 1996).

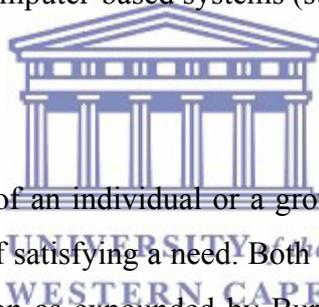
Information needs: This can be conceptualised in the context of the use of information in work, study or in everyday life (Bawden & Robinson, 2012:189). It is the conscious

awareness of a gap, fanned by the volition to seek meaning in order to fill the gap and become knowing.

Information seeking is “a conscious effort to acquire information in response to a need or gap in one’s knowledge” (Case, 2006b:5). Put differently, it is a conscious and constructive effort to derive the benefit of undistorted meaning from information for the purpose of knowledge acquisition and extension (Kuhlthau, 1991:361). This process requires information handling skills, also referred to as information literacy skills.

Information behaviour: According to Wilson (2000:49), 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”. The author added that in the event of seeking meaning, “the individual may interact with manual information systems (such as a newspaper or a library) or with computer-based systems (such as the World Wide Web)”.

Information Access



Information access is the ability of an individual or a group of individuals to seek, find and use information for the purpose of satisfying a need. Both intrinsic and extrinsic factors serve to determine access to information as expounded by Burnett and Jaeger (2011:167-168) in three levels: physical, intellectual and social.

Physical access is the first level of access to information which may be enhanced or constrained by external factors. This level of access includes the physical structures that contain information, the electronic infrastructures that contain information, and the paths that are travelled to get the information (Burnett, Jaeger & Thompson, 2008:57). Physical access is a pre-condition to the next level of access.

Intellectual access is dependent on the individual’s cognitive skills which translate to the knowledge of how to source for the needed information, critique, evaluate and filter the information and exploit it to achieve some set objectives and goals. It is important to state that an individual must possess information literacy skills in order to gain meaningful intellectual access to information. Information literacy skill is dependent on the individual’s

cognitive abilities (Kuhlthau, 2004), language competence (Bellardo, 1985: 237) and technological literacy (Burnett, *et al.* 2008: 58; Burnett & Jaeger, 2011:167-168).

Social access: This level of access refers to the information behaviours of people within defined social contexts (Burnett, *et al.* 2008). According to Burnett and Jaeger (2011:168), “social context may range from personal communication for entertainment purposes to educational and work settings to democratic participation”.

The World Wide Web and Web 2.0

The World Wide Web (www) or Web is an electronic environment that is ever evolving with new applications. Web 2.0 describes the upgraded, improved, and modernized World Wide Web in use today (Funk, 2009:xv); it is a paradigm shift both in technology and the way people interact in the cyber world. Web 2.0 encapsulates the evolving trends in the use and design of World Wide Web technology that enhances creativity, communications, secure information sharing, collaboration, interaction, and functionality (Sastry & Reddy, 2010: 2008). Examples of Web 2.0 platforms are social networking sites such as (Facebook, Twitter, Yahoo, Google), blogs (Weblogs and moblogs), wikis, video sharing sites (YouTube), and slide sharing sites (Slideshare). Being a read and write Web, the value of Web 2.0 Websites is in the way users are able to classify, evaluate, and add to the content that is there (EDUCAUSE, 2007:9).

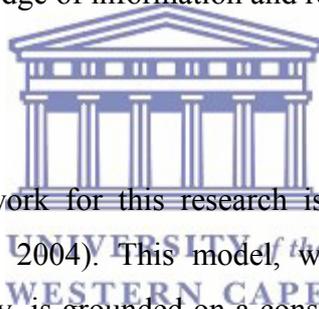
Information Literacy

On a general note, information literacy is the ability to recognize an information need, efficiently access information sources and evaluate information in a bid to close the gap in information and knowledge. This ability is a set of skills that is needed in the 21st century work place, more so as “the uncertain quality and expanding quantity of information pose large challenges for society” (Association of College and Research Libraries (ACRL), 2000:4). The copiousness of information in a technologically inclined 21st century requires attendant skills and ability to efficiently utilize information. These set of skills called information literacy skills are an inevitable and ubiquitous requirement for undergraduates in all fields of endeavour. The Association of College and Research Libraries (ACRL) (2005:5-

6) has a set of five standards used to describe someone who is information literate. An information literate individual is able to:

- Determine the extent of information needed
- Access the needed information effectively and efficiently
- Evaluate information and its sources critically
- Individually or as a member of a group, uses information effectively to accomplish a specific purpose.
- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally.

In this huge electronic world Tise (2000: 58), Brown, Murphy and Nanny (2003: 386), and Buschman and Warner (2005: 12–18) advocate that students need more training in the evaluation of information, knowledge of information and resources.



1.4.2 THEORIES

The principal theoretical framework for this research is Kuhlthau's Information Seeking Process (ISP) model (Kuhlthau, 2004). This model, which is an effective approach to understanding information literacy, is grounded on a constructivist approach to teaching and learning. The seven stages of the ISP model which articulate the information seeking process affectively, cognitively and physically are: Initiation, Exploration, Formulation, Collection, Presentation and Assessment. The model addresses the information seeking process from a holistic perspective by explicating the challenges of “seeking meaning” and “sense-making” in the 21st century where information is abundantly available through an array of media. A gap in information drives the individual to seek information and as well see meaning.

Kuhlthau, Maniotes and Caspari (2007), consequent upon many years of research, developed a programme of concept approach to teaching and learning information literacy called Guided Inquiry (GI). The programme aids students to engross in purposeful information seeking which prepares them for all ramifications of living and handling information. The progression and development of Kuhlthau's Information Search Process from 1985-2008 is available in Appendix 3.

Bloom's Taxonomy revised by Anderson, *et al.* in 2001 and further revised by Churches (2009), available in Appendix 4, is a key tool for teachers in instructional design (Churches, 2009). It is a non-exclusive layer of thinking from Lower Order Thinking Skills (LOTS) to Higher Order Thinking Skills (HOTS) (Churches, 2009:5). The LOTS have to do largely with knowledge acquisition, interpretation, summarising, inferring, describing, and so on while HOTS involve deepening and knowledge application. At the tertiary education level, Bloom's Taxonomy guides instructors on the appropriate type and level of learning activities and the expected outcome. For instance it can be used to categorise the level of an assignment to determine whether it encourages HOTS which involve creativity, deconstructing, attributing, evaluating, and creating.

1.4.3 STANDARDS

The ACRL (2002, 2011, 2012) has spelt out five information literacy standards, each with its performance indicators and outcomes for assessing the progress of tertiary students of science and engineering or technology at all levels of higher education towards information literacy (See Appendix 2). The essence of these standards is to embed information literacy across all curriculums in all tertiary educational programmes in collaboration with the efforts of faculty, librarians and administrators (ACRL, 2000:6).

In summary, the information behaviour of undergraduates is investigated using Kuhlthau's ISP model as a lens through which students' information handling skills are viewed.

1.5 RESEARCH PROCESS AND METHODS

In this section, the three-phased approach to the case study is outlined, in addition to the data collection methods, instruments and data analysis.

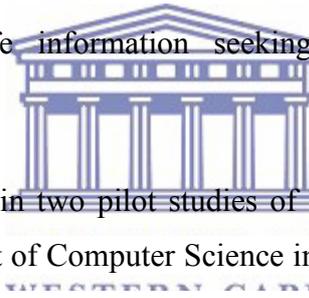
The three phases of the case study employed both quantitative and qualitative methods, by way of triangulation of methods. Todd (1979:603) advocates triangulation by restating the fact that "it rests on the premise that the weaknesses in each single method will be recompensed by the counter-balancing strengths of another"; Struwig and Stead (2001: 19) agree with Denzin (1978) and Todd (1979), by emphasizing the fact that the various data gathering methods, with the triangulation across them, contribute to the validity and

trustworthiness of a study. The data gathering process in the research work was in three phases, as follows:

1.5.1 PHASE ONE

The first phase of the case study involved quantitative survey research; extensively used as an empirical investigation of social phenomena (Given, 2008) by gathering numerical data used to generalize across groups of research participants. A *stratified* sampling method was used to determine the sample in the study. The strata used were 100 and 300 levels students of both colleges.

A structured questionnaire of modified open-ended, close-ended, Likert scale and differential scale was used to elicit data from the students. The questionnaire was in five sections: demographic information; general academic information seeking behaviour; information handling process; everyday life information seeking; and information behaviour of undergraduates on Web 2.0.



The questionnaire was pretested in two pilot studies of an opportunity sample of about 20 undergraduates of the Department of Computer Science in Ambrose Alli University, Ekpoma Nigeria; and also administered to some Master's students of the University of the Western Cape by one of the research supervisors. Similarly, three colleagues of the researcher also assisted in reviewing the questionnaire before the administration of the sample.

A total number of 803 students in Colleges of Science and Technology were surveyed in this study using a structured questionnaire. However, 782 questionnaires were returned, while only 711 were found usable. Thus, the response rate was 88.5%.

1.5.2 PHASE TWO

The second phase of the research which was conducted concurrently with the first phase involved the analysis of policy documents, interviews with the University Librarian, e-Librarians, Head of Web Unit and written interview responses of 12 lecturers (See Appendix 1 for the schedule of qualitative data gathering at FUPRE).

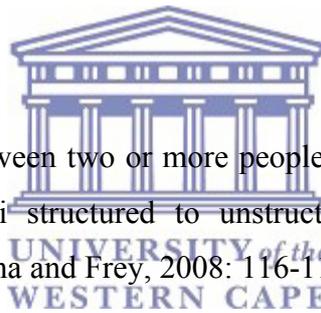
Analysis of policy

A policy document is a statement which spells out certain *modus operandi* (Anderson, 2005) and working principles of an organisation. It can also be described as benchmarks and working principles. The following documents were analysed in order to gain some understanding of the actual position of FUPRE library in its service to the university as a learning laboratory:

- Library guide
- Federal University of Petroleum Resources, Nigeria: Course Synopses. *General studies and entrepreneurship program*. Pages 2-3 of 140
- Use of Library and Study Skills (GES 104) course outline
- The University Website: www.fupre.org.ng

Interviews

An interview is an exchange between two or more people either face-to-face, electronically, or a written structured to semi-structured to unstructured with a view to creating a contextually defined story (Fontana and Frey, 2008: 116-117).



In the study, face-to-face interviews were held with the University Librarian, e-Librarians, and Head of the Web Unit of ICT Department, in addition to three telephonic conversations with the University Librarian for updates and clarifications. In addition, twelve written open-ended interviews were administered to lecturers in various departments and the university library.

The first interview with the University Librarian was held in an office assigned to the position based on appointment, after which three telephonic discussions followed within a period of a year, that is from April, 2014 to March, 2015. The interview and discussions investigated the information resources, facilities available to students, information literacy education for students and staff alike, and policies guiding the use of the Library and its attendant facilities.

Two e-Librarians, or rather librarians who staff the e-library, were interviewed together in the e-library. The interview investigated the availability and use of e-resources, policies guiding the use of e-resources and the e-library respectively, and the use of social media, specifically.

The Head of the Web Section of the ICT Unit was also interviewed based on appointment in the ICT Unit to elicit data on the infrastructural and technical support available to the university community from the ICT Unit. The interviews involved enquiry into the use of e-resources, policies guiding the use of e-resources in the computer laboratory and e-library respectively, and the policy guiding the use of social media and Learning Management System (LMS).

Twelve open-ended interview protocols were administered to 12 lecturers in various departments in both Colleges of Science and Technology, in addition to two librarians who teach the Use of Library and Study Skills course. The open-ended questions focused on the general assessment of students and how they seek and use information in attending to their assignments, whether students are directed to use specific information sources, on lecturers' familiarity with the concept of information literacy, and the use of the Internet and Web 2.0 tools in the teaching-learning process.



1.5.3 PHASE THREE

According to Bryman (1998) in Struwig and Stead (2001:56), qualitative research methods incline towards understanding issues from the participant's perspective, describe the settings of the participants in context, and understand the thoughts, feelings and behaviours of the participant. The third phase of the research explored students information seeking and search process using Kuhlthau's ISP as the lens to reveal how they interact with information in the affective, cognitive and physical realms. The data gathering process involved both 100 and 300 level students in Colleges of Science and Technology. There were two Large Group Discussions (LGDs), analyses of three assignment questions, analyses of assignments, and journaling.

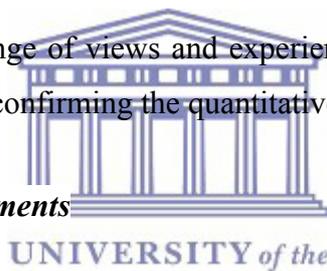
Large Group Discussions (LGDs)

Focus Group Discussions (FGDs) is “a way of collecting qualitative data, which—essentially—involves engaging a small number of people in an informal group discussion (or discussions), focused around a particular topic or set of issues” (Wilkinson, 2004:177); a simulation of everyday realism. Discussants should be 5 to 10 people per group, but 6-8 is preferred, and the environment should be conducive; a circle or conference seating (Krueger, 2002; Wilkinson, 2004).

Rather than two Focus Group Discussions (FGDs), two Large Group Discussions (LGDs) were held on 4 June, 2014. The change in plans was occasioned by conditions such as venue and time that were not favourable for the FGDs. The LGDs involved 17 and 15 students in 100 and 300 levels respectively.

The LGDs explored students’ range of views and experiences that could not be statistically captured in the survey as well as confirming the quantitative data gathered.

Examination of students’ assignments



The group assignments of 300 level students of Petroleum Engineering and the individual assignment of 300 level Electrical Electronics Engineering Departments and yet another individual assignment for the entire 100 students, all of whom took part in the survey (Phase 1) were examined. This was done in order to gather information that would aid the researcher in ascertaining the level of students’ information handling skills.

The assignments’ questions were analysed using Bloom’s taxonomy (Appendix 4) revised by Anderson, *et al.* (2001) to categorise the assignments along the continuum from Lower Order Thinking Skills (LOTS) to Higher Order Thinking Skills (HOTS) (Churches, 2009).

The assignment scripts were evaluated using a rubric prepared by the researcher (See Appendix 9). The rubric is founded on the ACRL information literacy standards (American Library Association, 2000; ACRL, 2002), which have a common ground with Kuhlthau’s ISP model in terms of the cognitive aspect of learning (See Appendix 2). Standards two to five

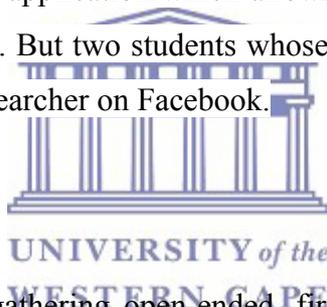
were used as a lens to evaluate students' information literacy skills in their assignments. The rubric was piloted with three assignments after which it was reviewed before use.

Journaling

Two journaling exercises took place with both 100 and 300 level students. In the Department of Petroleum (300 level students) there were seventy-seven participants and across various Departments in the Colleges of Science and Technology (100 level students) there were ten participants. Again, Kuhlthau's ISP model was used as a framework to examine the information behaviour of students. That is, how they go through their assignments in their thoughts, feelings and actions.

The initial plan was to work with students on Facebook but they opted for WhatsApp, a cross-platform mobile messaging application which allows instant exchange of texts, audios and videos (www.whatsapp.com). But two students whose phones were not compatible with WhatsApp interacted with the researcher on Facebook.

1.5.4 OBSERVATION



Observation is “the process of gathering open-ended, first-hand information by observing people and places at a research site” (Cresswell, 2008: 221). The researcher adopted the unstructured type of observation which cuts across all three phases. The settings observed were two Use of Library and Study Skills classes, one Entrepreneurial Studies class, the university library, facilities on campus, and students' social and academic life.

For validity sake, the researcher's observations were triangulated with the survey, interviews, large group discussions and journals.

1.6 OUTLINE OF THESIS

Chapter one provided a background to the study, delineated in brief, the key concepts and theory that framed the study and the research methods and methodology. Chapter two elucidates the conceptual and theoretical frameworks of the study while chapter three discusses the broad research literature of information behaviour of undergraduates across the

globe, with emphasis on the Nigerian context. Chapter four details the research design and methodology. Chapter five presents a summary and analysis of the data gathered from the survey. Chapter six offers the summary and analysis of qualitative data from students, teaching and non-teaching staff. The interpretations and convergence of findings across the quantitative and qualitative data as they relate to the research questions and the current research literature are expounded in chapter seven. Chapter eight, summarizes and concludes the study with some recommendations for future research.



CHAPTER TWO

CONCEPTUAL AND THEORETICAL FRAMEWORKS

2.1 INTRODUCTION

In research parlance, “framework” denotes the preferred research approaches adopted in a study in order to carry out a coherent empirical enquiry.

A theoretical framework consists of concepts, together with their definitions, and existing theory/theories that are used for a particular study (USC Libraries, 2013); it connects the researcher to the existing knowledge, helps to focus and resist going off track during the course of a research. Warmbrod (1986:2) defines theoretical framework as a systematic ordering of ideas about the phenomena being investigated. Theoretical framework is a lens through which a topic is being examined; hence, it must reflect an understanding of the theories and concepts that are related to the research topic.

The chapter discusses the conceptual and theoretical frameworks of the research. The concepts of information, information behaviour, information access, Web 2.0, and information literacy are discussed, as they underlie the project. Various theoretical models of information behaviour are discussed, including Kuhlthau’s Information Seeking Process (ISP), which is the theoretical framework chosen for the project.

2.2 SOME UNDERLYING CONCEPTS

The term concepts refers to the foundation of the conceptual framework of a subject under investigation based on the outcome of a major phenomenon previously studied (Ikoja-Odongo, 2002:86). Concepts can be used in various contexts and assume different meanings in the field of information Science; therefore, clarification is important.

2.2.1 INFORMATION

Information as a concept originated from the Greek words *typos*, *idea* and *morphe*, but evolved into the Latin word *informatio* (Ikoja-Odongo and Mostert, 2006), with the basic

meanings of “the action of giving a form to something material” and “the act of communicating knowledge to another person” (Capurro, 2009:128). Current use of the term *information* indicates that it is employed to represent and give expression to a very broad array of ideas, meanings and functions. Capurro (2009:131) posits that there is no absolute concept of information.

McCreadie and Rice (1999:46,48) give four major perspectives about information:

- *Information as a commodity/resource*. Information is seen as a physical commodity to be produced, purchased, replicated, distributed, manipulated, passed along, controlled, traded and sold.
- *Information as data in the environment*. Information is seen as a readily available data in the environment that can be communicated either intentionally or unintentionally for human understanding.
- *Information as a representation of knowledge*. Information is viewed as a presentation of, or a pointer to knowledge. A printed document is assumed to be the primary representation of knowledge.
- Information as part of the communication process. The meanings alluded to information are a fall-out of people’s cognitive process of making meaning and sense out of what is being communicated.

Social and geographical factors, in addition to level of education may impact in no small measure on interpretation and evaluation of information. The concept of information is fully situational and conditional and clearly dependent on specific frameworks (Barwise & Perry, 1983; Barwise & Seligman, 1997; and Pérez-Montoro 2007). That is, information is context dependent.

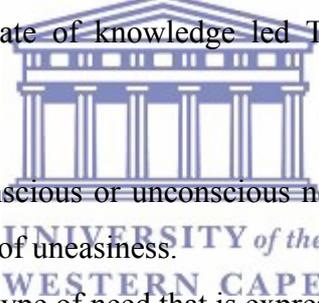
Bates (2010:2381) posits that, in the world of information behavior research, the term information “is generally assumed to cover all instances where people interact with their environment in any such way that leaves some impression on them—that is, adds or changes their knowledge store”. Hence, information is an agent of change. Put differently, “information is a difference which makes a difference” (Bateson, 1972:459).

2.2.2 INFORMATION BEHAVIOUR

Information behaviour research belongs to the discipline of *user studies* in the field of library and information science (Davis & Bailey, 1964); it includes studies on *information needs and uses* and *information seeking and gathering* (Menzel, 1996).

Information needs: The need for information is driven by a gap that needs to be filled. An information need evolves from the consciousness that something is either missing or inadequate and there is need to seek meaning in order to clarify and be informed (Kuhlthau, 1994).

Taylor (1968:181) describes an individual experiencing an information need as having a certain incompleteness in his picture of the world- an inadequacy in what might be called *his or her state of readiness* to interact purposefully with the world around him. This identified *inadequacy* in an individual's state of knowledge led Taylor to articulate four levels of information needs:

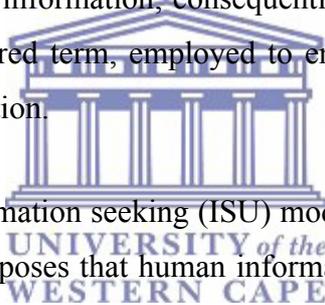
- 
- *The visceral need* is a conscious or unconscious need that is unexpressed which can manifest itself in the form of uneasiness.
 - *The conscious need* is the type of need that is expressed but vaguely or indecisively.
 - *The formalized need* is formally stated as a coherent statement.
 - *The compromised need* is in form of a question that is put before an information system.

According to Bawden and Robinson (2012:189), “information needs are a part of overall information behaviour, and can be understood in the wider context of the use of information in work, in study or in life generally”.

Information seeking is defined by Case (2006a:5) as “a conscious effort to acquire information in response to a need or gap in one's knowledge”, while Wilson (2000:49) views information seeking as “the purposive seeking for information as a consequence of a need to satisfy some goal”. Fourie (2004:70) opines that information seeking is a complex process, consisting of social, communicative and interactive behaviour. Kuhlthau (1991:361)

perceives information seeking as a user's constructive effort to derive appropriate meaning from information for the purpose of clarity and extension of knowledge on a particular issue or topic. To carry out purposeful information seeking, the information user requires some cognitive abilities and skills to engage with information systems. This may be referred to as information literacy skills, which will be discussed in a later section.

Since the late 1990s, there has been increasing interest in so-called Everyday Life Information Seeking (ELIS) – with a body of research and theory coming from the work of the Finnish researcher Savolainen (Savolainen, 1995; Durrance & Hinton, 2004 ; Fisher, 2005). Linked to this thread of theory is Burnett and Jaeger's Theory of Information Worlds, which considers the complex and interconnected contexts in which information users interact with information and its accompanying technologies. According to Bates (2010:2382), the term *information seeking* does not take into consideration the other dimensions in which people relate to and interact with information; consequently, with time, the term information behaviour has become the preferred term, employed to encompass all types of research on people's interaction with information.



Chuek (1998) developed an information seeking (ISU) model that is based on Dervin's sense making approach. The model proposes that human information seeking and using behaviour are responses to situations that prompt information needs (Chuek, 1998:4). The model was developed and tested in the workplace context in order to understand the information seeking behaviour of "individual-in situation" (Chuek, 1998:2).

The ISU model has seven different situations that target groups' (engineers and auditors) experiences in their work places based on the study on information seeking and use. These situations, confirmed by empirical evidence formed the framework for the understanding of the information behaviour associated with each and every ISU situation. The seven situations are: task initiating, focus forming, ideas assuming, ideas confirming, ideas rejecting, ideas finalizing and the passing on of ideas. Chuek (1998:3) discovered that the aforementioned situations were related to the following information seeking elements: use and choice of information sources; information relevance judgment criteria; information organization and information presentation strategies; feelings; and definition of information.

- *Use and choice of information sources:* The situation determines the choice of information sources. Auditors did not persist in using only one information source and people were more frequently consulted information sources than secondary documents. If the library was not accessible at the material time of information seeking, auditors were flexible enough to consult alternative sources (Chuek, 1998a:7). However, in terms of confirming the reliability of information, they relied on the use of authoritative information sources (Chuek, 1998b:3).
- *Information relevance judgment criteria:* In different situations, different criteria were used to judge the relevance of information (Chuek, 1998a:7).
- *Information organization and information presentation strategies:* Information organization strategies are professional skills and strategies acquired by individuals to organize information while information presentation strategies are about information presentation such as reports. The individuals' writing skills are crucial in information presentation strategies.
- *Feelings:* According to Chuek (1998a:7), auditors start their work confidently and soon become stressed and frustrated when they observe some contradictions in the information gathered. This feeling persists till the end of their information seeking. This feeling is contrary to Kuhlthau's (1994, 2004, 2008) information seeking process in which students only become confident only at the end of a fulfilled information seeking.
- *Definition of Information:* At different times during the work process, auditors refer to information as data, figures, events, opinions, comments and experience (Chuek, 1998a:8). However, no similar finding for engineers was reported by Chuek.

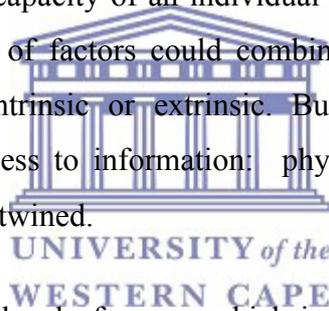
Chuek, (1998a:8; 1998b:4) also found that the ISU process in the workplace does not follow a specified order. People go through the seven ISU situations in multidirectional ways.

Information behaviour: Wilson (2000:49) describes information behaviour as “the totality of human behaviour in relation to sources and channels of information, including both active and passive information-seeking and information use”. Thus, it includes face-to-face communication with other individuals, as well as the passive reception of information as in, for example, watching TV advertisements, without any intention to act on the information given. Wilson further states that in the process of seeking, “the individual may interact with

manual information systems (such as a newspaper or a library) or with computer-based systems (such as the World Wide Web)". Thus, information behaviour takes into perspective a range of active and passive interactions of users with information. Burnett and Jaeger (2011: 173) argue that no matter how information needs and information seeking behaviour are conceptualized, they are also a function of the information worlds in which people live. If a certain issue is seen as a taboo in a particular society whereby members are not expected to talk about it, such may not constitute an information gap or present a problem that appears in form of an information need because it is prohibited in the society. Hence, the information behaviours of individuals are not exclusively personal but reflect the norms and culture of the society or worlds they live in.

2.2.3 INFORMATION ACCESS

Information access refers to the capacity of an individual or a group of individuals to reach and use information. A number of factors could combine as determinants of information access; such factors may be intrinsic or extrinsic. Burnett and Jaeger (2011:167-168) acknowledge three levels of access to information: physical, intellectual and social. The three are interdependent and intertwined.



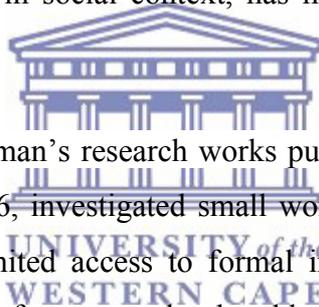
Physical access: this is the first level of access which includes the physical structures that contain information, the electronic infrastructures that contain information, and the paths that are travelled to reach the information (Burnett, *et al.* 2008:57). Oltmann (2009:6) summarises the barriers to physical access as geography, technology and economics. This level of information access is not solely within the control of the individual but is enhanced or constrained by the external environment. McCreadie and Rice (1999:51) argue that it is a common but erroneous assumption that access to technology equals access to information. However, physical access is a necessary prerequisite to the next level of access.

Intellectual access: At the level of the individual, the ability to understand, critique, evaluate and filter the information and employ it in the accomplishment of set goals translates to intellectual access. It is important to state that an individual must possess information literacy skills in order to gain meaningful intellectual access to information. Information literacy skills is dependent on the individual's cognitive abilities (Kuhlthau, 2004), language

competence (Bellardo, 1985: 237)) and technological literacy (Burnett, *et al.* 2008: 58 ; Burnett and Jaeger, 2011:167-168).

Social access: This level of access refers to the information behaviours of people within certain social contexts (Burnett, *et al.* 2008). It can be linked to the ELIS and Information Worlds theorising that was mentioned earlier. According to Burnett and Jaeger (2011:168), “social context may range from personal communication for entertainment purposes to educational and work settings to democratic participation”. Inability to appropriately communicate information is a bane to social engagement and this fact is in line with McCreadie and Rice’s (1999:54-56) approach to conceptualizing *access as participation* and as *access as control*.

Oltmann (2009:6) claims that the recognition of the three dimensions of information access, specifically the growing interest in social context, has made the theorising of information access more “robust”.



Still on the issue of access, Chatman’s research works published in 1985, 1987, 1992, 1995 (Chatman & Pendleton) and 1996, investigated small worlds in the contexts of constrained socio-economic poverty with limited access to formal information resources. Among her target groups were *small worlds* of poor people, the elderly, retired women, female inmates of gaols and university janitors. Chatman described the small world as a social group in which “mutual opinions and concerns are reflected by its members” (Chatman, 1999: 213). Hence, they engage in similar information behaviours due to their group thought on how and where information is best sought and shared. Undoubtedly, these attitudes affect the information seeking behaviour of the individuals in a small world including their reaction to accessing information. Hence, if there is any information coming into a small world from outside, its relevance or significance is not primarily because it is important in the outside world, but for the meaning attached to it by members of the small world.

Upon further investigation of the concept of small world by Burnett, Besant and Chatman in 2001, it was taken beyond the level of people yoked together by poverty and further investigated within the contexts of online virtual communities and the distributed community of feminist booksellers. Chatman’s model is helpful in understanding the context of

information behaviour as it pertains to people with the same interests, although it does not take into consideration their interaction with the outside world.

2.2.4 THE WORLD WIDE WEB AND WEB 2.0

The World Wide Web (WWW) or Web is the global information platform on which users can access information via various types of computers and mobile phones; it is an electronic environment that is ever evolving with new applications. Web 2.0 describes the upgraded, improved, and modernized World Wide Web in use today (Funk, 2009:xv); it is a paradigm shift not only in technology, but also in how people interact with one another online.

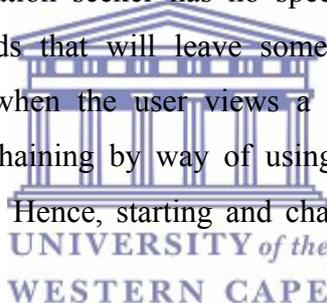
Web 2.0 is not a software package but a “read-write” Web (Poore, 2009: 41) that captures the dynamic trends in the use and design of World Wide Web technology that aim to boost creativity, communications, secure information sharing, collaboration, interaction, and functionality (Sastry & Reddy, 2010: 2008); these functions allow users to do more than just search and retrieve information. Web 2.0 is a buzzword, a term used to describe cultural trends like social networking, blogging, podcasting, and streaming media; it describes a landscape in which users control their online experience and influence the experiences of others (Funk, 2009:xi). The World Wide Web and Web 2.0 tools, such as social networking sites (Facebook, Twitter, Yahoo, Google), blogs (Weblogs and moblogs), wikis, video sharing sites (YouTube), slide sharing sites (Slideshare), are having a great impact on information behaviour in the 21st century. Researchers note that social media platforms like *MySpace* and *Facebook* offer students platforms to gather, in the same way young ones of past generations used to hang out at burger joints and malls (Horizon, 2007:12).

CIBER (2008:10) reports that users’ behaviour online is very diverse in terms of geographical location, type of university, and gender and status. They engage in horizontal information seeking and access authority and sources within a few seconds by relying on popular and favoured brands such as Google. The search engines fit students’ lifestyle almost perfectly more than the physical or online libraries, their online behaviour is more public and there are lots of pre-publishing, for example, wikis, blogs and so on CIBER (2008:7). Green and Hannon (2007) expressed the concern of students about the unmanageable scale of the Web and their difficulty to prioritize and evaluate searches. The value of the various Web 2.0

sites lie in the way users are able to classify, evaluate, and add to the content that is there and that there is a skills gap between using media to create and how to create meaningful content (EDUCAUSE, 2007:5-9). Hence, Poore (2009:68) in the study of the Net Generation information behaviour implied that users need to be ICT literate too. Even though ICT literacy is crucial, the foundation is information literacy.

Choo, Detlor and Turnbull (1998) proposed a model of information seeking on the Web which is a hybrid type that combined some elements of Aguillar's (1967) model of environmental scanning and Ellis' information seeking behaviour model to articulate a new model of information-seeking on the Web (Choo, Detlor, &Turnball, 1998:6-8). Undirected viewing, conditioned viewing, information search and formal search were four primary modes of information seeking on the Web identified by Choo, *et al.* (1998).

Undirected viewing: the information seeker has no specific information needs but seeks information on issues and trends that will leave some information gaps (Choo, *et al.* 2000a:5). Starting commences when the user views a Website of choice (Choo, *et al.* 2000a:6). This is followed by chaining by way of using specific hypertext links to seek further information purposefully. Hence, starting and chaining search related activities are important on the Web.



Conditioned viewing: The phase includes search related activities such as browsing, differentiating, and monitoring. Users browse by navigating the Websites, by using the site maps, site search or items on the homepage (Choo, *et al.* 2000b: 9). Websites of interest that are differentiated are bookmarked (Choo, *et al.* 1998:7).

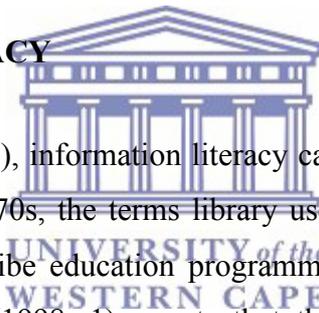
Informal search: Differentiating, extracting and monitoring are possible information seeking activities in the informal search context (Choo, *et al.* 1998:7; Choo, *et al.* 2000b:5). Extracting involves search activities that lead to the retrieval of the most relevant information while monitoring leads to the relevant information based on the selection of topic/keywords (Choo, *et al.* 1998:7).

Formal search: This is a focused search that follows a particular routine in order to expand and deepen the search. A formal search is carried out by visiting any Website(s) or by engaging in a detailed search within particular Website(s). Searching within the Website may

involve the use of services such as Website(s) alerts, soft agents and push channels (Choo, *et al.* 1998:6).

The information and technology revolution offers tremendous benefits to the university in terms of creative and interactive teaching and learning in the world of Web 2.0. An example of such technology is a Learning Management System (LMS) which integrates technologies that meet the different needs of both learners and educators. LMS are software applications valuable for “administration, documentation, tracking, and reporting of training programmes, classroom and online events, e-learning programmes, and training content” (Ellis, 2009:1); they manage, track and report on interaction between the learner and the content and the learner and the educator. Learners’ support features include: discussion forums, file exchange, emails, online journals, notes, real time chat, videos, individual grades and progress reports (Stockley & Olsson, 2013).

2.2.5 INFORMATION LITERACY



According to Rockman (2004a: 4), information literacy can be traced back to the nineteenth century. However, before the 1970s, the terms library user instruction, book education and library skills were used to describe education programmes offered to students and library users (King, 2007:11). Sayed (1998: 1) asserts that the concept of information literacy emerged in the 1970s consequent upon the introduction of new information technology devices which meant the ardent need for librarians to redefine their roles.

The term *information literacy* was first used by Paul G. Zurkowski in 1974 on behalf of the National Commission on Libraries and Information Science, with reference to someone who is able to solve information related problems by making use of relevant information sources and also applying relevant technology (Zurkowski, 1994). Since the 1980s, the concept began to appear more in literature in broad terms as the ability to identify information need, locate, evaluate and manage information efficiently (Webber & Johnston, 2000: 383; Maughan, 2001: 71; Boekhorst, 2004: 64). Due to a lack of proper understanding of the meaning of the phrase, particularly to non-librarians (Snavely & Cooper, 1997: 10), the American Library Association Presidential Committee on Information Literacy investigated the concept in 1989, and came up with a precise definition. That is, to be information literate, a person must

be able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information (American Library Association, 1989: 1).

In 1990, Patricia Senn Breivik established the National Forum on Information Literacy in the United States of America; the forum includes about 75 professional bodies with the sole objective of creating awareness of and sharing new trends in information literacy among educational, governmental, technological, and business organizations (Gibson, 2004: 16; Rockman, 2004: 5). Specifically, the forum investigates the role of information in libraries; integrates information literacy into library programmes; monitors information literacy programmes in the U.S. and abroad; encourages the creation and implementation of information literacy guidelines; and works with teacher education programmes to ensure new teachers incorporate information literacy into their teaching. In the early 1990s, many user education programmes were replaced by information literacy initiatives; however, such efforts were confronted by doubts and oppositions (Behrens, 1994: 313).

In 1999 the Society of College, National and University Libraries (SCONUL) published a model for information literacy for the United Kingdom (Society of College, National and University Libraries, 1999). In 2000, a set of information literacy competency standards for the United States of America was published by a division of the American Library Association (ALA), the Association of College and Research Libraries (American Library Association/Association of College and Research Libraries, 2000). In the same year, the International Federation of Library Associations and Institutions (IFLA) published guidelines for professional library and information educational programmes (IFLA, 2000). These publications formed the basis for frameworks and models for information literacy internationally. While in 2001, the Council of Australian University Librarians published a document on information literacy standards. After due collaborative work between Australia and New Zealand a second edition of information literacy standards was published by the Australian and New Zealand Institute for Information Literacy in 2004.

Generally, information literacy is conceptualized as the ability to recognize an information need, efficiently access information sources and evaluate information in order to close any observed gap in information and knowledge. In the international terrain, one of the most commonly used and cited definitions is by the American Library Association (ALA)

(1989:1); that an information literate person must be able to recognize when information is needed and have the ability to locate information from a variety of resources and use it effectively to solve a problem or to make informed decisions. Information literacy forms the basis for lifelong learning, which is central to the mission of educational institutions. It is common to all disciplines, to all learning environments, to all levels of education (American Library Association (ALA) 2000:2) and it is the basis of lifelong learning (ACRL, 2000:2).

The need for information in order to satisfy some needs demands information literacy skills and these skills are crucial for undergraduates especially in the face of rapid technological change marked by a proliferation of information resources. Students in their academic work deal with the complex and unfiltered array of information in various formats which require them to be skilled in determining the validity and authenticity of information sources. According to the Association of College and Research Libraries (ACRL, 2000:4), “the uncertain quality and expanding quantity of information pose large challenges for society”. The abundance of information in a technologically inclined world requires complementary skills and ability to efficiently utilize information. These set of skills called information literacy skills are a necessity for undergraduates in all fields of endeavour. The ACRL (2005:5-6) has a set of five standards used to describe someone who is information literate. An information literate individual is able to:

- Determine the extent of information needed
- Access the needed information effectively and efficiently
- Evaluate information and its sources critically
- Individually or as a member of a group, uses information effectively to accomplish a specific purpose
- Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally

The essence of the information literacy standards for higher education lies in the fact that it provides frameworks for teaching information literacy and also assessing the information literacy level of students (Snelson & Stillwell, 2001: 226). It is expected that the curriculum should be structured in a way that learning is student-centred whereby critical thinking and enquiries are part of the process. Tise (2000: 58), Brown, Murphy and Nanny (2003: 386),

and Buschman & Warner (2005: 12 – 18) suggest that students need more training in the evaluation of information, knowledge of information resources and infrastructure which may be referred to as information technology literacy and how to formulate search strategies including the ability to read, understand and interpret information provided electronically.

Embedded in the concept of information literacy are other types of literacies:

Academic literacy: In general, academic literacy can be defined as academic reading, writing and critical thinking (King, 2007: 7). It is the ability to read and comprehend information within various disciplines, to deal with challenging vocabulary, to understand text cues, to develop research skills and to present viewpoints (Pearce & Amos, 2000: 58).

Library literacy: This is the ability to use the library services, resources and facilities effectively and independently (Behrens, 1993: 124). This skill is crucial for undergraduates as it aids them in accessing the library and its resources efficiently when going about their academic work.

Information technology literacy: This is the ability to employ information technology to access, retrieve, store, manage and communicate information. Rockman and Smith (2005: 587) define information technology literacy as the ability to use digital technologies communication tools and or networks to solve information problems in order to function in the information society. Computer literacy is an aspect of information technology literacy; it is the competence to use the computer to complete a task (King, 2007:8). A computer literate person must have an understanding of functions of the computer hardware and software. Also as part of information technology literacy are Internet and Web 2.0 literacies. Internet literacy is a prerequisite to Web 2.0 literacy which is the understanding and usage of the Internet as a participatory Web for reading and writing. In this epoch, Web 2.0 literacy is crucial in academic circles and in all professional education because of its high relevance in the exercise of creativity and innovation, problem solving, critical thinking and communication and collaboration skills.

According to Kuhlthau who has done extensive research on information behaviour, information literacy and impact of information, information literacy is the ability to locate, evaluate and use information wisely, besides, it is the core of what it means to be educated in

the 21st century. Hence, Kuhlthau argues that “it is high time to apply what we know about information behaviour and information impact to information literacy programs” (2008:71).

Based on many years of empirical research, Kuhlthau, *et al.* (2007) came up with a programme for developing information literacy called Guided Inquiry. The programme, which is a conceptual approach to information literacy (Kuhlthau, 2008: 71), enables students to engage in purposeful information seeking which is a means of learning that prepares them for all facets of living and working with information.

The seven stage ISP model which incorporates the realms of the affective, the cognitive and the physical (Kuhlthau, 2004) reveals a process of seeking meaning in the process of seeking information, the outcome of which is linked with the level of information literacy of the user. The ISP is discussed in more depth in section 2.3.

In the disciplines of science, engineering and technology, students should access a wide variety of information sources and formats in order to add value the body of knowledge in their fields. Science, engineering, and technology are disciplines that pose some challenges in identifying, evaluating, acquiring and using information. Information presents in various formats that usually require some working knowledge of specialized software. The Association of College and Research Libraries (ACRL, 2002, 2011, 2012), an arm of the American Library Association (ALA), has spelt out five information literacy standards, each with performance indicators and outcomes for assessing the progress of students of science and engineering or technology at all levels of higher education towards information literacy (Appendix 2).

According to the Association of College and Research Libraries (2000: 6):

Incorporating information literacy across curricula, in all programs and services, and throughout the administrative life of the university, requires the collaborative efforts of faculty, librarians, and administrators. Through lectures and by leading discussions, faculty establish the context for learning. Faculty also inspire students to explore the unknown, offer guidance on how best to fulfil information needs, and monitor students' progress.

In this age and time, teaching and learning has gone beyond the traditional approach in which an instructor assumes both the directive and authoritative roles, but rather interacts and negotiates with students to unravel the sort of dynamism that goes with experience based

knowledge acquisition (Giesen, n.d). The constructivist approach to learning on the other hand encourages and enhances activity and participation (Kuhlthau, 1991, 1993, 2004, 2008; Christie, 2005; Todd, 2006; Kuhlthau, Heinström & Todd, 2008). Kuhlthau's guided enquiry is grounded on a constructivist approach to learning (Kuhlthau, 2010:21); a flexible yet creative approach.

Bloom's revised digital taxonomy map (Appendix 4) revised by Anderson, *et al.* (2001) examines the cognitive domain and categorizes thinking order and skills. This assists instructors in no small measure to design class activities, assignments and learning outcomes. Bloom's taxonomy is a continuum from Lower Order Thinking Skills (LOTS) to Higher Order Thinking Skills (HOTS) (Churches, 2009). Active, challenging, interactive and attentive learning (Anderson, *et al.* 2001; Churches, 2009; Kuhlthau, 2010; Kuhlthau, 2012b; FitzGerald, 2011) are the very essence of the constructivist approach to teaching and learning, information literacy and guided enquiry.

As Nigeria aspires to be one of the leagues of top 20 economies in the world with the aim of using education as an instrument for human development, the right education that instils lifelong learning is a key necessity in achieving such a laudable goal. The concept of information literacy takes into consideration the need for citizens to build an informed opinion; such is what Nigeria requires, to build an information literate citizenry for economic inclusion and sustainable democracy, amongst others.

For the purpose of this research, the information behaviour of Nigerian undergraduates in the World of Web 2.0 refers to the information seeking processes and behaviours associated with various information sources but with particular focus on online and interactive channels, especially Web 2.0.

2.3 INFORMATION BEHAVIOUR MODELLING

A model may be described as a framework for articulating a problem and may eventually develop to show the connections between various theoretical structures. In the general field of information behaviour, most information behaviour models have assisted in no little way in the articulation of problems (Wilson, 1999: 250). The value of models is that they identify

separate components and depict connections and flows that make up complex often invisible processes.

So far, information behaviour theories and models have primarily paid attention to one of the three broad aspects of information behaviour, either information seeking, information organizing and using (Lakshminarayanan, 2010:11). Although these behaviours are separate, they are also interrelated.

The term information behaviour (IB) was coined in the late 1990s, but has its roots in the concepts of information needs and uses research that emerged in the 1960s (Case, 2006b). Since then, there has been an apparent shift in paradigm from a *system-centred approach* towards a *person-centred approach* (Case, 2008:4) which explored the micro-processes of information behaviour of individuals. This shift also impacted on research methods as there was a shift from quantitative methods to qualitative methods (Wilson, 2000:51). Information behaviour researchers such as Dervin, Ellis, and Kuhlthau and Wilson can be linked with such changes and their models encapsulate the dominant and evolving ideas.

In trying to figure out a holistic model for the research work, the researcher explored the following models: Aguilar's model of environmental scanning (Aguilar, 1967); Wilson's Model (1981, 1996, 1999); Blom's task performance model (1983); Dervin's sense making model (1983, 1992, 1996); Bates' berry picking model of information retrieval (Bates, 1989); Ellis' information seeking model (Ellis, 1989; 1993; Ellis & Haugan, 1997); Kuhlthau's information search process model (1994, 2004); the optimal foraging theory (Sandstrom, 1994); information seeking and using (ISU) model (Chuek, 1998); Choo's behavioural model of information seeking on the Web (1998); Chatman's theory of small worlds (1999); and the theory of information worlds (Burnett & Jaeger, 2011).

Based on appropriateness, ease of application and relevance in academic world, Kuhlthau's information seeking process (ISP) model is the choice of theoretical framework for this research. The model goes beyond the accepted paradigms of information seeking and delved into the subjective inside world of the information user, a world that is phenomenologically beyond enquiry. Kuhlthau's Information Search Process (ISP) model and the models of Dervin, Ellis, and Wilson are discussed in this section.

2.3.1 DERVIN'S SENSE MAKING MODEL (1983, 1992, 1996)

Dervin propounds a sense-making model that takes into account social context. The model is "...a set of assumptions, a theoretical perspective, a methodological approach, a set of research methods, and a practice". The model views information as "...a human tool designed for making sense of a reality assumed to be both chaotic and orderly" (Dervin, 1983).

The sense making theory has four elements of information seeking: a material situation of time and space in which there is an information gap thereby exposing some difference in contextual and desired situations, that is, an uncertainty; the outcome which is a fall-out of the sense-making process; and a bridge, which is the gap closure between the initial situation and the outcome. The sense-making elements, situation, gap/bridge and outcome are presented by Dervin in triangle.

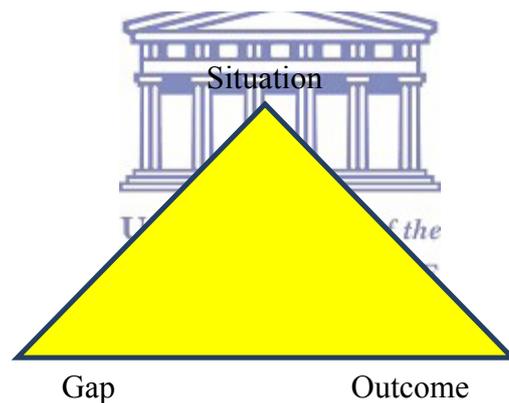


Figure 1: Dervin's *sense-making* triangle

However, there is a preferable bridge metaphor that is directly related to the model (Figure 2 below).

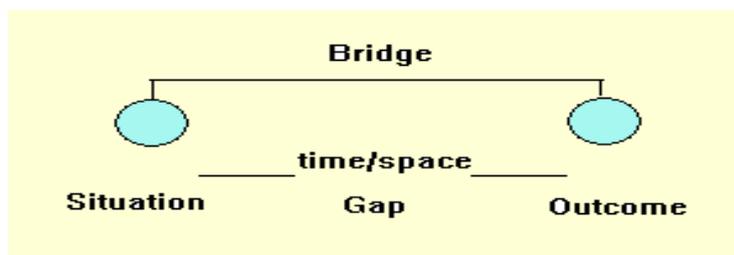


Figure 2: Dervin's *sense-making* model re-drawn (Wilson, 1999:254)

Dervin's model is related to information behaviour in the sense that it allows for the nature of the problem to be revealed through questioning.

2.3.2 ELLIS'S INFORMATION SEEKING MODEL (ELLIS 1989; 1993; ELLIS AND HAUGAN 1997)

Ellis (1989), Ellis, Cox and Hall (1993), and Ellis and Haugan (1997) propose a model that takes into perspective the different behaviours that occur while seeking information. The outcome of the study of the information seeking pattern of social scientists, research scientists and engineers in an industrial firm informed the model. Ellis's model identifies eight features involved in the process of information seeking which are: Starting, Chaining, Browsing, Differentiating, Monitoring, Extracting, Verifying and Ending (Ellis 1989; Ellis, Cox and Hall, 1993), illustrated in the following diagram:

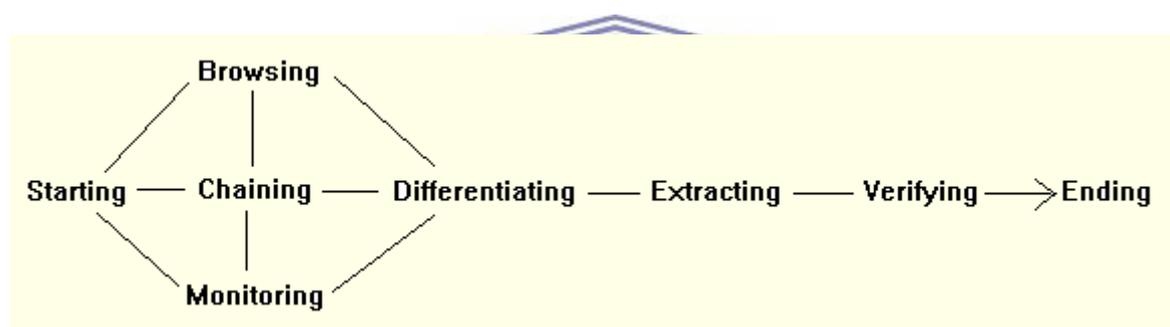


Figure 3: A stage process of Ellis (1994) behavioural framework

Source: (Wilson 1999:255)

Starting involves certain activities that make up the initial information search process, such activities may include the identification of information sources. Accessibility plays a vital role in the *starting* process, a source is likely to be selected based on its accessibility. Initial sources may suggest or recommend additional sources.

Chaining has to do with a follow up arising from the initial information search. Chaining can be backward or forward. Backward chaining is when pointers from an initial source are followed while forward chaining follows other sources that make reference to an initial source. Chaining helps to broaden the search for information.

Browsing takes place after locating potential information sources. It may involve browsing through tables of contents, lists of titles, abstracts, summaries, names of persons or institutions, and so on.

Differentiating is when the user filters and makes necessary selection from the pool of information sources based on quality, experience with the sources, reviews of published sources or recommendations from personal contacts.

Monitoring is the act of seeking updates regarding any developments in the area of interest, it basically involves following some particular sources. Ellis, Cox and Hall (1993) discovered that social scientists and physicists were found to track developments in their fields via journals, online search updates, books, conferences, magazines, catalogues, and so on.

Extracting is the process of reading and looking through specific information sources in order to identify material of interest. Extracting may be done by directly consulting the source(s), or by indirectly looking through bibliographies, indexes, or online databases.

Verifying has to do with checking the accuracy and authenticity of the information.

Ending of the information seeking process may be seen as “tying up loose ends” through a final search.

The strength of this model is that it is based on empirical research and it has been tested in several studies. However, observation confirms that information seekers do not necessarily follow ideal, optimized linear routes (Pettigrew 1999; Burnett & Jaeger 2011). Burnett and Jaeger (2011: 1762) point out that

searching activities undertaken by an individual user in a specific information setting such as a library are made possible, constrained and otherwise influenced not only by that individual's information needs and by the characteristics and context of the local library but also by a myriad of other factors, including social, political and economic forces related both to the searcher and the setting; and, indeed, information behaviour may be influenced by factors of which individuals are only dimly aware and that are well outside of their control.

2.3.3 WILSON'S MODEL (1981, 1996, 1999)

Wilson (1981) developed a model (See figure 4) for information seeking behaviour which is largely predicated on the individual's physiological, cognitive and affective needs. The model takes into consideration how an individual's social roles, environments and characteristics can affect information needs. However, it is not explicit about context as it does not elucidate any process in which, whether or not, an individual is affected by context or how context affects an individual's understanding of the barriers to information seeking. The author argues that the model is quite relevant in the process of identifying some areas for further research with specific reference to research on information use.

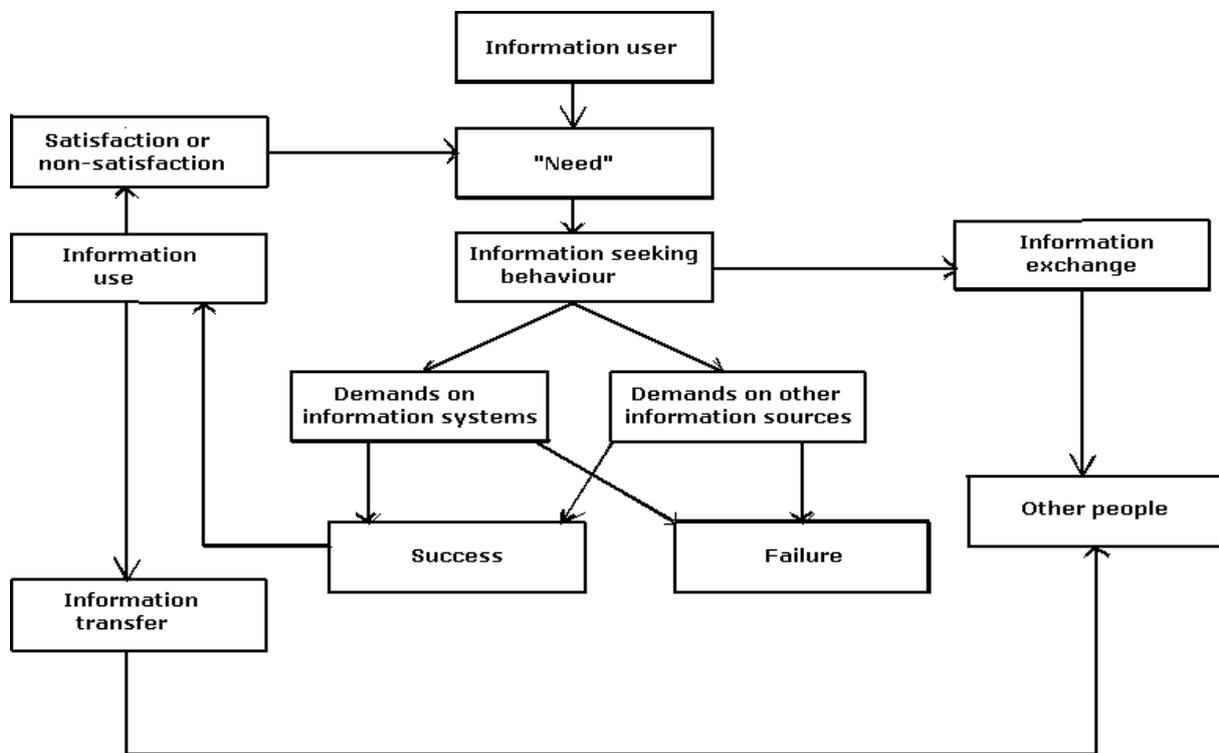


Figure 4: Wilson (1981): Model of Information Seeking Behaviour

Wilson modified the model of 1981 in 1999 by using Ellis' characteristics of information seeking behaviour (Ellis, 1989) situated within the context of an information need due to the person's environment, social roles and personal characteristics; these highlighted conditions of the information seeker may present barriers which must be overcome before information seeking.

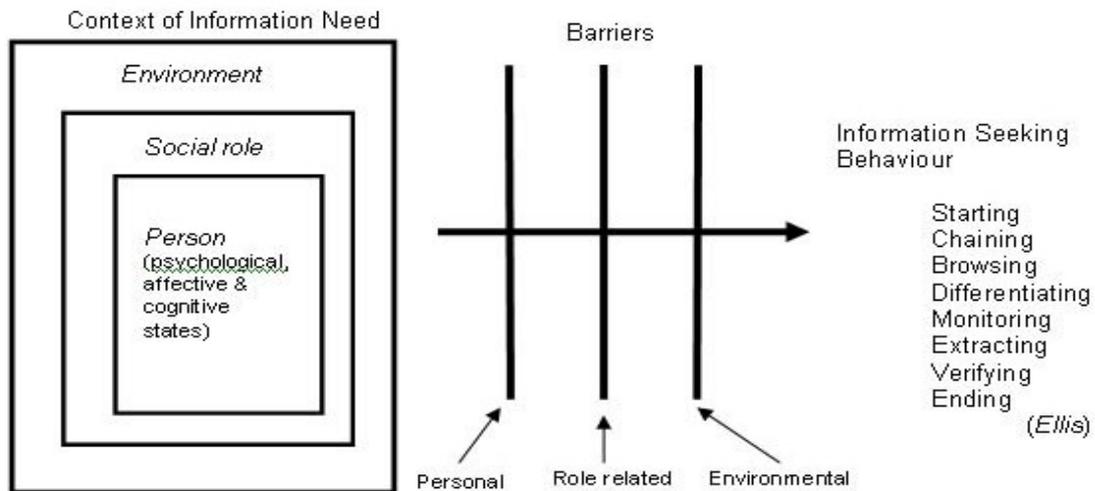


Figure 5: Wilson's 1999 model of information-seeking behaviour

Wilson (1996) reviewed and expanded the 1981 model to the general study of information behaviour, rather than only information-seeking behaviour which is purposeful in nature. In the review, a number of fields were taken into perspective, such as study of personality in psychology; the study of consumer behaviour; innovation research; health communication studies; organizational decision-making; and information requirements in information systems design. The author clarified that the 1996 model was not an exhaustive review of literature in the aforementioned fields but an *integrated* review based on what may contribute to information science.

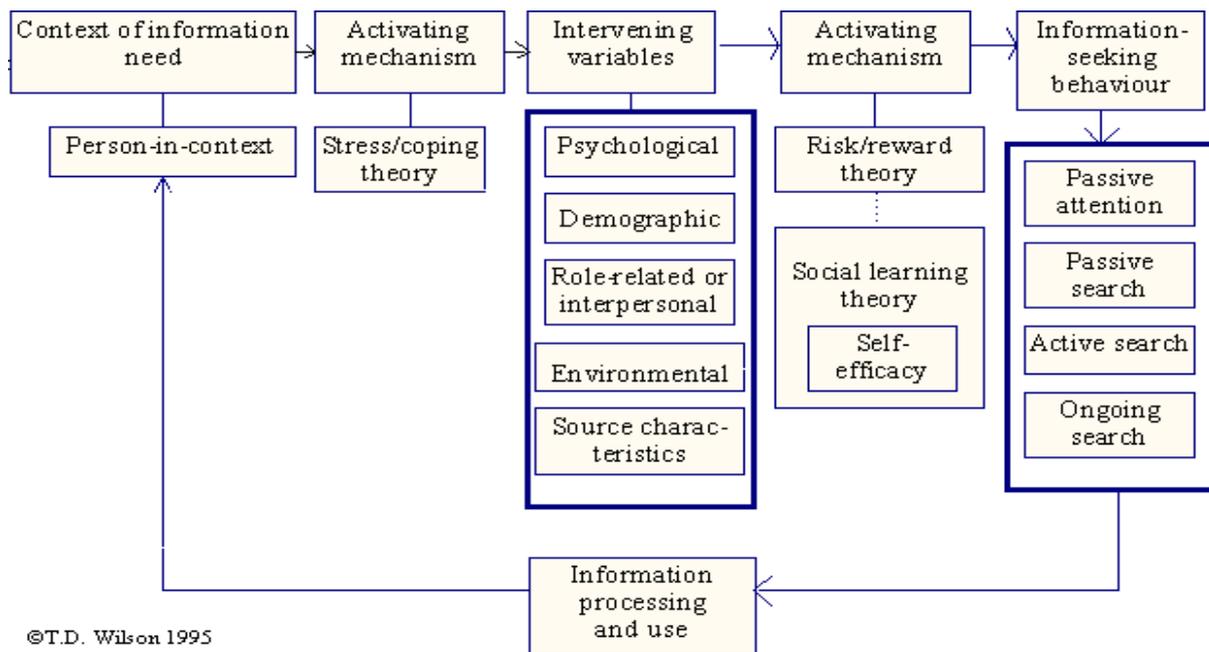
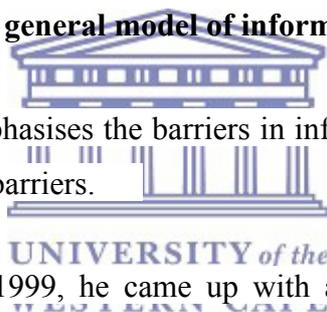


Figure 6: Wilson's 1996 revised general model of information seeking behaviour



Specifically, the 1996 model emphasises the barriers in information seeking and the possible dimensions to surmounting such barriers.

Further on Wilson's model, in 1999, he came up with a nested model (Figure 7) which implies that *information search behaviour* is a consequence of *information seeking behaviour* and that *information seeking behaviour* is secondary to all likely *information behaviour*. Hence, it is evident that information seeking is not the only aspect of information behaviour.



Figure 7: Wilson's 1999 nested model of information behaviour

2.3.4 KUHALTHAU'S INFORMATION SEARCH PROCESS (ISP) MODEL

Professor Carol Kuhlthau began her career as a first grade teacher in the 1960s. While teaching, she became “intrigued with the way children learn to read”. After five years, she considered working towards a master’s degree as a reading specialist, but a friend suggested a library school and she earned her Master of Library Science (MLS) degree at Rutgers University.

Kuhlthau studied the learning processes of students in her high school library for her dissertation – this work formed the basis for the ISP model and she observed the students for 14 years from high school into university. The results were reported in her 1993 doctoral dissertation and book (1993) along with several articles shortly thereafter.

In their appraisal of the model in 2008, Kuhlthau, Heinström and Todd assert that the model has been further refined through quantitative and longitudinal methods of diverse information users over time; and it is shown as being also relevant in the online world. King (2007), for example, found the model applicable in her doctoral study of undergraduates at the University of the Western Cape. In the field of Library and Information Science, Kuhlthau’s model is considered to be seminal as it holistically addresses information seeking by taking into cognizance the cognitive and affective facets of information seeking which has created a common vocabulary for researchers.

Kuhlthau’s ISP model which has its roots in both information science and constructivist cognitive learning presents two unique features of “uncertainty” and “Zone of Intervention”. Uncertainty is natural and important for constructing personal meaning in the process of information seeking. Increased uncertainty in the ISP is an indication for the need for intervention (Kuhlthau, 1999). Kuhlthau’s (1996) “Zone of Intervention” model is a concept modelled on Vygotsky’s (1978) zone of proximal development. Vygotsky’s work has had a significant impact on learning theory as his work developed a concept of identifying a point in which intervention would be both necessary and useful to a learner (Kuhlthau, 1996). The ISP model is a process of construction and seeking meaning influenced by George Kelly’s personal construct theory. Kelly (1963) explains the emotional experience arising from constructing meaning from new information; the information is taken-in in phases and it

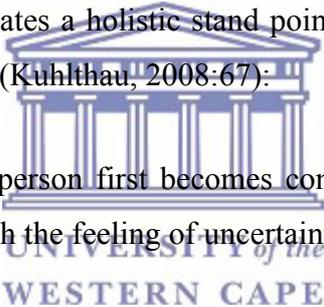
usually begins with confusion. The process construction is not just reproducing information but also exploration and formulation. The process of which instils the value of lifelong learning.

In addressing the challenges of “seeking meaning” and “sense-making” in the 21st century, Kuhlthau (2008:68) re-emphasizes the fact that the ISP model

reveals a process in which a person is seeking meaning in the course of seeking information. The model clearly reveals the link between information seeking behaviour and the impact of information. In fact, from the user’s perspective, the two are inseparably connected.

The progression and development of Kuhlthau’s Information Search Process from 1985-2008 is available in Appendix 3.

The ISP model in figure 8 articulates a holistic stand point of information seeking from the user’s perspective in seven stages (Kuhlthau, 2008:67):

- 
- Initiation: this is when a person first becomes conscious of a gap in knowledge or understanding during which the feeling of uncertainty is quite evident.
 - Selection: at this stage, a general problem is identified, and the initial uncertainty often declines due to some sense of confidence and a readiness to begin information search.
 - Exploration: in the exploration stage, a volume of inconsistent information is encountered. Such information may be overwhelming and incompatible with the topic, hence, the person’s level of confusion and uncertainty increases and low confidence level sets in.
 - Formulation: formulation of focus is when confidence begins to increase and uncertainty gives way consequent upon a focused perspective.
 - Collection: this stage portrays some level of certainty based on focused perspective and hence deep involvement.

- Presentation: at the completion of the search, there is a new understanding which informs learning, sharing and communicating with others.
- Assessment: A positive and conclusive information search gives a sense of accomplishment and increases self-awareness while it is contrary for an information search that is not conclusive.

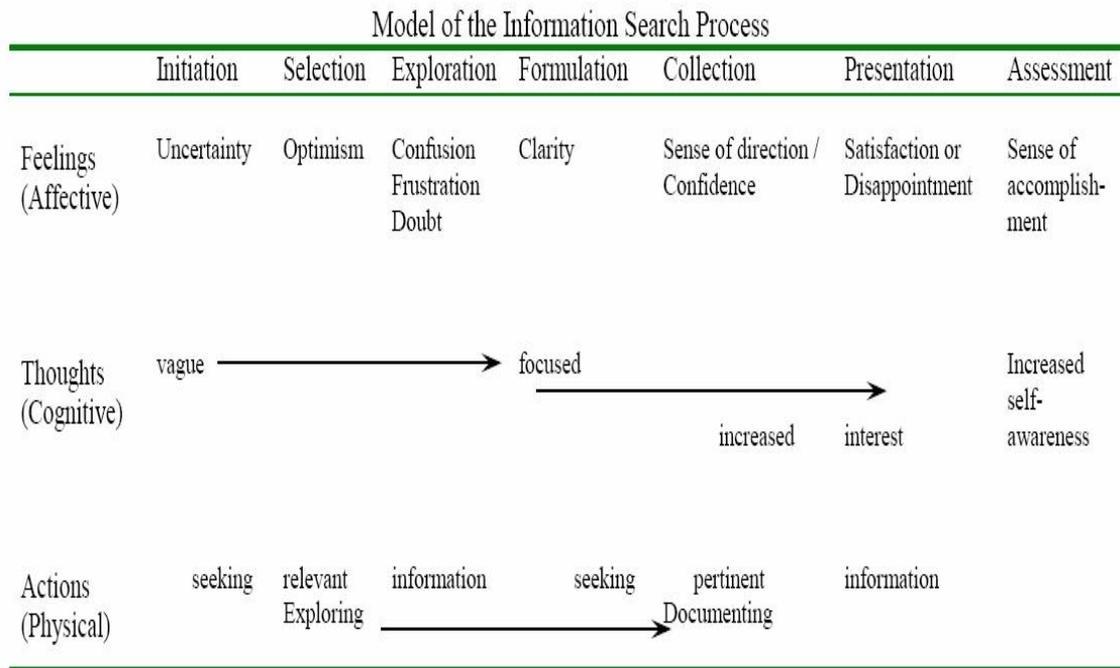


Figure 8: Information Search Process (Kuhlthau, 2004:82)

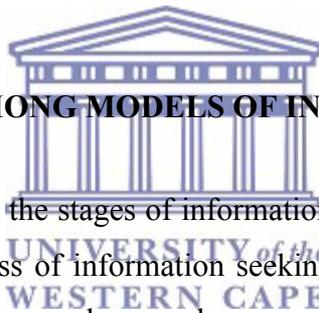
The ISP model as a process of knowledge articulation with varied cognitive and affective stages has been investigated and confirmed by several studies which will be discussed in the next chapter; and it is relevant in the study of information behaviour irrespective of the information environment, whether print or online media.

The Information Search Process (ISP) on the Web

Ongoing research reveals that the ISP model is a valid theoretical framework for the study of information behaviour irrespective of the information environment, whether print or online media. Branch (2003) confirms that students experience the phases of the ISP even on the Web; for example, they experience confusion and frustration when they come across barriers in their search while Broch (2000) emphasizes that the search challenges elucidated by the

model may be more serious when searching the Web. Also, research reveals that readily available information on the Web has impacted greatly on how students construct meaning (Holiday & Li, 2004).

One question relevant to the study of Nigerian students is over their experience of online sources. In some contexts, first year undergraduates might be assumed to be *digital natives* (Tapscott, 1999), part of the Net Generation - the first generation to grow up in a global environment that was already connected before they were born. According to Prensky (2001:2), they are “*native speakers* of the digital language of computers, video games and the Internet”. Digital natives are used to quick information delivery, they prefer graphics to text (Long, 2005:188) and multitask; while digital *immigrants* generally have less experience with technology (Gaston, 2006:12). Digital immigrants use the Internet and World Wide Web as the last resort when browsing for information and will print emails instead of read online (Prensky, 2001:3).



2.3.5 COMMON GROUND AMONG MODELS OF INFORMATION BEHAVIOUR

Kuhlthau's (2004) model is about the stages of information seeking borne out of her analysis of human behaviour in the process of information seeking. Kuhlthau's models stand out as the most focused on the information-seeker as a human, complete with emotions, rather than as a purely cognitive information creature which is why it is the most suitable model for this research. Taking the thoughts, feelings and actions into consideration clearly identifies Kuhlthau's perspective of information behaviour as phenomenological, rather than cognitive (Wilson, 1999). Ellis (1989) focuses on steps that information seekers go through to obtain information while Kuhlthau (2004) considers the thoughts and feelings of the information seeking and how they change in the process of information seeking. Therefore both models look at information seeking from different perspectives. Also, Ellis' (1989) model highlights the fact that behavioural tendencies may differ at different times and from person to person. The strength of both models lies in the empirical evidence as they have been tested in subsequent studies (Ellis & Haugan, 1997).

Wilson (1999) merged the works of Ellis (1989) and Kuhlthau (1991). Each of the combined models indicates stages or phases of information seeking.

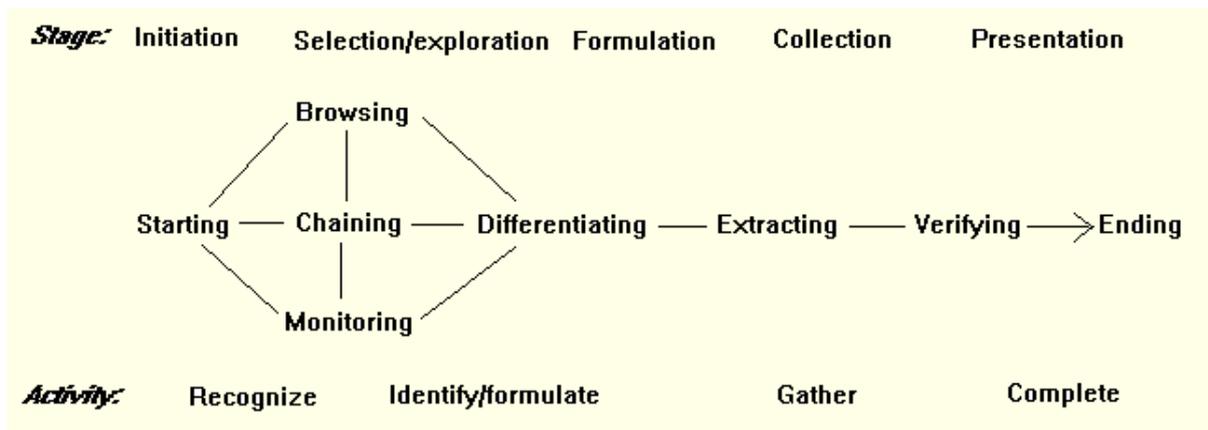


Figure 9: Wilson (1999) comparing Ellis's behavioural framework with Kuhlthau's ISP model

The merger reflects that both models relate to an active search mode of information behaviour; however, Ellis is concerned with information behaviour in the actual search activity while Kuhlthau identifies stages of activity, within which the behavioural patterns may occur. According to Wilson (1999), the key difference in both models appears to be that Ellis shows modes of exploration and investigation. Kuhlthau's ISP model indicate stages of information seeking based on analysis of behaviour while Ellis elements of information behaviour may occur in different orders with different persons or with the same person and at different times.

One may suggest that within the collection stage of Kuhlthau's information seeking process lies Ellis' behavioural model.

Wilson's model is a general one that offers a three-fold view of information seeking (2005: 31): the context of the seeker; the system employed; and the information resources that can be drawn upon. The model reflects the various approaches to information seeking behaviour and information searching. In one of his models, Wilson incorporated Ellis' "behavioural characteristics" of information seeking (Ellis 1989), which explains how the information seeker is involved in the "active search" mode of information seeking. Dervin's (1996) "sense-making" theory can also be associated with Wilson's model, in that it deals with the perception of a need for information - the experienced "gap" in one's knowledge - and the steps taken to "bridge" the gap. Dervin's sense making theory is not specific to any information setting like Kuhlthau's that is applied in some specific idealised settings.

2.4 CONCLUSION

The section discussed the conceptual and theoretical frameworks of the study.

In the conceptual framework, concepts like information, information behaviour, information literacy, information access, Web 2.0 and undergraduate were discussed to reflect the current definitions in line with the research work.

In the theoretical framework, models of information behaviour were discussed. Kuhlthau's information seeking process which stands due to its cognitive and affective dimensions in information behaviour in addition to the relevance of the model on the Web makes it suitable for the research.

The concepts and the model shall be discussed further in the review of literature.



CHAPTER THREE

LITERATURE REVIEW

3.1 INTRODUCTION

This chapter reviews the literature of the information behaviour of undergraduates on the World Wide Web and in the world of Web 2.0. It covers research in Nigeria, South Africa and other African countries, as well as across the globe. The purpose is to explore the research in the growing utilization of the Internet and Web 2.0 in the academic life of students and how it impacts on their information seeking behaviour.

As mentioned in the previous chapter, information literacy is recognized as a crucial graduate attribute across the world. Studies of students' information behaviour inevitably include comment on their information literacy and how it might be improved. The chapter has a special focus on research within the purview of Kuhlthau's Information Search Process (ISP) Model, which has been adopted as a useful analytical tool by many researchers in information literacy. As discussed in Chapter two, the ISP provides the theoretical framework for the research reported on in this thesis. It, moreover, informs much of the programmes for information literacy education in academic library circles, such as the ACRL Competency Standards for Information Literacy, which was covered in a previous chapter.

Research in information behaviour cannot be easily categorized and so the sections in this chapter often overlap. The threads of inquiry into information needs, information seeking behavior and information literacy are intertwined. Thus, studies of so-called digital information seeking often include shortcomings in students' information seeking skills in their lens.

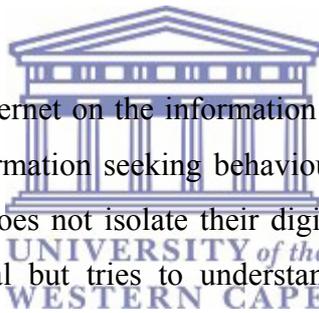
Nonetheless, the research literature in information behaviour is discussed under the following themes:

- The growing influence of the Internet on students' academic information behaviour
- The role of Web 2.0 in students' information behaviour

- Information behaviour of applied science students
- Research in shortcomings in students' information literacy
- Research in information literacy education
- Research within the ISP frame of Kuhlthau.

3.2 THE GROWING INFLUENCE OF THE INTERNET IN STUDENTS' ACADEMIC INFORMATION BEHAVIOUR

Information seeking and utilization has taken a new dimension in the 21st century, especially in the face of the Internet or Web and Web 2.0. The ready availability of the Internet has impacted in no small measure on how students seek information for academic purposes. Thus, this increasingly pervasive trend rightly calls for scholarly investigations of which findings could be employed to leverage Internet and Web functionalities to optimally serve information needs.



Research in the impact of the Internet on the information behaviour of students investigates their information needs and information seeking behaviour, with a specific interest in their digital information seeking. It does not isolate their digital information seeking from their information behaviour in general but tries to understand if and how their behaviour is influenced by the Internet. The research cuts across disciplines, levels, countries and context to answer such questions as:

- What information do students need to be successful in the various components of their academic programmes and assignments? And how do they use online resources to meet these needs?
- How do they access the information they need? And what barriers to access do they encounter?
- What sources and channels do they prefer? And why?
- What are the differences in need and behaviour across disciplines?

First of all, gender, level of study and course of study are variables that may impact on the information seeking behaviour of students. Kishore (2008) expressed concern over the low enrolment of females in tertiary institutions across Africa and in fact the world (Kishore,

2008). Specifically in Nigeria, the study of Aderemi, Hassan, Siyanbola, and Taiwo, (2013) on gender participation in tertiary enrolment, graduation and staffing of science and technology, sponsored by the Federal Ministry of Science and Technology (FMST) in Nigeria, explicates that female participation over the period of 1997 to 2006 vary across the different geopolitical zones of Nigeria. But, there was a general and notable increase of 81% for male and 110% for female over the 10-year period.

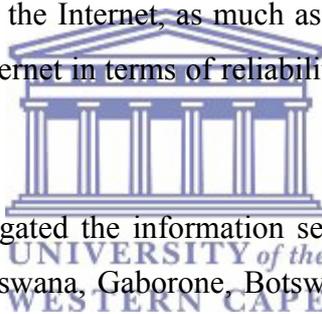
There is a fair amount of research in the information behaviour of Nigerian undergraduates and their information literacy, some of which takes place within specific faculties and disciplines (for example: Baro & Fyneman, 2009; Baro, Onyenania & Osaheni, 2010; Ejiwoye & Ayandare, 2011; Emmanuel & Jegede, 2011; and Adetimirin, 2012). It shows that students not only seek information related to their academic work on the Internet, they also use the Internet to meet their everyday life information needs.

Baro, *et al.* (2010) carried out a descriptive survey in their investigation on information seeking behaviour of undergraduate students in three universities in Nigeria; Niger Delta University, Delta State University and University of Port-Harcourt. The survey covered first year to final year undergraduates in History/Humanities. The population was 867 and sample size was 259, a questionnaire was used, supplemented by structured oral interviews and observations. Findings suggest that undergraduates need information primarily for academic purposes to complete their assignments, write their seminar papers, prepare for their class discussions, examinations and tests, and to write their final year research papers. About 65% of the respondents do browse the Internet to obtain information for their academic work; however, the problem of poor electricity supply is a major barrier to the use of the Internet. In Nigeria the electricity supply problem has been ongoing for over 20 years and it has in no little way affected business, international relations and education. Where electronic facilities are available, they are of no use if there is no regular electricity to power them. There is a heavy dependence on the library for books and journals; and also human sources. However, quite a number of the students do not know how to search for the library print resources, probably because they are not well trained in the use of the Library, the study reports. Inability to access information resources could arouse the feeling of frustration and confusion in students, besides, it may impact negatively on their academic performance.

Emmanuel and Jegede (2011) reported their findings on the information needs and information seeking behaviour and use of information resources by MBA students of Obafemi Awolowo University, Nigeria. A survey was conducted to elicit responses from students. Findings revealed that respondents need information related to government policies, business management, finance/economics, strategic/operational planning results of scientific research, and corporate developmental information topped. The information sources consulted are lecturers, the Internet, management journals, library facilities and textbooks. Respondents expressed difficulty in accessing both print and online materials. Even though the students lamented that accessing the Internet is a Herculean task because they have to queue or book to browse the Internet for a fee in one of the pockets of Internet café on campus, it is interesting to note that 99.9% of them preferred to search for information on the Internet first in order to explore a number of options before leveraging other information sources. This means that the Internet assists them in the process of task initiation, the period in which they experience uncertainty and some vagueness. This aspect of the findings resonates with the first stage of Kuhlthau's ISP Model which is the initiation stage. This is the stage in which a person becomes aware of a gap in understanding, in which the feeling of uncertainty is quite apparent (Kuhlthau, 2008:67). The primary recognition here is that there is a need for information to solve a problem. This recognition leads to seeking for information in order to gain clarity.

Kerins, Madden, and Fulton (2004) report two empirical studies which investigated the information seeking behaviour of students in Ireland, with one study focusing on engineering programmes and the other on law programmes, to determine whether engineering and law students share similar behaviours with respective professionals. The study employed a sample of 14 final year undergraduate engineering students split evenly between two engineering institutes in Irish universities. The final year students were chosen because it is expected that they would have acquired some information seeking skills throughout their engineering programme. To investigate the information seeking and strategies, each student participated in two semi-structured interviews, one at the beginning of his or her project and a follow-up interview at the end of the project. Each participant was required to describe what they did in seeking information for final year project which was used as an appropriate critical incident. As for the Law students, semi-structured interviews were employed to explore information seeking strategies used by the students. Twelve were interviewed, split evenly between two

Irish universities as well. Findings reveal that engineering students prefer personal direction either from a lecturer or an expert. Similarly, law students appeared to be strongly influenced by their lecturers due to the fact that they shape their impressions of how information seeking and legal research should be approached. Easy accessibility, convenience, speed and ready availability are the primary factors considered in the selection of an information channel by student engineers; they consider the Internet the most versatile source requiring the least effort to access, hence it is their first point of call in meeting their initial information need. However, some of the students did mention that they use print resources such as books, technical handbooks and journals as resources to validate the information retrieved from the Internet. Law students did report that their legal training is largely teacher-centred hence, they consult reading lists, textbooks and course packs prescribed by lecturers. But electronic resources, such as legal databases and the Internet, became more important for the Law students as they progressed through their studies. Both engineering and law students expressed their mixed reaction to the Internet, as much as they value the resource, they also observe the problems with the Internet in terms of reliability of information. Besides, Google is the key search engine they use.



Ajiboye and Tella (2007) investigated the information seeking behaviour of undergraduate students in the University of Botswana, Gaborone, Botswana. The primary objective of the study was to determine the sources consulted and the general patterns of information gathering by the students. The study adopted a descriptive survey design and data was collected using a questionnaire administered to 2000 respondents randomly selected from six faculties in the University. The findings reveal that academic information such as information required to complete course work, individual and group assignments and research work is the predominant information need of the students. The other type of information required by students are everyday life information for personal development, health, employment and global trends. The Internet is rated the most consulted source of information; the respondents find it more convenient to search for information online than consulting library books (6.4%). Other sources consulted by respondents are lecture notes and handouts; textbooks; newspapers; consulting/photocopying of colleagues notes; CD-ROMs database; and print journals. About 60% of the respondents are satisfied with the information they obtain from the respective sources.

The study also found that gender, level of study and course of study significantly influence students' information seeking behaviour. However, the level of study most significantly impacted on students' information seeking behaviour. As students' progress in their study from one year to the next, more information is required to complete coursework, assignments, and research and even sit for examination. All these tasks demand some measure of independence on the part of the students so that they can on their own organize their learning, especially in their final year when they have to conduct their own research. Therefore, the level of study is a key factor that impacts on the information seeking behaviour of students.

As mentioned earlier, much of the information behaviour research takes place within specific faculties and disciplines. As a scholarly reaction to the call made by Uak (2007:697) that “it is important to explore the information behaviours of the students who are being educated in the field of information management since the role they are going to play in establishing connections between information sources and users is crucial”, Niemand (2010) investigated the information seeking behaviour of students in the Department of Information and Knowledge Management at the University of Johannesburg, South Africa. A survey research method was employed to elicit response from 289 students. Findings revealed that students need information for their research work, assignments and also to learn about the latest development in their area of personal interest. The majority of the respondents prefer information in a digital format. Forty percent (40%) of the respondents use the Internet on a daily basis while 51% use it several times a week (Niemand, 2010:4). The relatively high Internet usage at the time of the research may be due to the fact that the University of Johannesburg employs an integrated learning approach which uses educational technologies that enhance more than one mode of content delivery and response to the face-to-face mode of instruction. The majority of the students prefer to use search engines, particularly Google. A few respondents do consult the Library and Information Centre and textbooks.

MohdSaad (2008) in his PhD study in Malaysia examined the information literacy and information seeking behaviour of students conducting final year projects at the Faculty of Computer Science and Information Technology, University of Malaya, Malaysia. The research work was carried out in two phases. The first phase was a survey while the second phase was diary entries and subsequent in-depth interviews. Students were expected to be computer and Internet literate because of having undergone at least two years training in

Computer Science and IT programmes. Also, they were expected to be information literate by reason of having taken a one-credit “Information Skills” course offered by the University Library in their first year; therefore, it was expected that they would be computer and Internet literate and by extension, information literate. Findings revealed that over 90% explored resources on the Internet via search engines and databases to understand the possible scope of their project. Also the respondents were aware of their need for information, from the moment they had to choose the topic for their Final Year Project. Overall 92.5% reported that they used the Internet to understand the possible scope of their project. Other sources they used included past year project reports (81.9%), guidelines from lecturers (70.6%), books (69.4%), friends (62.5%) and other reports (50.3%). When searching through search engines or databases, 98.1% used keyword search and 90.8% used subject search. The respondents knew the criteria to be used to measure reliability, validity, accuracy, authority, currency and bias of the information gathered.

Nkomo (2009) investigated the Web information seeking behaviour of students and staff at the University of Zululand and the Durban University of Technology, South Africa, to determine how students and staff have adapted to the Internet as an information environment and the extent to which it has affected their information seeking behaviour. The study covered four faculties in each university. Faculties of Arts; Commerce, Administration and Law; Education; and Science and Agriculture were sampled in the University of Zululand while the Faculties of Arts; Accounting and Informatics; Engineering and the Built Environment; and the Health Sciences were sampled in Durban University of Technology. Both quantitative and qualitative research methodologies were employed in a survey. The main research instrument was a questionnaire, supported by limited interviews. Findings show that the Web is a platform that both students and lecturers have come to rely on for information and also the first point of call for information. Students mostly consult the Web for information to complete their assignments, research, general awareness, communication and entertainment. It is noted that there is no remarkable evidence to show a total reliance on the Web alone; but undergraduates and staff alike do consult the library which also plays a vital role in meeting their information needs. However, the sole use of electronic media is higher than sole use of print. The respondents rely more on the Web because of its speed; time saving; ease of use and simplicity; currency of information; relevance of information; wide subject/topic coverage, that is, “they get everything”; easy accessibility (can work from

home and in the office); availability of multimedia, the Web combines text, video, pictures and sound; and sometimes, the Web is the only source of information available. Both institutions provide students and staff with physical access to the Internet. But effective use is not achieved due to challenges such as high student population, restrictive opening hours, and erratic Internet connection speeds (bandwidth). The online resources mostly used were OPACs, online databases, search engines, subject portals, discussion lists and newsgroups, Websites and email.

Kahlal (2011: 15-21) investigated the information seeking behaviour of Business and Engineering undergraduates of Royal Melbourne Institute of Technology so as to reveal any common pattern in their information behaviour. The focus was on the impact of technological advancements on students' capacities, expectations and learning styles, and also on the role of the academic library in the life of tertiary students. An online survey was conducted via SurveyMonkey.com and findings reveal that undergraduates have common patterns when searching for information and they are more comfortable using information available on the Web as their primary tool of information gathering than other tools. The secondary tools are still available online (i.e. databases and library electronic resources). The responses show that both groups of students did not spend time evaluating the information, by examining its citation; in fact, they only scan through the information found to decide its relevance. Also, due to the high use of Google and other search engines, students showed little use of the library's content. The ISP model of Kuhlthau was used as a framework to closely examine the different thoughts and feeling associated with the process of information search. Findings show that certain feelings are associated with respondents' information search process, such feelings often start with stress, anxiety and lack of clarity as to how to go about the task. However, as they progress, they gradually regain their confidence. Although, about half of the students are still not fully confident even when they have completed their task because they are not satisfied with their work. This finding shows that Kuhlthau's Information Search Process (ISP) Model, which takes into perspective the realms of the affective, the cognitive and the physical is very relevant in the use of the Web. The respondents displayed the affective stages while searching for information on the Web.

In the USA, the EDUCAUSE Centre for Applied Research (ECAR) in its 9th year of profiling undergraduates' use of technology for academic purpose explored technology ownership,

uses patterns, and perceptions of technology among undergraduates in tertiary institutions in the US (Dahlstrom, 2012). Data was elicited through online survey, the link to the survey was sent to the students by the institutional representative. 106,575 undergraduates across 195 US based institutions responded to the survey. Findings revealed that students prefer a blended learning environment; students' expectations, that their instructors should use technology to engage them in the learning process, are met by their instructors; students favour small portable devices such as phones and nine out of ten students owned a laptop; students want to access their academic progress, information and course materials via their mobile devices; academic success is underpinned by email, face-to-face interaction and using course management systems, Google and Blackboard topped the list of frequently visited Websites.

Summary

From the review of literature across the globe on the growing influence of the Internet on students' information behaviour, studies reveal that students seek information primarily for academic purposes as well as engage in Everyday Life Information Seeking (ELIS) (Savolainen, 1995; Durrance & Hinton, 2004) which focuses on the way and manner in which people acquire information in daily life in the non-work context. Regarding the everyday life information seeking, students seek information on health, jobs, political issues, and global trends, among others. For academic work, generally, students seek information to complete their coursework, assignments, projects and research work.

Across all the literature and disciplines such as applied sciences, social sciences and humanities, the respondents employ the Internet as their primary source of information for academic purposes; this is due to the ease of use and convenience that is associated with the search engines. This aligns with the research output of Bawden and Vilar (2006); Griffiths and King (2008); Head and Eisenberg (2010); and Connaway, Dickey and Radford (2011), which reveal that convenience is a critical factor in information seeking in a variety of situations, including academic and everyday like information seeking.

In science and technology, the knowledge base is cumulative, inventions and discoveries are grounded on former ones (Heinström, 2002:80), which expectedly allows room for deep

thinking, innovation and creativity which should be taken advantage of. Based on this, seeking trustworthy and credible information either electronically or in print may not be convenient.

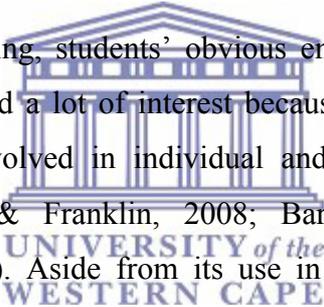
The use of the Internet tops the list of information sources because of its speed, easy accessibility, multimedia formats and the fact it seems to have every information that one may need. The online sources mostly consulted are the search engines and databases; Google search engine tops the list. Other information sources mostly consulted, especially by Nigerian undergraduates sampled, were print materials from various sources including textbooks and journals and CD-ROM databases. Even though undergraduate students do consult the Internet as their primary information source, the content should differ based on their discipline, however, this is not quite explicit in some of the research works.

It is observed from the literature that even though Nigerian students heavily depend on the Internet as their primary information source, they however have access problems due to poor infrastructural facility and erratic power supply so much so that students have to go an extra mile to use public cyber cafes to enable them to gain access to the Internet in order to compete their academic tasks. According to Burnett, *et al.* (2008:57); and Burnett and Jaeger (2011), physical access which is the first level of access to physical infrastructure is a necessary pre-condition for intellectual and social access. Physical access is not entirely within the control of the individuals as exemplified in the studies. However, the large survey that involved over 100,000 students in the USA including 195 students of various nationalities shows that students are beginning to break the barrier to physical access due to ownership of small portable devices such as laptops and phones on which they can gain physical access to the Internet. If students successfully break the physical barrier, another issue of interest here is gaining intellectual access to information which largely depends on students' ability to properly digest, evaluate and critique information for proper use. A student who achieves this is information literate, studies on information literacy will be discussed latter in this session.

Apart from the heavy reliance on the Internet, it is also noted that students still depend on other sources, especially text books. Quite common among Nigerian students, the use of hand-outs and lecture notes is widespread.

In terms of the effect of gender on information behaviour, the study in Botswana (Ajiboye & Tella, 2007) queried these variables, although the impact of gender was not clearly explicated. However, it was established that the level and course of study significantly impacted on students' information behaviour. Obviously, the type of information students seek depends on the nature of their course of study. In all cases, it has been established that the Internet is the first point of call because of its versatility. Regarding the impact of the level of study on information seeking, it is expected that as students' progress in their academic study, the tasks they are faced with demand some measure of independence, especially in their final year project, hence, one may conclude that as students' progress from one level to the other, their information seeking is more intense and they become more independent in carrying out their academic work.

3.3 STUDENTS' INFORMATION BEHAVIOUR ON WEB 2.0

Within the higher education setting, students' obvious engagement with Web 2.0 tools in their everyday lives has generated a lot of interest because of the potentially new ways in which students can be duly involved in individual and collaborative learning activities (Alexander, 2006; Armstrong & Franklin, 2008; Barnes, Marateo, & Ferris, 2007; Thompson, 2007; Hughes, 2009).  Aside from its use in social networking, the teaching-learning potential of Web 2.0 has led to its recent, more frequent and ready application in higher education (Arnold & Paulus, 2010; Hung & Yuen, 2010); microblogging (Grosbeck & Holotescu, 2009; Ebner, Lienhardt, Rohs, & Meyer, 2010), wikis (Bonk, Lee, Kim, & Lin, 2009), and blogging (Ellison & Wu, 2008; Halic, Lee, Paulus, & Spence, 2010). The uniqueness of these Web 2.0 tools in teaching and learning is based on its high level of social interactivity which is the core of Web 2.0. It is a trend in teaching and learning that is unique in the 21st century.

Despite the relevance in learning activities and the requisite benefit of Web 2.0 in the higher education setting, the literature that reveals the effectiveness of its implementation is rather scarce (Carmichael & Burchmore, 2010; Hung & Yuen, 2010; Schroeder, Minocha, & Schneider, 2010; Bennett, Bishop, Dalgarno, Waycott, & Kennedy, 2012).

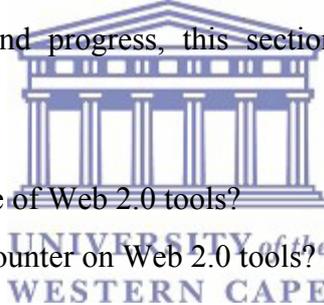
Based on the competency index for the library field compiled by the OCLC's WebJunction (2009:65), part of the responsibilities of a library is to

understand the importance of having a Web presence beyond the library Web site; investigate and develop the library's presence on social networking sites (Facebook, LinkedIn, Eventful, etc.), and evaluate and implement other tools for extending online access to library content, among others.

Some libraries are using the emerging technologies to connect and engage with their audience (Anunobi & Ogbonna, 2012; Collins & Quan-Haase, 2012; Dowd, 2013), as the tools offer different ways to communicate with the youth in non-traditional ways that extend beyond physical walls (ALA, 2013:43).

In order to ascertain how undergraduate students use and explore the power of Web 2.0 to enhance their academic work and progress, this section seeks to answer the following questions:

- How do students make use of Web 2.0 tools?
- What barriers do they encounter on Web 2.0 tools?



Generally, the use of Web 2.0 tools for academic purposes is one of the topical issues demanding attention in the research parlance. While the literature on the subject in the Nigerian context appears scarce probably due to low level utilization of Web 2.0 tools for teaching and learning purposes by students and educators alike, some available research in Australia, the USA and South Africa, are discussed.

As part of a larger study to examine how students use Web 2.0 technologies to support learning in the University of Melbourne, the University of Wollongong and Charles Stuart University, institutions which largely represent the diversity of the Australian higher education sector, Bennett, *et al.* (2012:525-533) investigated how the use of Web 2.0 tools influence students' engagement in academic work and possible learning outcomes. The study cut across a range of disciplines, class sizes and year levels. Quantitative and qualitative research techniques were adopted, that is, survey and large group discussions respectively.

The focus of the project was on photo sharing (using Flickr and Sakai Resource Tools) and publishing (WordPress, Sakai BlogWow, and wiki). Findings across the institutional setting highlighted the potential learning benefits that Web 2.0 offers if used effectively. Such benefits may arise especially through student content creation and sharing. However, students' inadequate experience with the technologies, which is suggested in the survey, is confirmed in the case studies. Hence, this implies possible drawbacks of students being unfamiliar with Web 2.0 tools and the need for institutional support in terms of training. Dohn (2009:344) affirms that to effectively use Web 2.0, the need to possess a "lifelong, life-wide" set of skills that traverses the boundaries between formal and informal learning cannot be overemphasised. For students to effectively utilise Web 2.0 tools, they must be able to gather, analyze and synthesize information, communicate effectively, collaborate with others, think creatively and critically and also possess computer and Internet literacy skills. All these skills make up the information literacy skills.

It is challenging to find the right tool to support a well-designed activity. More importantly, the cases underscore fundamental tensions between Web 2.0 and educational practices. Such tensions may arise due to the playful, expressive and reflective or exploratory aspect of knowledge building that is applicable to Web 2.0 as against the standard education practice. Dohn (2009: 352-360) observed this tension and argues that they are not an "eternal principle", but only entrenched in reality. Some of such tensions as observed by Dohn (2009) include distributed peer responsibility, and patchwork, in terms of the dynamic use and re-use of information across contexts which is seen as cheating in education.

Luo (2010:33-37) investigated the adoption of Web 2.0 in teaching Information Literacy (IL) classes by a sample of librarians in the USA who are members of the popular Information Literacy Instruction Discussion List listserv (ILI-L), sponsored by the Instruction Section of the Association of College and Research Libraries (ACRL). Survey and semi-structured phone interviews were conducted for data collection. An email message was sent to the ILI-L listserv, inviting librarians who use Web 2.0 tools in their IL classes to participate in a survey study that examines the incorporation of Web 2.0 in Information Literacy Instruction (ILI). Fifty (50) librarians participated in the study. Generally, the librarians admitted using Web 2.0 tools such as blogs, wikis and YouTube to facilitate course delivery and content; and they perceive students' positive reaction towards the incorporation of Web 2.0 in their teaching

and learning. However, it is noted that not all students are skilled on the use of computer, the Internet and Web 2.0 tools, especially for those students who come from rural areas or the lower socio-economic class. However, those who are regular users of Web 2.0 tools (Facebook and YouTube) outside the academic setting tend to use them as a ‘toy’; and they seem not to be aware of the educational potential of Web 2.0 but appear only interested in the social and entertaining aspects of it. Hence, one may deduce that if students spend ample time on Web 2.0 for social interaction without exploring its possible significance in their academics, too much time devoted to it may impact negatively on their academic work.

The study also highlights the technical challenges of using Web 2.0 tools which require some time and practice to master. An example given is the technicality of the formatting rules of wikis which must be learned through practice. Another issue of concern was online vandalism especially in running a wiki. Since it is open to student editing as well as easy for students to share, such may present an opportunity to vandalise the wiki.

The EDUCAUSE Centre for Applied Research (ECAR) mentioned earlier explored the usage of social networks on Web 2.0 platforms across 184 US-based institutions. Findings revealed that students do not want to mix their social lives with academic lives. Three out of every five students who participated in the study both in 2011 and 2012 preferred social networks for interacting with friends more than for academic communication. The majority enjoyed connecting with fellow students on social network sites like Facebook and online forums. Only one out of three found it appropriate to connect with instructors via social networks, the others considered it a taboo to be “friending” current or past instructors on social networks. They prefer email communication with their instructors and interactive mode of communication, such as texting, instant messaging and online chatting, among themselves. The use of social network sites, including Facebook and Twitter, moved from minority status in 2011 to majority status in 2012, so also the use of social studying sites (e.g., Cramster, CourseHero, GradeGuru, etc.). Students do not favour social networking sites and telephones for communicating with their instructors, but prefer face-to-face, email and via their course management system; email topped the list.

Rudman and Steenkamp (2012:397-400) of Stellenbosch University, South Africa, investigated the changing behaviour of students on Web 2.0 in addition to security practices

online, by conducting a Web-based survey. The researchers found that Web 2.0 is widely used (80.6%) by students but for non-academic purposes; 46% of the respondents stated that they believe the use of Web 2.0 influences students' studies and takes some time away from academic work; and in addition, 48.2% are of the opinion that Web 2.0 influences their social life and the ways they interact socially. Spending time and effort on social networking means that students are already investing in building relationships and their own communities of shared interests and fostering 21st century skills in the process. However, the relevance of such endeavours should be brought into their academic world to enhance their educational development.

Summary

Research works on the information behaviour of students on Web 2.0 reveal that students are aware of the potential of Web 2.0 associated technologies and tools such as wikis, blogs and YouTube in furthering their academic pursuit, especially as it permits students' content creation and sharing. Consequently, one may assume that students who in their everyday lives use Web 2.0 tools should be motivated to use them in their academic work; this is even more relevant when it is considered against the background that they possibly also possess the requisite skills, but such is not the case. Studies reveal that students prefer Web 2.0 tools (Facebook, Twitter and online chat) for socializing and communicating with friends. Some socio-economically disadvantaged students are neither computer nor Internet literate. The majority prefer email and face-to-face communication with their instructors. In the case where Web 2.0 tools are incorporated for course delivery, students are confronted with the technical challenges of the Web 2.0 tools. An example is a wiki, it has a unique formatting feature that needs to be learned and internalized over time. The challenge of finding the right Web 2.0 tool to support a well-designed class activity is also evident; this brings to the fore some form of tension between Web 2.0 and the traditional educational practices.

It appears that students who are already comfortable in using social networks for socializing with friends do experience some physical barriers in accessing Web 2.0 tools for academic purposes. Hence, it becomes obvious that using Web 2.0 for academic purposes requires some skills for the usage of such platforms. Dohn (2009:344) maintains that to effectively use Web 2.0, students need to possess a "lifelong, life-wide" set of skills that traverses the

boundaries between formal and informal learning that cannot be over-emphasised. Even when students are able to overcome the physical barrier, to effectively utilise Web 2.0 tools by way of gaining intellectual access, they must be able to gather, analyze and synthesize information, communicate effectively, collaborate with others, think creatively and critically and also possess computer and Internet literacy skills. All these skills make up information literacy skills.

3.4 INFORMATION BEHAVIOUR OF APPLIED SCIENCE STUDENTS

It is expected that the information behaviour of undergraduates will differ from faculty to faculty. Applied sciences are pragmatic in nature and aim to invent new techniques and products which control the environment. Specifically, engineering is an application focused discipline, the aim of which is to develop products which can be used for practical purposes. According to Heinström (2002:80), the knowledge base is cumulative in science and technology; consequently, discoveries are grounded on former ones. The aim of applied sciences is basically not in understanding “why” but to produce solutions that are both efficient and effective. As an example, professional engineers conduct various tasks, such as design, development, documentation and implementation. These tasks, whether technical or non-technical, require specific information. Of the various tasks performed by professional engineers, especially designing, testing, manufacturing and constructing, a final product is required or expected. Therefore in the training of student engineers, they are expected to perform one or more in their final year project.

Therefore, this sections seeks to answer the following questions:

- What are the information needs of applied science students in the various aspects of their academic programme? Are their needs different from the needs of students in other disciplines?
- What are the information sources they consult? What is their preferred information source? And why?
- What are the barriers they encounter in their information seeking?

As in all disciplines where quick and reliable results are expected, the use of Internet in the field of applied sciences is crucial.

Kerins, *et al.* (2004) mentioned earlier in their study of the information seeking behaviour of Irish engineering and law students found out that easy accessibility is a primary factor in the selection of an information channel by student engineers. Also, the student engineers appear to have a preference for information channels that require least effort such as the Internet because of its speed and availability of current information sources which feed their initial information need. For most of the engineering students, the Internet is identified as the first information source they explore. However, some of the students who identified the Internet as best source of information for their project also considered it the worst because of information overload and they are not sure how reliable the information from the Internet is. This is an indication of the fact that they have poor information handling skills. However, some of the students did mention that they use print resources such as books, technical handbooks and journals as resources to validate the information retrieved from the Internet.

Barker, Cook and Whang (2006) determined which sources engineering students of the University of Washington College explored for their academic work and the possible reasons for their choice. The investigation was carried out with the hope to use the findings to better inform their library instruction efforts and the services provided at the University of Washington Engineering Library. A pilot study was carried out with a sample of students using an online survey which was then approved by the University of Washington Human Subjects Review Committee. An invitation to take the survey was sent by email to the University of Washington College of Engineering's student listserv in the Spring Quarter of 2006. Findings revealed that engineering students seek to "minimize loss rather than maximize gain" when searching for information, and they value quick, easy to use and convenience over reliability when selecting information sources for their assignment or project. They also use fellow students as information sources; however, librarians and library collections are not frequently consulted. They use the Internet not because they think it is reliable but because it is quick and convenient.

In the PhD research of MohdSaad (2008) mentioned earlier, the information literacy and information seeking behaviour of students conducting final year projects at the Faculty of

Computer Science and Information Technology, University of Malaysia, Malaysia was investigated. Findings showed that the majority of the students use resources on the Internet. Other sources students consulted include past year project reports (81.9%), guidelines from lecturers (70.6%), books (69.4%), friends (62.5%) and other reports (50.3%). About 57.5% of the respondents conduct surveys and interviews to gather information from their respective sources, the students. Also, 98.1% use keyword search and 90.8% use subject search when browsing for information via search engines or databases.

Similarly, Kahlal (2011:15-16) also mentioned before discovered that engineering students of Royal Melbourne Institute of Technology, Australia, are more comfortable using information available on the Web as their primary tool of information gathering than other tools. The secondary tools are also available online (i.e. databases and library electronic resources), which indicate that students would rather collect information off a computer screen, than make the extra physical effort of seeking academic help by using library hard copy resources.

In 2011, Ejiwoye and Ayandare investigated the level of test anxiety and its impact on the information seeking habit of undergraduate students of the Federal University of Technology, Ondo State, Nigeria. Also determined was the information sources used by the undergraduates. A survey research design was adopted; a questionnaire, supplemented by an unstructured interview collected data from 125 students from first year to final year across the applied sciences faculty. Findings revealed that applied sciences students need everyday life information on sports and healthcare in addition to information for their academic work. However, erratic power supply impacted negatively on their use of the Internet and electronic resources, hence, the mostly consulted information resources by the students were textbooks, reference materials, lecture notes, newspapers and magazines. Also of concern is the fact that respondents complained of not having access to current and up-to-date information resources in the library.

Summary

Like students in other disciplines, applied science students consult the Internet as their first port of call in information seeking, however, with some reservations. They find it easy,

convenient and versatile a source to meet their immediate information needs, however the reservation comes from the fact that they do not really trust the sources or see it as reliable enough, hence they tend to confirm the online information by consulting print sources. Some of the print sources they consult are textbooks, technical handbooks and manuals. with reliable specific protocols on how to go about their coursework, assignments and project.

There is a rather thin line between the information behaviour of applied science students and students in other disciplines in terms of information sources and channels they consult. This is because the literature reviewed expressly states that the students consult the Internet first in their seeking in addition to the use of search engines and databases. However in the case of applied science students, the studies did not specifically highlight the type of online databases they consult in terms of subject area. This would have explicated the specific information sources they consult to clearly highlight the difference.

Worth noting is the fact that applied science students heavily rely on experiences human sources due to the practical nature of their discipline. This is not really the case with the studies in humanities and social sciences where students are expected to explore current trends in socio-political issues and economics, among others.



Again, the problem of erratic power supply as a barrier to accessing the Internet comes up in the literature on the information behaviour of applied science students; also mentioned as a barrier is lack of up-to-date print materials in the library.

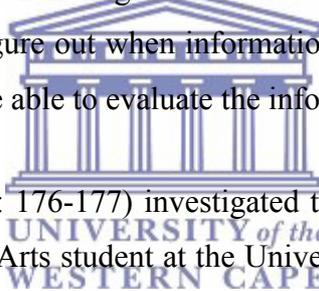
3.5 RESEARCH IN STUDENTS' INFORMATION LITERACY

Information literacy is a crucial skill in the technologically infused 21st century; it is recognized in the global community and in Nigeria as a driving tool for progress and development in this era of globalization. Being a key graduate attribute, organizations expect that graduate recruits should know and understand how to handle information for optimum service delivery.

Students are expected to acquire information literacy skills while in the university. However, a number of research works have shown that there are shortcomings in students' information literacy skills. This section will answer the following questions:

- Do students bring in information literacy skills from secondary school into the university?
- What are the shortcomings of undergraduate students in information literacy?
 - Are they able to determine the extent of their information needs?
 - Are they able to access the needed information effectively and efficiently?
 - Are they able to evaluate information and its sources critically?
 - Are they able to use information effectively to accomplish a specific purpose?

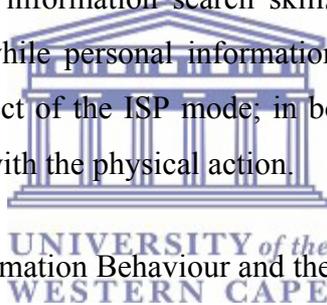
Kerins, *et al.* (2004) mentioned previously in their study of law and engineering students in three Irish Universities found that students who identify the Internet as the best source of information for their project also considered it the worst because of information overload and they are not sure of how reliable the information from the Internet is. Students tend to display poor judgment in their choice of electronic resources. This is an indication of the fact that, they have poor information handling skills. One of the attributes of an information literate student is to be able to figure out when information is needed, know the right source to seek information and as well be able to evaluate the information sources available.



In her PhD research, King (2007: 176-177) investigated the information literacy level of an average incoming undergraduate Arts student at the University of the Western Cape (UWC), the majority of whom were from South African historically disadvantaged black schools. A pen and paper questionnaire based on the Information Literacy Standard by the American Library Association to assess the information literacy level of incoming Arts students was designed by the Department of Library and Information Science, the University Library and the Digital Academic Learning Division. It was a three-year longitudinal study that involved 483 incoming students. Findings revealed an established trend that prior to admission into UWC, an average student is not information literate; is not computer literate, does not use email or the Internet, does not know how to use the library and has a poor reading habit. At pretest, the baseline information literacy level ranged from low to very low. According to King (2007: 75), the majority of South African universities' undergraduate students come from historically disadvantaged black schools. This applies to incoming undergraduate Arts students at the University of the Western Cape (UWC), their economic depravity impacts on their reading culture. Besides, the apparent low information literacy level carried over from

the secondary school may have been due to a lack of exposure to libraries in addition to poor information literacy education informed by a poor curriculum.

Gross and Latham (2008) conducted in-depth interviews with freshmen at Florida State University, USA, in order to explore their perceptions of what information literacy (IL) is, how information literacy is attained, and their self-views of their own information literacy knowledge base and skills set, and to compare these self-views to scores they earn on a standardized test of information literacy. The research hypothesis was derived from competency theory that people with low-level ability in a domain lack the meta-cognitive skills that would allow them to recognize and seek to address their own skill deficit (Gross, 2005); hence the query. Findings revealed that the undergraduates are not familiar with the term *information literacy*. Unfortunately, they feel constrained by imposed information seeking as against personal information seeking (Gross & Latham, 2008: 11-12). Such constraints may be due to poor information search skills which may reflect the negative affective aspect of ISP model while personal information seeking is easy and may likely reflect the positive affective aspect of the ISP mode; in both cases, there are corresponding cognitive dispositions which go with the physical action.



Also in 2008, the Centre for Information Behaviour and the Evaluation of Research (CIBER), University College London, reported the outcome of the research work commissioned by the British Library and Joint Information Systems Committee (JISC). The objective was to identify how the specialist researchers of the future are likely to access and interact with digital resources in five to ten years' time. A “virtual” longitudinal study from the literature together with some new primary data gathered from a study on how people actually use the British Library and JISC Web site were used for the study. It was discovered that students have poor information literacy skills: they have poor understanding of their information needs; search engines become the primary brand associated with the Internet; and prefer to use Google.

Williams (2010:12) summarises the findings of a number of market research studies that have been commissioned by Mimas (www.mimas.ac.uk), which is a nationally designated academic data centre based at The University of Manchester in the United Kingdom. The role of Mimas is to support the advancement of knowledge, and powering world-class

research and teaching. Mimas initiated market research in order to gain an understanding of their audience and to inform their work in the development of new functionality and tools through personalisation and aggregation, Web 2.0, and mobile technology. The investigations aimed at understanding how students and researchers interact with, search and conduct research using online resources involved a number of focus groups and interviews. Basically, respondents admitted to varied research skills but lack confidence in some; they have knowledge of relevant resources and they mostly use search engines by way of optimizing keywords search success. Also, many undergraduates and sometimes postgraduates do not possess adequate research skills; many fall back to the 'bad habit' of Googling everything and once they form the habit of relying on a particular source, they rarely change. Generally, findings revealed low levels of information literacy amongst students at all levels, which validate the outcome of the CIBER Google Generation report of 2008. Therefore, one cannot agree more with Dahlstrom (2012: 5), who contends that technology training and skill development for students is more crucial than new, more, or "better" technology.

Also, MohdSaad's (2008) PhD work revealed that even though students know how to go about their final year project, over 80% of them need assistance in searching from electronic databases (73.6%), digitised information (67.9%) and the Internet (59.7%). The effective use of databases is part of information literacy. Therefore, the skill of getting the right information from the right source is crucial to the success of any research endeavour.

Kunakornsakul and Pinit (2012:291-298) investigated the IL skills of undergraduate students in Science and Technology and also identified the needed IL skills for improvement in the field of Science and Technology at King Mongkut's University of Technology, Thonburi in Thailand. Based on a survey undertaken by The Working Group on Library Instruction of the Subcommittee on Libraries of the Conference on Rectors and Principles of Quebec Universities (CREPUQ), an IL questionnaire was administered to 550 freshmen. Findings reveal that the IL literacy level of the students was low, similar to the outcome of King (2007) in the study of freshmen at the University of the Western Cape, South Africa. Students were found to be weak in five areas of research namely: concept identification; search strategy; documents types; search tools and use of results.

In Nigeria, studies by Baro and Fyneman (2009); Isa, Amusan and Umma (2009); Abubakar and Isyaku (2012); Adetimirin (2012); and Ukpebor and Emojoorho (2012) reveal that the information literacy levels of Nigerian undergraduates are insufficient, even though some students have acquired a certain level of information literacy, including technological skills as well as investigative and critical thinking.

Ukpebor and Emojoorho (2012:7) investigated the information literacy level of 100 first year students across five faculties at the University of Benin. The essence of the investigation was to understand the prior information literacy knowledge of the first year students, something which has broad implications for how librarians understand their readiness for library research as well as for the future development of information literacy programmes at the secondary school level. Again, similar to the studies of King (2007) and Kunakornsakul and Pinit (2012), Ukpebor and Emojoorho (2012:7) discovered that students at the University of Benin, Nigeria, do not bring skills from secondary school to the university that is commensurate with their current level of educational attainment.

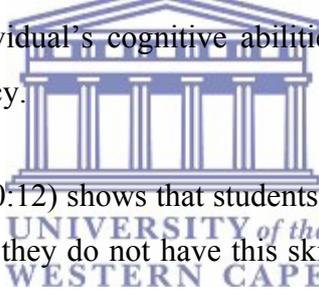
As mentioned in the previous chapter, the concept of information technology literacy is one of the skills embedded in the concept of information literacy which is the ability to use digital technologies such as the Web and the evolving Web 2.0 to function in the *hyper-connected* world of the 21st century. In a large study carried out by Adetimirin (2012:386) across seven Nigerian Universities on ICT literacy competencies of undergraduates across seven Nigerian universities. Findings reveal that undergraduates in federal universities are found to have average information technology literacy skills while it is low for those in state universities. Factors such as irregular power supply, inadequate ICT infrastructure and limited duration of the use of ICT are factors that affect the acquisition of skills, hence for students and lecturers alike, ICT should be an integral part of the teaching and learning experience.

Summary

Based on the outcome of the research works of King (2007) and Ukpebor and Emojoorho (2012) it is evident that, on a general note, students do not bring in information literacy skills from secondary school into the university, hence the university is first of all saddled with responsibility of training students on how to be information literate so that they can acquire

the lifelong skill to enable them appropriately key into the scheme of academics at this level. Although, how the universities handle the information literacy training is another issue on its own.

Generally, students are aware of their information needs, be it for academic purpose or everyday life as discussed in the previous section. Findings across settings reveal that students prefer to consult the Internet in order to meet their information needs, however, some are unable to do more than “googling” mentioned in this section and the previous one. Over-reliance on particular information sources or channels is not recommended, because this can limit access to information which can affect in no small measure students’ academic performance. Hence, one can safely mention that the majority of students are unable to effectively and efficiently access the information they need because of poor information handling skills. This can be likened to poor intellectual access to information as described by Burnett and Jaeger (2011:167-168) and Burnett, *et al.* (2008:168). Gaining intellectual access is primarily dependent on the individual’s cognitive abilities (Kuhlthau, 2004), which is the corner stone of information literacy.



Research work by Williams (2010:12) shows that students are unable to evaluate information and its sources critically because they do not have this skill, this issue is beyond technology skills, it is more of handling skills. Students tend to dart around when compiling information for academic work, hence, they download so much from the Internet that they get inundated and find this hard to trim information down to specifics hence this will go a long way to affect the essence of information seeking and gathering and by extension their academic performance.

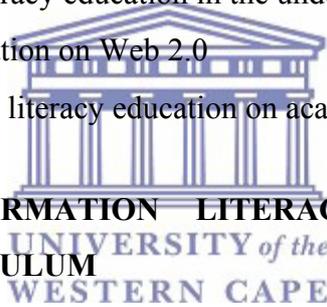
Peculiar to the studies in Nigeria are the threats of irregular power supply, inadequate ICT infrastructure and limited duration of the use of ICT as factors militating against the acquisition of digital literacy skills which is part of information literacy skills. In this era of globalization where the Internet is a fundamental information source, the knowledge of how to use the computer and the Internet are very crucial and such knowledge can easily be acquired where there are facilities to aid such endeavours.

3.6 INFORMATION LITERACY EDUCATION

Since the late 1980s, information literacy has formed an important part of the literature of university libraries, especially in the United States and Australia and more recently in South Africa and Nigeria. Information literacy is a crucial skill in the technologically infused 21st century and it is recognized in the global community as a driving tool for progress and development in this era of globalization. Ideally, the teaching of information literacy should be an integral part of the curriculum of educational institutions (Owusu-Ansah, 2003: 219; Swartz, Carlisle & Uyeki, 2007: 109-122). When students are assisted in the acquisition of intellectual abilities, especially reasoning and critical thinking, it helps them to learn how to learn. This in turn provides the solid foundation for continuous learning and development of careers. This section is discussed under the following themes:

- Models of information literacy education in the undergraduate curriculum
- Information literacy education on Web 2.0
- The impact of information literacy education on academic performance

3.6.1 MODELS OF INFORMATION LITERACY EDUCATION IN THE UNDERGRADUATE CURRICULUM



Irrespective of the various information literacy initiatives, Information literacy standards and learning outcomes as spelt out by the American Library Association (ALA) 2000 discussed in the previous chapter serve as the framework for information literacy teaching and training across disciplines. The following are some of the models of information literacy education in the undergraduate curriculum:

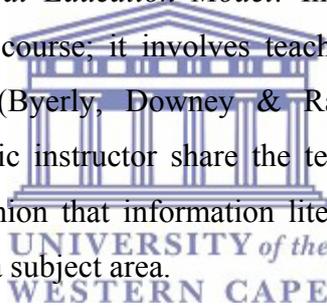
Entrance requirement model: This model requires incoming students to take information literacy test before their enrolment into the tertiary institution. Based on the outcome of the test, those who do not have the required information literacy skills are obliged to attend a remedial programme before their full enrolment for other courses (Curzon, 2004: 42- 43).

Introduction Model: The model can be a once off seminar or integrated sessions aimed at familiarizing students with the library, information resources, research skills and information technology. This model makes it possible to reach a large audience of students but the effort

might not be enough for the students to be grounded in information literacy skills (Curzon, 2004: 38), this is because it is targeted at the first year students. Meanwhile, information literacy competences of students increase over the years as they progress in their academics (Fitzgerald (2004: 22).

Information literacy Course: The traditional aim of information literacy course was to develop skilled users who are able to find and use information in the library. However, since the 1980s, these courses have been integrated into information literacy programmes. The curriculum and course content are adapted to various disciplines that student study (Curzon, 2004: 40). One key advantage of this model is that students graduate as information literate individuals because the courses are credit bearing which encourages active and participatory learning.

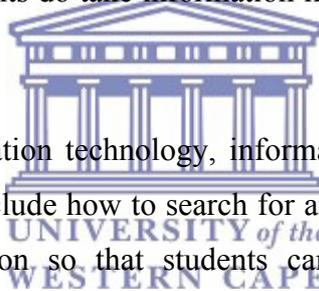
Integrated Curriculum or General Education Model: In this model, information literacy training is part of an academic course; it involves teaching research skills for a specific assignment or research work (Byerly, Downey & Ramin, 2006: 589). Usually, the information literacy and academic instructor share the teaching responsibility. Baker and Curry (2004: 96) are of the opinion that information literacy skills are best learned when embedded in the learning within a subject area.



Learning outcomes model: The success of this model requires all lecturers to have the understanding of information literacy, how it is taught and what it entails because they do the teaching; besides, both students and lecturers are supposed to be in the know of what outcomes are expected and at what levels (Curzon, 2004: 39).

Demonstration of mastery model: In this model, it is compulsory for students to demonstrate that they have mastered information literacy skills by passing the information literacy test despite the fact that the test is not credit bearing, they will also not graduate without passing the test. It is usually a Web-based test that gives quick feedback to the students and the institution alike and students have ample opportunity to retake the test until they pass. Curzon (2004: 40) is of the opinion that the skills level attained using this model may not be very advanced.

Whatever the models in use in any institution, collaboration and partnerships between the Librarians/information literacy teachers and faculty members is crucial (Sun, 2002: 216) to the success of such laudable initiatives. Abubakar and Isyaku (2012:3) support this by asserting that the success of information literacy education depends on collaboration between classroom faculty, academic administrators, librarians and other information professionals; the authors observed that at the University of Ilorin, Nigeria, the information literacy education mainly involves librarians without partnership with the faculty members, and the inadequate teaching aids worsens the situation. The same applies to Ambrose Alli University, Nigeria, where the Researcher works; however, information literacy course is specifically taught to the Library and Information Science students by the Lecturers in the Department, and this does not involve students from other departments. However, the use of library course is the only course that involves all the first year students across the university and it is only a once off/semester. The case is different with the University of the Western Cape, South Africa, where all the students do take information literacy course that goes beyond the use of library at the entry level.



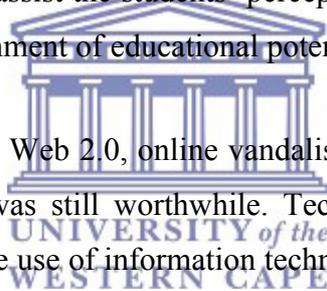
With the global trend in information technology, information literacy education should go beyond the use of library, and include how to search for and gather electronic resources, and also how to evaluate information so that students can on their own find appropriate information to meet their information needs. This enables them to be independent in their thinking and learning.

3.6.2 INFORMATION LITERACY EDUCATION ON WEB 2.0

As Web 2.0 tools assist in reflection, visual approaches, sharing convenience, content creation and critical thinking, it offers an effective platform for information literacy teachers to organize and manage course content and materials, to enhance collaboration and interaction, and this helps students develop information literacy skills and concepts.

In the study by Luo (2010:37) earlier mentioned, findings reveal that Librarians surveyed the adoption of Web 2.0 tools in teaching information literacy and this manifested in three-level hierarchy: At the first level, 4% of Librarians only use Web 2.0 tools for personal purposes; at the second level, 84% of Librarians use Web 2.0 tools to facilitate content delivery to

students by way of publishing contents for students' access or to aid students to complete some task or facilitate interaction; at the third level, 38% of the Librarians use certain features of Web 2.0 technology to better illustrate some information literacy concepts. The librarians use blogs and wikis to publish lesson plans, course guidelines, content reviews and other course documents. YouTube is used to create videos or to use existing YouTube videos. Students create blogs to submit assignments and also interact with each other via blog comments, they also use wikis collaboratively to develop group projects and also use social bookmarking tools to collaboratively identify and organize relevant online resources for group work. The tagging feature of social bookmarking tools is quite helpful in illustrating the concept of controlled vocabulary, while the read/write feature of Web 2.0 (for example, the communal editing feature of wikis) demonstrates the importance of information evaluation. The feature of the Web 2.0 tools can also be used to explain the issue of copyright; these are information literacy concepts incorporated in Web 2.0 for teaching and learning. All these activities assist the students' perception of Web 2.0 from a social and entertainment venue to an environment of educational potential.



Although technical challenges on Web 2.0, online vandalism and inadequate skill on how to use Web 2.0 are expressed, it was still worthwhile. Technical challenges are part of the learning curves for adapting to the use of information technology. Working on some Web 2.0 tools require the knowledge of the rules that must be followed. For example, wiki has its own unique formatting rules that must be followed. Also, wiki is quite open to student editing and also easy to share but due to its communal editing feature, it can be easily vandalized by ill-minded people. Computer literacy and Web 2.0 literacy are two different skills, though the former aids the latter. Besides having both skills, the intellectual ability to effectively use Web 2.0 platform cannot be downplayed. Even for the students who are good at using the technology, King (2011:24) did advise that educating the students to develop cognitive skills and fostering other essential competencies for the individual learner's effective use of Web 2.0 is important.

As the landscape of Web 2.0 is constantly evolving, it is crucial for information literacy teachers to be up-to-date with the trends and be able to identify the tools that are used in teaching information literacy.

3.6.3 THE IMPACT OF INFORMATION LITERACY EDUCATION ON ACADEMIC PERFORMANCE

According to Williams and Wavell (2001: 69), information literacy, particularly library usage can impact positively on information handling skills, learning and academic achievement. In support of this claim, Gratch-Lindauer (2005: 715) asserts that students who are frequent library users reflect a studious work ethic and engage in academically challenging tasks that require higher-order thinking.

In the PhD research work of King earlier mentioned, the baseline information literacy level of an average incoming undergraduate Arts student at the University of the Western Cape range from low to very low, however, after teaching Library Science 121 (Information Literacy Course). When a post test was conducted the result show a clear indication of its positive impact on the information literacy level of the students, the average information literacy score had risen to 75.556 out of a perfect score of 120 (King, 2007:176-177). Hence, results are used to produce benchmarks for assessing information literacy at the university.

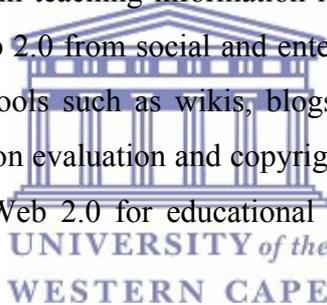
Also, in MohdSaad's (2008) PhD work earlier mentioned, the context of the study was the information behaviour as indicated within the Information Literacy Framework developed based on the Information Literacy Standards for Higher Education by the Association of College and Research Libraries and the Information Literacy Standards by the Council of University Librarians, Australia. Having taken courses in Computer Science, IT and Information skills, students were computer and Internet literate. Right from the moment they choose their final year project topic, the students are ware of their information needs and the use of the Internet assisted them to understand the scope of their work. The students know the criteria for measuring reliability, validity, up-to-dateness and biasness of the information they gathered.

The impact of information literacy on academic performance cannot be over-emphasised. It goes beyond affording students the opportunity for academic excellence but also equips them for life-long learning.

Summary

Entrance requirement, introduction, information literacy course, integrated curriculum or general education, learning outcomes model, and demonstration of mastery models of information literacy are discussed. Whatever model is to be employed by an institution, it is important to ensure that it best suits the target group, and collaboration is a necessity among the stakeholders and partnerships between stakeholders, for instance, the Librarians/information literacy teachers and faculty members. Also, with the world being a global village rapidly infused with information and communication technology, information literacy education should include how to search and gather electronic resources in addition to how to evaluate information for ultimate use.

The study by Luo (2012) has established the fact that when Web 2.0 tools such as wikis, blogs and YouTube are adopted in teaching information literacy it positively influences the perception of students about Web 2.0 from social and entertaining tools to tools of immense educational potential. Web 2.0 tools such as wikis, blogs and YouTube assist in teaching some basic concepts of information evaluation and copyright issues. However, students need to be educated on how to use Web 2.0 for educational purposes due to some formatting technicalities involves.



The PhD research works of King (2007) and MohdSaad's (2008) in South Africa and Malaysia respectively reveal that information literacy education enhances students' information handling skills and academic achievement.

3.7 RESEARCH WITHIN KUHLTHAU'S INFORMATION SEEKING PROCESS

MODEL

The Information Search Process (ISP) model which presents information behavior as a process of gradual understanding and refinement of a problem area (Kuhlthau, 1994) is a result of more than two decades of empirical research by Professor Carol Kuhlthau, of Rutgers University as mentioned in the previous chapter.

In Kuhlthau's first study, she investigated whether users do have common experiences in the process of information seeking that can be articulated and described and whether users'

experiences resemble the phases in the process of construction. A questionnaire was administered to determine perceptions on a 5- Likert scale. She attempted to develop stages along with six categories for each stage: - task, thoughts, feelings, actions, strategies, and mood (Kuhlthau, 2004:36).

- Task Initiation: students expressed feelings of uncertainty
- Topic Selection: uncertainty eased to a degree
- Pre-focus Exploration: could be most difficult stage if there is no focus
- Focus Formulation: for many, this is the turning point in their research effort
- Information Collection: renewed confidence
- Search Closure: begin writing

Major findings of the first study are that patterns experienced by students match those described in the process of construction and the information seeking process model developed. However, the problems with the study is that the initial group is small and not diverse; there is conflict between students understanding of the task versus actual experiences; and students do not perceive librarians as more than locators of resources.

In her second study, there was a large-scale and a more diverse group (low, middle, and high-achieving students). The study was a mix method of qualitative and quantitative and a longitudinal piece that used process surveys conceptual maps and perception surveys questionnaire.

The model of information search process is verified in her second study. Findings reveal that learning begin with vague thoughts, low confidence and progress to clarification and increased confidence. She discovered that there is a correlation found between an increase in confidence and teacher assessments of learning occurring and that information search process has more impact on learning than the quantity of resources.

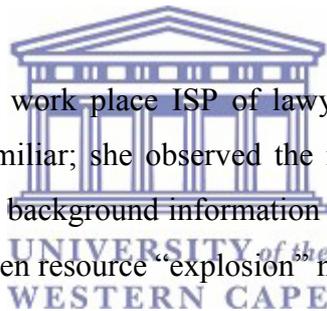
Kuhlthau also examined users at academic, public and school libraries. Public library users are more confident at the initiation stage while college students show more confidence at closure than high school students. The high significance is the further confirmation of the information search process in other settings, such as in the academic and public settings. The

study reveal that uncertainty and lack of confidence occur before a research focus was developed and there were implications for mediation. However, she needed to gather data from more diverse groups including the low-achieving students who were absent when she gathered her initial data.

Kuhlthau's longitudinal research work looked at small group of college students (her former high school students) to determine the ISP at the college level. Through quantitative and qualitative research methods, again, she verified the ISP model. She discovered that over time, students change their research process expectations to meaning-making processes.

From these results, Kuhlthau developed the principle of uncertainty and the concept of zones of intervention for services and systems, based on Lev Vygotsky's work (1978). This was consolidated in her book titled *seeking meaning: a process approach to library and information services* (1993).

Kuhlthau's other studies include work place ISP of lawyers in which she discovered that information search process is familiar; she observed the need for information providers to locate and communicate complex background information at project initiation. Librarians are also helpful at initiation point, when resource "explosion" may be overwhelming.



Furthermore, a study conducted by the research team of the Rutgers Centre for International Scholarship in School Libraries in 2003-2005 led by Ross Todd, Carol Kuhlthau and Jannica Heinström provided an ample opportunity to revisit the model and investigate the validity of the model in the current information environment. The investigation involved 574 students in Grades 6 to 12 in ten New Jersey public schools where school librarians and classroom teachers implemented collaborative instructional units of work to engage students in meaningful research on selected curriculum topics. The pedagogical framework for the instruction was informed by guided enquiry based on the stages of ISP model (Kuhlthau 2004).

Among others, the study examined the extent to which the information search process model is useful in understanding the interactions between knowledge construction and feelings in information seeking. The primary objective of the study was to develop a data collection framework that aid classroom teachers and school librarians in charting the information-to-

knowledge development of students as regards a topic in the curriculum (Todd, 2006). In the research process, data were collected at three points: initiation of the research task, midpoint and completion of the project. Students' knowledge development was measured in terms of substance of knowledge, structure of knowledge, amount of knowledge, extent of knowledge and title of knowledge. Findings highlight the significance of Kuhlthau's Focus-Formulation stage of the *information search process*, and the need to be careful in choosing instructional interventions to enable students to develop knowledge in rich and complex ways (Todd, 2006). Nine feelings are tracked through the three points of data collection. The feelings were: confidence, disappointment, relief, frustration, confusion, optimism, uncertainty, satisfaction and anxiety (Kuhlthau, Heinström and Todd, 2008). The findings of this study support earlier findings. It is obvious that students have the tendency to conceptualize information as something easily and readily available and feel frustrated when the process did not turn out as expected, similar to the findings of Holliday and Li (2004).

Based on the outcome of her ground breaking research, Kuhlthau's work has informed many information search process studies, both in education and in the work force, performed since the 1990s (Jiao and Onwuegbuzie 1997; Onwuegbuzie 1997; Yang 1997; ; Onwuegbuzie and Jiao 1998, 2004; Wang and Soergel 1998; Heinstrom 1999, 2002; Bilal 2000, 2001, 2002; Bilal and Kirby 2002; Serola and Vakkari 2005; George *et al.* 2006; King 2007).

A number of studies are in support of information seeking as a process of knowledge construction with different cognitive and affective stages (Yang 1997; Wang and Soergel 1998; Serola and Vakkari 2005; George *et al.* 2006). The ISP model emphasizes the interrelationship of cognitive, affective and physical perspectives of information seeking and how the search process often causes uncertainty and anxiety. Also confirmed by several studies is the issue of interplay between cognitive, affective and behavioural factors in information seeking (Jiao and Onwuegbuzie 1997; Onwuegbuzie 1997; Onwuegbuzie and Jiao 1998; 2004; Wang and Soergel 1998; Bilal 2000; 2001; 2002; Bilal and Kirby 2002; Heinstrom 2002; George *et al.* 2006).

In Nkomo's research work earlier mentioned in which Web information seeking behaviour of students and staff at the University of Zululand and the Durban University of Technology, South Africa was investigated, Kuhlthau's Information Seeking Process (ISP) was employed

as a framework to examine how students and staff formulate their search strategy. Findings show no established consistent pattern; neither did the undergraduates critically analyse their queries nor formulate search strategies, but rather they resort to the use of keywords on search engines until they are satisfied (Nkomo, 2009: 113). However, the researcher did not report the affective that accompanied the formulation stage.

Recently, Kahlal (2011) in his study of the information seeking behaviour of undergraduates in their academic environments, with focus on the impacts of technological advancements on students' capacities employed the ISP framework. Findings reveal that students felt a lot of stress in addition to lack of confidence when it dawned on them that they lacked the requisite knowledge to attend to a task. However, when the initial search began, relief and confidence started to return but got overwhelmed when they seem to experience information overload. This study confirms the cognitive and affective stages on the model.

Kuhlthau's ISP model has been used to structure education programmes. For example, Kuhlthau's model is one of the models in use at the University of the Western Cape, South Africa, to develop an active learning information literacy spiral emphasizing cognitive thinking skills in Library Science 121 (Information Literacy Course). In their appraisal of the model in 2008, Kuhlthau, Heinström and Todd confirmed that the model has been very useful in structuring and enhancing education programmes, services and systems and this accords the model its credibility in the education world and its uniqueness amongst the information behaviour models. The researchers also reported that the model has been in use as a conceptual framework for developing a programme of inquiry-based learning at the Centre for International Scholarship in School Libraries (CISSL), Rutgers University, USA, (Kuhlthau, Heinström and Todd (2008). The model is employed as an instrument for teachers and school librarians to recognize critical moments when instructional interventions are necessary in students' information-to-knowledge experiences. The model assists students in no little way to get deeply involved in extensive exploration of thoughts and ideas before coming up with their own understanding of their topics and making presentations rather than just gathering information to please their teachers.

3.7.1 THE INFORMATION SEARCH PROCESS (ISP) ON THE WEB AND WEB 2.0

One question relevant to the study of information behaviour of Nigerian students is about their experience of online sources. In some contexts, first year undergraduates might be assumed to be *digital natives* (Tapscott, 1999), part of the Net Generation - the first generation to grow up in a global environment that was already connected before they were born. According to Prensky (2001:2), they are '*native speakers* of the digital language of computers, video games and the Internet.' Digital natives are used to quick information delivery, they prefer graphics to text (Long, 2005:188) and multitask; while digital *immigrants* generally have less experience with technology (Gaston, 2006:12). Digital immigrants use the Internet and World Wide Web as the last resort when browsing for information and will print emails instead of read online (Prensky, 2001:3).

Ongoing research reveals that the ISP model is a valid theoretical framework for the study of information behaviour irrespective of the information environment, whether print or online media. Broch (2000) emphasizes that the search challenges elucidated by the model may be more serious when searching the Web while Branch (2003) confirms that students experience the phases of the ISP even on the Web; for example, they experience confusion and frustration when they come across barriers in their search while. In the Web 2.0 world, the affective stages of the model may be more eminent because of the read and write feature of the Web 2.0 platforms.

In her recent research work, Kuhlthau 2012a (17-18) stressed the importance of technological tools as part of everyday life across the globe and that of Web 2.0 which helps to interact, connect and collaborate. These tools make information instantaneous due to real time access to information. However she alerts on the danger as everyone has a voice and access. Her concern is about the accuracy and reliability of information being communicated which is a product of information literacy. Therefore, Kuhlthau's ISP model is relevant even on Web 2.0.

3.8 CONCLUSION

This session reviewed literature on information behaviour of undergraduates on the World Wide Web and in the world of Web 2.0. It covered research in Nigeria, South Africa and

other African countries, as well as across the globe. It explored the research in the growing utilization of the Internet and Web 2.0 in the academic life of students and how it impacts on their information seeking behaviour.

First of all, the research methodologies employed in data gathering in the literature reviewed on information behaviour of undergraduates across the globe shows that almost in all cases, a combination of both quantitative and qualitative research methods were employed. The quantitative method used was largely survey while the qualitative method was in some cases, diary taking over a couple of weeks, interviews (semi-structured or face-to-face) or focused group discussion. In cases of research works undertaken by large research organizations in the UK and USA, mixed methods were also employed but the studies were longitudinal to enable them establish a trend over a period, as most, if not all the research were geared to understanding the patterns and common trends in the information behaviour of undergraduates in this era of high technology.

As the emergence of Web 2.0 technologies have provided new opportunities for creating and sharing content and interacting with others, thereby reducing the boundaries between formal and informal learning, the effective use of Web 2.0 is now considered a required competence for the contemporary world, and a lifelong set of skills is required. The review of literature shows that research works on the information behaviour of undergraduates on the Web across the globe abound, but that of information behaviour on the Web 2.0 appears scarce, especially in Nigeria. The evaluation of research works on the information behaviour of undergraduates across the globe reveals the established trend of students consulting the Internet first to meet their information needs, be it in their academics or everyday life information seeking.

Literature available from Australia, USA and South Africa on the information behaviour of undergraduates on Web 2.0 reveals that students prefer to use Web 2.0 in social networking and not necessarily for their academic work. Also important is the fact that students preferred portable devices based on their ease of use and other conveniences. In the case where the Web 2.0 has been incorporated in their learning, it was obvious that students appreciated the potentials of Web 2.0 in teaching and learning, however, there is need for students to enhance their skills for effective use of Web 2.0 platforms.

Information behaviour of applied science students revealed that their choice of information source is based primarily on quick and easy access, hence, they choose to consult the Internet mostly, not necessarily because they find it reliable but because it is quick and easy. Some of the students did mention that they use print resources such as books, technical handbooks and journals to validate the information retrieved from the Internet.

Across literature, there was an established trend of poor information literacy skills among undergraduates; however, it was clear that with appropriate training and intervention, students can indeed learn how to learn as a lifelong skill which cannot be overemphasised in the technologically infused environment of the 21st century.

Several research works have established the relevance of Kuhlthau's ISP model in the study of information behaviour irrespective of the context, whether print or online media. It is also very relevant on Web 2.0; in fact, the affective stages of the model may be more emphasised based on the read and write feature of the platforms which demands some measure of information literacy skill. The ISP model has been used to structure some education programmes due to its validity and usefulness in the process of knowledge construction.

Lastly, the review of literature from Nigeria shows that undergraduates do consult the Web in order to meet their information needs either for their academic work or for everyday life concerns but have poor information literacy skills. However, irregular power supply and inadequate ICT facilities are issues of concern in the acquisition of information technology literacy skills of undergraduates. It is crucial to investigate the information behavior of undergraduates at the Federal University of Petroleum Resources, Effurun, Nigeria, a specialized university and the only one of its kind in Africa. It was established in 2007, primarily to meet the huge demands of Nigeria's largest industry, the petroleum industry. Therefore, the specialized university holds a strategic position in national development. More so, as Nigeria is aspiring to be one of the largest 20 economies in the world by the year 2020, the undergraduates of the specialised university are expected to be up-to-date in technological advancement, information literate and well prepared for the work place. Besides, it appears no research work has been done specifically on the information behaviour of undergraduates of the specialized university in the world of Web 2.0.

CHAPTER FOUR

RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

The chapter discusses the research design and methodology of the research on the information behaviour of undergraduates in the world of Web 2.0. The questions the study sought to answer were explored through a case study of the information behaviour of undergraduates in a *specialized* university in Nigeria, FUPRE. The mixed method case study uses both quantitative and qualitative approaches and has three phases:

Phase one: Quantitative questionnaire survey of undergraduates

Phase two: Unstructured Interviews (face to face, telephone and written) with the University Librarian, e-Librarians, ICT staff and Lecturers, observation; examination of policy documents and the University Website.

Phase three: Qualitative investigation of selected group of students, including large group discussions, analysis of assignment questions and answers, and journal keeping on WhatsApp and Facebook.

Phases one and two were done concurrently, except the interview with the University Librarian which was conducted first, based on the appointment given.

The research objectives discussed in Chapter one gave rise to the following questions which were developed against the theoretical background of Kuhlthau ISP Model discussed in chapter two.

- 1) What are the information needs of Nigerian undergraduates in terms of their academic work and everyday life?
- 2) What are the information resources and infrastructure available to undergraduates?
 - a. What access to the Internet and the social media do students have off and on campus?

- b. What personal electronic devices do undergraduates have and use?
 - c. What online electronic resources such as full text databases are available via the library and other information centres?
 - d. What information literacy education is available to undergraduates?
- 3) What are the information seeking processes of Nigerian undergraduates?
- a. How do they go about defining and articulating their information needs?
 - b. How do they identify, evaluate and select likely information sources?
 - c. What techniques do they use to search for relevant information in the identified information sources?
 - d. How do they explore a problem and thereby formulate and deepen a focus?
 - e. How do they engage with and analyse the information in their sources?
 - f. How do they synthesise information from various sources ?
 - g. Are they able to articulate, organise, synthesise for onward presentation or communication?
 - h. On completion of an assignment, do they reflect on and assess and adjust their information behaviours?
 - i. Are they aware of the ethical, legal and social issues surrounding the use of information and ICTs, either as an individual or as a member of a group?
- 4) What are the barriers that undergraduates experience in their information seeking?

4.2 CASE STUDY

A case study is the ideal research methodology employed when a holistic and in-depth investigation is required (Feagin, Orum & Sjoberg, 1991); this implies a thorough investigation into the parts that intimately interconnect with the whole. A holistic study implies the recognition of the importance of context. A case study tells a detailed story about individuals, institutions, events, programmes, organizations and phenomena (Neale, Thapa, & Boyce, 2006:3). Thomas (2011:513) defines case studies as “analyses of persons, events, decisions, periods, projects, policies, institutions, or other systems that are studied holistically by one or more methods”. Sources of data in a case study may include questionnaires, documents, archival records, interviews, direct observation, participant observation and

physical artefacts. The project is a case study of the information behaviour of undergraduates at FUPRE, Effurun, Delta State – an oil and agricultural producing state situated in the South-South geo-political zone of Nigeria.

4.2.1 CASE SITE

The case site for the research is FUPRE. As mentioned in Chapter one, the university is the only one of its type in Nigeria and Africa. It was established and approved at the Federal Executive Council meeting of 14 March, 2007, in order to meet the human resources needs of the oil and gas sector. The mission of the university is to design, develop and deliver cutting edge education and training programmes for professionals in the industry and to engage in research, consultancy and development activities in all technical and managerial aspects of the oil and gas sector.

The University comprises two colleges; College of Science and College of Technology, and both colleges offer ten specialised degree courses both in College of Science and College of Technology as shown in Table 2.



Table 2: Courses offered in College of Science and College of Technology

College of Science	College of Technology
Chemistry and Industrial Chemistry	Chemical Engineering
Environmental Science	Electrical and Electronics
Geology and Geophysics	Engineering
Mathematics and Computer	Marine Engineering
Science	Mechanical Engineering
Physics	Petroleum Engineering

According to Newman (2006:224), a study population is a large pool of cases or elements from which the sample is drawn. It is a collection of individuals that constitute the main focus of the scientific query. During the 2013/2014 session, records available to the researcher showed that the study population of 789 registered students in College of Science and 875 registered students in College of Technology, made up the sum total of 1664 students

in the university. The degree courses offered in Colleges of Science and Technology are four and five years respectively.

In addition to the two colleges mentioned, the university has a Department of General and Entrepreneurial Studies that offer nine courses in liberal education through which students can develop and expand their awareness of the social, cultural and natural environments. These courses are taken by all the students in 100, 200 and 300 levels. The objective of the department is to train students to acquire relevant knowledge outside their respective field of specialisation for productive and healthy living, the promotion of peaceful coexistence; to develop competence in the use of English; and to prepare students for a post university life with opportunities for job competences and application of entrepreneurial skills.

The following are the nine compulsory courses offered by the Department of General and Entrepreneurial Studies:



Table 3: Compulsory courses offered by the Department of General and Entrepreneurial Studies

Courses	Level	No. of units
Communication in English (GSE 101)	100 level	3 units each
African culture and civilization (GSE 102)		
Government, the society and the economy (GSE 103)		
Use of library and study skills (GSE 104)		2 units
Basic communication in French		
Philosophy and logic (GSE 201)	200 level	3 units each
Peace and conflict resolution (GSE 202)		
Introduction to entrepreneurship (GSE 301)	300 level	3 units each
Contemporary health issues (GSE 302)		

Upon admission into the specialised university, freshmen are taken through orientation programmes during which key principal staff address the students, including the University Librarian. There is a guided tour of the library and information centre.

The Use of Library and Study Skills taken by all 100 level students is taught by professional librarians with a Master's Degree. The course covers the history of libraries, library and education, university libraries and other types of libraries; study skills (reference services), types of materials, using library resources including e-learning, e-materials etc; understanding library catalogues and classification; copyrights and its implications, database resources, bibliographic citations and references.

The Library has 40 staff members; nine professional librarians with a Master's Degree (except for two who graduated with a very good class of degree at bachelor level), 16 higher library officers with bachelors degrees, and 10 library assistants with either a diploma or secondary school leaving certificate and four executive officers posted to the library from the university registry.

The entire campus is on Wi-Fi. At the time of data gathering the library had 25 computers.

There is attention on the university library because the library is a learning laboratory for both students and academic staff, and a centre for information literacy education. As mentioned in Chapter two, information literacy skills is a crucial graduate attribute in the 21st century and the library is the anchor for such training and education.

The study assumes that due to the high importance of the university and the role it is established to play in national development, in converse relation to Nigeria's Vision 20:2020, it should have good ICT infrastructure to create an ideal learning environment for students. To the best of the researcher's knowledge, based on review of literature and enquiry from the university library, there are no records of the information behaviour of the undergraduates in this unique and specialized university established primarily to provide manpower to the nation's largest industry.

4.3 MIXED METHODS

Mixed methods is the approach to this study. It is identified as the pragmatist approach to research which combines both quantitative and qualitative research methods (Flick 2009: 32; Neuman, 2006: 149-150). The essence of mixed methods research is to address a given research problem from any pertinent angle, by using more than one investigative outlook. It

offers in-depth, context dependent and natural insights to a problem, but is rather time consuming. Mixed methods is a comprehensive approach, more comprehensive than addressing a problem from only one point of view.

The primary rationale for the mixed methods approach is that the quantitative data and their analysis provide an in-depth understanding of the research problem. Creswell (2003) is of the view that qualitative data and their analysis refine and provide possible explanations on those statistical results by investigating participants' views in more depth.

There are quite a number of discussions on the reasons for mixing methods; Bryman (2006: 105-107) provides sixteen reasons to validate mixed methods:

Triangulation or greater validity refers to the traditional view that quantitative and qualitative research might be combined to triangulate findings in order that they may be mutually corroborated.

Offset refers to the suggestion that the research methods associated with both quantitative and qualitative research have their own strengths and weaknesses so that combining them allows the researcher to offset their weaknesses to draw on the strengths of both.

Completeness refers to the notion that the researcher can bring together a more comprehensive account of the area of inquiry in which he or she is interested if both quantitative and qualitative research are employed.

Process refers to when quantitative research provides an account of structures in social life but qualitative research provides sense of process.

Different research questions refers to the argument that quantitative and qualitative research can each answer different research questions.

Explanation refers to when one is used to help explain findings generated by the other.

Unexpected results refers to the suggestion that quantitative and qualitative research can be fruitfully combined when one generates surprising results that can be understood by employing the other.

Instrument development refers to contexts in which qualitative research is employed to develop questionnaire and scale items—for example, so that better wording or more comprehensive closed answers can be generated.

Sampling refers to situations in which one approach is used to facilitate the sampling of respondents or cases.

Credibility refers to suggestions that employing both approaches enhances the integrity of findings.

Context refers to cases in which the combination is rationalized in terms of qualitative research providing contextual understanding coupled with either generalizable, externally valid findings or broad relationships among variables uncovered through a survey.

Illustration refers to the use of qualitative data to illustrate quantitative findings, often referred to as putting “meat on the bones” of “dry” quantitative findings.

Utility or improving the usefulness of findings refers to a suggestion, which is more likely to be prominent among articles with an applied focus, that combining the two approaches will be more useful to practitioners and others.

Confirm and discover refers to using qualitative data to generate hypotheses and using quantitative research to test them within a single project.

Diversity of views includes two slightly different rationales—namely, combining researchers’ and participants’ perspectives through quantitative and qualitative research respectively and uncovering relationships between variables through quantitative research while also revealing meanings among research participants through qualitative research.

Enhancement or building upon quantitative and qualitative findings entails a reference to making more of or augmenting either quantitative or qualitative findings by gathering data using a qualitative or quantitative research approach.

In the current study, both quantitative and qualitative research techniques are combined. The extent to which the aforementioned sixteen reasons for mixing methods will be fulfilled unfolds in Chapter seven where all data is converged.

Creswell and Clark (2007) proposed four major types of mixed methods designs: (1) triangulation (i.e., merge qualitative and quantitative data to understand a research problem); (2) embedded (i.e., use either qualitative or quantitative data to answer a research question within a largely quantitative or qualitative study); (3) explanatory (i.e., use qualitative data to help explain or elaborate quantitative results); and (4) exploratory (i.e., collect quantitative data to test and explain a relationship found in qualitative data).

This research work adopted the triangulated method by merging qualitative and quantitative data to understand a research problem. Table 4 shows the mixed methods approach to the study, that is, the research questions and the blend of quantitative and qualitative data gathering techniques employed.

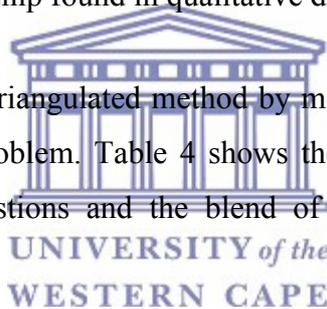


Table 4: Mixed method approach to the study

RESEARCH PROBLEM	RESEARCH QUESTIONS	DATA-GATHERING METHODS
<p>The investigation of the information behaviour of Nigerian undergraduates with particular focus on Web 2.0.</p> <p>Theoretical Framework Kuhlthau's Information Seeking Process (2004)</p>	<p>What are the information needs of Nigerian undergraduates?</p>	<p>Quantitative Survey (Phase one): a sample of the 808 undergraduates.</p> <p>Literature on past research work on information behaviour of undergraduates</p> <p>Qualitative research (Phase three): Two Large Group Discussions (LGDs) with undergraduates.</p>
	<p>What are the information resources and infrastructure available to undergraduates?</p>	<p>Quantitative Survey (Phase one): a sample of the 808 undergraduates.</p> <p>Qualitative Research (Phase two): Face-to-face and telephone interviews with the University Librarian, face-to-face interviews with two librarians in the e-library and the Head of Web Section of ICT Unit, and twelve written interviews with lecturers and teaching librarians.</p> <p>Qualitative Research (Phase three): Two Large Group Discussions (LGDs) with undergraduates., journals and assignments.</p>
	<p>What are the information seeking processes of Nigerian undergraduates in terms of Kuhlthau's ISP model and the ACRL information handling competencies?</p>	<p>Quantitative Survey (Phase one): a sample of the 808 undergraduates.</p> <p>Qualitative Research (Phase two): Twelve written interviews with lecturers and teaching librarians.</p> <p>Qualitative Method (Phase three): Journals and analysis of three assignment questions and answers.</p>
	<p>What are the barriers that undergraduates experience in their information seeking?</p>	<p>Quantitative Survey (Phase one): a sample of the 808 undergraduates.</p> <p>Literature on past research work on information behaviour of undergraduates</p> <p>Qualitative research (Phase three): Two Large Group Discussions (LGDs) with undergraduates.</p>

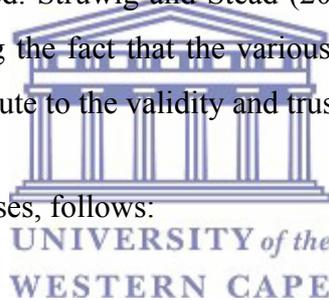
The mixed methods approach to research seems to have more strengths than weaknesses. As an example, the survey explored the information literacy level of undergraduates by asking questions about the criteria they used in determining the reliability of information, and also how they feel at various stages in their assignment writing. However, the analysis of assignments, journals, and large group discussions complements, corroborates and completes the quantitative data. However, the key challenge of mixed methods is that it is time-

consuming and a complex process of data gathering as experienced in the current study.

4.4 THE THREE PHASES OF THE RESEARCH

The case study employs quantitative and qualitative research methods, by way of triangulation of methods. Denzin (1978: 291) defines triangulation as “the combination of methodologies in the study of the same phenomenon”; the phenomenon in this case being information behaviour. Todd (1979:603) advocates triangulation by reiterating the fact that “it rests on the premise that the weaknesses in each single method will be compensated by the counter-balancing strengths of another”; and that the use of multiple methods “may also uncover some unique variance which otherwise may have been neglected by single methods”. In this sense, qualitative methods in particular can play an especially significant role by elucidating data and suggesting conclusions to which other methods would be blind; elements of the context are also illuminated. Struwig and Stead (2001: 19) agree with Denzin (1978) and Todd (1979) by emphasizing the fact that the various data gathering methods, with the triangulation across them, contribute to the validity and trustworthiness of a study.

The research work is in three phases, follows:



4.4.1 PHASE ONE

The first phase of the case study involved quantitative survey research, which is widely used as an empirical investigation of social phenomena (Given, 2008). It gathers numerical data which can be used to generalize across groups of research participants. This implies the need for sampling.

Stratified sampling

Sampling is the process of choosing from the population the subjects that will be included in the research investigation in order to allow for a fair generalization of results to the whole population (Struwig & Stead 2001:113; Trochim 2001: 412). Sampling is used in survey research because it is expensive in terms of cost and time to study a whole population.

A *stratified* sampling method was used to determine the sample in the study. The strata were the 100 and 300 levels of both colleges because students within each college might well have different information behaviours – perhaps following the norms of their college’s disciplines. Hence focusing on these levels would highlight any differences in behaviour that might have evolved in the course of their university studies.

Research textbooks provide guidelines and tables on appropriate sample sizes for different population sizes in order to achieve accuracy and reliability. The smaller the population, the larger the sample has to be. Neuman (2006: 242) suggests that for a population of 1000, the sample should be 543 or 54.3%, and, for a population of 200, 71 responses are required.

Table 5: Student population in colleges of science and technology

Serial No.	College of Science	College of Technology	Total
First year	201	206	407
Third year	176	220	396
Total	377	426	803



The total population of the first and third year students in both colleges is 803 as indicated in Table 5. The number is relatively low and a high response rate is crucial. Hence the researcher targeted the entire population of students in 100 and 300 levels in both colleges.

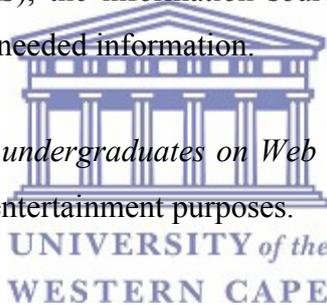
Questionnaire survey

In the first phase, the researcher employed the use of a structured questionnaire as a research instrument to elicit responses from the entire first and third year undergraduates of the Colleges of Science and of Technology. The questions were a variety of modified open-ended, close-ended, Likert scale and differential scale, each with a different purpose. They covered the following themes:

- *Demographic information:* This section covered general questions about their age, gender, level of study, college of study, course of study and college. The answers to

the questions might be useful in understanding the impact of the variables on their information behaviour.

- *General academic information seeking behaviour:* Questions were asked about how they felt when given and undertaking an assignment, how and where they access the Internet, ownership of personal devices, the challenges they experience with using electronic resources, and the factors that hinder their information seeking.
- *Information handling process:* A series of Likert scale and differential scale with close ended questions were used to explore how students go about their academic assignments. The ISP model framed the statements.
- *Everyday life information seeking:* Questions were on students' everyday life information seeking (ELIS), the information sources consulted and whether or not they were able to find the needed information.
- *Information behaviour of undergraduates on Web 2.0:* Questions were on the use of Web 2.0 for academic or entertainment purposes.



Pilot study

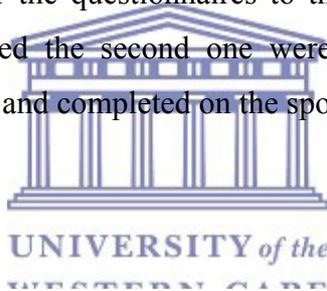
A pilot study, also known as a feasibility study is a mini version of a full scale study (Teijlingen & Hundley, 2001:1) which is a feature of a good research design. It is a way of pre-testing a research instrument such as a questionnaire or interview schedule (Struwig & Stead, 2001:135). In order to test the quality of the quantitative research instrument to ensure that it is able to measure what it is meant to measure, a pilot study was carried out with an opportunity sample of about 20 undergraduates of the Department of Computer Science in Ambrose Alli University, Edo State, Nigeria, where the researcher is currently employed. Similarly, the questionnaire was also administered to some Masters students of the University of the Western Cape by one of the research supervisors.

The questionnaire was also administered to three colleagues to complete. They took their time and offered laudable suggestions that were incorporated to enrich the questionnaire.

The survey of undergraduates at FUPRE

The questionnaires were administered during lecture time. For the first year students, it was administered during the *Use of Library* lecture, in two consecutive classes; students took home the questionnaire. With the assistance of the lecturer, the completed questionnaires were retrieved over a period of about four weeks from April 22nd to May 21st, 2014. It was challenging to retrieve the questionnaires until the lecturer insisted that copies of the questionnaires should be handed over to the course representatives of each department and the names of those who submitted be taken down. At that point, many turned in their completed questionnaires in the second and third week of administering them.

For the third year students, the questionnaires were administered during the *Entrepreneurship Course*. The course lecturer agreed to spare about 30 minutes of her class time for two consecutive classes to administer the questionnaires to the students. Those who could not attend the first class but attended the second one were handed the questionnaires. The questionnaires were administered and completed on the spot and were retrieved on the spot.



4.4.2 PHASE TWO

The second phase involved analysis of policy documents; written, telephone, and face-to-face interviews with key university staff; and campus-wide observations. It was conducted concurrently with Phase 1.

Analysis of policy documents

A policy document is a statement of intent (Anderson, 2005), a *modus operandi* that serves as a benchmark for performance and possible outcomes; hence, policy documents are written statements that guide and regulate action. In academic parlance, such documents are approved curricula, course outlines, university handbooks and library guides, among others.

The following are the policy documents examined:

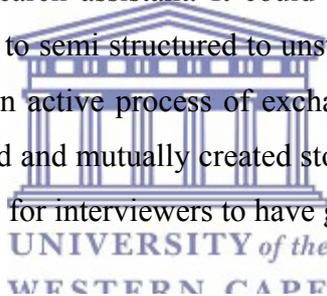
- Library guide

- Federal University of Petroleum Resources, Nigeria: Course Synopses. *General studies and entrepreneurship program*. pages 2-3 of 140
- Use of library and study skills (GES 104) course outline
- The University Website: www.fupre.org.ng

The primary purpose of examining the documents was to gain some insight into the actual position FUPRE library occupies in terms of serving the university community as a learning laboratory, and the centre for information literacy education.

Interviews

The process of conducting interviews can be described as question and answer sessions. Interviews may be single or group interactions that are moderated by an interviewer/researcher and/or research assistant. It could be in several forms: face-to-face, electronic, or a written structured to semi structured to unstructured as the case may demand. Differently put, an interview is an active process of exchange between two or more people and “leads to a contextually bound and mutually created story” Fontana and Frey (2008: 116-117). In this exchange it is crucial for interviewers to have good listening ears.



The University Librarian, e-Librarians, and ICT staff were interviewed in their respective offices. Twelve open-ended interview protocols were administered to lecturers in various departments and the university library.

The face-to-face interview with the University Librarian was based on appointment, which was followed by a telephone interview. The essence of the interviews was to enquire about the information resources, facilities available to students, information literacy education for students and staff alike, and policies guiding the use of the Library and its facilities.

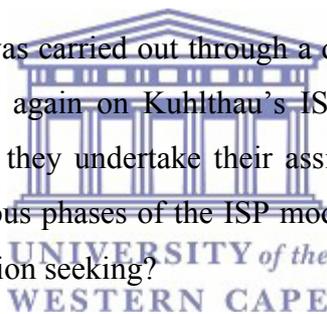
The interviews with the e-Librarians and ICT staff were done during the administration of survey questionnaires to students; they were scheduled in a matter of hours. The staff only requested to see the official letter issued to the researcher by the University, granting the approval to interact freely with the staff and students of the University during the course of the research. The interviews involved enquiry into the use of e-resources, policies guiding the

use of e-resources in the computer laboratory and e-Library respectively, and the policy guiding the use of social media, specifically.

Twelve open-ended interview protocols were administered to 12 lecturers in various departments in both colleges, including two librarians who teach the Use of Library. The interviews were completed and retrieved within three weeks of administering them. The open-ended questions focused on the general assessment of students in terms of how they seek and use information in attending to their assignments, whether students are directed to use specific information sources, lecturers' familiarity with the concept of information literacy, the use of social media in the process of teaching and learning and their take on Wikipedia as a source of information.

4.4.3 PHASE THREE

The third phase of the research was carried out through a qualitative study in order to enrich the research. This aspect relied again on Kuhlthau's ISP model in order to "get inside" students' heads and emotions as they undertake their assignments. The key questions here were: Do they negotiate the various phases of the ISP model? Do they have insight into and control of the process of information seeking?



Forms of data collection included interviews and group discussions, journaling, observation, reflection on field notes, various texts, pictures, and other materials. According to Bryman (1998) in Struwig and Stead (2001:56), qualitative research methods tend to understand issues from the participant's standpoint, describe the settings of the participants in context, and understand the thoughts, feelings and behaviours of the participant. There is room for flexibility since the research is conducted in an inductive manner; to enable the participants to express themselves in detail and to enable the researcher to gain closer insight into their choices and behaviours (Ohman 2005: 275).

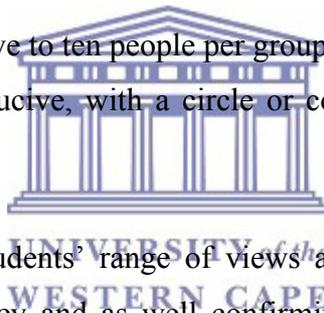
In the third phase of the study, three methods were employed in which student volunteers who also took part in the questionnaire survey were involved.

Large Group Discussions (LGDs)

Instead of two focus group discussions (FGDs), two Large Group Discussions (LGDs) were held on the 4th of June, 2014. The first was with the 100 level students in which 17 students were present but only eight spoke while the second one involved 15 students in 300 level. Both LGDs involved students across various departments in Colleges of Science and Technology.

A FGD is “a way of collecting qualitative data, which—essentially—involves engaging a small number of people in an informal group discussion (or discussions), ‘focused’ around a particular topic or set of issues” (Wilkinson, 2004:177); it is a simulation of everyday reality, it makes “explicit use of group *interaction* to produce data and insights that would be less accessible without the interaction found in a group” (Flick, 2009).

In FGD, participants should be five to ten people per group, but six to eight are preferred, and the environment should be conducive, with a circle or conference seating (Krueger, 2002; Wilkinson, 2004).



For the purpose of exploring students’ range of views and experiences that could not be statistically captured in the survey and as well confirming the quantitative data gathered, FGDs were initially planned but due to students’ tight schedule and inability to secure a conducive venue, it could not be held.

A video recording of both LGDs were done using Samsung Galaxy Tab 3. Also, a research assistant took hand written notes as back up. Both sessions were transcribed for the purpose of analysis.

Examination of students’ assignments

The entire 100 students making up the 300 level students of Petroleum Engineering and Electrical Electronics Engineering Departments were on assignments, which formed part of the case study to enable the researcher to elicit information that would assist to ascertain students’ information literacy skills level.

The assignment questions were analysed using Bloom's taxonomy (Appendix 4) revised by Anderson, *et al.* (2001) which is a continuum from Lower Order Thinking Skills (LOTS) to Higher Order Thinking Skills (HOTS) (Churches, 2009) to categorise the level of assignment and to ascertain whether the assignments encourage more than mere reading and understanding to knowledge application, comparing, organising, deconstructing, attributing, evaluating, and creating.

The assignment scripts were evaluated using a rubric in Appendix 9 prepared by the researcher. The rubric incorporates the various aspects of information seeking in the process of writing an assignment. It draws principally from ACRL information literacy standards (American Library Association, 2000; ACRL, 2002), which have a common ground with Kuhlthau's ISP model in terms of the cognitive aspect of learning. Specifically standards two, three, four and five of ACRL were incorporated in the rubric. Each of these four standards was used as yardstick for evaluating students' information literacy skills in their assignments.

The rubric was piloted using one assignment each from the aforementioned three assignments administered to 100 and 300 levels students, to ascertain whether it can effectively be used to evaluate the assignments. The pilot study revealed that the rubric is a viable tool for assessing the students' assignment. However, the criteria for evaluating students' assignment under ACRL standard five were slightly adjusted as the pilot revealed that none of the three assignments had in-text citations.

Journaling

The journal or dairy is a data collection tool that involves writing over a protracted period of time (Zinn, 2012:125). Journaling can bring engagement, reflection and exploration. Borg (2001: 169-170) highlights some important reflective processes that take place in research journals as follows: articulating and rationalizing concerns and exploring solutions; acknowledging, expressing and examining feelings; describing events and procedures; establishing goals, formulating plans, and deciding on actions; describing and evaluating progress (or lack of it); clarifying concepts and their implications for the research; capturing, exploring and pursuing ideas; and structuring thoughts.

Journaling in the current study is not used in the above-mentioned classic sense. *Dialogue journaling* as a methodological tool was adopted for interacting with participants by way of “peering” into their thoughts, feelings and actions during their assignment.

Dialogue journaling is a written discourse or dialogue between two or more persons in exchange of experiences, ideas or reflections (Haynes-Mays, Peltier-Glaze & Broussard, 2011; Alsaleem, 2013). Characteristically, it involves interactions between the instructor and the students, employed as a literacy strategy at all educational levels to meet diverse educational and social needs. The dialogue journal could be a log, notebook or an electronic journal that aids interaction.

In the current research journaling with the participants was mainly on WhatsApp messenger, a cross-platform smartphone messenger service that enables online users to send and receive instant messages such a text, audio and video. According to Bouhnik and Deshen (2014:217) WhatsApp groups can be employed as follows: communicating with students; nurturing the social atmosphere; creating dialogue and encouraging sharing among students; and as a learning platform. Similarly, Facebook groups, which served as a supplementary platform for a few students who did not have smart phones, enabled collaboration and promotion of interaction between students and teachers (Wang, Woo, & Quek, 2012).

In the current research, journaling involved the researcher, 100 and 300 level students working on an assignment and the course lecturer of the 300 level students.

Journaling with the 300 level students

This aspect of the research was planned and arranged after due written permission and approval by the respective Head of Departments who assigned lecturers to assist the researcher.

With the support and cooperation of the lecturer who teaches Basic Petroleum Geology (PNG 315), the researcher was able to interact with 77 students on this assignment via WhatsApp. The students were in seven groups (Groups A, B, C, D, E and F) with eleven students per group and each group had its own assignment under the themes indicated as follows:

- a. Group A- Earth Structure; Depositional Basins; Post Depositional Processes
- b. Group B- Petroleum Traps
- c. Group C- Earth Structure; Depositional Basins; Post Depositional Processes
- d. Group D- Rocks, Geological Considerations and Engineering Practices
- e. Group E- Petroleum Traps
- f. Group F- Earth Structure; Depositional Basins; Post Depositional Processes
- g. Group G- Rocks, Geological Considerations and Engineering Practices

Each assignment group formed its own WhatsApp platform; the lecturer and researcher were present on all seven platforms. The interaction between the students, lecturer and researcher was intensive for seven days, usually from 7am till about 10pm; that is, students could interact from when they woke up till it was their bed time.

Students were asked to come up with a final report divided into Introduction, Objective, Body of the Report and Conclusion. The lecturer did give them some materials to use and they were instructed to use those materials and as well source for more. The soft copies of the final report were submitted to the Course Representative; it was also presented orally. Each group selected members to discuss their findings on their behalf. The reporters highlighted the major findings in their work (especially the relevance of what had been researched into the Petroleum Industry and the Engineering Profession) during their presentation. There was a minimum of two (2) presenters per group, and each group was allowed only ten (10) minutes to present the group report.

A lecturer in the Mechanical Engineering Department and another in the Electrical Engineering Department were assigned by their respective heads of department to work with the researcher in ensuring the success of journaling with their students who were undertaking an individual assignment. Each of the departmental students already had an existing WhatsApp platform on which they interacted on a daily basis. However, the journaling exercise was not successful because student's feedback was rather low.

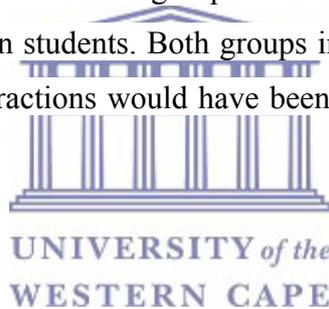
A Facebook group named "FUPRE IB Project 300" was set up to accommodate some 300 level students who were on their Entrepreneurship Course Studies assignment; six students

joined the group but after the formal introduction online one student responded to one question by the Researcher.

Journaling with the 100 level students

The 100 level students were on the Use of Library assignment for a period of two weeks; the Lecturer and the researcher briefed them on the need to interact with the researcher during their assignment. The assignment question was: *Discuss the role of information in science and technology.*

The volunteering students were divided between the use of Facebook and WhatsApp. Consequently, the researcher opened a group on Facebook with the name “FUPRE IB Project 300”, while the course representative opened a group on WhatsApp and added the interested students. Nine students joined the Facebook group while another eight joined the WhatsApp group making a total of seventeen students. Both groups interacted with the researcher for a period of two weeks but the interactions would have been richer and more intensive if their lecturers were on board.



4.4.4 OBSERVATION

Observation is a type of qualitative data gathering process that supplies information on nonverbal behaviours (Dunn, 2002: 34; Hernon & Dugan, 2002: 95). It enables and aids the recording of the physical environment, people and their interactions without their consciousness of it. Cresswell (2008: 221) articulates observation as “the process of gathering open-ended, first-hand information by observing people and places at a research site”. The role of an observer is not rigid. In the study, the researcher adopted the unstructured type of observation by experiencing the site unassumingly before deciding on the relevance of what had been observed to the research. Full attention was paid by the researcher in order to avoid partial judgement of the observed scenarios.

The settings observed were two classes of Use of Library and Study skills, one Entrepreneurial Studies class, the university library, facilities on campus, and students’ social and academic life.

For validity sake, the researcher's observations were triangulated with a survey, interviews, large group discussions and journals.

4.5 QUALITY CRITERIA: RELIABILITY AND VALIDITY

Reliability is the degree of consistency between two measures of the same thing (Mehrens & Lehman, 1987; and Zonrabi, 2013); it is about repeatability or consistency (Venkatesh, Brown, & Bala, 2013), which the triangulation of mixed methods ensures, evident in this study. Validity is the degree to which research instruments accomplish the purpose for which they are being used (Worthen, Borg & White, 1993; Edwards & Talbot, 1994:70; Shadish, Cook & Campbell, 2002; Teddlie & Tashakkori, 2003; and Venkatesh, *et al.* 2013). Validity is primarily 'concerned with the integrity of the conclusions that are generated from a piece of research' (Bryman, 2012: 47).

Qualitative research is more fluid in its approach than quantitative research. Hence, quantitative researchers have debated that the interpretive nature of qualitative research makes it 'soft' science, lacking in reliability and validity (Hammersley, 2008; Torrance, 2008; and Denzin & Lincoln, 2008). However, the interpretive and fluid approach is a necessity because the essence of qualitative research is meaning and interpretation (Liamputtong, 2013). That being mentioned, Patton (2002: 227) reiterates that "in some ways, the differences between quantitative and qualitative methods involve trade-offs between breadth and depth ... Qualitative methods typically produce a wealth of detailed data about a much smaller number of people and cases"; herein lies the crux of the difference in the measurement of reliability and validity in both research approaches.

4.5.1 RELIABILITY AND VALIDITY IN QUANTITATIVE RESEARCH

In quantitative research, a measure is considered reliable if it yields the same result over and over again (Venkatesh, *et al.* 2013: 32); this seem a straightforward process because data is presented in numerical terms. However, without reliable procedures and measures, quantitative research is considered invalid (Patton, 2002).

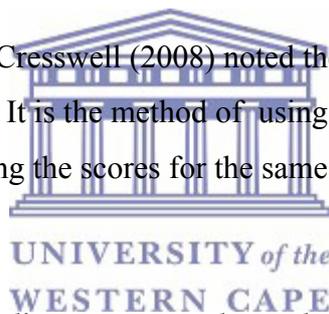
Kirk and Miller (1986: 41-42) identified three types of reliability in quantitative research: first is the degree to which a measurement, given repeatedly, remains the same. Second is the

stability of a measurement over time (Bryman, 2012); and third is the similarity of measurements within a given time period.

Shadish, Cook & Campbell (2002) and Teddlie & Tashakkori (2003) identified and defined four ways of determining reliability in quantitative research:

- Inter-Rater/Observer Reliability: The degree to which different raters/observers give consistent answers or estimates.
- Test-Retest Reliability: The consistency of a measure evaluated over time.
- Parallel-Forms Reliability: The reliability of two tests constructed the same way, from the same content.
- Internal Consistency Reliability: The consistency of results across items, often measured with Cronbach's Alpha.

In addition to these four pointers Cresswell (2008) noted the *alternate forms reliability* which is reliability through equivalence. It is the method of using two instruments to measure the same concept variables and relating the scores for the same group of individuals to the two instruments.



Validity is how accurately the findings represent the truth in the real world (Venkatesh, *et al.* 2013: 32). Shadish, *et al.* (2002) and Teddlie & Tashakkori (2003) identified three types of validity in quantitative research:

- Measurement validity (e.g., content and construct validity): This provides an estimate of how well an instrument measures what it is meant to measure, this can be ascertained by retesting or piloting, as was the case in the current study. The questionnaire used for the quantitative survey was piloted in three different contexts (undergraduates in Ambrose Alli University, Nigeria, and the researcher's colleagues in the same university, and Masters students of University of the Western Cape, South Africa) to ensure that it was good instrument to elicit data from the sample that answered all the research questions of the study.
- Design validity has to do with internal and external validity. Internal validity is the extent of approximate truth about inferences regarding causal relationships in a

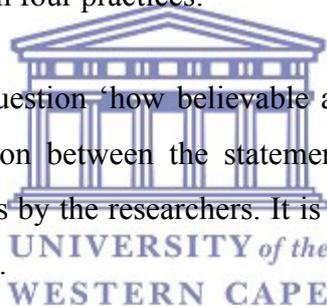
scientific investigation while external validity is the extent to which the results of a research study can be generalised to other settings and groups.

- Inferential validity (i.e., statistical conclusion validity) is about the findings of quantitative studies based on inductive or deductive arguments. Inferential validity in the study are inductive, based on the research premise.

4.5.2 RELIABILITY AND VALIDITY IN QUALITATIVE RESEARCH

In qualitative research, reliability is an indispensable condition for validity. Thus, demonstrating validity is sufficient to establish reliability (Venkatesh, *et al.* 2013: 34). Validity in qualitative research parlance is the degree to which data are credible and trustworthy. Lincoln and Guba (1985) and Merriam (1998) suggest that the dependability and trustworthiness results, that is, reliability and validity, can be ensured and assured in qualitative research engagement in four practices:

Credibility: This relates to the question ‘how believable are the findings?’ (Bryman, 2012: 49). It examines the corroboration between the statements made by participants and the representation of these viewpoints by the researchers. It is about whether the explanation fits the description without ambiguity.



Transferability: This implies applicability or generalisability of results. To ensure this, Bryman (2012: 49) suggests that these questions be asked and answered. ‘To what degree can the study findings be generalised or applied to other individuals or groups, contexts, or settings?’ or ‘Do the findings apply to other contexts?’ Transferability concerns the degree to which findings can be applicable to other contexts.

Dependability poses questions to the research findings, that is, ‘are the findings likely to apply at other times?’ (Bryman 2012: 49). This is ensured through an auditing process which necessitates the researcher to establish a research process that is clearly documented and logical.

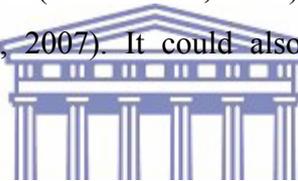
Confirmability probes whether the researcher has “allowed his or her values to intrude to a high degree?” (Bryman, 2012:49). This tries to show that findings and the interpretations of the findings are clearly connected with the data, and not the researcher’s sentiments.

Confirmability, according to Lincoln and Guba (1985: 290), is “the degree to which findings are determined by the respondents and conditions of the inquiry and not by the biases, motivations, interests or perspectives of the inquirer”.

From the foregoing discussion, the reliability of quantitative research depends largely on instrument construction; in qualitative research, “the researcher is the instrument” (Patton, 2002:14) who ensures trustworthiness, rigor and quality.

4.6 DATA TRANSCRIPTION AND ANALYSIS

Transcription is conceptualised as a representational process (Bucholtz, 2000) that comprises what is represented in the transcript, for example, talk, time, nonverbal actions, speaker/hearer relationships, physical orientation, multiple languages, and translations. Transcription involves a translation (Slembrouck, 2007) or transformation of sound/image from recordings to text (Duranti, 2007). It could also be a representational process of electronic data in text format.



In the current study, the quantitative data was analysed using Microsoft Excel 2010 version and SPSS software.

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All the oral interviews were video recorded using a Samsung Galaxy Tab 3 after which simple orthographic transcriptions were done; a research assistant took hand written notes as back up. Interviews and journals were manually analysed using a colour coding method. Transcribed journals and interviews were analysed using colour codes, by assigning colours to predetermined themes and concepts (Hay, 2005) and emerging ones.

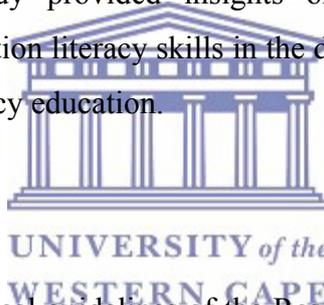
Assignment questions were analysed using a rubric constructed by the researcher (See Appendix 9) while Petroleum Geology assignment scripts were submitted to Turnitin.com software (plagiarism detection software) to ascertain the similarity index with the online sources consulted.

4.7 SIGNIFICANCE AND LIMITATIONS OF THE STUDY

As this study investigated the information behaviour of Nigerian undergraduates in the world of Web 2.0, the outcome would give some insight into undergraduates' access to information and their level of information literacy. This would in turn inform policy review and communicate more urgency in upgrading information literacy programmes which will contribute in no little way to the broad vision of education in Nigeria, as it strives to be one of the top 20 knowledge economies in the world by 2020. This vision requires a strong human capital base produced by tertiary education. Besides, the research work serves as a model for information behaviour research as it takes into perspective factors that are both intrinsic and extrinsic to the users of information.

The primary limitation of this study is that it is a case study of only one university in Nigeria. However, a rigorous case study provided insights on the information behaviour of undergraduates and their information literacy skills in the dynamic world of online media and this can inform information literacy education.

4.8 ETHICAL STATEMENT



The researcher abided by the ethical guidelines of the Research Committee of the University of the Western Cape. A request for permission to carry out the study was sent to FUPRE Management (See Appendix 10) and approval was granted through the University Registrar (Appendix 13). The copies of the approval letter were submitted to the various department heads, whose students and staff were part of this study. That aside, in the questionnaire survey the researcher sought the permission of students and lecturers. Where there was need for recording during the qualitative research data gathering, participants were duly informed and their consent equally sought. The anonymity of respondents and participants in all phases was respected as well as the right to withdraw at any time.

4.9 CONCLUSION

This chapter has discussed the basis of the research methodology, a mixed methods of quantitative and qualitative research. The data collection methods and tools employed included questionnaires, interviews, journaling, observation documents. Chapters five and six

shall discuss the findings gathered from the quantitative and qualitative research methods respectively.



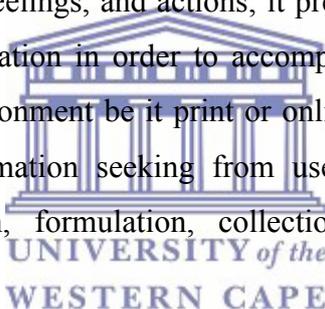
CHAPTER FIVE

SUMMARY AND ANALYSIS OF THE QUESTIONNAIRE DATA

5.1 INTRODUCTION

Chapter five gives the summary and analysis of the questionnaire data gathered in Phase 1 as described in Chapter four. It is a survey of all 803 students in 100 and 300 level in Colleges of Science and Technology at FUPRE. As explained in Chapter four, 782 questionnaires were returned; only 711 were found usable. Consequently, the response rate is 88.5%.

The ISP model, discussed in Chapter two, provides the frame for the questions in the questionnaire. The model explicates the experience of users in the process of information seeking as a series of thoughts, feelings, and actions; it presents a search process in which a user seeks meaning from information in order to accomplish a goal. The model, which is relevant in any information environment be it print or online media (Kuhlthau, *et al.* 2008), articulates the process of information seeking from users' perspective in seven stages: initiation, selection, exploration, formulation, collection, presentation and assessment (Kuhlthau, 2008:67).



The Chapter is organised according to the order of the questionnaire which is provided in the Appendix 5; and at times, data across sections are cross tabulated. Some statistical analysis were also carried out.

Regrettably, question 10 which delves into the provision of electronic resources by the university is missing in the data analysis. It was after the administration of the questionnaire to students that it was realised that some part of it was unwittingly cut off during further editing after the pilot study. However, the question is sufficiently addressed in the qualitative research across the interviews with the University Librarian and two Librarians in the e-library, large group discussions with students and in the journals.

The questionnaire has five sections as follows:

Section A: This section enquires about the demographic information of students, such as sex, age, college, level and native language. Variables such as level and college of study might be significant in information behaviour among students.

Section B: This section focuses on general academic information seeking behaviour of students. It explores how students feel when they receive a big course assignment, where they access information in order to complete their assignments, their ownership of personal electronic devices, the challenges they encounter when using electronic resources and other challenges not related to technical issues, and how often they use the university library, and for what purpose.

Section C: A probe into the cognitive and affective feelings of undergraduates on a current and specific assignment using Kuhlthau's ISP model is covered in this section. The aim is to focus on their *actual* behaviour while undertaking a specific assignment so as to obtain the nitty-gritty of their true behaviour. This section investigates the type of assignment, how far they have gone with the assignment, their confidence level, feelings, the search tools explored during the assignment, the information resources used and the criteria they employ in choosing their information sources. The essence of this section is to explore whether students conform to Kuhlthau's ISP model, which determines information literacy competency.

Section D: This section of the questionnaire examines how students engage in Everyday Life Information Seeking (ELIS) discussed in Chapter 2 because university life is not just about academic work. It enquires about their information needs, the sources they explore and whether or not their information needs are met.

Section E: This section focuses on the information behaviour of undergraduates in the world of Web 2.0 which is the fundamental purpose of this PhD research. It investigates the Web 2.0 tools students use and whether they are for academic or entertainment purposes; it also enquires if any Web 2.0 tools are incorporated in their teaching and learning by their lecturers. The interest is more than whether they consume the Web content as in Web 1.0,

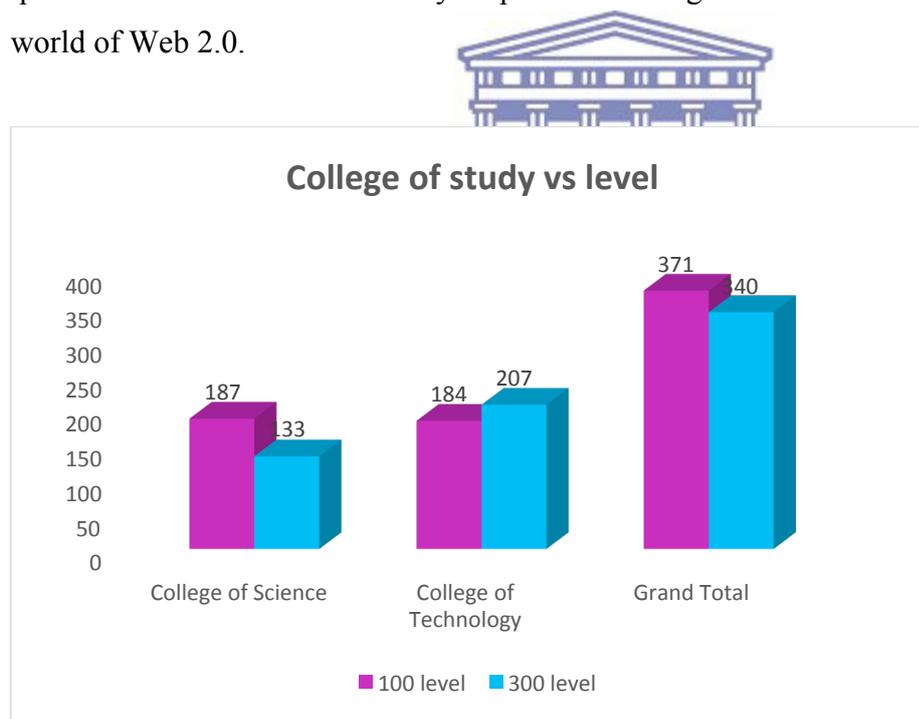
but to see if they work with the creativity that Web 2.0 offers in terms of interactions, collaborations and creators of user-generated contents.

5.2 SECTION A: DEMOGRAPHICS

This section presents data on the demographics of the respondents, such as gender, age, college, level and home language, which are covered by Questions 1, 2, 4 and 5 of the Questionnaire.

5.2.1 COLLEGE OF STUDY VS LEVEL

Data on the number of respondents in both colleges of science and technology vs their level of study is presented in Figure 10. These variables will be cross-tabulated with some questions to determine how they impact on undergraduates' information behaviour in the world of Web 2.0.

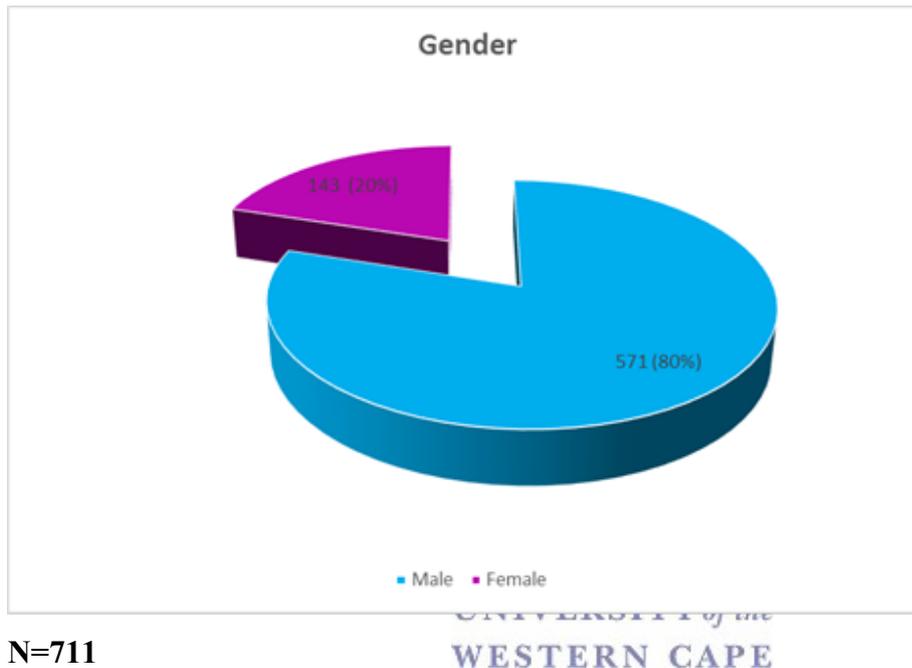


N=711

Figure 10: College of study vs level (Questions 4 and 5)

5.2.2 GENDER

Figure 11 reveals the striking difference in the number of male and female students in both 100 and 300 levels at FUPRE. This may be due to the fact that FUPRE as a specialised university of science and technology has a low patronage of female students owing to the nature of the courses offered which are science and technology based.



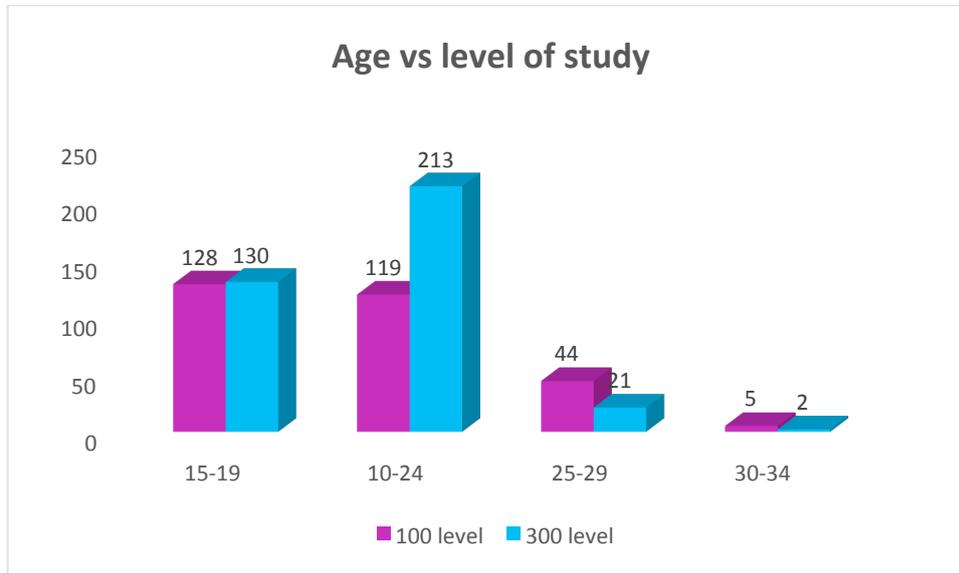
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Figure 11: Gender of respondents (Question 1)

There has been a growing concern on the low enrolment of females in tertiary institutions across Africa and in fact the world (Kishore, 2008). In a study by Aderemi, Hassan, Siyanbola, and Taiwo (2013) on gender participation in tertiary enrolment, graduation and staffing of science and technology sponsored by the Federal Ministry of Science and Technology (FMST) in Nigeria, findings show that female participation over the period of 1997 to 2006 vary across the different geopolitical zones of Nigeria. However, there was a general increase of 81% for male and 110% for female over the 10-year period. Despite that, the number of female students admitted was consistently lower than that of their male counterparts over the ten-year period studied. The national average ranged between 32.8% and 40.6%.

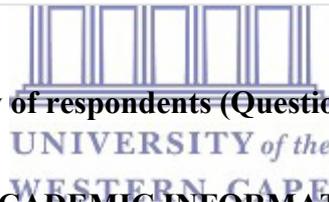
5.2.3 AGE AND LEVEL OF STUDY

The majority of respondents in both 100 and 300 levels are within the age bracket of 15 to 24 years old as evident in Figure 12. There is no record of any respondent above the age of 35.



N=711

Figure 12: Age vs level of study of respondents (Questions 2 and 5)



5.3 SECTION B: GENERAL ACADEMIC INFORMATION SEEKING BEHAVIOUR

Data gathered from Questions 6 to 14 of the questionnaire on students' general academic information seeking behaviour are presented in this section.

5.3.1 STUDENTS' EXPERIENCE WHEN UNDERTAKING A BIG COURSE ASSIGNMENT

Question 6 presents a number of statements relating to assignment writing in general.

In Figure 13, neutral is the option with the most responses to item 13i (31%) which indicates that respondents are undecided as to whether they are unsure of how to begin to find information for their assignment. Being neutral could suggest uncertainty in the face of information seeking as suggested by (Kuhlthau, 2008:67), discussed in Chapter two. A total of 58% of respondents trust in their Google search for information and preference for seeking

information online (42%) directly, rather than through the Library; similar to the finding of Centre for Information Behaviour and the Evaluation of Research (CIBER:2008) discussed in Chapter three. About 60% of respondents claim they are knowledgeable on how to cite sources so that they are not guilty of plagiarism.

Despite their trust in Google search and preference for online information seeking, 50% of respondents yet agreed and strongly agreed that Librarians are useful source of help in their information seeking; while the remaining 50% is neutral, disagree and strongly disagree.

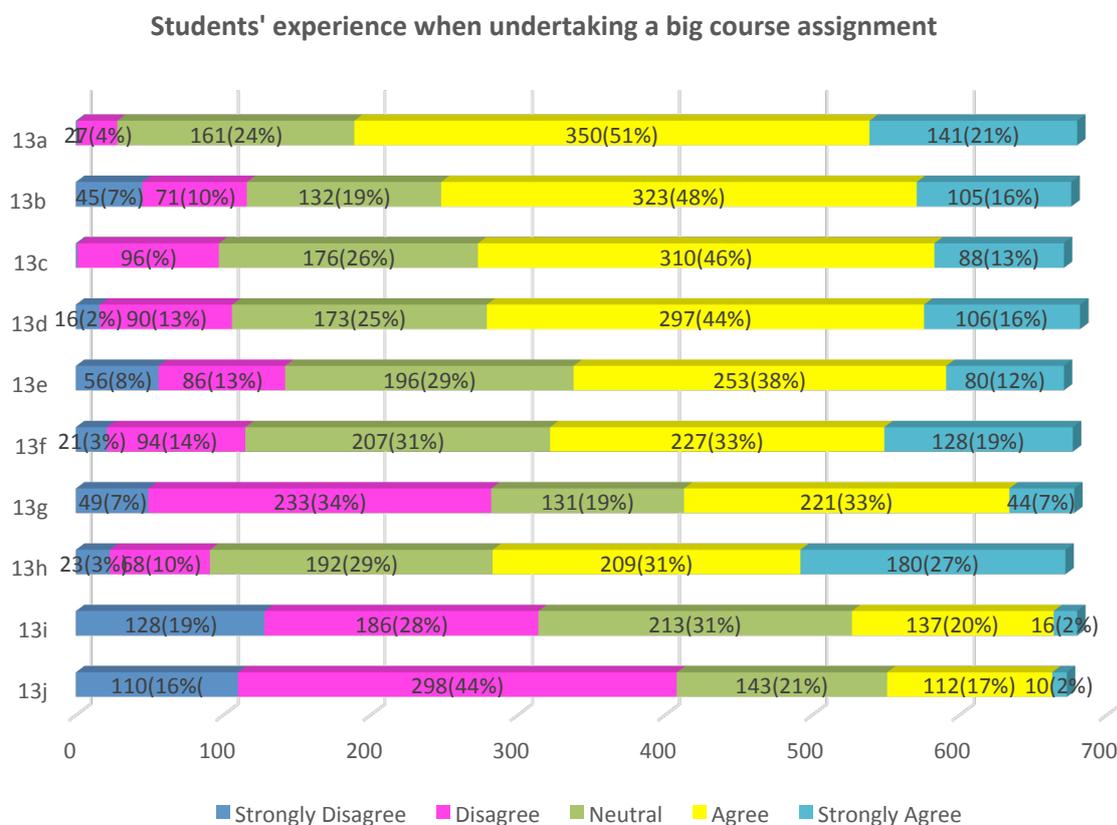


Figure 13: Respondents experience when undertaking a big course assignment (Question 6)

- 13a (N=680) When I hand in my assignment I am confident that it is of high quality
- 13b (N=676) I read to explore the background and bigger picture first
- 13c (N=671) I am able to find useful information quickly
- 13d (N=682) I know how to cite my sources correctly so that I am not guilty of plagiarism
- 13e (N=671) Librarians are a useful source of help in my information seeking.
- 13f (N=677) I trust my Google searches to give me the best information.
- 13g (N=678) In course assignments it is not clear when to stop looking for information.
- 13h (N=672) I prefer searching for information online directly rather than via the library
- 13i (N=680) When I receive an assignment I often feel unsure on how to begin to find information
- 13j (N=673) When I receive an assignment I worry that I do not understand what is expected

5.3.2 HOW AND WHERE STUDENTS ACCESS THE INTERNET DURING THE COURSE OF THEIR ASSIGNMENTS

Figure 13 shows students' preference for online sources which raises the question of when and how they access the Internet. A striking number of the respondents access the Internet using the campus Wi-Fi on their personal electronic devices as indicated in Table 6, followed by many who also access the Internet at home. However, the 43 respondents who indicated "other" did spell out in their questionnaires that they buy Internet bundles on their phone to enable them use the Internet.

Table 6: How respondents access the Internet during the course of their assignments (Question 7)

Item	No. of Responses
My own laptop / notebook / iPad / tablet/phone using WI-FI on campus	568
At home	394
Cybercafé - off campus	261
Library computers	147
Residence (Hostel) computer labs	112
Campus computer labs	70
I don't use the Internet at all	2
Other	43

N=711

5.3.3 OWNERSHIP OF PERSONAL ELECTRONIC DEVICES

In terms of ownership of personal electronic devices, the option with the highest number of responses is smart phones, followed by laptops/notebooks and iPad or other tablet devices as evident in Table 7. This conforms to the finding of Dahlstrom (2012) discussed in Chapter three, in which undergraduates in the United States favour the use of portable electronic devices such as phone, while nine out of ten have laptops.

The 63 respondents who indicated “other” use Java phones which are also Internet enabled.

Table 7: Ownership of personal electronic devices (Question 8)

Item	No. of responses
Smartphones	474
Laptop / notebook	323
iPad or other tablet device	123
Desktop computer	82
Other	63

N=711

5.3.4 PROBLEMS ENCOUNTERED WHILE USING ELECTRONIC RESOURCES

Table 8 provides data on the problems encountered with the use of electronic resources while undertaking an assignment. Technical problems account for the most responses, followed by the problem of not having enough facilities on campus. Both problems indicate poor physical access which is the first level of access to information according to Jaeger and Thompson (2008:57), and Burnett and Jaeger (2011) as discussed in Chapter three. Physical access is a precondition to intellectual access, the second level of access to information.

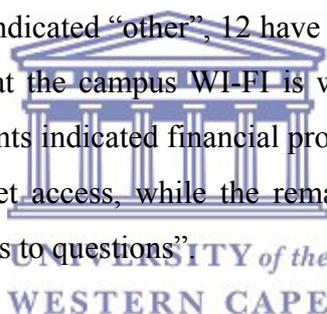
Table 8 highlights barriers to intellectual access explicated by Burnett and Jaeger (2011:167-168) and Burnett, *et al.* (2008:168) as problems with choosing appropriate subject headings, keywords and formulating a good search strategy and databases. The ability to gain intellectual access to information depends on users cognitive abilities (Kuhlthau, 2004), crucial to information literacy.

Table 8: Problems encountered by respondent when using electronic resources during an assignment (Question 9)

Item	No. of responses
Technical problems (e.g. system hangs, server down time, access speed, etc.)	517
Not enough facilities on campus	265
Choosing appropriate subject headings, keywords, and formulating a good search strategy	236
Choosing appropriate database	119
Operating the physical devices	28
Other	29

N=711

Among the 29 respondents who indicated “other”, 12 have Internet connectivity problems but two of them specifically said that the campus WI-FI is weak, which is similar to the first option in Table 9. Eight respondents indicated financial problems, that is their inability to buy data bundles for personal Internet access, while the remaining nine complained about the Internet “giving irrelevant answers to questions”



5.3.5 HOW STUDENTS LEARN INFORMATION SEEKING SKILLS

Question 11 asked how students learn information seeking skills. It is cross-tabulated with Question 5 (the level of the students) in order to compare how respondents in 100 and 300 levels have learnt information seeking skills and to observe any differences and similarities, if any.

Based on the low number of responses as shown in Table 9 , it appears the students are not familiar with the term, information seeking skills/information literacy, as discovered by Gross and Latham (2008: 11-12) in their study of undergraduates at Florida State University, USA. However, the highest number of responses was indicated by those who have learnt information literacy education before entry into the university. This may suggest that FUPRE is an elite university which attracts students from standard secondary schools where information literacy is embedded in their teaching and learning.

Table 9: How respondents have learnt information seeking skills (Questions 11 and 5)

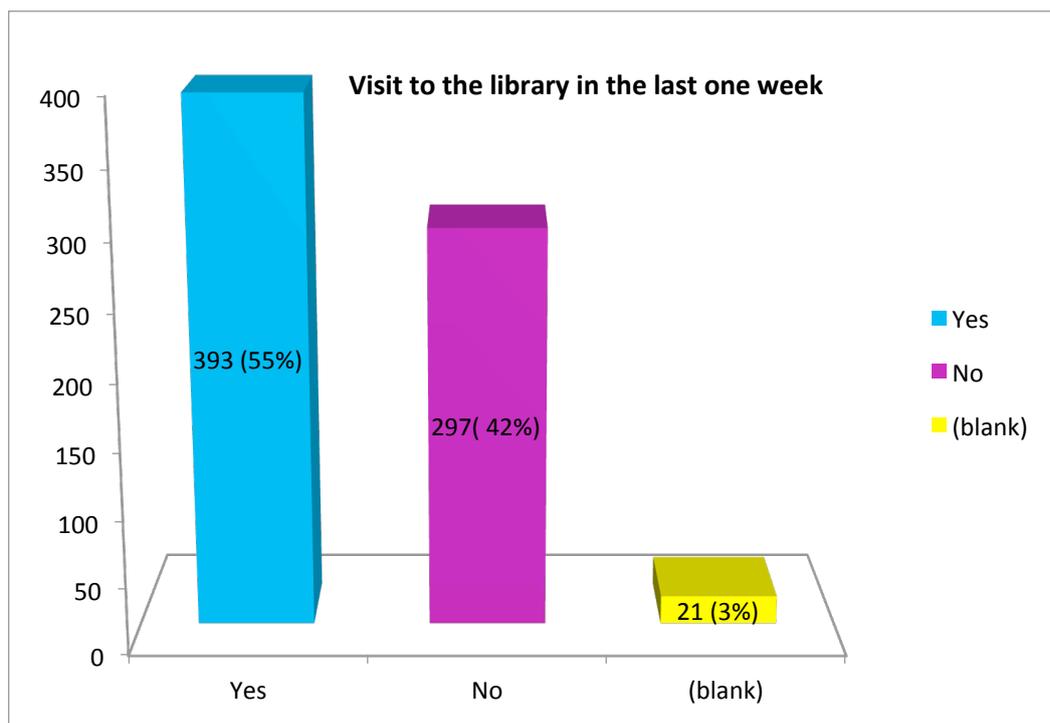
Item	100 level	300 level	Total	Blanks
Through information literacy education before your entry into the university	163	95	262	258
Is it through guidance from other students?	90	167	257	454
Through a formal course organized by the Library on information literacy	63	52	115	596
Through guidance from Lecturers	58	172	232	479
Through one on one guidance from Library staff	42	25	67	644
University credit-bearing course	13	30	43	668

N=711

The responses elicited from the respondents in 300 level show that most of them learnt information seeking skills through guidance from lecturers and fellow students. Not many respondents indicated that they learnt information literacy skills through formal courses organised by the library (the Use of Library) which is compulsory; it may be because the concept is not explicitly taught, they did not remember or they did not like it.

5.3.6 VISIT TO THE LIBRARY IN THE LAST ONE WEEK

Figure 14 shows that only about half of the respondents had visited the library in the past one week period, this may be due to their ownership of smart phones and other portable electronic devices on which they can easily access the Internet and read anywhere they so choose.



N=690

Figure 14: Visit to the library in one week (Question 12)



However, even though there seem to be some movement from print towards e-resources, the library still remains the heart of the university and the tasks it undertakes contributes greatly to the institution's overall mission. Also important is the crucial role of librarians in equipping the students with information literacy skills in order to maximise their employability.

5.3.7 PURPOSE OF VISITING THE LIBRARY

Table 10 analyses the purpose of visiting the library. The option with the most responses is visit to the library in order to study/use the reading space. The number of those who visit the library for the purpose of using the computer facilities is low; this may be because there are only 25 computers in the library as spelt out in Chapter four. Seventeen students indicated "other", 16 of whom mentioned they visit the library to read for exams, tests, personal notebooks, which fall within the bracket of the first option in Table 10. It is interesting to note that a 100 level student wrote "*I went to the library to observe*"; it is not surprising being a new student in the university.

In Table 9 (Question 9) mentioned earlier, out of 711 students, only 67 indicated that they had learnt information literacy skills through one-on-one guidance from library staff; this fact is confirmed in Table 12 based on the low number of respondents who indicated that they went to the library to consult with a librarian. Also only a few respondents visited the library to use the computer facilities to access online Websites, blogs and email.

Table 10: Purpose of visiting the library (Question 13)

Item	No. of Responses
To use study / reading space	390
To read a newspaper	122
To browse the book shelves	105
To use OPAC (catalogue) to find book	93
To use databases to find articles and information	85
To use computer facilities to access online Web sites and blogs	80
To return a book	69
To use printing facilities	60
To find a journal on shelf	52
To consult with a librarian	46
To use computer facilities to email	45
To access social media (e.g. to consult with a librarian via Skype)	18
To meet with friends	16
To watch a video/film	11
To use seminar room	11
Other? Please specify	17

N=711

5.3.8 FACTORS THAT HINDER INFORMATION SEEKING

Physical access dominates the barriers to information seeking as revealed in Table 11. Irregular electricity supply is a major challenge that hinders respondents' in their information seeking. The study of Ejiwoye and Ayandare (2011) on information seeking behaviour of

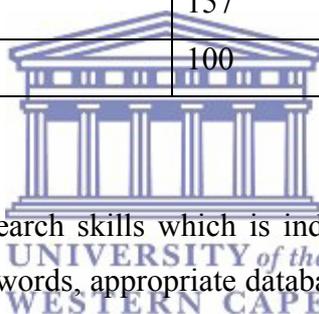
undergraduate students in three Nigerian universities discussed in Chapter three found that electricity is a major barrier to undergraduates in information seeking.

Another noteworthy challenge is poor access to information resources and finance in terms of accessing funds to buy Internet bundles for data.

Table 11: Factors that hinder information seeking

Item	No. of responses
Irregular electricity supply	349
Poor access to information resources	337
Lack of funds/finance	307
Lack of time	217
Poor infrastructure	157
Lack of search skills	100

N=711



Some responses reveal lack of search skills which is indicated as problems with choosing appropriate subject headings, keywords, appropriate databases and formulating a good search strategy in Table 9; it is an indication of poor intellectual access to information.

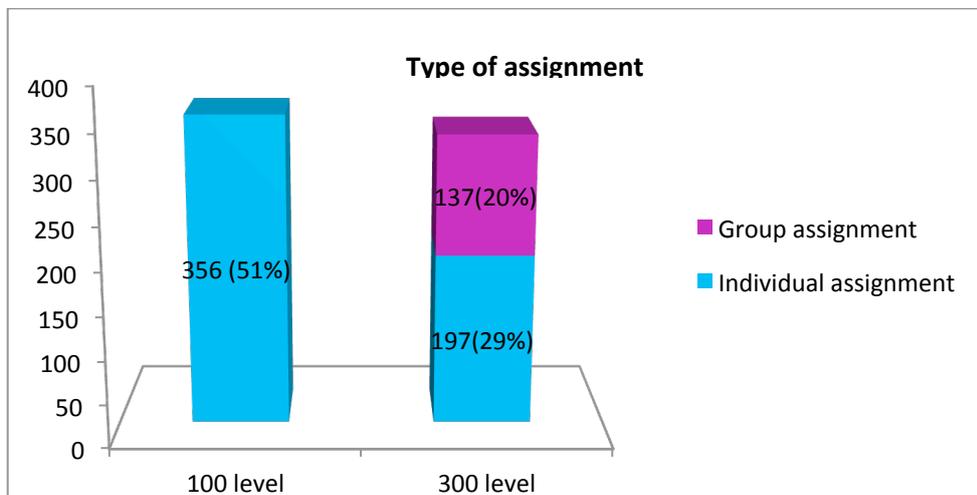
5.4 SECTION C: FOCUS ON SPECIFIC ASSIGNMENT

Data gathered from Questions 15 to 24, are presented in this section. Kuhlthau's ISP frames some of the questions that address how students go through their assignments. This section hoped to focus on a current assignment.

5.4.1 TYPE OF ASSIGNMENT

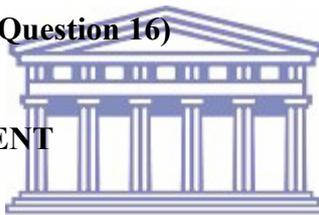
Figure 15 shows that none of the 100 level students is on a group assignment; the reason may have been because they are in the first semester of their first year in the university. Perhaps, lecturers may consider it a bit too early to give them group assignments thereby giving them

the opportunity to build their skills individually. However, the 300 level students are both on individual and group assignments.



N=690

Figure 15: Type of assignment (Question 16)



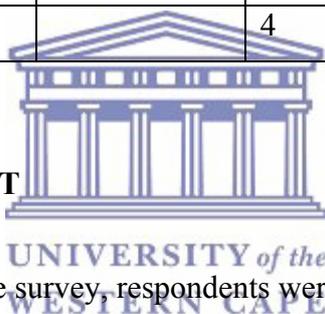
5.4.2 FORMAT OF ASSIGNMENT

Question 17 is cross-tabulated with Question 5 with a view to finding out the level of engagement of respondents in research work and scholarly writing. Worthy of note is the number of respondents who are to present their assignment in the form of a research report and an essay, across both levels as shown in Figure 15. Some of the respondents to present research reports and essays may also have to do oral presentations, so there is a possibility of choosing more than one option. None of the 100 level students chose presenting their assignment in the form of a slideshow, video clip, multimedia presentation or Website. This may imply that Web 2.0 tools are not incorporated in their teaching and learning. The four who indicated “other” wrote “written calculations”.

Table 12: Format of assignment (Question 17)

Item	100 level	300 level	Grand Total
A research report	159	148	307
Essay	101	184	285
An oral presentation	2	85	87
Slide show		26	26
Literature review	8	22	30
A model	5	21	26
Video clip		10	10
Multimedia presentation		8	8
Website		1	1
A research proposal			
Other		4	4

N=711



5.4.3 STAGE OF ASSIGNMENT

During the period of questionnaire survey, respondents were at various stages in their individual and group assignments as indicated on Table 13. However, 45 students ticked “none of the above”, that is, they were not in any of the stages listed even though the available options cover all possible stages of an assignment; this may be due to lack of self-awareness.

Table 13: Stage of assignment (Question 18)

Item	No. of responses
I have completed the assignment	203
I am generally searching and gathering background information that pertains to the topic	134
I am trying to understand the topic and the type of information I need to complete the assignment	119
I have completed the information search and currently focusing on specifics and information relevant to the task	95
I just arrived at an understanding of the scope of the topic and what is expected of me	59
I am deeply involved in and writing my assignment	33
None of the above	45

N=688

While the 300 level students were submitting their questionnaires during lecture time, the researcher flipped through some on the spot and noticed about 11 who indicated “none of the above” to Question 18. Upon asking a student as to why, he said: “*They want to kill me with assignments, they are too many*”.

Responses to Question 15 which asks for the topics of respondents’ assignments reveal that there were at least 33 on-going assignments across their courses (Appendix 14). However, the respondents in 300 level appear to have more assignments than those in 100 level; 25 and 10 assignments respectively.

5.4.4 AFFECTIVE EXPERIENCE DURING AN ASSIGNMENT

One of the reasons why Kuhlthau’s ISP model is seminal is because of the affective experience it highlights as students go through their assignment (Kuhlthau, 2008:67). Such experience includes the feelings of uncertainty, confusion, frustration, doubt, optimism, satisfaction, lack of satisfaction and confidence.

Table 14 hints that the respondents seem to be quite confident in themselves and are hopeful while conducting their current assignments. Fifty-two percent (52%) of respondents have confidence levels ranging from 7 to 10 while 33% have average confidence levels of 5 and 6. However, the mean confidence across the various stages of the assignment is 6.74.

Table 14: Confidence scale (Question 19)

Scale of confidence	1	2	3	4	5	6	7	8	9	10	Grand Total
No. of responses	9	7	22	32	113	119	99	187	76	31	695

N=695

Table 15 is a cross tabulation of Questions 18 and 19, it gives details about the confidence level of the respondents in the current stage of their assignments.

The confidence level is the highest among the respondents who have completed their assignments; this may be due to a sense of accomplishment coupled with increased self-awareness, followed by those who have completed the information search and are currently focusing on specifics and information relevant to the task. However, respondents who are trying to understand their topic and the type of information appear to have an average confidence level which may have arisen from a feeling of uncertainty as to what is expected. These suggest that students appear to be conforming to Kuhlthau's ISP model.

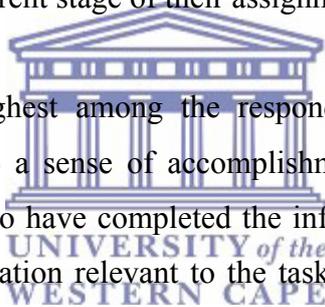


Table 15: State of assignment and confidence level (Questions 18 and 19)

Stage of assignment	Mean confidence level	N
I have completed the assignment	7.56	202
I have completed the information search and currently focusing on specifics and information relevant to the task	7.11	92
I am deeply involved in and writing my assignment	6.67	33
I am generally searching and gathering background information that pertains to the topic	6.60	130
I just arrived at an understanding of the scope of the topic and what is expected of me	6.27	59
I am trying to understand the topic and the type of information I need to complete the assignment	5.82	115
None of the above	5.66	44
Grand Total	6.74	675

N=675

Question 20 continued the exploration of the respondents' feelings and emotions. A majority of the respondents, as evident in Table 16, are optimistic in the process of undertaking their assignment. Some are also confident, while there are those confused and frustrated by their assignment, not many but their feeling is equally striking. All these feelings reflect the affective stages of ISP model.

Table 16: Affective experience of students during their assignment (Question 20)

Item	No. of respondents
Optimistic	418
Confident	86
Satisfied	80
Confused	62
Frustrated	39
(blank)	20
Other? Please specify	6
Grand Total	711

N=711

Six students indicated “other” of whom four wrote “tired”, one wrote “crazy” and the last one wrote “pissed off”. They are all feelings of frustration and confusion, put differently.



5.4.5 STAGE OF ASSIGNMENT AND FEELING

In order to determine how respondents feel at the current stage in their assignment, Questions 18 and 20 are cross-tabulated as presented in Table 17. A total number of 621 responses were gathered out of which a marked majority of the students appear to be optimistic irrespective of the stage of assignment they are in, meaning that they are hopeful they would eventually get the information they need and get the assignment done. However, among those trying to understand the topic and the type of information they need to complete the assignment, a few worth noting are confused and frustrated, being at the early stage of the assignment. This may suggest that students’ assignments are not quite challenging, or perhaps they are given the specific sources to use for the assignment.

Table 17: Stage of assignment and feelings (Questions 18 and 20)

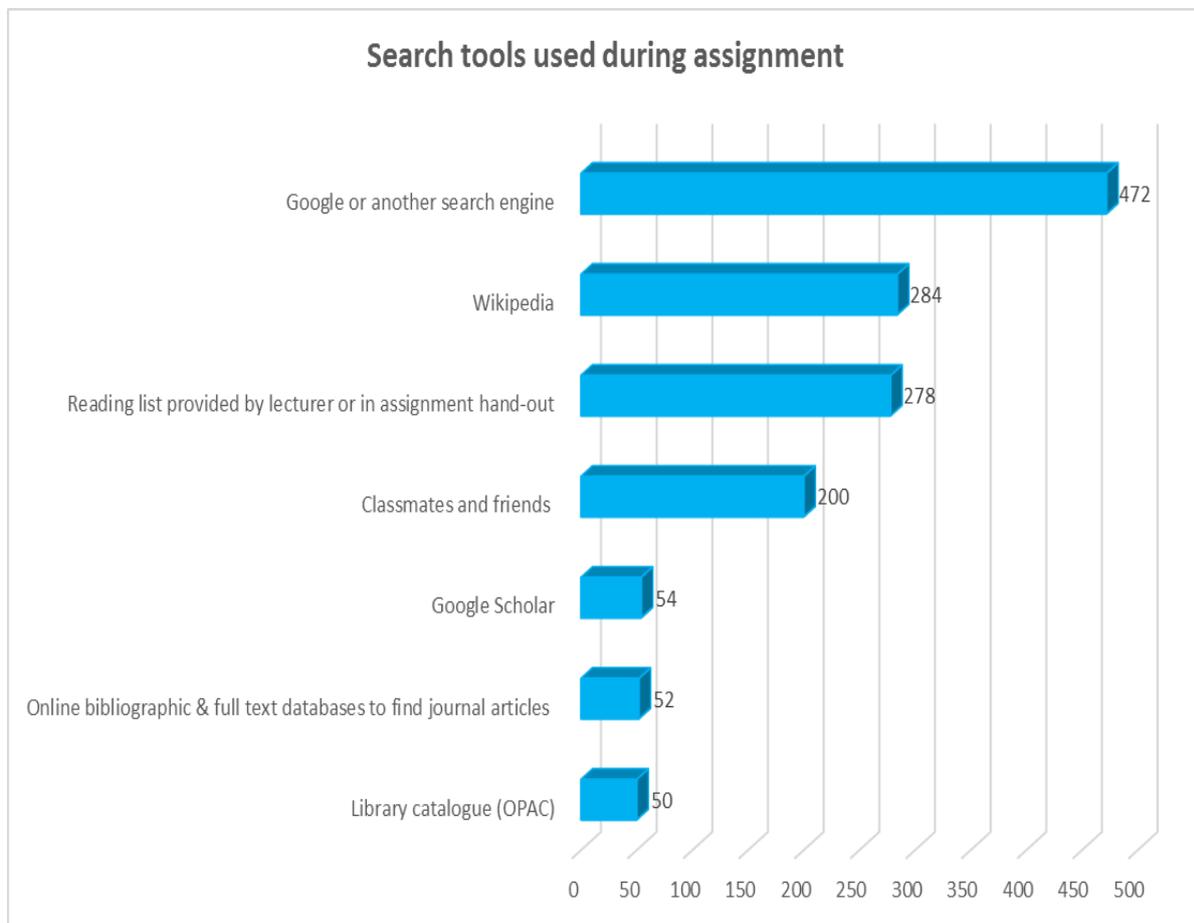
Item	Confused	Frustrated	Optimistic	Confident	Satisfied	Total	Grand
I have completed the assignment	4	1	119	25	46	195	
I am generally searching and gathering background information that pertains to the topic	6	14	78	28	6	132	
I am trying to understand the topic and the type of information I need to complete the assignment	31	12	56	7	10	116	
I have completed the information search and currently focusing on specifics and information relevant to the task	5	5	54	15	12	91	
I just arrived at an understanding of the scope of the topic and what is expected of me	5	3	44	3		55	
I am deeply involved in and writing my assignment		3	22	3	4	32	
Grand total	51	38	373	81	78	621	

N=621

5.4.6 SEARCH TOOLS AND INFORMATION SOURCES

As revealed in Figure 16, which summarises the responses to the question on what search tools respondents had used in the assignment, the most common tool by far is Google (or any other search engine), followed by Wikipedia and a reading list from lecturers; also worth noting is the fact that they do consult classmates and friends. This is similar to the findings of Barker, *et al.* 2006:1) in their study of information sources consulted by University of Washington College Engineering students in which the use of Google or any other Internet

search engine rank the highest as their information search tool, followed by their lecturer and then classmates as their sources of information.



N=711

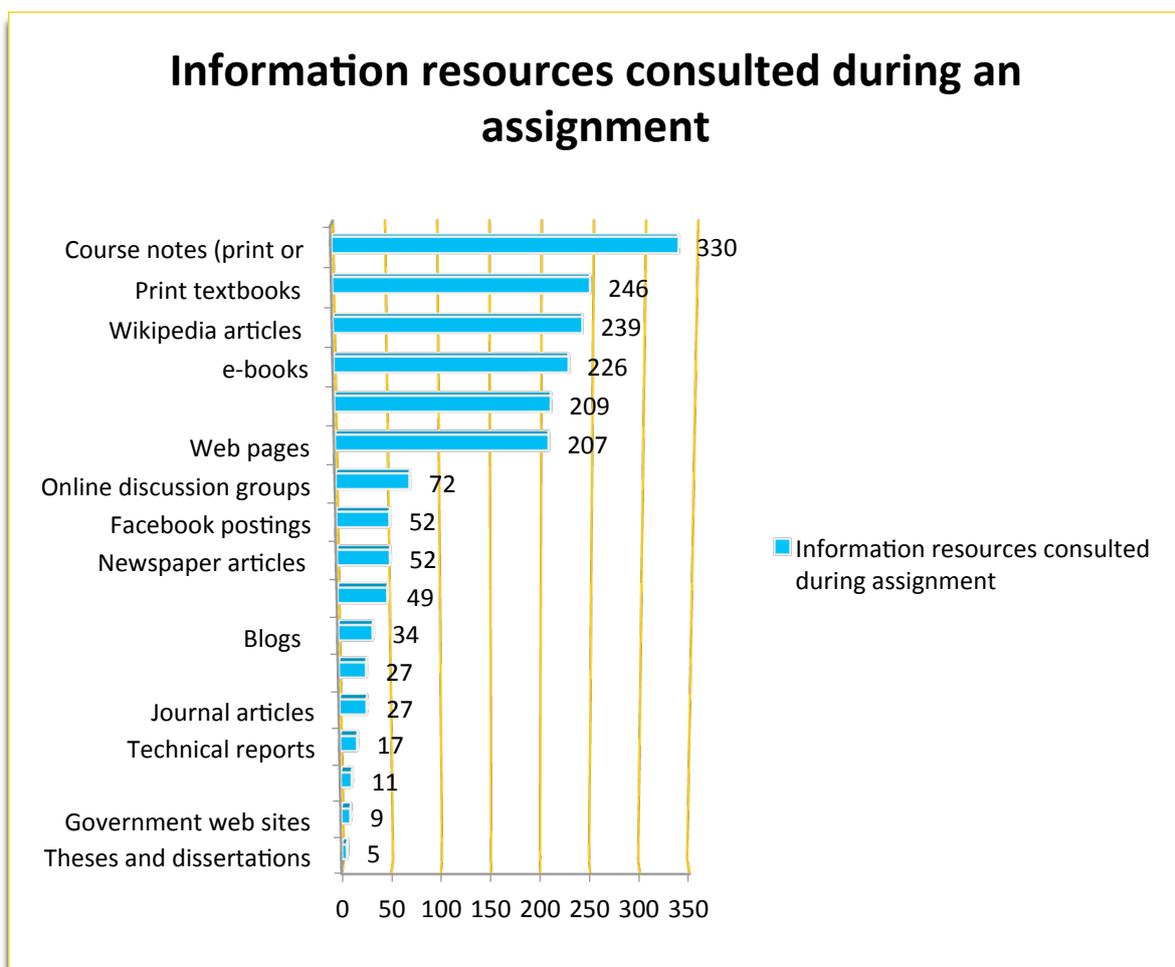
Figure 16: Search tools used during assignment (Question 21)

However, the OPAC and online bibliographic and full text databases seem to be unpopular with the students. Nine students indicated “other” of whom seven used www.bookboon.com, a free Website for ebooks and text books, while two wrote textbooks. This may be linked with convenience, a crucial factor in the process of information seeking as opined by Bawden and Vilar (2006); Griffiths and King (2008); Head and Eisenberg (2010); and Connaway, Dickey and Radford (2011).

A noteworthy number of respondents use course notes and print books in attending to their assignment as revealed in Figure 16. This appears to conform to the findings of Ejiwoye and Ayandare (2011) in their investigation of the information seeking habits of undergraduate

students of the Federal University of Technology, Ondo State, Nigeria discussed in Chapter three. However, the Ejiwoye and Ayandare (2011) study asserts that the reason why students consult course materials and print books is because of the erratic power supply which has negatively impacted on the use of the Internet; this may affect the use of the library and its resources on campus. But this may not be the case with FUPRE students as a marked number of the respondents have smart phones and laptops/notebooks; besides, as observed, FUPRE has a reliable power generating plant. It may well be because their lecturers place much emphasis on course notes in their teaching and learning.

Theses and dissertations, technical reports, journals, social media (Twitter, Delicious, SlideShare) and blogs appear not to be widely consulted information resources among the students during their assignments.



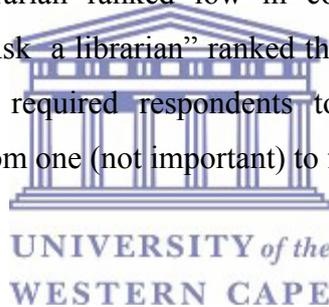
N=711

Figure 17: Information resources used during the assignment (Question 22)

5.4.7 CRITERIA FOR CHOOSING INFORMATION SOURCES

Respondents appear to be aware of the criteria for choosing a credible information source as indicated in Figure 18, as a number of respondents agree or strongly agree to the relevance of information source to their topic (68%), peer-reviewed content (60%), in-depth coverage (74%), and trustworthy and credible authorship (78%). At the same time, 60% of respondents agree or strongly agree that one of the criteria for choosing information sources is that it must be easy to find. Across the literature reviewed in Chapter three, convenience is the primary factor that determines the information sources consulted by students. The responses in the present study appear to conform to the findings of Connaway, Dickey, and Radford (2011), that convenience is a critical factor in information seeking in a variety of situations, including academic and everyday information seeking.

Again, consultation with a librarian ranked low in comparison with other criteria as evidenced earlier in Table 10. “Ask a librarian” ranked the lowest in the study of Barker, *et al.* (2006:1) too. Question 23 required respondents to rate the criteria for choosing information sources on a scale from one (not important) to five (very important).



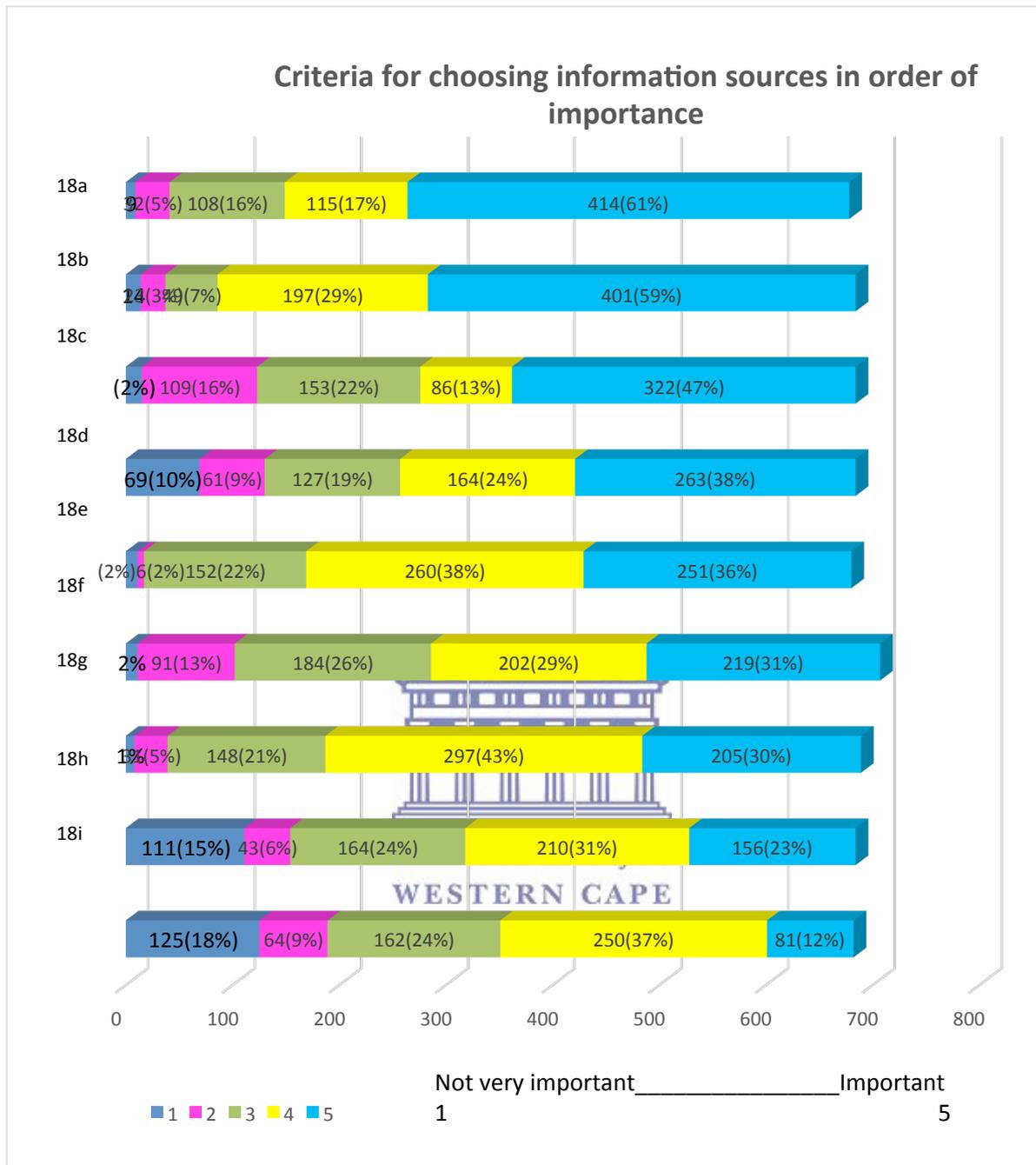


Figure 18: Criteria for choosing information sources (Question 23)

18a (N=678) Trustworthy and credible authorship

18b (N=684) Relevant to the topic

18c (N=684) Content has been peer-reviewed (assessed by experts before publication)

18d (N=684) Recently published

18e (N=689) In-depth coverage

18f (N=707) Easy to find

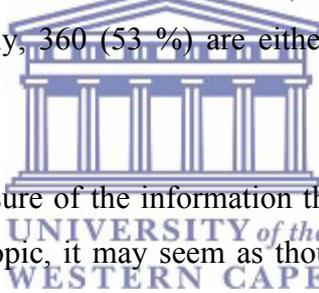
18g (N=689) Easy to understand

18h (N=684) Personal recommendation by lecturer or tutor

18i (N=684) Personal recommendation by librarian

5.4.8 FEELINGS DURING ASSIGNMENT

On a Likert scale, Figure 19 presents data on how students feel during their assignment. A total of 497 (74%) respondents agree or strongly agree that they are clear on the assignment topic and the type of information they need for their assignment (19a); to a large extent this shows that they are not rattled with confusion and anxiety. This aligns to a large extent with the data for 19d in which 490 (73%) disagree or strongly disagree to the statement “I do not understand the scope of the topic and what is expected of me”, similarly, 43% who agree that they feel overwhelmed and unable to form a deeper focus (19b). However, 19c shows a neutral dominance of 43%, that is, they are not sure if they have done enough reading to be clear on the significance of the topic of assignment. If added to those who have not done enough background reading, it would be 51% while 49% agree and strongly agree to have done enough background reading. Sixty-three percent (63%) claim that they are able to engage with and analyse information and their sources (19e) while 19g, similar to 19c, has a neutral dominance of 48%. Lastly, 360 (53 %) are either neutral or not satisfied after the completion of their assignment.



With 74% of respondents being sure of the information they need for their assignments and are clear with the scope of the topic, it may seem as though the assignments are either not sufficiently challenging or students are given specific information sources to work with. But with the dominant feeling of being neutral or unsatisfied with the assignment, that may be an indication of an unsuccessful information search. This data appears contradictory and does not seem to conform with Kuhlthau ISP model. However the qualitative data will clarify this.

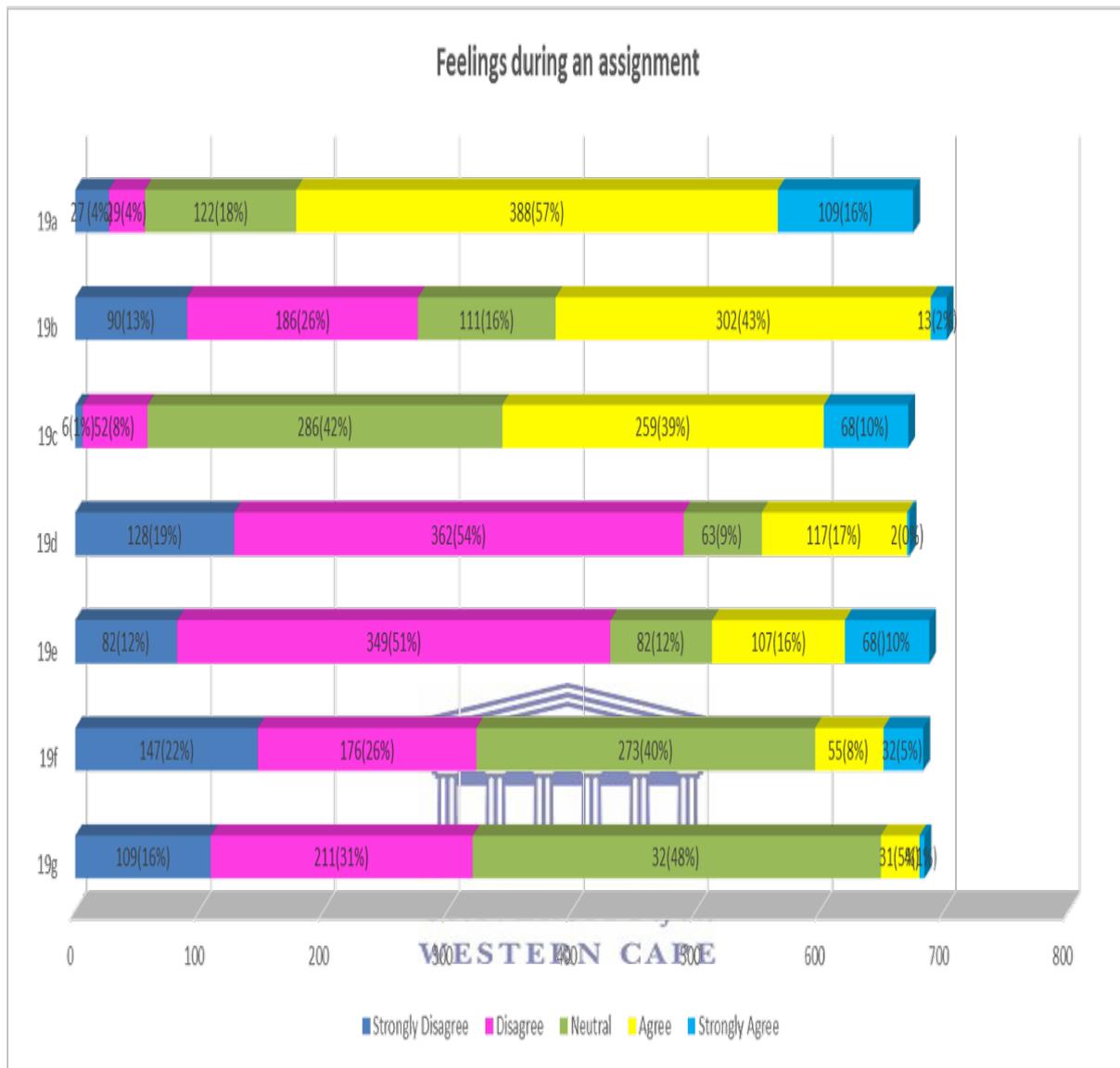


Figure 19: Feelings during a specific assignment (Question 24)

19a (N=675) I am clear on the assignment topic and the type of information I need

19b (N=702) I feel overwhelmed and unable to deepen my focus

19c (N=671) I have done enough background reading to be clear on the significance of my topic

19d (N=672) I do not understand the scope of the topic and what is expected of me

19e (N=688) I am unable to engage with and analyse the information and their sources

19f (N=683) I am not satisfied after the completion of my assignment

19g (N=684) I am unable to synthesize information from various sources

5.5 SECTION D: EVERYDAY LIFE INFORMATION SEEKING (ELIS)

This section presents data on respondents' everyday life information seeking. That is, their everyday life information needs, information sources consulted and whether they satisfy their information needs.

Tables 19 and 21 reveal, that apart from information seeking for academic purposes, students also seek information for everyday life, mostly on careers, money, health, entertainment and sports. Of the 18 students who indicated “other”, 11 seek information on religious issues, and six seek everyday life information on personal development while one looks for classical music. Studies by Savolainen (1995); Durrance and Hinton (2004); Ajiboye and Tella (2007); and Ejiwoye and Ayandare (2011) confirm that besides seeking information for academic purposes, students also seek information for everyday life concerns.

Table 18: Everyday life information needs (Question 25)

Item	No. of responses
Study related issue	435
Career	274
Money issue	179
Health	167
Entertainment or leisure	164
Sports/hobby	152
Relationship issue	136
Travel / Transport	92
Family	88
Accommodation	81
Legal issue	40
Sexual abuse	27
Crime	25
Other? Please specify	18

N=711

Only 91 students named their sources, probably because the next question, Question 27, lists the sources for them to choose. The sources named are presented in Table 20 which reveals many respondents use Google or other search engines to source for information in their everyday life needs. Interestingly, respondents also source for information via WhatsApp, Blackberry Messenger and 2go; these are mobile telephone platforms for instant messaging. One may assume that respondents do source everyday life information by chatting with

people who can provide them needed information via the mobile phone platforms.

Table 19: Information sources named by respondents for everyday life information seeking (Question 25)

Item	No. of responses
Google or other search engine	85
Watsapp/BBM/2go	72
Facebook/twitter	63
Friends	52
Wikipedia	34
Blogs	27
Newspapers	4
Bible	3
Goal.com/Chelseanews.com	2
Parents	2
Classical music sites	1

N=91



Just as in information seeking for academic purposes, a significant majority of respondents use Google and other search engines and Wikipedia in their everyday life information seeking, as shown in Table 20. The number of those who consult with a librarian is very low, similar to their academic information seeking. The number of respondents who consult other social media such as Delicious and SlideShare is low; it implies that they are more familiar with Web 2.0 technologies such as Wikipedia, Facebook, discussion groups and blogs. The three students who indicated “other”, consulted with a counsellor in the counselling unit at FUPRE.

Table 20: Information sources consulted in everyday life information seeking (Question 26)

Item	No. of responses
Google or other search engine	425
Wikipedia	216
Books in your own collection	164
Library books	159
Personal interaction with a professional	120
Newspaper articles	109
Email a friend or someone you trust	104
Facebook postings	97
Online discussion groups (listservs, chat rooms)	74
Journal articles	58
Blogs	54
University Web site	53
Other social media (e.g. Twitter, Delicious, SlideShare)	34
NGO Web sites	32
Government Web sites	22
Personal interaction with librarian (face to face or by email/sms)	8
Other	3

N=711

5.5.1 WHETHER OR NOT THE INFORMATION NEED IS MET

The majority of respondents found some, but were still looking for more information they needed in their everyday life, while for 186, they had already met their information need as shown in Table 21.

Table 21: Whether or not the information need is met (Question 27)

Item	No. of responses
Some but I am still looking for more	379
Yes	186
No	121
Grand Total	686

N=686

5.6 SECTION E: INFORMATION BEHAVIOUR OF UNDERGRADUATES IN THE WORLD OF WEB 2.0

This section presents data on the information behaviour of undergraduates in the world of Web 2.0. Responses elicited from Question 25 (Table 19) in Section D reveal that a number of respondents explore some Web 2.0 tools in their everyday life information seeking. This section probes more directly and reveals if these tools are used for academic and/ or other information seeking.



5.6.1 SOCIAL MEDIA PLATFORMS

Table 22 reveals that students use social media platforms both for academic and entertainment purposes, but largely for entertainment purposes. This conforms to the findings of some research described in Chapter three. Luo (2010:33-37) in a project sponsored by the Instruction Section of the Association of College and Research Libraries (ACRL) discussed in Chapter three shows that students who use Web 2.0 tools such as Facebook and YouTube tend to use them for social interactions. Similarly, EDUCAUSE Centre for Applied Research (ECAR) also found that across 184 US-based institutions that three out of every five student, who participated in the study both in 2011 and 2012, use social networks like Facebook and online forums for interacting with friends more than for academic communication (Dahlstrom, 2012). More light will be shed on this in the Phase 2 interviews with the students which will be presented in Chapter six.

The data presented in Table 22 confirms the finding in Tables 20 and 21, that respondents use Wikipedia for academic purposes. There seem to be less use of emails for entertainment purpose probably because Facebook has features which incorporate email, photo-sharing, video and voice chats (Funk, 2009).

The usage of social bookmarking tools such as Delicious is low despite its usefulness for academic purposes. Delicious aids the organisation and categorisation of Web pages for easy retrieval (Redden, 2010: 213-214).

Seventy-nine respondents indicated “other” Web 2.0 tools for entertainment. They are Blackberry messenger (32), and WhatsApp (61) and 2go(67). These mobile network platforms are for text (instant) messaging, audio and video sharing. This conforms to the finding presented in Table 20 that respondents use mobile network platforms for interactions in their everyday life information seeking.

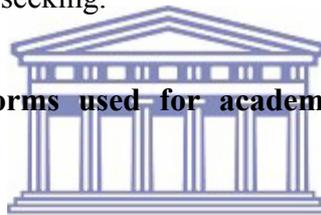


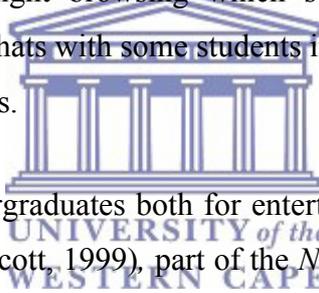
Table 22: Social media platforms used for academic and entertainment purposes (Question 28)

Item	Academic purpose	Entertainment purpose	Both
Social networking (e.g. Facebook, twitter)	124	278	122
Video sharing sites (e.g. YouTube)	38	167	68
Photo sharing sites (e.g. flickr)	18	113	15
Blogs (Weblog, moblog and diaries)	18	80	19
Online discussion forums eg. yahoo group, Google circles	98	83	34
Emails	154	90	56
Virtual worlds (e.g. Second life, Sims)	83	63	34
Wikis (e.g. Wikipedia)	208	37	4
Social bookmarking tools (e.g. Delicious)	53	45	21
Slide sharing sites (e.g SlideShare)	28	32	10
Other		79	

N=711

Table 23 is a cross tabulation of Question 5 and 28, that is, social media platforms used for academic purposes only versus level of student, to determine any similarities and/or differences in their use of social media for academic purposes. The 100 level students appear to be more engaged with emails, social networking sites and online discussion forums than the 300 level students. Notably, the 300 level students use Wikipedia more than the 100 level students. The journaling and analysis of assignments in Chapter six will throw more light on this.

It is surprising to note that a sizeable number of students do take advantage of virtual worlds such as Second life and Sims despite the challenge of Internet access. Nonetheless, Sims 3 and Sims 4 released in 2009 and 2014 respectively can be accessed offline (<http://www.thesims.com/>) while Second Life is an online virtual world (<http://secondlife.com/>). However, there are cheap bundles by telecommunication service providers for night calls and night browsing which students do take advantage of as mentioned during informational chats with some students in the Department of Petroleum and Electrical Electronics Departments.

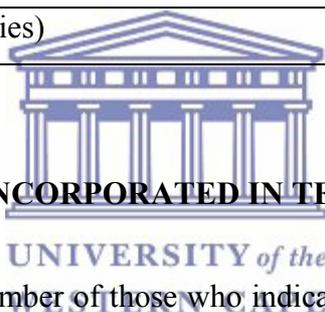


The use of social media by undergraduates both for entertainment and education may imply that they are *digital natives* (Tapscott, 1999), part of the *Net Generation* - the first generation to grow up in a global environment that was already connected before they were born. They are also referred to as the “*native speakers* of the digital language of computers, video games and the Internet” (Prensky, 2001:2). Digital immigrants use the Internet and World Wide Web as the last resort when browsing for information (Prensky, 2001:3).

Table 23: Social media platforms used for academic purposes

Item	100 level	300 level	Grand Total
Wikis (e.g. Wikipedia)	90	118	208
Emails	98	56	154
Social bookmarking tools (e.g. Delicious)	78	75	153
Social networking (e.g. Facebook, twitter)	79	45	124
Online discussion forums eg. yahoo group, Google circles	63	35	98
Virtual worlds (e.g. Second life, Sims)	36	47	83
Video sharing sites (e.g. YouTube)	20	18	38
Slide sharing sites (e.g. SlideShare)	15	13	28
Photo sharing sites (e.g. flickr)	10	8	18
Blogs (Weblog, moblog and diaries)	6	12	18

N=711



5.6.2 WEB 2.0 PLATFORMS INCORPORATED IN TEACHING AND LEARNING

For the 100 level students, the number of those who indicated that their lecturers incorporate Web 2.0 tools in their teaching and learning is low compared to 300 level, as shown in Table 24. This shall be delved into in Chapter six.

Table 24: Web 2.0 platforms incorporated in teaching and learning by Lecturers (Question 29)

Item	100 level	300 level	Grand Total
Yes	47	158	208
No	322	152	475

N=711

One hundred and seventy-seven (177) students specified the Web 2.0 tools incorporated in their teaching and learning by lecturers as follows: Wikipedia-151; Email-79; Blogs-11. Of the 79 who indicated email, one wrote: “just to receive emails”.

The vast majority of students do make entries on social media platforms, in the form of text, and uploading of photos and videos. Web 2.0 encourages creativity, interaction and constructivist active learning rather than merely consuming information as in Web 1.0. However, very few respondents do actually blog as evident on Table 25. Respondents prefer the quick chatting and interactions on Facebook.

Table 25: Uses of Web 2.0 tools (Question 29)

Item	No. of responses
To make entries on Facebook, Twitter	642
To add video clips to blogs, Facebook entries, YouTube	157
To add audio clips to blogs, Facebook entries, YouTube	138
To create blogs	83

N=7115.7



5.7 CONCLUSION

This chapter has summarized and analysed the quantitative data. Certain key themes have emerged across the various sections.

Throughout the chapter there are references to Kuhlthau's ISP model and the tentative conclusion is that FUPRE students' information behaviours appear not to conform to the model. Students experience the affective stages of the ISP but the experience is not consistent with the model. The majority of the respondents show high levels of confidence and optimism throughout the assignment writing which may imply the assignment is not sufficiently challenging or students are fed with the information to work with.

With regards to students' preferences in terms of sources and resources, the chapter indicates an overwhelming preference for online resources. Data relating to the use of library and its bibliographic databases tend to show that they are underused by students for their academic

purposes. This echoes the research in students' information seeking covered in Chapter three, for example Dahlstrom (2012) and EDUCAUSE (2007). The data provides support for the Convenience Theory school of thought as described by Connaway, Dickey and Radford (2011). It seems that time constraints and the inconvenience of traditional sources might be critical factors in the choices that students make in their information seeking.

Regarding the problems students experience in their information seeking, physical and intellectual barriers are revealed in the questionnaire survey. The primary barrier was physical, relating to technical issues such as system hangs, server down time, access speed, and erratic power supply. The intellectual barriers concern their inability to choose appropriate subject headings, keywords, formulating search strategies, and choosing appropriate databases. According to Burnett and Jaeger (2011:167-168) and Burnett, *et al.* (2008:168), physical access is a precondition to intellectual access and problems with both constitute a major barrier to information seeking. Intellectual barrier is an individual problem which translates to lack of information literacy skills.

Apart from seeking information for academic purposes, the data analysed also reveals that students not only engage in information seeking for academic purposes but also for their everyday life; this aligns with the research of Savolainen (1995). FUPRE students engage in everyday life information seeking; the top three on the list are career, money and health issues. Data reveal that the common ground between the academic everyday life information seeking is the use of the Google search engine and Wikipedia.

The majority of the students own electronic devices and the top on the list is a smart phone owned by two out of three of them, followed by laptop/notebook and iPad or other tablet device. This might explain the finding that they use of social media is very popular among the respondents. It seems however, that they are more in use for entertainment than for academic purposes. The top three Web 2.0 platforms on the list for entertainment are social networking sites (Facebook and Twitter), video sharing site (YouTube) and Photo sharing sites (Flickr). For academic purposes, the top three are Wikipedia, emails and social networking sites such as Facebook and Twitter.

Only about half of the 300 level students mention that their lecturers incorporate Web 2.0 tools in their teaching and learning, while for the 100 level students, the number is very low (less than one quarter).

These findings will be explored further in the next chapter which focuses on the data arising from the journaling with the students, analysis of their assignments, large group discussions, interviews with key informants and observations.



CHAPTER SIX

SUMMARY AND ANALYSIS OF QUALITATIVE DATA

6.1 INTRODUCTION

Chapter six provides the summary and analysis of the qualitative data in phases two and three of the data gathering. Phase two is the analysis of policy documents, interviews with the University Librarian, e-Librarians, Head of Web Unit and written interview responses of 12 lecturers. The phase three data gathering process involves both 100 and 300 level students: they are large group discussions, analysis of three assignment questions, analysis of assignments, and journaling.

The rest of the chapter is organised as follows:

Chapter 6.2: This section presents the analysis of policy documents: the library guide, the FUPRE Course Synopses for General studies and Entrepreneurship programme, the Use of library and study skills (GSE 104) course outline; and the university Website. The essence is to understand how the university library, in reality, serves the university community as a laboratory and the centre for information literacy education.

Chapter 6.3: The analysis of open-ended interviews with 12 lecturers which elicited responses on how they conduct their classes, assignments, and the use of Web 2.0 tools in the process of teaching and learning, is presented.

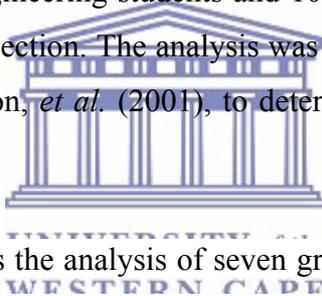
Chapter 6.4: This section presents the data analysis of two interview sessions with the University Librarian; one face-to-face and the other telephonic. The main themes that emerged from the interviews are the library holdings and space, the level of information literacy education anchored in the library, and the use of Web 2.0 tools.

Chapter 6.5: This section presents the findings of the interview with two staff of the eLibrary. The findings reveal the facilities available to the university community, and the day to day running of the eLibrary.

Chapter 6.6: Findings from the interview with the Head of Web Unit, ICT Department, FUPRE, on the level of Internet connectivity on campus, availability of the learning management system to staff and students and general support to the university are presented in this section.

Chapter 6.7: The analysis of large group discussions (LGDs) with eight students in 100 level and 15 students in 300 level are presented. The essence of the LGD was to explore how the same or similar questions in the survey would be answered in face to face interactions with a few students in order to really ascertain their information behaviour and to confirm or contradict the submissions in the survey; better still to gather a variety of information that could not be statistically expressed.

Chapter 6.8: Three assignment questions administered to 300 level Petroleum Engineering students, 300 level Electrical Engineering students and 100 level students across the various departments are analysed in this section. The analysis was done based on Bloom's taxonomy (Appendix 4) revised by Anderson, *et al.* (2001), to determine the thinking order and skills encouraged by the assignments.



Chapter 6.9: This section presents the analysis of seven group assignments carried out by 77 students in 300 level Petroleum Engineering Departments, 50 hand written assignments by 300 level students in Electrical Electronics Engineering Department, and 311 hand written and typed assignments by 100 level students across the various departments in FUPRE. The analysis is carried out to ascertain students' actual information literacy skills vis-a-vis their self-knowledge about their information literacy skills. All assignments are evaluated using the rubric in Appendix 9 prepared by the researcher which incorporates the various aspects of information seeking in the process of writing an assignment. The rubric draws from ACRL information literacy standards (American Library Association, 2000; ACRL, 2002), specifically standards two, three, four and five.

Chapter 6.10 presents findings from the journaling with 77 students in 300 level Petroleum Engineering Department writing assignment and 10 students in 100 level across the various departments. The journaling took place on WhatsApp Messenger, a cross-platform mobile messaging application which allows instant exchange of texts, audios and videos

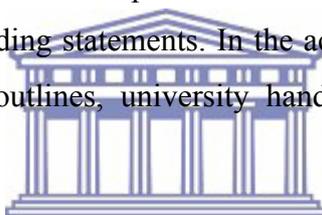
(www.whatsapp.com). Only two students in 100 level chose to interact with the researcher on Facebook because their phone was not WhatsApp compliant.

The essence of the journaling exercise with the students was to understand how they go through their assignments; their thoughts, feelings and actions as explicated by Kuhlthau's ISP model, during the various stages of assignment writing.

Chapter 6.11: This section concludes the chapter

6.2 ANALYSIS OF POLICY DOCUMENTS

Policy is a set standard meant to guide the process of decision making in order to accomplish the desired outcomes. A policy document is a statement of intent (Anderson, 2005), a *modus operandi* that serves as a benchmark for performance and possible outcomes. Therefore, policy documents are written guiding statements. In the academic parlance, such documents are approved curricula, course outlines, university handbook and library guides, among others.



For the purpose of gaining further clarity on the actual position the FUPRE library occupies in terms of serving the university community as a learning laboratory, and the centre for information literacy education, the following documents were examined:

- Library guide
- Federal University of Petroleum Resources, Nigeria: Course Synopses. *General studies and entrepreneurship program*. pages 2-3 of 140
- Use of Library and Study Skills (GSE 104) course outline
- The University Website: www.fupre.org.ng

6.2.1 FUPRE LIBRARY GUIDE

The FUPRE library guide is a 17-page document (See Appendix 6).

On page iii is a caption titled, *Questions to reflect on*, with the following salient questions:

*Do you know what your university library is to you?
Do you know that a library is to an information seeker what the hospital is to a sick person?*

Have you ever thought of the fact that it is easier for a camel to go through the eye of a needle than for an undergraduate to pass out of the University without adequate use of the library.

These statements appear to be addressed to the university undergraduates even though they are not and should not be the only users of the library within the university community; however, they are the primary library user. Importantly, they question the undergraduates' knowledge and understanding of the high significance of the library to the success of their academic pursuits. This implies that the library is fully ready in human and material resources to satisfy the information needs of its users and also create platforms and opportunities for them to acquire the much needed information literacy skills which have been identified as graduate attributes in this 21st century as discussed in Chapters two and three.

Dwelling on the hospital analogy in the library guide, apart from providing specific treatment for the one who reports sick, it is expected that issues about patients' lifestyle are also very crucial to the doctor/nurse; therefore, attending to this aspect as well can enhance the overall health and wellbeing of the patient. Similarly, the library should do more than just be an information provider to the undergraduates upon specific request(s), but also teach them in theory and in practice, information literacy skills that will prepare and establish them for employability, even though information literacy is for lifelong learning. These are the implications of the questions to reflect on.

A brief history of the library on page 1 of the guide shows that FUPRE library was established on the 6th of September, 2010, but became operational in October, 2011, with about 3,000 books, 85 journals and databases of over 2000 electronic journal articles in oil and gas, general sciences, engineering, ICT and earth science. The vision statement of the library is:

To become world class center of excellence in support of teaching, learning, research, consulting and extension services.

This lofty vision implies that the library has both a focus and aspiration that will inform its support to the university academic lecturers and students in achieving the five information literacy standards with their respective performance and learning outcomes as spelt out by ACRL (2002) in Appendix 2. However, the library guide does not explicitly mention information literacy and neither does it endorse ACRL standards.

The library also has 11 broad goals and objectives spelt out on pp.2-3. These broad objectives can be summarized into four: to serve as efficient information provider (# 1,2,3,5,6,7 and 11); to create a library without walls and computerize their processes (#7 and 10); to encourage collaboration both locally and internationally (#6 and 9); and to create a conducive environment for users (point 4).

These objectives are central to the mission of the higher education institution as elucidated in the vision statement of the university (www.fupre.edu.ng), discussed in Chapter one. However, worth noting is the import of information literacy which is also decisive as regards the core mission of any higher education institution but not reiterated in the broad goals and objectives of FUPRE's library guide.

Pages 4-15 of the library guide discuss the opening hours, library holdings, services, library regulations, borrowing rights and privileges, and decorum.

6.2.2 GENERAL STUDIES AND ENTREPRENEURSHIP PROGRAM

As discussed in Chapter four, apart from the Colleges of Science and Technology, FUPRE has a Department of General and Entrepreneurship Program which administers nine compulsory courses for students in 100, 200 and 300 levels. These courses are meant to:

expose students to liberal education through which they can develop and expand their awareness of social, cultural and natural environments. The goal is to produce well rounded graduates that are intellectually sound, competent in the use of English and equipped with entrepreneurial skills to contribute maximally to societal development in an environment of peace and social cohesion.

Furthermore, the core objectives of the programme include:

- *Acquisition of a body of situational knowledge relevant outside the respective field of specialization of the students for productive, healthy living and promotion of peaceful coexistence.*
- *Development of competence in the use of English Language as a tool for their studies and effective means of communication in the society and in their future employment/enterprise.*
- *Prepare students for a post university life with opportunities for job competence and entrepreneurial skills.*

Of interest to this research is one of the courses called the *Use of Library and Study Skills*, the importance of which is not highlighted in the objectives of the programme. This may be because the head of department is not a librarian and may not necessarily be aware of the

significance of emphasizing the importance of information literacy skills in the broad objectives of the department, which may go a long way in informing the content and teaching methods. This highlights the need for collaboration between faculty (lecturers), librarians and academic administrations as suggested by Abubakar and Isyaku (2012:3) after observing that information literacy at the University of Ilorin, Nigeria, mainly involves librarians without partnership with the faculty members.

The course description of *Use of library and study skills* (GSE 104), a 3-unit course reads:

History of libraries, library and education, university libraries and other types of libraries; study skills (reference services), types of library materials, using library resources including e-learning, e-materials etc; understanding library catalogues and classification; copyrights and its implications, database resources, bibliographic citations and referencing.

Obvious in the course description is the 20th century role of the library in taking students through the types of information sources (Swartz, *et al.* 2007: 109-122, Owusu-Ansah, 2003: 219) and how to source for them which is implied in the course title. The only aspects of the information literacy that may be relevant to the global trends are: using library resources including e-learning, e-materials; copyrights and its implications, database resources, bibliographic citations and referencing. However, not inclusive are the 21st century core information skills, which can be acquired following the information search process (Kuhlthau, 2004, 2004, 2007, 2008), guided enquiry (Kuhlthau, Maniotes & Caspari, 2007, 2010, 2012), and ACRL information literacy standard (ACRL, 2002, 2005, 2011, 2012).

Again, this gap may be a reflection of the non-collaboration between the library and the faculty. However, clarity will unfold with further analysis.

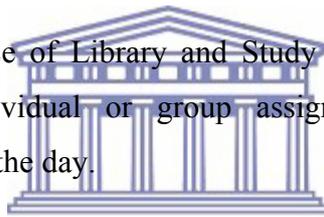
6.2.3 USE OF LIBRARY AND STUDY SKILLS (GSE 104) COURSE OUTLINE

The course outline is a two page document which mentions the purpose of the course, lists a 7-point objective of the course, recommends study materials, highlights teaching methods, test/examination conduct, attendance, grading system, provides a list of class topics per week for 10 weeks and the remaining three weeks for revision, continuous assessment test and examination, See Appendix 8.

The primary purpose of the course is “to introduce students to the functions and resources of a library”, while the goal is “to provide students with knowledge and skills in order to intelligently and competently use library facilities, tools and resources”. These statements align with the traditional role of information literacy course which was primarily meant to develop skilled users who are able to find and use information in the library. However, this changed in the 1980s (Curzon, 2004:40). The various models of information literacy education discussed in Chapter three are now being adopted for use in undergraduate curricula globally so that the standards and outcomes spelt out by ACRL can be achieved. It appears FUPRE is being left out in this.

The section for recommended study materials on the course outline has a list of five books, no electronic resources listed. Well, this may allude to the nature of the content of the course which does not provide room for robust information seeking, search and use.

The teaching method for the Use of Library and Study Skills as explained in the course outline includes; lectures, individual or group assignments, class presentations and discussions based on the topic of the day.



All the 405 students in 100 level across the two colleges are taught at once, and the instructors use microphones. The course is offered only in the first semester. During the first semester of 2014, the researcher observed two lectures and noted that the course is taken only for two hours per week; one hour per class. There are four instructors (library staff) and a teaching assistant (library staff) in charge of the course. The course content is shared among the four instructors on a weekly basis. While one is teaching, the others stand at strategic locations in the lecture hall to keep the class in order while the teaching assistant does the same.

However, one question that begs for an urgent answer is, rather than have all four instructors in every class while only one teaches, why not divide the class into four for better pedagogy? To provide a modest answer to this, over a period of three months, the researcher observed that FUPRE does not have enough lecture halls for classes and offices for staff. Apart from the heads of department who occupy private offices, lecturers share offices.

The researcher noted that in the 26 offices observed, between two and three lecturers occupied an office depending on the size. For the non-teaching staff, sometimes up to six people occupied an office as observed when seeking to book appointments to meet with heads of departments and administrators. In the same vein, lecture halls are not enough in number to cater for the various classes across the colleges. Nevertheless, there are many physical buildings under construction and the space challenge will soon be a thing of the past.

Also, students do not have convenient sitting areas outside the classrooms where they can discuss their academic work with their peers; most times they loiter and stand around the lobby in front of the classrooms. It is for this same reason that one of the large group discussions, which will be discussed in later session, was held in the library lobby.

The researcher observed two *Use of Library and Study Skills* classes where students were taught library information resources and their formats. One key observation was that the classes were not interactive; learning was passive, being passed from instructor to students as against the constructivism approach to learning which encourages activity and participation (Kuhlthau 1991, 1993, 2004, 2008; Todd, 2006; (Kuhlthau, Heinström and Todd, 2008). It was a “chalk-and-talk” classroom setting. Even though the class was a large one, participation, attentiveness and understanding would have been enhanced using a projector and slides with images which could have helped the students in no small measure to understand the class content better; that is, the images of the various library resources, their locations and formats. Images address more visual way of learning.

The list of weekly classes by topics is rich in content in terms of the library and its information sources; however, it is silent about information literacy. Though for week seven, the topic is how to study. Unfortunately, the content is not available to the researcher in order to ascertain what it teaches. However, two hours of lectures on how to study is not the same information literacy education.

6.2.4 FUPRE WEBSITE: www.fupre.edu.ng

The FUPRE Website contains an array of information on the courses offered in the colleges of science and technology; the laudable vision and mission mentioned in Chapter one, among

others. Two pages on the Website are of interest here: the library, and prospects for academic development.

The library link: Most of the content in the library guide discussed earlier feature on the library link; except for contact and e-resources.

- The e-resources are open access journals and open scholarship listed as follows, while the comments/observation of the researcher goes with each:

Open access journals

<http://www.doaj.org> - The directory of Open Access Journals cover over 1,992 journals. The service covers full-text, quality controlled open source scientific and scholarly journals.

Comment: Free and full text accessible

<http://www.e-journals.org> - Provides links to e-journals in all subject fields. It also lists journals with free on-line text articles.

Comment: Open access journals and journals on Virtual lab Website.

<http://www.nigeriavirtuallibrary.com>: National Universities Commission (Virtual Library Project). *Comment: The username and passwords are listed but the Website is a dead link.*

<http://www.refdesk.com> - Fairly extensive collection, actually arranged as a portal with news headlines, and other features as well as links to valuable reference sources.

Comment: An accessible open source reference service.

<http://www.digilib/journals> - This is a collection of electronic journal articles of over 2000, with special emphasis on petroleum, oil and gas and science.

Comment: Webpage is not available

Open scholarship

<http://www.lib.umb.edu/drum> – Healey Library, University of Massachusetts, Boston, US
Thesis and Dissertations from the University of Maryland.

Comment: Only journal abstracts are accessible without login

<http://dspace.mit.edu>: DSpace@ MIT (Massachusetts Institute of Technology): is a growing collection of MIT's research that includes peer-reviewed articles, technical reports, working papers, theses and more. End-user downloads of the 70,000+ items regularly exceed one million per month.

Comment: Only accessible to students and staff of MIT

<http://dash.harvard.edu> - Harvard University: Digital Access to Scholarship at Harvard

Comment: Openly available

<http://www.collectioncanada.ca/thesescanada/index-e.html>: Library and archives, Canada; exclusively for theses and dissertation.

Comment: It is a link on a Canadian immigration Website, full texts of theses and dissertations are available upon search.

<http://tinyurl.com/4x6fa8z> - Cornell University. It connects to the ecommons@ Cornell University Library on: <http://ecommons.library.cornell.edu/handle/1813/39>.

Comment: Theses and dissertations are openly available.

An overview of the library pages shows that the e-resources are freely accessible. However, no mention is made of databases and eBooks.

- *Prospects for academic development link*

The Prospects for Academic Development link has some details that reflect that FUPRE is aspiring to be a top class university with 21st century resources and facilities to train first class students who will be of immense value and anchor for Nigeria's vision 2020: 20. The validity of the claims will be confirmed with further analysis in subsequent sections.

Summary

This section has analysed some policy documents and the FUPRE Website. There is a strong indication that the FUPRE library is not anchoring information literacy education as expected of a 21st century academic library which involves teaching core information skills as spelt out

by the ACRL (2002) and guided learning (Kuhlthau, Maniotes & Caspari, 2007, 2010, 2012). Rather, there is more focus on teaching the traditional role (Curzon, 2004: 40) of the library.

The *Use of Library and Study Skills* course is not directly under the control and administration of the library; it appears there is no collaboration between the library and the faculty in anchoring information literacy education. The teaching methods need to be improved, as well as the course content.

Based on observation, the university seems to have infrastructural challenges; classrooms are not enough, many offices are shared, and students do not have small venues where they can interact among themselves in case of group work.

These pose huge challenges to the only university of petroleum resources in Nigeria and Africa, more especially as it occupies a strategic position in providing human capital to the nation's most vibrant sector: oil and gas.



6.3 FINDINGS FROM OPEN-ENDED INTERVIEWS WITH LECTURERS

Students' information literacy levels and information seeking process are not entirely within their control. There are some crucial extrinsic factors that impact on their general information behaviour. Factors such as standard of information infrastructure, library resources, Internet connectivity and mode of teaching may go a long way in determining students' attitudes to learning and general skills' acquisition; in this case, information literacy.

The open-ended interviews with FUPRE lecturers elicited responses on how they conduct their classes, assignments, and the use of Web 2.0 tools in the process of teaching and learning. These, amongst others, are the factors that impact the undergraduates' information behaviour which is the primary enquiry of this PhD research work. Also, the interviews gathered data on the respondents' perceptions of their students' information literacy skills.

In administering the interview protocol, six respondents were first of all targeted: the four librarians who teach the *Use of Library and Study Skills* course (GSE 104) to 100 level students across the colleges of science and technology, one lecturer each in electrical engineering (EEE 314) and petroleum engineering departments (PNG 315) whose students,

participated in the Phase 11 of the research work. They all completed the interview protocol. Afterwards, one lecturer in each of the 10 departments across the colleges of science and technology was randomly selected for the open-ended interview, out of which six responded, making a total of 12 responses, as shown in Table 26.

Table 26: Respondents (lecturers) and their departments

No.	Department	Assignment for sample students
L1	Petroleum and Natural Gas Engineering	PNG 315
L2	Electrical and Electronics Engineering	EEE 314
L3	Library	GSE 104
L4	Library	GSE 104
L5	Library	GSE 104
L6	Library	GSE 104
L7	Computer Science	None
L8	Physics	None
L9	Electrical and Electronics Engineering	None
L10	Chemical Engineering	None
L11	Chemistry/Industrial Chemistry	None
L12	Geology	None

6.3.1 MODE OF TEACHING AND LEARNING (QUESTION 8)

Teaching and learning in the current era of information explosion has gone beyond the traditional approach in which an instructor assumes both the directive and authoritative roles, but rather interacts and negotiates with students to unravel the sort of dynamism that goes with knowledge acquisition, which is experience based (Giesen, n.d). The constructivist approach to learning on the other hand encourages and enhances activity and participation (Kulthau, 1991, 1993, 2004, 2008; Todd, 2006; Kuhlthau, Christie, 2005; Heinström and Todd, 2008). Kuhlthau's guided enquiry is grounded on a constructivist approach to learning (Kuhlthau, 2010:21); a flexible yet creative approach.

Enquiring as to whether students are able to generate their own meaning through interactions during course lectures or whether lecturers typically teach and provide sources for further reading, six respondents submitted the following responses:

L1: I typically lecture and later give them sources for further reading.

L4: Yes, I teach them, give them notes also and sometimes direct them to source for further information.

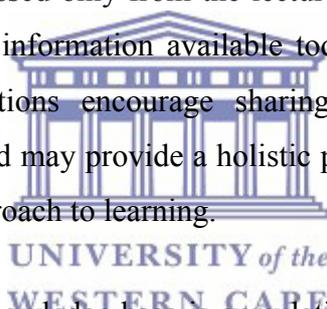
L9: I typically teach and then give them sources for further reading.

L10: I generally teach/lecture them and give them other sources for further reading

L11: Yes, during teaching, day to day examples are used to enable the students understand the course the better.

L12: Yes they demonstrate good level of understanding of the relevant subject matter by asking intelligent questions and making relevant contributions

With the volume of information available online, it is a good endeavour for lecturers to encourage their students to explore sources that can further aid their understanding of the subject matter. However, there is more to teaching and learning! Going beyond the traditional approach where knowledge is passed only from the lecturer to the students is crucial in this 21st century; with the wealth of information available today, lecturers can also learn from their students. Besides, interactions encourage sharing, this brings many angles and perspectives which when explored may provide a holistic picture of the subject at hand. This is the crux of a constructivist approach to learning.



In science and technology, the knowledge base is cumulative, inventions and discoveries are grounded on former ones (Heinström, 2002:80). Hence, this allows room for deep thinking, innovation and creativity which should be taken advantage of.

The researcher had the opportunity to observe two sessions of the *Use of Library and Study Skills course* at FUPRE. It was a class of all the 100 level students across both colleges, about 300 students were in attendance. Having an interactive class with such a large number of students is a challenge; learning was passive; knowledge being passed from lecturer to students, a projector was not in use during the classes. However, even though using a projector is more of a teacher-centred approach, with such a class population, it would serve the purposes of improving students visual focus and concentration, as well as increase their spontaneity and interactivity (with concepts, points, and images, albeit, on an individual basis). Worth noting is the fact that FUPRE is only seven years old, more lecture halls are under construction and with time, the challenge of space will be overcome and hopefully that of teaching and learning methods.

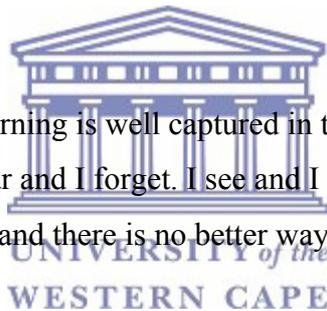
Worth noting are three lecturers (L2, L6, L7) who differed in their responses. They tend to align themselves with the constructivist approach to teaching and learning:

L2: The students are taught and also given sources for further studies. However, they are encouraged to express their own meaning without losing the meaning of whatever they have been taught. After teaching them, they are referred to the Internet to get broad and further knowledge of what they have been taught to broaden their horizon.

L6: My lectures usually contain questions to test their understanding of something I just explained.

L7: Sometimes, I ask a question and fake a poll of different answers. Other times, I put forth an idea and ask them: what do you think?

Using test questions drawn from current topics as expressed by L7 stimulates students thinking and allows them to make their own meaning. It features active, challenging, interactive and attentive learning (Churches, 2009; Kuhlthau, 2010: 3; Kuhlthau, 2012). These are the very essence of the constructivist approach to teaching and learning, and guided enquiry.



The constructivist approach to learning is well captured in the popular quote by Confucius (Brainy Quote 2001-2015): “I hear and I forget. I see and I remember. I do and I understand”; “to do” is to be active in learning and there is no better way to learn. But this was not the case in the classes observed.

6.3.2 CONDUCTING OF ASSIGNMENTS (QUESTIONS 3 and 6)

The questions investigate, first of all, whether lecturers do tell the students where to search for information when giving them assignments; and secondly, to find out whether they do encourage students to explore the vast information resources provided on the Internet when they give assignments.

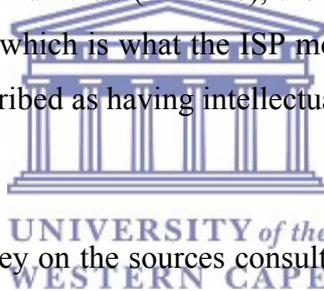
The responses revealed that 10 lecturers do tell their students where to look for information when they are giving assignments while two librarians (L5, L6) do not. Eight of the 10 respondents do refer their students to the Internet while two specifically refer them to Google (L2 and L7). Other sources listed are e-books (L7, L11), textbooks (L8, L10), library (L2, L11), reference materials (L4), and materials from senior students (L1).

When giving assignments, nine respondents usually insist that students go online to look for information. This conforms to the data gathered in the survey questionnaire presented in Figure 16 (Question 22 of the Questionnaire) in which Google and other search engines ranks first as the search tools employed during their assignment, followed by Wikipedia. Some mentioned emphatically:

L1: Yes, I insist that they source for materials everywhere - online, libraries, books, ebooks, etc

L3: Yes, because that is the only place they can get current and relevant information that would suit their information needs

Exploring the complex information environment of the 21st century is a necessary preliminary step in the process of information literacy skills acquisition (Broch, 2000; Kuhlthau, Heinström and Todd, 2008; and Nkomo, 2009). Nonetheless, this is not the hard part of information seeking according to Kuhlthau (2010:18), the hard part is using the technologies for creativity and enlightenment, which is what the ISP model echoes. That is, making sense and meaning of information, described as having intellectual access to information by Burnett and Jaeger (2011:167-168).



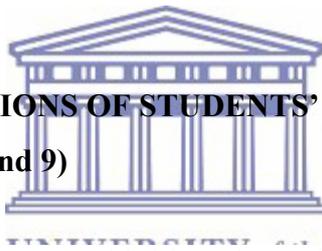
Enquiry in the questionnaire survey on the sources consulted by students during an on-going assignment presented in Figure 17 (Question 22) reveals that course notes, print textbooks and Wikipedia rank the first, second and third respectively. However, Section 6.3, which discusses the interviews with lecturers, confirms that sources consulted by students depend on the lecturer's instruction or advice. In the PNG 315 assignment, students were referred to a particular print textbook by their lecturers while for the other two assignments they were asked to use both print and online sources. This is not far from the result presented in Figure 17 (Question 22). This may serve as a pointer to the fact that there is no collaboration between the library and the faculty which is an important success factor in the process of guided enquiry (Kuhlthau 2010 & 2012; FitzGerald, 2011) which implies scaffolding of lessons in order to meet course objectives (King, 2011:22).

Despite the volume and vastness of information available on the Internet, Kuhlthau (2012:4) asserts that a common misunderstanding among users is to think "I can find anything I want on the Internet. I don't need a library or a librarian." This statement holds true in a situation

where a library positions itself not only as an information provider but also as a support to the teaching and learning system in terms of anchoring information literacy education. Noteworthy is the fact that of the respondents, a librarian seems to align with the thought of Kuhlthau.

L6: I don't insist because some information are also available in the library. Therefore, I ensure that they use both online and library resources

Even though the misunderstanding spelt out by Kuhlthau is crucial, the undergraduates need the library for information resources especially in the case of FUPRE, a new and growing university. Students need the library/librarian to have knowledge of the literature in their various fields as spelt out in ACRL performance indicators for the first standard of information literacy (Appendix 2). Therefore, the role of the library is still relevant even in this age of digital information, more so that there are more print resources that the library is subscribed to.



6.3.3 LECTURERS' PERCEPTIONS OF STUDENTS' INFORMATION LITERACY SKILLS (QUESTIONS 4, 5, 7 and 9)

The proliferation of information in a world driven by technology requires a complementary ability to use information meaningfully and creatively; this is what Kuhlthau describes as the hard part of information (technology) use (Kuhlthau, 2012:18). This ability is a set of skills called information literacy discussed in Chapter two.

The five standards set by the Association of College and Research Libraries (ACRL) (2005:5-6) to describe someone who is information literate are as follows:

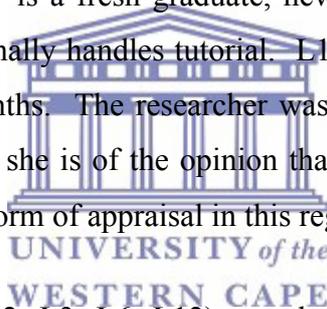
An information literate individual is able to:

- *Determine the nature and extent of information needed.*
- *Access and gather the needed information effectively and efficiently.*
- *Evaluate and critique information and its sources.*
- *Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally, either as an individual or a member of a group.*
- *Understand that information literacy is an on-going process and uses a variety of methods and emerging technologies for keeping abreast of trends in the field.*

These standards are captured in Kuhlthau's recent definition of information literacy; that is the ability to locate, evaluate and use information wisely for learning, thinking and creating (2012: 6).

This section explores lecturers' perceptions of the information literacy skills of their students; that is, their ability to seek and access the information needed (standards 1 and 2), synthesise and apply them in solving academic tasks (standards 3); and their knowledge of ethical issues concerning the use of information (standard 4). Also of interest is the respondents' awareness of the concept of information literacy.

Nine respondents expressed the extent to which their students are able to seek needed information while two respondents (L7, L11) could not ascertain. Being an unusual response to a salient question, the researcher probed the respondents during a casual face to face chat. Hence, it was discovered that L7 is a fresh graduate, newly employed; he assists the main lecturers in teaching and occasionally handles tutorial. L11 is newly employed too, and has only taught students for two months. The researcher was not aware of these details before administering the interviews, but she is of the opinion that having up to eight sessions with students is enough to give some form of appraisal in this regard.



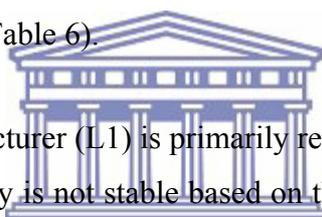
Of the nine respondents, four (L2, L3, L6, L12) rate their students as excellent/advanced. This means that their students have knowledge of the literature of the field, for example primary and secondary sources, and are able to construct and implement effectively designed search strategies; retrieve information using a variety of methods and tools; and as well extract, record, transfer, and manage the information. These are the performance indicators of standards one and two of the ACRL information literacy standards.

Put differently, the students are good at "finding trails and pathways" (Kuhlthau 2012: 34). Students of two of the respondents (L2, L6) were involved in the assignment and journaling which will be discussed in the subsequent sessions; therefore, their perception will be validated in the students' assignment and journals.

Two respondents (L 9, L10) rated their students as fair. While L1, whose students were also involved in the assignment and journals explained:

I will put that at 60% at most. Resources for information within FUPRE are limited for now. Some students go to Petroleum Training Institute (PTI), some use the Internet and any books and eBooks they can find.

Physical access which is the first level of access to information infrastructure is a precondition to intellectual access (Jaeger & Thompson, 2008:57; Burnett & Jaeger 2011); and it is not entirely within the control of the individuals. However, some studies have shown that students are beginning to break the barrier to physical access. An example is a large survey in the USA discussed in Chapters three and five, in which students of various nationalities are beginning to break the barrier to physical access due to ownership of portable devices such as laptops and phones on which they can gain physical access to the Internet (Dahlstrom, 2012). This is similar to the findings in the questionnaire survey of this research presented in Table 7 in which at least two out of three students own smart phones besides the few who own java phones that are Internet enabled. Also, about one out of two own a laptop. To support this claim, the majority of the students do access the Internet on their personal electronic device (Table 6).



Having said that, it appears the lecturer (L1) is primarily referring to print materials which are also useful especially as electricity is not stable based on the students' submission, presented in Table 11 and in the research work of Ejiwoye and Ayandare (2011) in Nigeria. Indeed erratic power supply can negatively impact on the use of the Internet be it on campus facilities or personal electronic devices (that require regular charging).

Regarding their ability to synthesise and use the information gathered in solving their academic tasks, five respondents (L2, L3, L5, L11, L12) rated their students as excellent/advance/impressive. This implies that their students evaluate information and its sources before selection; are able to summarise the main ideas they gather from information sources; compare their previous knowledge with the new knowledge and confirm the interpretation of the information through discourse with other individuals, small groups or teams, subject-area experts, and/or practitioners based as explicated in the performance indicator of standard four. This is explicated by Kuhlthau (2012:34) as judging usefulness by quality, expertise, accuracy, currency and perspective, determining importance, relevance, pertinence, forming a focus, deciding what is enough, summarizing, interpreting and creating, among others.

Again, this will be confirmed in the assignment and journals. Two respondents (L8, L9) rated their students as fair while one respondent (L7), again “cannot say”.

L6 explained that “the information gathered by students through assignment serve as eye opener to their academic development.” This is quite pertinent in a situation where students go through a process step-by-step process in their assignment as recommended by Kuhlthau (2010:22; and 2012:16) in the concept of guided enquiry which involves a constructivist approach to learning in today’s ubiquitous information environment. However, when students are not guided they may merely relate with information at a surface level.

Furthermore, one respondent (L1) expressed:

I would say 50% at most. They are new to this kind of assignment-research and report writing. However, they did very well. Some students simply summarised without understanding the subject matter. Others put all the information obtained together and came up with their own understanding of the subject matter.

Details will be provided about the assignment in the later session. Being new to research and report writing in year three is an issue. According to FitzGerald (2011: 40) information literacy skills of students is addressed in a systematic way. In the case of FUPRE, information literacy should be addressed from 100 level and reinforced across all courses and levels. But despite this hitch, some students are able to cope well according to the lecturer. This elucidates the concept information literacy in terms of ‘seeking meaning’ and ‘sense-making’ as an individual’s cognitive abilities (Kuhlthau 2004, 2008:68).

The information literate student has knowledge of ethical issues concerning the use of information either as an individual or member of a group and uses information effectively and ethically to accomplish a task, for example, citing and acknowledging sources correctly to avoid plagiarism (Standard 4). Six respondents (L3, L4, L8, L9, L11, L12) indicated that their students are able to cite and acknowledge sources correctly while the others expressed their perceptions as follows:

L1: Yes, I specifically instructed them to do that. They had references for their reports. The references were not excellent but they made a good attempt.

L2: Yes, they cite sources but not always correctly in terms of citing format.

L5: Yes but they need more enlightenment on how to reference materials.

L6: Some do while others don’t - well it is the rationale behind the teaching of the use of library as a general course in all higher institutions.

The concept of citing and acknowledging sources correctly needs to be constantly reinforced in the process of teaching and learning across all levels within the university. It can only be learned through constant practice.

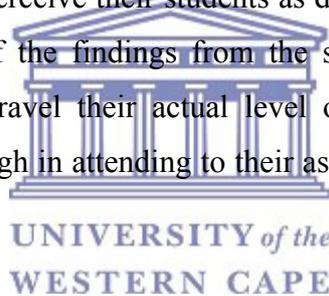
Of all respondents, two (L7, L2) are not aware of the concept of information literacy.

L1 expressed that:

I just learnt about information literacy, however, I follow this concept in my approach to problems. He also added that some of my students seem to be information literate, but many of them are not, based on what I saw in their reports (assignment).

Eight respondents are of the view that their students are information literate while one (L8) mentioned that some of them are information literate.

Respondents seem to generally perceive their students as doing well and information literate. Nonetheless, the convergence of the findings from the survey, assignments, journals and large group discussions will unravel their actual level of information literacy skills and explain the process they go through in attending to their assignments, using the ISP model as lens.



6.3.4 USE OF WEB 2.0 TOOLS IN TEACHING AND LEARNING

Web 2.0 tools are social networking platforms that enhance creativity and interactivity (Marateo, & Ferris, 2007; Hughes, 2009). They help people connect easily and enhance collaboration in new ways (Kuhlthau, 2010: 2). Consequently, the teaching and learning potentials are of immense benefit in the higher education setting (Krubu & Krubu, 2010; Arnold & Paulus, 2010; Ebner, *et al.* 2010; Hung & Yuen, 2010). To effectively use Web 2.0 tools, students need to possess computer (electronic device) literacy, Internet/Web (digital) literacy to complement information literacy; this enables them to gather, analyze and synthesize information, collaborate with others, think creatively and critically and also possess computer and Internet literacy skills.

However, to tap into the educational benefit of Web 2.0 tools, it must be incorporated in teaching and learning, otherwise it remains a tool for entertainment as it is largely used today (Dahlstrom, 2012).

Seven (L1, L2, L3, L4, L8, L10, L11) respondents indicated that they use Web 2.0 in their teaching and learning process. While only six specified technologies and Websites associated with Web 2.0 that they employ as follows:

L1: Wikipedia, blogs, forums, WhatsApp. I use WhatsApp to interact with students during their assignment to address their concerns as much as possible

L2: Arduino forum (an open-source electronics platform based on easy-to-use hardware and software. It's intended for anyone making interactive projects.)

L4: Google circle, Weblog, yahoo group and wikis

L8: LinkedIn, Wikipedia

L10: Google, wikis

L11: Wikipedia

This data is similar to the one presented in Table 23 in which about two out of three students indicated that their lecturers do not incorporate Web 2.0 tools in their teaching and learning. However, referring students to Wikipedia does not translate to using Web 2.0 in teaching and learning because it does not directly encourage interactivity and creativity, but could mean to view and apply. Wikipedia is an online encyclopedia. On the other hand, if students engage in their own wiki, then it is the case of using Web 2.0 for interactivity rather than for consumption alone. The responses show that incorporation of Web 2.0 tools in teaching and learning is not in the university mandate. Hence, it is not surprising that five respondents (L2, L8, L10 and L11, L12) are not sure whether Web 2.0 tools are helpful in academia.

Three of those who do not use Web 2.0 tools in teaching and learning gave the following reasons:

L5: not all students have laptops

L9: it gives students the opportunity to do irrelevant things online

L12: the information there cannot be relied upon, students will need to further verify the information on such site

The lecturer (L1) who was part of the journaling with students explained:

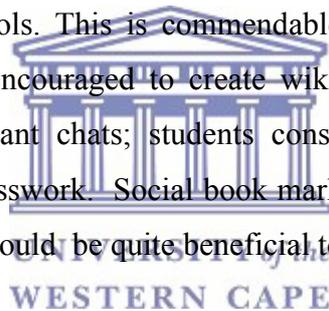
I believe they are helpful. The WhatsApp was helpful because I could understand their challenges and work with them to achieve the task I gave them.

Six of the respondents (L2, L3, L4, L8, L9, 10) considered Wikipedia a credible source of information for teaching and learning, while two of them (L1, L11) commented negatively:

*Wikipedia is a good source of information. It has improved over time. However, it is still important to find credible sources of information like international journals, books, eBooks, etc
Not 100% good in teaching.*

Seven respondents do communicate with students via email; among them, some communicate with their students via WhatsApp (L1), Facebook (L2), and also Yahoo group and Google circle (L4). Of the five respondents who do not communicate with their students via email or any social media platform, only one gave a reason as requested in the interview protocol; he (L12) wrote “personal reasons”.

Responses elicited from students show that they (on their own) use Web 2.0 tools in their learning. The top on the list is Wikipedia, Web based emails, e.g., Gmail and Yahoo mail, and then social bookmarking tools. This is commendable! However, the fact is that they consult Wikipedia but are not encouraged to create wikis. In this era of Web 2.0, some emails, e.g., Gmail, enable instant chats; students consult with course mates for quick responses to assignments and classwork. Social book marking tools which serve as a virtual list of favourite Websites which could be quite beneficial to students.



Summary

An analysis of the open-ended interviews with 12 lecturers at FUPRE reveals that there is a need for more creativity and interactivity during classes rather than passing knowledge from lecturers to students as is largely the case at the moment, although one out of four respondents seems to align with the constructivist approach to teaching and learning.

In the conducting of assignments, most lecturers tell students what sources to visit and they mostly direct them online. This aligns with the data gathered from the questionnaire survey in terms of Internet usage; however, it also confirms that the library is underused as a result of the low referral to the library as two out of every three students accesses the Internet via their personal electronic device.

A striking number of respondents are convinced that their students are information literate, to a reasonable extent. That is, they can access information resources, critique and synthesise information gathered and the resources, and are also able to use information ethically. However, underlying this is the need to improve their skills as indicated by some respondents.

Some respondents do communicate with their students on Web 2.0 tools such as WhatsApp, and Facebook, among others. However, the creativity and innovation that Web 2.0 tools bring into teaching and learning is not explored. Put differently, respondents do not incorporate Web 2.0 tools in teaching and learning. Although, some of them do refer students to Wikipedia, students do not produce their own wikis. Consuming information and generating information are not one and the same thing. Web 2.0 is about generating, creating and sharing information and knowledge.

Lecturers' perceptions of students' information literacy levels will be confirmed in the student assignments and journals which will be analyzed in later sessions as indicated earlier.

6.4 FINDINGS FROM INTERVIEWS WITH THE FUPRE UNIVERSITY LIBRARIAN



The researcher held two interview sessions with the FUPRE University Librarian. The first one took place on the 2nd of April 2014, in an office. However, approval was not granted for the recording of the interview due to a recent happening that involved an unethical use of recorded casual discussion. In view of this, notes were taken by two assistants in order to ensure that the entire discussion was well captured. Nonetheless, the librarian promised to be willing and available for further discussions when necessary.

The second contact with the librarian was a brief telephonic enquiry on the 13th of August 2014.

6.4.1 LIBRARY HOLDINGS AND SPACE

The holdings of the FUPRE library at the moment include both print and electronic materials. Print materials in the stock are textbooks, reference materials, journals, newspapers, and

magazines. At the time of the first interview, the books numbered 3,000. The librarian said they were working towards acquiring 6,000 copies of textbooks in applied sciences with funds made available from the Tertiary Education Trust Funds (TETFunds), to support teaching, learning and research. On the 20th of August 2014, a brief telephonic discussion with the librarian revealed that the library was awaiting delivery of some new books.

The electronic resources the library accesses online include: databases comprising electronic journals, e-books, e-theses and e-dissertations, some of which are accessible on the FUPRE Website. Printing facilities are available for a fee for those who may wish to download and print online resources, otherwise, they may view or read them without printing.

The FUPRE library also has access to the National Universities Commission (NUC) database and what the librarian referred to as their offline database; thousands of downloaded free e-books and journals which can be accessed offline.

As at the time of data gathering between April and May 2014, FUPRE has only one library, the main library, with 187 reading/study spaces as follows:



- e-Library: 25 (with computers)
- Special Reading Area: 73
- General Reading Area: 64
- Serial/ Newspaper Reading Area: 25

In the standards laid out by the ACRL for higher education libraries, it is spelt out that “Libraries are the intellectual commons where users interact with ideas in both physical and virtual environments to expand learning and facilitate the creation of new knowledge.” This implies the need for enough physical space and connectivity to virtual space, conducive for study and research. Therefore, for a university population of about 2,500 (staff and students), there is a need for more reading spaces, ports to plug in personal devices and computers in the library. In terms of expansion and what is being done to handle the space problem, the librarian explained:

My major challenge here is space and that is why we are a bit slow in acquiring new print materials since there is no space to put them. Currently, we are working on how to put about

130 computers in place for use and a lot of effort is being made by the university to put a permanent library in place with four floors.

Indeed as observed by the researcher, a number of buildings are under construction on the FUPRE campus. However, with the problem of space, encouraging more use of electronic resources and communicating with the university community via Web 2.0 would in one way or the other enhance the library's productivity, more so that many students possess personal electronic devices as revealed in the survey (Figure 17). However, on the 26th of March, 2015, FUPRE launched a new e-library with 120 computers, thereby increasing the reading spaces to 187 to 282.

6.4.2 INFORMATION LITERACY EDUCATION IN THE 21ST CENTURY

According to the standards set out by the ACRL (2011:9) for libraries in higher education, the primary educational role is “to partner in the educational mission of the institution to develop and support information-literate learners who can discover, access, and use information effectively for academic success, research, and lifelong learning.” To achieve this feat, the library must highlight its relevance to the university community and collaborate with the faculty to include library materials in the learning experience of the students, embed information literacy outcomes in the curricula, classes and assignments, and also come up with the best pedagogical principles in teaching and learning.

Librarians are vital agents in enabling students to navigate through the myriads of information resources and channels available in this 21st century; they have the know-how of searching, locating, evaluating and using information. These skills come handy in information literacy education which is an important aspect of the academic library, in collaboration with the faculty, especially in this age of information proliferation. Information technology, particularly the aspect of creativity in Web 2.0, has an impact on education, the economy, and politics in phenomenal ways that change the way we learn, work and are governed, according to Kuhlthau (2010: 2). Therefore, new skills and new learning methods are most needed by students to enable them to function optimally in the dynamic information world, and to prepare them for employability.

Kuhlthau's ISP model, guided learning and the ACRL standards are invaluable frameworks on how to tailor information literacy education in the 21st century. For example, Kuhlthau's model is one of the models in use at the University of the Western Cape, South Africa, in Library Science 121 (Information Literacy Course), in a bid to help students develop cognitive thinking skills (King, 2007). An inquiry-based learning model has been in use at the Centre for International Scholarship in School Libraries (CISSL), Rutgers University, USA (Kuhlthau, Heinström and Todd, 2008) for a few years now.

Here is what the Librarian has to say about information literacy education at FUPRE:

We have a Department of General studies that teaches a number of courses on general knowledge. Use of Library and Study Skills is one of the courses administered to 100 level students; it is handled by librarians. We teach students all they need to know about the library and the wealth of information available in the library and online. We also teach them how to search for information online, we teach how to cite and acknowledge sources so that they can use information ethically. However, regarding teaching them the core information literacy skills identified by ALA, you would agree with me that such would involve both the library and the departments, discussions are going on to that effect. These skills are very important. But for now, the library is always open to the students for guidance in sourcing for information resources and how to handle their assignments. But with time, we shall grow into having a proper structure in place. There are other courses like, Philosophy, Entrepreneurial studies, use of English, etc. These courses are taken from 100 to 300 levels and lecturers do come to the library from time to time to source for relevant materials.

An analysis of the course synopsis and Use of Library course content reveals that the Use of Library course emphasizes library skills and study skills (basically information search, usage and citation). Library usage is part of information literacy, which can positively impact on learning and academic achievement (Williams and Wavell, 2001: 69). Gratch-Lindauer (2005: 715) supports this claim and that frequent library users reflect a studious work ethic and engage in academically challenging tasks.

Library education has evolved since the 1990s to information literacy (Kuhlthau, 2004; 2005). To be information literate in this 21st century is to be able to use the vast resources of information available online and in print form productively, not only as a consumer of information but also for creativity and interactivity which needs the ability to critique and evaluate information effectively. The position that academic libraries should occupy is to anchor information literacy education that prepares students for employability.

FUPRE has no academic literacy unit according to the librarian but there is an academic planning unit that is responsible for curriculum development and staff training both at home and abroad. All the academic staff studying abroad are on scholarship.

6.4.3 USE OF WEB 2.0 TOOLS BY FUPRE LIBRARY

As Web 2.0 tools have become part and parcel of the fabric of communication and positive channels for people to interact, learn and share, there is no doubt that libraries are using emerging technologies to connect and engage with their audience (Anunobi & Ogbonna, 2012; Dowd, 2013). The tools offer different ways to communicate with the youth in non-traditional ways that extend beyond physical walls (ALA, 2013:43).

Part of the responsibilities of a library, based on the competency index for the library field compiled by the OCLC's WebJunction (2009:65), is to "understand the importance of having a Web presence beyond the library Web site; investigate and develop the library's presence on social networking sites (Facebook, LinkedIn, Eventful, etc.), and evaluate and implement other tools for extending online access to library content, among others".

The FUPRE library is yet to incorporate social networking platforms such as Facebook, Skype, Twitter, LinkedIn, Eventful, and others, into their day-to-day communication with the university community. This is tied to infrastructural challenges in terms of space for computers and poor Internet connectivity. It is the same situation with about a third of the academic libraries in Anambra State, Nigeria (Anunobi & Ogbonna, 2012) where the level of awareness of the use of social networking sites in academic libraries is high but with low usage of libraries' social media.

However, the university librarian spoke highly of the benefits of Web 2.0 tools and eagerly looks forward to when they will be part of the tools the FUPRE library employs in serving the university community.

Summary

The interview with the librarian reveals that FUPRE library is still in the process of reaching the height from which it can fully serve the university community as an academic library due

to insufficient infrastructure. There is awareness of the need to go beyond teaching library skills to teaching information literacy skills and it appears the library is looking into it. So far, the library is yet to incorporate Web 2.0 tools in the discharge of its duties to the university community which is also blamed on low infrastructure.

6.5 FINDINGS FROM THE INTERVIEW WITH LIBRARIANS IN THE E-LIBRARY

A recorded interview session was held with the two staff of the FUPRE eLibrary, on the 21st of May 2014. The librarians were interviewed in the eLibrary.

The initial plan was to interview only one librarian with whom the researcher had an appointment. However, as the interview was about to commence, another librarian in the eLibrary signalled interest. The librarian was asked to wait so that the interview could be done separately, however, they both agreed to sit in at once. Further information and clarifications on specific issues were done with one of the librarians interviewed via Facebook chat.

This section presents the findings on the interview with two staff of the e-library, with pseudonyms Paul and Diana. Paul is the one with whom the researcher had the initial interview arrangement while Diana volunteered to join. The interviewer enquired about the facilities available to the university community, and the day-to-day running of the e-library.

The e-library has 24 computers as revealed by Paul, and they are all connected to the Internet through LAN and Wi-Fi. Both staff and students alike can also connect on their personal electronic devices such as laptops, iPads, smartphones, and so on.

Two weeks before the interview, specifically on the 7th May 2014, the researcher observed that the Internet connection was down for hours but later came up. This featured in the interview and here are the responses from Paul and Diana as to the reliability of the Internet:

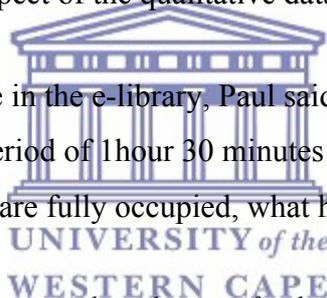
Paul: When you came the other time, the Internet connection was poor but after some upgrading by the ICT section, it is okay now. Even till now, we are still enjoying the Internet connection.

Diana: It has been stable since last week Tuesday.

Based on the data gathered from the survey presented in Table 8 (Question 9), the top two challenges that students experience in their use of electronic resources are technical problems (e.g. system hangs, server down time, access speed, etc.) and inadequate information infrastructure on campus. The 24 computers in the e-library are not enough to serve the entire university community. Also, with frequent server downtime and low speed access, using the electronic facilities in the e-library becomes an issue. Both problems are barriers to physical access which is a precondition to intellectual access (Jaeger & Thompson, 2008:57; Burnett & Jaeger, 2011; Krubu, 2013). These problems may partly explain why students underuse the library (Figure 14) but rather access the Internet on their personal electronic devices (Tables 6 and 7) instead of the computers in the library for their assignments.

However, it was good to hear from the librarians that the ICT unit has remedied the situation on Internet connectivity. This will be confirmed or denied in the large group discussion with the students which was the last aspect of the qualitative data gathering.

Due to limited resources available in the e-library, Paul said that an average of 60 students visit the e-library per day and a period of 1 hour 30 minutes is allocated to each user. In a situation where all the computers are fully occupied, what happens?



Paul: We tell them to wait so that others can finish up; it is 1hr 30min per student.

This can pose barriers to students' information seeking. However on a Facebook chat with Paul on the 25th of August 2014, he mentioned that the e-library will soon expand and have an additional 130 computers as revealed by the librarian.

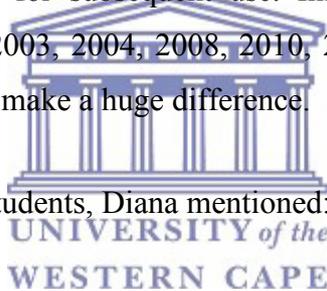
When students visit the e-library, they are assisted based on request as expressed by Paul in an example given:

Most often, they call us when they want to login to the system. Some don't know how to do it. So I will tell them to put in their user name and password so that they can access the Internet. Last week Tuesday, a student called me and said he was doing an assignment but did not know how to go about it. I now assisted him. I directed him to Google the assignment. I explained how to search using Google. He was very happy; he only needed information to be able to do his assignment. I think he left with a smiling face.

The researcher further enquired if he asked the student to take note of the Website he was taking information from, he said:

No, I didn't really pay attention to that because there were a lot of people calling me on that day.

While Google is a very useful search engine, depending on the assignment, students should be given assistance in the areas of searching online databases that have been peer reviewed and scholarly works. Even though the library is not subscribed to e-journals yet as revealed by Diana, it has a list of online open source e-journals. Regular use of databases for academic purposes helps students appreciate and focus on scholarly databases rather than just “Googling”. In the process, they identify and choose appropriate search tools as indicated in the performance indicator of standard two of ACRL standard of information literacy (Appendix 2). They also learn research works that relate to their topic of interest and their field of knowledge (standard one). It is also important that they pay keen attention to the specific Website they draw information from; this will encourage them to use information ethically so that they are not guilty of plagiarism (standard 4). Besides, it helps them to readily uncover the information for subsequent use. Information literacy is for lifelong learning (Kuhlthau, 1995,1999, 2003, 2004, 2008, 2010, 2012) bit by bit of exposure from lecturers and the library staff will make a huge difference.



Further on the issue of assisting students, Diana mentioned:

When students come, we try as much as possible to help them. When students come with their request, we try as much as possible to help them with information free open access databases. And for those who need eBooks, we go to open access, such as, eBook databases and download for them.

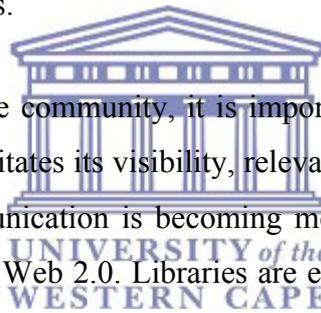
For some time now it seems they are beginning to see the importance of eBooks so they are requesting for them more than before. It appears their attention is shifting from coming to the library to consult print materials to eBooks.

In my understanding, the 400 and 500 level students are more literate than the 100 level students. I see them do their project themselves. They go to Google, petrol wiki and do their work by themselves. Even when I wish to offer help they tell me they are okay. But for the 100 level, they are confused. They came plenty the other day to say they were given assignment in the use of library course and they don't know how to do it, yet they are not saying anything. Maybe it is because they are new in the system.

Apart from Wikipedia articles, eBooks are the mostly consulted online materials by students during their assignment while consultation with librarians is low (Table 17). It may well be that consultation with the librarian is low as mentioned even by the librarians (Paul and Diana) partly because they encourage students to use Google, which the students already “know” how to use, in the case of those who visit the e-library. The issue of access to facilities is another challenge. Since the library does not subscribe to online databases but

accesses free online databases and search engines that students equally have access to on their own, students might as well go online and help themselves. But if the library is offering them resources and assistance in terms of teaching them how to search for information, critique, synthesize and teach them all what it takes to be information literate, they would find the library more useful.

Regarding the policy on the use of social media, e.g. Facebook, the library does not permit students to access Facebook and other social networking sites in the e-library and when students are caught using Facebook, they are immediately told to log out otherwise they may run the risk of being sent out. Based on the survey (Tables 22 and Table 23), interview (with librarians), general observation and outcome of some research works discussed in Chapter three (Luo (2010; Dahlstrom, 2012), students use Facebook mainly for entertainment purposes, be that the case, they are not allowed to use the limited computers in the FUPRE e-library for non-academic purposes.



As part of regular outreach to the community, it is important for the library to put in place structures and strategies that facilitates its visibility, relevance and significance. In this age of information proliferation, communication is becoming more and more online due to social networking tools associated with Web 2.0. Libraries are expected to tap into these resources to provide information about library services and products in multiple mediums (OCLC WebJunction: 3).

FUPRE library has a print library guide that spells out its services and resources; this important information is also available on the FUPRE Website (www.fupre.edu.ng). When asked about other ways of informing students about updates to the library resources, it was said:

Paul: I do enlightenment programme to let students know the resources we have so that they can come and consult them. Most times you see them sitting down and using their phones to browse and source for materials. We use the student government to reach them, let them know the services we can offer them so that they can come to the library. A good student should read ahead of the class, we are telling them to come here and seek help from us. We are ready and the turnout is improving. We go to the reader's session of the library to announce how we can assist them in the e-library.

Diana: There is a section in the circulation area where there is a notice that journals and eBooks are available in the library. The institution is trying to make money available for the library to subscribe to some journals so that there will be more materials available for students. This upgrade of Internet has been very helpful. One

*of my colleagues told me that he downloaded 380 free eBooks for students within the last 1 week. I got some on Physics and Geophysics
Paul: I downloaded about 90 books on Geology. As we are getting the eBooks, it is our duty to announce to the students.*

The methods of communication being used to reach students are good but may not be able to reach them all. Therefore, using social media platforms and alerting the students well enough will go a long way.

Academic libraries worldwide are beginning to wake up to the 21st century call as they are now increasingly using social networking tools to showcase their services and highlight resources to their patrons (Collins & Quan-Haase, 2012). The majority of libraries across the USA use social networking platforms in their service delivery (ALA, 2012). Baro, *et al.* (2013) in their comparative study of Nigeria and South Africa found that Libraries in Africa are also fast adopting the use of Web 2.0 tools in their service delivery, though librarians in South Africa use various Web 2.0 tools more frequently more than their counterparts in Nigeria. This was attributed to lack awareness, lack of interest, lack of skills, and unwillingness to embrace emerging technologies on the part of librarians in university libraries in Nigeria. However, as it is evident that students are on social media most of the time, it is necessary to provide regular updates and receive feedback through these platforms.

Lecturers too underuse the library. Regarding their patronage, Paul revealed that:

They go to the readers section but not the e-library. We have maybe two-three a day. I do one-on-one campaigns with the lecturers; I believe with time, more of them will come here.

Summary

The interview with two librarians in the e-library reveals that there are only 24 computers available to the university community presently due to space problems. However, soon there will be some expansion to accommodate 130 more computers; the university librarian also confirmed this in his interview. The Internet connectivity has improved due to some upgrading by the ICT unit.

Students underuse the library and rarely consult with the librarian as confirmed in the survey. The librarians also confirmed that students basically use Google search engine while they also refer them to Google if they request for help. Therefore, this calls for the need to encourage students to use scholarly databases to search for peer-reviewed information resources online.

However, it was observed that students' interest is beginning to shift to the use of eBooks and the librarians are downloading a number of eBooks for the benefit of students. The librarians send updates to the students on resources available in the library through the student union government and notices pasted in the readers section. This calls for a review of the mode of dissemination of information to the community. Incorporating social media will be a veritable way of reaching out.

The FUPRE library does not allow the use of social networking sites like Facebook, because it is believed that students use such sites for entertainment purposes. Nonetheless, if such tools are interwoven in their teaching and learning, the attention could shift to the usefulness of Web 2.0 tools in their academic quest.



6.6 FINDINGS FROM THE INTERVIEW WITH THE HEAD OF THE WEB UNIT, ICT DEPARTMENT, FUPRE

During the period of data gathering, the ICT unit witnessed a change in the administrative head. Consequently, the researcher decided to interview the Head of the Web unit, who is also the FUPRE Website developer, on the 24th of April, 2014, in the office.

The interview enquired about Internet connectivity on campus, the learning management system available to staff and students and general support to the university.

The primary task of the ICT Unit in the University is to deploy ICT infrastructure and related services for teaching, learning and research to the university community.

The National University Commission (NUC), Nigeria, who is charged with the responsibility to develop universities in Nigeria, has 12 departments (www.nuc.edu.ng). Of relevance to this discourse is the ICT Department. The vision of the department is *to assist the NUC to*

carry out its mandate in the deregulated Nigeria University System by enabling the University and the NUC to take advantage of Information and communication technology to reap from, and deliver, the benefit offered by the information and technology revolution.

The information and technology revolution offers tremendous benefits to the university in terms of creative and interactive teaching and learning in the world of Web 2.0. An example of such technology is a Learning Management System (LMS).

Learning Management Systems (LMS) integrate technologies that meet the different needs of both learners and educators. According to Ellis (2009:1), LMS are softwares applications valuable for “administration, documentation, tracking, and reporting of training programme, classroom and online events, e-learning programmes, and training content”; they manage, track and report on interaction between the learner and the content and the learner and the educator. Learners support features include: discussion forums, file exchange, emails, online journals, notes, real time chat, videos, individual grades and progress reports (Stockley & Olsson, 2013).



The interview with Ben (pseudonym for ICT librarian) revealed that all support regarding the FUPRE Website is from his desk. He gives support in the aspects of student online accounts, contact enquiry forms, and staff emails, among others. However, FUPRE has no Learning Management System platform to facilitate its teaching and learning, and no email accounts offered to student. Course content will be available online with time, according to him.

FUPRE is on a hybrid type of Internet connection. It is mainly wireless while the systems in the computer laboratory are networked to a LAN.

Apart from the 24 computers in the library, Ben confirmed that there is a computer laboratory with 70 computers in the Department of Mathematics and Computer Science, staffed by a technologist. Upon authorization, students from other departments may use the computer laboratory.

Just as the university librarian expressed, the ICT unit is always available for technical support to the entire university community as soon as complaints are made. Depending on the

nature of the complaint, the four units namely, hardware, Web, system analysis and network units, persons will be contacted by the ICT admin immediately.

FUPRE has student residences both on and off campus. Those on campus do enjoy Wi-Fi while those off campus do not. Also, there are no computer laboratories either in the on or off campus residences.

As revealed by the librarians, the university policy does not allow the use of social media either in the computer laboratory just as in the e-library.

At the time of the interview, the WI-FI Internet connection was poor on the FUPRE campus as mentioned by students in the survey, confirmed by Ben. However, enquiry at the ICT unit on the 4th of June 2014, revealed that the Internet connection had improved. When probed, the respondent said:

Imagine traffic of about 1500 persons pooling on a network that goes at a speed of 1mbps, back then. Now we have done a network upgrade and installed some more repeaters to transmit wireless signals from LAN source.



The network upgrade was confirmed during the interview with the staff of the e-library.

Summary

The interview with a staff member of the ICT Unit, the head of Web unit, confirms that in addition to the 24 computers available for use in the library, there are 70 computers in the department of computer science and mathematics which are available to students in other departments subject to authorization.

FUPRE does not incorporate any LMS in their teaching and learning, neither are Web 2.0 tools allowed to be accessed on the desktop computers in the library and the only computer laboratory based on the policy guiding the use of social media.

The ICT unit recently conducted an upgrade of their Internet connectivity; hence there is more network coverage, confirmed by the librarians interviewed.

6.7 ANALYSIS OF LARGE GROUP DISCUSSIONS (LGDs)

Instead of two focus group discussions (FGD), two Large Group Discussions (LGDs) were held on the 4th of June 2014. The first was with the 100 level students while the second was with the 300 level students; both involved students across various departments in Colleges of Science and Technology.

Immediately after the Use of Library class, the first LGD with the 100 level students commenced. Seventeen students were present but only eight spoke; the duration of the discussion was 26.44 minutes.

The change in plan was due to insufficient classrooms/offices/seminar rooms; hence, the researcher could not secure a venue conducive for the focus group discussion. Lectures were going on in all the classrooms. Consequently, the discussion took place in the foyer in front of the e-library, a sitting area with a long 8-seater, mostly used by students waiting to commence their lecture while there is a class in session. The 8-seater was inadequate for the students and quite a number were standing, including the researcher and the research assistant. In addition to the issue of securing a good enough venue, students seem to be saddled with so much academic work and as a result did not appear to have the required attention needed to elicit a rich and deep conversation required for the FGD. Rather than cancel it, the researcher decided to make the discussion an informal one.

The second large group discussion took place with 300 level students across the departments in both colleges as well. Fifteen students participated; the discussion was one for 42.59 minutes. Again due to the inability to secure a proper venue and the “experience” with the 100 LGD, the researcher had to make arrangements with the Entrepreneurial Studies lecturer to teach a scheduled class for 30minutes instead one hour so that the remaining 30minutes could be used for the LGD since another class was to commence at the end of his hour. A video recording of both LGDs were taken using Samsung Galaxy Tab 3. Also, a research assistant took hand written notes as back up. Both sessions were transcribed for the purpose of analysis.

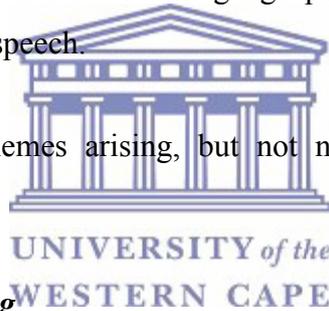
The essence of the LGDs was to explore a range of views and experiences of the students that could not be statistically captured in the survey; hence, the reason for discussants across the various departments, albeit a few.

6.7.1 ANALYSIS OF THE LARGE GROUP DISCUSSION (LGD) WITH 100 LEVEL STUDENTS

The LGDs focused primarily on the questions covered in the survey. The essence was to explore how the same or similar questions in the survey would be answered in face to face interactions with a few students in order to really ascertain their information behaviour or confirm the submissions in the survey, better still to gather a variety of information that could not be statistically expressed.

Students' quotes are verbatim and therefore language peculiarities (the way they express themselves) arise as part of their speech.

The analysis is discussed in themes arising, but not necessary in the sequence of the discussion.



Everyday life information seeking

Everyday life information seeking is part of everyday life practice (Savolainen, 1995) which information users engage in for various reasons.

Findings from the LGD confirm that apart from information seeking for academic purposes, students also engage in information seeking for their everyday life issues as highlighted in Section 5.5 (Table 18), which agrees with the findings of Savolainen (1995); Durrance and Hinton (2004); Ajiboye and Tella (2007); and Ejiwoye and Ayandare (2011).

Here are some of the comments made by students to relate their everyday life information seeking, which supports the survey results. The students are numbered from S1 to S15

S3: I need information that will teach me how to use the various technology applications, and the Internet has been very useful in this.
S4: I need information to solve problem.

Researcher: What problem?

S4: Technology related or something like I have a stain on my shirt and I want to take it out.

Researcher: Where do you get the information from?

S4: Most times, I visit Nairaland.com to ask questions. It is a group/discussion forum.

S5: Sometimes we do have arguments on religion, so we go Google.com to find the correct answers.

S6: Everything about life be it on relationship, religion, job, technology, and so on. So I look for information for everything so that I will be vast.

S7: During the holidays I do some baking, I make snacks for sale; the Internet has been a good source of information for me.

On a general note, students seem to visit the Internet in order to meet their everyday information need. S4 employs www.nairaland.com, a discussion forum with many chat rooms, to meet his information needs by posting questions while some other students unanimously agreed that they “google” whatever information they need.

Ownership of personal electronic devices

All the students who took part in the LGD use smart phones on which they browse the Internet; five of them own laptops while three own iPads in addition to their smart phones. This confirms the findings in Section 5.3 (Table 7), that students favour ownership of personal devices; more than two-thirds of the students own smart phones and some of those who do not own smart phones use “java” phones which are also Internet enabled. This is similar to the finding of Dahlstrom (2012) discussed in Chapter three, in which undergraduates in the United States favour the use of portable electronic devices such as phones, while nine out of ten own laptops.

Information seeking process

Students exhibit certain behaviours in their information seeking; such behaviours include physical actions, cognitive skills and the affective realm.

Physical actions are personal efforts made to seek and source from information from a variety of sources in order to meet information needs. In other words, physical actions may lead to physical access to information which is a pre-condition to intellectual access as described by Burnett, *et al.* (2008), and Burnett and Jaeger (2011), discussed in Chapters two and three. Intellectual access is the ability to use information effectively and ethically. Therefore, an

information user who can effectively access information intellectually is said to be information literate; this is the cognitive aspect of the information seeking process.

In terms of physical actions, students confirm that they encounter some physical barriers to information seeking.

S1 and S4: Not having Internet connectivity on campus whenever I need information is my greatest challenge.

S6: Me too, most times when I open a page, I see something like "Error 404". No network.!

Chorus: Yes

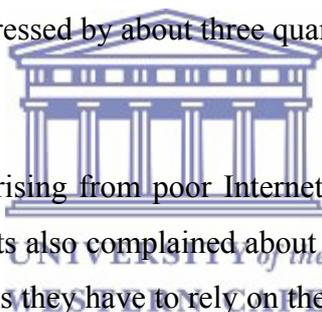
S1: Sometimes when I search for articles, I see only the abstract, not the full article.

The Research assistant who is a staff member of the e-library clarified:

Some Websites are not accessible on Nigerian IP address, if you visit such Websites, it shows "Error 404".

S6: I learnt that Nigerian IP can't open on some sites.

These are technical problems expressed by about three quarters of respondents as indicated in Section 5.3 (Table 8).



Apart from technical problems arising from poor Internet connectivity on campus as at the time of the data gathering, students also complained about finance. Since the campus Internet connection is not reliable, it means they have to rely on their personal electronic devices such as smart and java phones, laptops and iPads; for most of them, if not all, it is expensive to buy Internet bundles to serve them on a regular basis.

In Section 5.3 (Table 11) about half of the students said that finance is the major barrier they experience in their information seeking, which was also mentioned in the LGD.

S6: I use cybercafé sometimes, outside the campus. There is a hot spot on campus but it doesn't work after 4pm, and we are busy till 4pm even till evening sometimes. The unreliable wifi is only effective in the library, it is not effective in other parts of the campus.

When asked if they are aware of the various information resources available in the e-library, S4 unexpectedly mentioned "desktop computers" while others were simply staring at the researcher. This implies that students are not aware of the various open sources they can access online in the e-library, all of which can be accessed on their phones when online, being open sources. The knowledge of the information resources is very important to the

academic pursuit of the students, the lack of which is a physical barrier to accessing information.

Intellectual access depends largely on cognitive abilities of the information users. Student S4 expressed an inability to critique and evaluate information from various sources which is an indication of poor cognitive abilities, that is, poor intellectual access to information.

S4: It's kind of frustrating when you key in your search words in a search engine and the page it gives you are nothing related to what you want. The first page is not related; even the second and the third, are not what you are looking for.

Researcher: Okay, can you give an example?

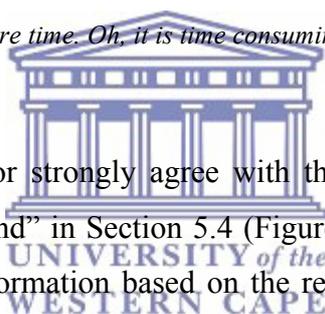
S4: It is not specific, mostly related to other different stuff. Like, when I googled the role of information in science and technology, it kept of showing me the role of Internet in science and stuffs like that.

Researcher: You mean you would have preferred to see exactly "the role of information in science and technology"?

S4: Yes, exactly.

R: Don't you think if you had read different articles you would have been able to figure out what you needed?

S4: That would kill more time. Oh, it is time consuming.



The majority of students agree or strongly agree with the desire for “quick information”, which is expressed as “easy to find” in Section 5.4 (Figure 18). In the same table, they also indicated their preference for information based on the relevance of information sources to their topic, peer-reviewed content, in-depth coverage, and trustworthy and credible authorship. However, these are not “easy to find” as such, therefore convenience is a critical factor in information seeking in a variety of situations, including academic and everyday like information seeking (Bawden & Vilar, 2006; Griffiths & King, 2008; Head & Eisenberg, 2010; Connaway, Dickey & Radford, 2011).

S8: For me it is convenience, there is no point going to the library to start looking for textbooks when I have a phone. Ah! If I can lay on the bed and get information, even in the toilet, get information so of what use it is stressing myself!

S1: Yes convenience is the key. All I need is to gather information here and there from the Internet even from my bedroom, toilet.....

S4 mentioned the popularity of an information source as a determining factor in making choices.

S4: For me it is all about the popularity of the search engine, Google is the popular search engine here in Nigeria. It was all over the Internet yesterday when Doctors from the United States said that people should stop taking medical information from Wikipedia because the

information there is junk. So for me it is popularity and credibility that determine the sources I use.

All the students who participated in the LGD mentioned that they do not acknowledge the sources they consult and use during their assignment. This is unwitting, unethical use of information which is an indication of poor information literacy skills. This is expressed differently by S6:

S6: I read through, even though it is time consuming, I have to read through to determine the reliability of the information and extract and collect the information raw, or else I write off point and do what is not relevant.

Researcher: The extract you talk about, do you copy it out.

6m: Yes.

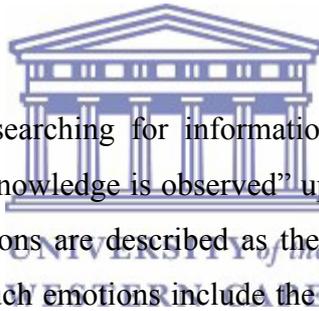
Researcher: And paste?

S6: No, there is a difference between copy and paste and copy and edit.

R: How do you do the editing?

S6: I add my own.

This would have meant that the student paraphrases, if only the sources copied and pasted were acknowledged.



In the process of seeking and searching for information certain emotions are expressed beginning from “when a gap in knowledge is observed” up to “when the information needed is found and used”. These emotions are described as the affective phase of the ISP model (Kuhlthau, 1996, 2004, 2008). Such emotions include the feelings of uncertainty, confusion, frustration, doubt, optimism, satisfaction, lack of satisfaction and confidence.

In line with the findings of the survey, students who participated in the FGD also expressed some emotions while undertaking their assignments:

S1: It takes time to look for information on Google because it gives a lot of references that one must look at so it is a bit stressful going to the Internet to find answers.

S2: It depends on the type of assignment and question. For example the Use of Library requires us to go to the e-library to browse for materials and the main library to look for books that will give exactly what we want. But if it is an assignment that I can do on my own, that is very simple, I feel excited.

S3: I feel excited about my assignments but for use of library I never like the assignments. Because the library course is never direct. I do not understand it.

S6: For me I am happy because I am confident that I will always get the information I need.

S8: At first, I feel uncertain. Even though I get the information from the Internet, I will want to confirm from my colleagues to know if the information is correct. It is not about being excited or sad but I will be uncertain. I need to verify to be certain. If all the information we get from Google are all correct, then we should be scoring 100%. But it is not so.

Use of Web 2.0 tools

As revealed in the survey, students employ Web 2.0 tools in their academic and everyday life, but it is not necessarily incorporated in their teaching and learning by lecturers. They are encouraged to use the Internet but not the interactive and creative aspects of Web 2.0.

In the LGD, students mentioned that they use Facebook and WhatsApp for entertainment and academic purposes, but more of WhatsApp for academic purposes.

S4: Sometimes when I have math question to answer, I will send it to my friend. After answering it, he will snap it and send it to me.

S5: Me too. Very easy.

S7: In my department, Petroleum engineering, we have a WhatsApp group. All of us are members of this group. So when you have a question you cannot solve, you can simply post it on WhatsApp. If it is what you can type you type it and if it is what you can snap it. Before you know you will have various responses and people contradicting themselves and at the end you get something from their responses.

S8: When I am on an assignment, I confirm my answers on WhatsApp. After doing it, I will now ask "guy have you done it, what is your answer?" if what he gives is not okay with me I will know that he is wrong.

Of all the students at the LGD, only one blogs.

S4: I am not in computer science but I do blog.

Researcher: Is it for academic purpose?

S4: No, just for information.

Researcher: Do you have a blog site?

Yes I do. fuprecity.blogspot.com.

Researcher: Was that initiated by your lecturer?

S4: No, on my own. When I gained admission into the university, I created the blog to put up some information to reach out to fellow students who need information.

Researcher: Is there no formal academic arrangement for blogging? Are you asked to do clips like video clips, audio clips?

All the student unanimously said that they do not communicate with the lecturers via email, they do not blog in their teaching and learning, lecturers do not use data projectors in their teaching and learning and they (students) are not aware of Slideshare.

This means that the use of social media is personal, at the discretion and initiative of the students. Students confirm that they do not communicate with their lecturers via email, which has been in use worldwide long before Web 2.0. This may well mean that students are ahead of the lecturers in their use of Web 2.0 tool.

Summary

To a large extent, the findings from the LGD with the 100 level students confirm the findings from the survey.

Apart from seeking information for academic purposes, students also engage in everyday life information seeking; this is similar to the findings of Savolainen (1995); Durrance and Hinton (2004); Ajiboye and Tella (2007); and Ejiwoye and Ayandare (2011). They mostly consult the Internet, particularly the Google search engine.

Students favour the ownership of personal electronic devices such as smart and java phones, iPads and laptops, similar to the finding of Dahlstrom (2012) in which undergraduates in the United States favour the use of portable electronic devices such as phones, while nine out of ten own laptops.

In the process of seeking information for academic purposes, students engage in physical actions and express their cognitive skills in addition to the affective. FUPRE students experience challenges in accessing the Internet which seem to be their favourite information source due largely to convenience; this is similar to the findings of Connaway, Dickey, and Radford (2011), that convenience is a critical factor in the choice of information by students. Also students do not seem to evaluate information critically and do not use it ethically as revealed in the LGD, this implies poor information literacy skills which has been a growing concern across some literature discussed in Chapter three. Poor information literacy skills is conceptualized as poor intellectual access by Burnett, *et al.* (2008), and Burnett and Jaeger (2011).

During the assignment, certain emotions were expressed as explicated in Kuhlthau's ISP model (2004, 2008). Such emotions include stressful information search, uncertainty at the beginning of the assignment and excitement upon completion.

Finally, students use Web 2.0 tools for entertainment and academic purposes. They mostly use WhatsApp and Facebook but more of WhatsApp for academic related chats with their peers whenever they have some questions to solve.

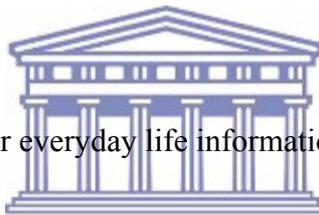
6.7.2 ANALYSIS OF LARGE GROUP DISCUSSION (LGD) WITH 300 LEVEL STUDENTS

Just like the LGD with the 100 level students, the one with the 300 level students focused primarily on the questions covered in the survey, with a view to confirming the responses they put down and also noting possible contradictions or new data.

Fifteen students participated; their quotes are verbatim and therefore language peculiarities arise as part of their speech.

Everyday life information needs

Information users engage in everyday life information seeking for personal but various reasons (Savolainen, 1995). The information sought is used in accordance with their everyday needs.



Here are their submissions on their everyday life information seeking:

S24: I need information when I am searching for job.

S12: I need information to know the current trend that is going on in the world. Listen to and watch news to know the current trend.

S17: I need to know how to balance my spiritual life with my academic life, they have to be equal, one does not have to be higher than the other. So I have to read books on spiritual matters that help me strike a balance.

S13: The information I need is how to manage time.

Researcher: Do you go looking for information on time management?

S13: Yes I do, I look for information on how to manage my time effectively in terms of my personal life.

S18: I am the type who likes to have vast knowledge, even if it is a different area from my field of study like medicine, accounting....I just want to be vast. I can be very good in my field but should be an average student in other areas.

S20: I need information on how to improve on my ability, on what to do for myself.

Researcher: Do you mean self-development?

S20: Yes

The quotes from the students confirm that they also engage in information seeking for their everyday life issues in addition to information seeking for academic purposes, explained in Section 5.5 (Table 18); which is in agreement with the findings of Savolainen (1995); Durrance and Hinton (2004); Ajiboye and Tella (2007); and Ejiwoye and Ayandare (2011).

Sources of information

Large group discussions show that students seem to use various information sources; some sources they explore on their own while they also endeavor to work within their lecturers' expectations.

S16: It depends on the Lecturer, some want us to give back what they have given unto us. But some will give hand out and we still have to meet with our senior students in the department to put us through, go to the library to look for books and also surf the Internet to get more information for our academic work.

S22: Apart from sticking to the sources that my lecturers give me, I am fond of digging more into textbooks that the Lecturers use to broaden my understanding, I now combine this with what they have given us.

S21: Basically there is this big dependency on technology now. So when I have assignments I don't use book (sic) again, I surf the net to get my information.

While this aspect of the discussion was on going, some students digressed and put forth certain sensitive issues and experiences that bothered them in attending to their assignments.

S13: Sometimes our lecturers insist that we don't use any material outside the recommended textbooks, personally I think they do that for the ease of marking. It is quicker for them to mark what they are used to.

S11: I remember when we were in 100 level, when we were taking a number of general courses together in the college, the lecturers usually share the exam scripts among themselves. They would have written the expected answers (marking scheme) and the person marking will marking exactly according to the marking scheme

Researcher: Okay do you mean the marking scheme is not flexible?

S11: Exactly. For instance if you read the course, understand and put it down in your own words, you may not do well like someone who gave the exact words back to the lecturer. It is very rigid.

S10: The problem in FUPRE is that 70% of us cram. For example if you see a very intelligent student who is in the 2-1 range, ask him a question from what he was taught in 100 level, no, let's say 200 level he may not remember, because all we do is cram.

A lecturer will tell you this is what I want and this is the approach you should use. For example in mathematics, you may think a particular approach is better and you are going to arrive at the same answer but the Lecturer will say "this is what I want". There is a lecturer in my department, DR.....he will tell us for instance, define a computer. For me, I prefer to define it using my own words but for him he wants some kind of sequence, so words. And if you don't conform you will score "0". So no room for my personal understanding and language.

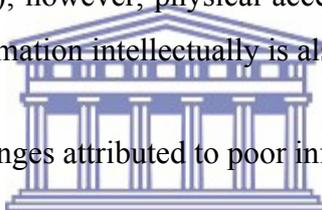
S12: It all depends on the Lecturer, in my department (Geophysics), some lecturers expect you to explain in your own words, you need not give them what they gave you but they need keywords from you. For example I was asked a question by my lecturer "what is a sediment", he was looking for the keywords "weathered materials", and soon as I used the keywords, he lecturer said I got it. But there are some other lecturers, for instance the one who taught us today, he told us that if we want to pass is course that we have to use the words, the exact words that he gave us.

If, at the university level, creativity and ability for critical and analytical thinking are discouraged by expecting students to regurgitate whatever they have been fed with by their

lecturers, it will surely be a challenge for them to acquire the much needed information literacy skills advocated by Kuhlthau (1993, 2003, 2008, 2012), Dahlstrom (2012) and many other researchers mentioned in Chapters two and three. Besides, such a teaching method limits students to the low order thinking level according to Bloom's taxonomy (Anderson, *et al.*, 2001; Churches, 2009); the students are unable to rise from the ladder of mere reading and understanding to knowledge application, comparing, organising, deconstructing, attributing, evaluating, and creating which involves designing, constructing, planning, producing, and inventing.

Information seeking process

Large group discussions (LGDs) reveal that students are confronted with challenges when undertaking their assignments. These challenges relate to physical and intellectual access (Burnett & Jaeger, 2011:167-168); however, physical access is a precondition to intellectual access. The ability to access information intellectually is also termed information literacy.



Some students spoke about challenges attributed to poor information literacy skills.

S14: Sometimes we surf the Internet, see various things written by various people, we don't know which one is right or wrong. We submitted an assignment recently during which we gathered the information from the Internet but we scored 2 and 3 over 15. So we don't know if the net is wrong. So that is a challenge.

Researcher: Did your lecturer give you a specific information source to explore which you did not?

S14: No! no! no! It was just a typical assignment; he did not talk about which source to use.

Researcher: Did you use Wikipedia?

S14: Yes. We also did Google. You know when you are on Google, you see some answers from Wikipedia, you see some pdf files and so on. So we all wrote from the Internet. But people got 4, 2, 1 and half over 15.

S11: One major problem we have with attending to our assignments on the net is that we are not able to type the questions directly and get the exact answers that we need.

S25: We surf the Internet and copy and paste most of the time.

Researcher: Please kindly speak for yourself.

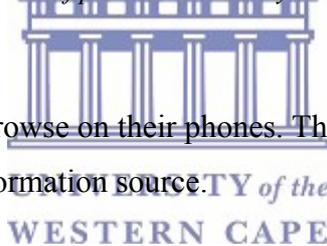
S10: I copy and paste, for example there was an assignment we were given on the application of automata theory. When we searched the net we had so many responses and some of them were even related to our mathematics course, but that was not what we were looking for. So we had to look for some points and merge them together and try to edit by ourselves to make it acceptable.

S23: Apart from surfing the net one problem we have is that for example, we are given on Monday and we are expected to submit by Friday. And between Monday and Friday we have so many lectures. If we now put such an assignment aside to do some others, before we know it, it is Friday. We have too many lectures that disturb us from doing assignments.

The lecturers seem to have different approaches to teaching and learning. While some say that the students should explore various information sources, some narrow the students' horizon down to only their prescribed sources. Again, it is interesting to note that some lecturers penalize the "copy and paste" habit of the students.

Some students mentioned the challenge of accessing the Internet on campus, especially at the e-library:

- S21: One basic challenge is that we have very bad access to the Internet on campus.*
- S19: The challenge we have when we go there is that....personally, I see the staff occupying the seats that the students should occupy. So they now tell us to wait for the students who are working or we go elsewhere to work and that if we have our own computers we should go and use them elsewhere.*
- S18: I realize that the computers they use are faster than the ones they asked the students to use. It appears they channel the much (sic) bandwidth to the computers they use, and give us the ones that are "sick" and weak to use. You will just be there, you are waiting for one page to load, after one hour they will tell you your time is up.*
- S12: There is a link on FUPRE Website which is the e-library, when you get there you don't find any materials that are connected to the e-library. When you go to the e-library they (the staff) will always complain of poor network and you can't access files.*



All of students, except one, can browse on their phones. This may be responsible for why the Internet is primarily their first information source.

Many students agree that finance is a major problem when it comes to using their Internet at their own cost.

- S15: Considering the fact that the university is located in one rural area, there is no way one can get a good cyber café around here. And even if you get, they charge very high. They sometimes charge N150 for 30 minutes, and the Internet connection is very slow.*

Here are some challenges that students experience in sourcing for books in the library as well as with library operations:

- S25: There is a course I am doing now, Introduction to Geostatistics, there is no textbook for the course in the library.*
- S11F: Sometimes when we are given an assignment and we go to the library we find out that there are not enough copies of the book we are to use. There are many other people who want to use the particular book so it doesn't go round.*
- S17: Because of the current population of the school now, we find it hard to get space when we want to use the library. S17F: There is a new development in our library now; there is a*

particular system where there are e-books for science and technology. If you need any e-book you can come along with your flash drive or disc to copy what you need. And if you choose to use the e-book on their system, you are allowed to sit and use the e-book on their system.

Also mentioned are complaints about library staff:

S18: There was one that came for her IT(Industrial training) from Abraka, she was talking anyhow to one of us, because she was working for the library, the library staff backed her even though she was wrong. It was like, she was right as a "staff" while the student was wrong. If someone is wrong let her know she is wrong, no need supporting who is wrong. S19: Personally I have issues with them. For instance I might be using a textbook. I just drop it to crosscheck what I have written, they can just come and pick up the book. I can't challenge them because the materials are not many. So because of that I have issues with them.

Large group discussions (LGDs) reveal that students express certain emotions when seeking information, they however seem to give expression to the fact that they experience a lot of stress because they are always writing assignments from various lecturers.

S12: In my department (Geology) we don't feel relieved because as you are finishing one you are getting another one.
S11: It is the same thing in my department.

Three students (S17, S24, S11) did say that they feel relieved after concluding their assignment which may be an indication of a satisfactory information search process or it may simply be relief that the assignment is done. While S18 said:

S18: I don't feel relieved because there is always an assignment waiting for me.

For S12, there was an expression of unsatisfactory information search process:

S12: In my department there is no way you can please a lecturer, by the time you finish with your assignment thinking you have done well, when they bring the result your joy will be drained.

These various emotions are described as the affective phase of ISP model (Kuhlthau, 1996, 2004, 2008).

Information behaviour on Web 2.0

The incorporation of Web 2.0 tools in teaching and learning is not a university policy at FUPRE; that is, there is no Learning Management System (LMS), software applications

valuable for “administration, documentation, tracking, and reporting of training programmes, classroom and online events, e-learning programmes, and training content” (2009:1).

However, students being taught by a particular lecturer in the Computer Science Department seem to be enjoying the benefits of LMS.

S21: We (computer science) have a new lecturer who studied in Canada who introduced new social media stuff to us. So we have our course notes, assignments, and test questions online. It is a platform called Piasa.

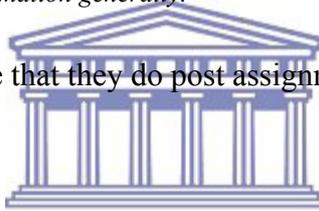
Researcher: Tell me more about the learning platform?

S21: I don't know but it is a student-lecturer platform, like a classroom. He created a classroom for us where we interact, get messages and share insights. So we get out notes before the class.

From the other students:

S17: Our lecturers do not use social media with us but for us 300 level earth science, we created a group on WhatsApp where we share information about upcoming classes, assignments, and information generally.

The students did however indicate that they do post assignment questions on social media to solicit responses:



S18: Yes, I do that on WhatsApp. In my class, electrical engineering, we have a group on WhatsApp so sometimes I post my questions to get answers from my course mates. Many of us do so and we try to help one another.

The students do not blog for academic purposes, even for those in Computer Science.

Interestingly, they all use YouTube both for academic and social reasons.

S18: I am in electrical engineering department and my course is a practical one. So sometimes after my lectures, I go on YouTube to watch the video of some processes because we are not having enough practicals. We are not even exposed to the fundamentals. It is basically theory and that is why it seems the workload is too much for us. So we are always reading and reading; and we need to go out of our way to spend a lot of time and finance in order to meet up. So it is hectic.

S11: In my own case I use YouTube. There was a time we had a practical and everybody seemed to get different result and output, so I googled it and found a YouTube file which I watched. It was the YouTube video that now taught me how the practical should be and how it should have done it.

Students seem to unwittingly use information unethically by not acknowledging the sources they consult. Most of them do not even take cognizance of the Website they gather information from when they use search engines. Here are some responses from the students

when asked if they usually take note of the specific Websites they use whenever they google information:

S12: No, just go, get the information and find your way.

S17: I take note of the Webpage and bookmark it on my system for future use.

S11: No, except if we are required to cite references.

S18: There are some assignments that require typing a number of passages, like big assignments where we are expected to include references. If for instance I have an assignment with the question, "what is passive iron", there is no need for references.

The key determining factor for students' choice of information source is convenience. This is evident in Figure 18 as a distinct number (60%) of respondents agree or strongly agree that one of the criteria for choosing information sources is that it must be easy to find.

S18: Convenience: if I have an assignment all I need to do is to go to google, type my search and get the facts, in 20min I am done with my work.

S15: For me it is time factor, the quicker it comes the better.

S11: For me it is both time and convenience because at times we are given an assignment and are expected to submit the next day, and others are even pending.

Researcher: Are you not concerned about the quality of the information you got?

S11: I think the important thing is to do the assignment first of all. For instance we are given an assignment today and we are to submit tomorrow, and we are in school till now, so for me what is important is to do it and submit. But if we have enough time and room to do the assignment, then I can be bothered about the quality of information.

S24: For me, I think the lecturers are not keen about the viability or reliability of information. All they are concerned with is whether the assignment is done or not. They don't even show us the output of what we do, so awarding marks is to (sic) their own discretion.

Again, across the literature reviewed in Chapter three, convenience is a primary factor that determines the information sources consulted by students which is revealed in the LGDs. This highlights the findings of Connaway, Dickey, and Radford (2011), that convenience is a critical factor in information seeking in a variety of situations, including academic and everyday life information seeking.

At the end of the LGDs, the researcher thanked the students for their time and informed them that some recommendations will be made to the university management that will address their concerns. Some students found this promising and thus decided to share some more problems they experience, relating to poor infrastructural facilities, inadequate books, poor curriculum and tight schedule which does not give them much room for personal development.

S21: Since this is all about FUPRE, I would like to make some suggestions.

First of all, we don't have a library. I have been to a school library before, so I know what a library is. Here, we have just 2 classrooms for a library and we have limited books. Dr got about 550 personal books for our department to use. But when we go to the HOD's office to look for books, they tell us the Lecturers have taken them but I think they are meant for students. We are in 300 level and we do not have good books to use.

Researcher: As the books are in the HOD's office, maybe they are meant for Lecturers.

S10: No he told us they are meant for us when he was bringing them.

Secondly, another challenge is that our schedule is so tight and choked and we do not have time for self-development. We are currently in 300 level and we only know the basics of 2 programming languages. When I was in 200 level, I did more of math courses; 11 math courses across the 2 semesters. Why am I doing so much mathematics when I am studying Computer Science, I think it is too much, I don't need it. I did only 2 basic programming languages, C++ and Fortran. A lecturer told us to develop software and use any language. But I did not know what to do because I don't know any language.

S18: It is not everyone who learns through theory. So it is not all about telling us to go read up and up. Some people learn through visuals, particularly myself. I learn more when I see. I would want the university to do something like the Montessori school. I need to do some visual learning. I have a neighbour who schools in London, where they do a lot of visual learning. They have a digital board, in class they see a lot of videos that help them to understand the lectures very well. Most Nigerian universities don't have these facilities except some private universities. It would be good if they can incorporate such in teaching and learning to teach us.

S13: We have space problems; we in 300 level share our labs with the final year students. So we need more classes and more spaces so that we can have a better learning. Even the chairs are not conducive for learning.

S16: I understand that the university is at it's juvenile state and all these challenges are bound to happen but I want to believe that government is in full support of the establishment of this school and there is enough resources to make it one of its kind. I just want to talk about the library my colleague complained about. A Professor in UNIBEN can have that size of library. A standard secondary school in any state can have that kind of library. So a university where they expect us to be versatile should not be operating in that kind of library. We know that they are working to make it a world known and State Of The Art University but we want it to happen fast. I am in my 3rd year now by next year I will go to the main industry to learn more and they would also want to know what I have learnt.

FUPRE, being a growing university has a small library. According to one of the library staff during an informal chat with the researcher, an ultra modern library is under construction, and would be ready for use soon. The concern of the students about the tight schedule is a problem that is obvious to the researcher because it was such a challenge to organize the LGDs due to the space problem in terms of venue and time. These concerns raised by the students will be confirmed in subsequent sections.

Summary

The large group discussions with the 100 level students confirm the findings in the survey to a large extent and also revealed new perspectives.

Students seek information to attend to everyday life issues, in addition to information seeking for academic purposes. This aligns with the findings of Savolainen (1995); Durrance and Hinton (2004); Ajiboye and Tella (2007); and Ejiwoye and Ayandare (2011).

Similar to the finding of Dahlstrom (2012), students favour the ownership of personal electronic devices.

Students seem to unwittingly use information unethically because they are neither taught nor expected to do so. For instance students use online search engines without paying attention to the specific Websites from which they use information; such is not expected of 300 level students, therefore, this may be a teaching/learning problem. Inability to critically evaluate and analyse information is evidence of poor information literacy skills described as poor intellectual access by Burnett, *et al.* (2008), and Burnett and Jaeger (2011). Findings from the LGDs reveal that the 300 level students are into the bad habit of “copying and pasting”, but with some of the their lecturers, they do not escape the consequences.

Similar to the experience of the 100 level students during their assignment, the 300 level students do express certain emotions based on Kuhlthau’s ISP model (2004, 2008).

FUPRE has no Learning Management System (LMS). Students use Web 2.0 tools for entertainment and academic purposes. They mostly use WhatsApp and Facebook but more of WhatsApp for academic related chats with their peers whenever they have some questions to solve. This is similar to the findings with the 100 level LGDs.

Students also gave expression to poor infrastructural facilities in the library and its operations by staff, poor curriculum content and poor teaching and learning methods. Some students complained about not having enough practical exercises of which exposure to some audio-visual materials could have been appropriate, in order to fill any gap in knowledge arising

from lack of exposure to practical lessons. However some students on their own do watch relevant research videos to aid their understanding of what they have been taught.

6.8 ANALYSIS OF ASSIGNMENT QUESTIONS

A well-designed assignment is an effective tool and teaching aid which helps students to develop their research skills and subject knowledge. Therefore, instructors should bear in mind that every assignment is an opportunity to develop in students, the skills and dispositions towards research (Colorado College Library, 2014), which they will employ in future classes and experiences. To achieve this, assignment questions should be such that it provokes thinking, encourages in-depth reading of subject knowledge, opportunity to explore library resources, involves some measure of complexity and inspires creativity. It is also important that students realise that research work is rarely carried out in isolation. Rather, it involves consultations with experts who may guide them in the process of engaging in their assignment (Kuhlthau, Maniotes & Caspari, 2007, 2012) and in the Zone of Intervention (Kuhthau, 1996, 2008) during which intervention would be both necessary and useful to a learner (Kuhlthau, 1996). Almost always, the assignment questions determine largely the extent to which students explore and seek meaning (Churches, 2009).

With the vast information resources available online in this 21st century, it is important to give students the latitude to explore as many sources as possible. When specific sources are given with an injunction to look for more, there are already set limitations in terms of the scope of their exploring various information sources.

An assignment question should be clear and free of ambiguities. Instructions as to the format of the assignment should be explicit.

Students need time to gather materials, explore, and focus on specific themes in their assignments. They need time to write and review their assignment, especially if it is research work that should be presented in the form of a research report. Group assignments may require even more time than an individual assignment because of the need for members to meet at scheduled times in order to explore the research problem sufficiently to be able to produce quality output that would have taught them some information literacy skills.

Bloom's Taxonomy revised by Churches (2009) examines the cognitive domain and categorizes thinking order and skills. This could assist instructors to design class activities and learning outcomes. Bloom's taxonomy is a continuum from Lower Order Thinking Skills (LOTS) to Higher Order Thinking Skills (HOTS) (Churches, 2009:5) (Figure 20). For example, a user must first of all remember a concept to understand it, and also a concept can only be applied if understood and remembered. The LOTS is about knowledge acquisition, interpretation, summarising, inferring, describing, and so on while HOTS involve analysing, judging and producing. However, Bloom's Taxonomy is not an exclusive layer of the thinking process. At the university level, assignments should be tailored in such a way that it encourages critical thinking, evaluation and creativity, among others.

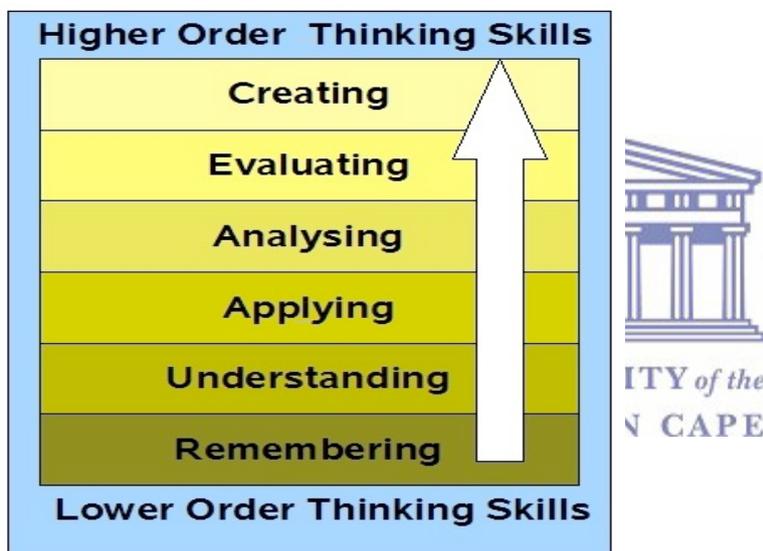


Figure 20: Blooms revised taxonomy by Churches (2009:5)

The three assignment questions will be analysed using Bloom's taxonomy to determine the level of thinking skills encouraged by the assignment, quality of action and process of seeking meaning.

6.8.1 ANALYSIS OF BASIC PETROLEUM GEOLOGY ASSIGNMENT (PNG 315) QUESTION

The PNG 315 assignment instruction is available in Appendix 11. Here are some comments on the assignment question and conduct:

1. The Basic Petroleum Geology Assignment (PNG 315) was a group assignment. Seventy seven students were divided into seven groups; Group A, Group B, Group C, Group D, Group E, Group F, and Group G. That is, 11 students per group, a size that is somewhat too large for effective learning.
2. The instructions from the lecturer were clear as to the mode of presentation in terms of number of pages, font size and font type.
3. It was given to the students on Thursday 22nd of May, 2014 and to be submitted on Friday 30th of May, 2014; making it a one week assignment. However, the Lecturer later postponed the submission date to June 3rd, 2014. The researcher is of the view that the short time span and the later submission date given during the course of the assignment must have affected the pacing and the quality of the assignment.
4. The researcher finalized arrangements with the Lecturer and the students and the WhatsApp groups were created for interactions/journaling on Tuesday the 27th of May 2014 (the 6th day of the assignment).
5. Students were in seven groups and each group was assigned a specific session from the indicated source (book entitled *Basic Petroleum Geology* by Peter Link), but it was not clear what to do with the sections. However, a group leader explained to the researcher during a private chat that they were asked to read and summarise the content of the various sections assigned. They were also required to consult other sources.

Each of the seven groups was assigned a specific section in the book as follows:

- GROUP "A" = *Earth Structure; Depositional Basins; Post Depositional Processes*
- GROUP "B" = *Petroleum Traps*
- GROUP "C" = *Earth Structure; Depositional Basins; Post Depositional Processes*
- GROUP "D" = *Rocks, Geological Considerations and Engineering Practices*
- GROUP "E" = *Petroleum Traps*
- GROUP "F" = *Earth Structure; Depositional Basins; Post Depositional Processes*
- GROUP "G" = *Rocks, Geological Considerations and Engineering Practices*

The assignment did not encourage a scholarly approach as such, but rather a "read and summarise" type of assignment which only encourages students to understand and infer the meaning of terms and concepts. However, the lecturer asked the students to source for more information to enhance their discussion of the themes. While this may require them to

evaluate information and their sources, it does not encourage knowledge application in context.

Based on Bloom's Taxonomy, this is a lower order thinking assignment because it only encourages students to read, understand, paraphrase and possibly remember.

6. A private interaction with some group members revealed that as at Tuesday the 27th of May 2014, they had not met face-to-face but been communicating via WhatsApp. A group leader said they paired themselves and allocated responsibilities to 2 members each to handle a section of the assignment.
7. During the period of interaction with the class on WhatsApp, a common phrase among the students was "compile the assignment" which appeared as though some individuals had put some information together within such a short time. For a research assignment that needs to be reported with the various parts of a typical report, it is questionable to have completed this report within such a time frame while, other lectures and assignments were still on. The same students also had a Thermodynamics and Phase Behaviour (PNG 313) assignment which was due the same week and the Entrepreneurship course group assignment, among others.
8. The instructions regarding the format of the assignment were somewhat confusing as follows:

"The report should be divided into Introduction, Objective, Body of the Report and Conclusion. For each item discussed in the report (NOTE that all items in the materials given MUST be discussed), there must be a conclusion at the end. This conclusion discusses the relevance of the item discussed in the Petroleum Industry and the Engineering profession at large. For example if depositional basins are discussed, how do these, or the knowledge thereof, affect the Petroleum Industry. Also, what kind of depositional basins can be found in the Niger Delta, and why?"

The assignment required students to read and summarise, there was no research problem investigated nor any exploration carried out, hence there was no need for a research report. An essay would have been good enough.

6.8.2 ANALYSIS OF THE PHYSICAL ELECTRONICS (EEE 314) ASSIGNMENT QUESTION

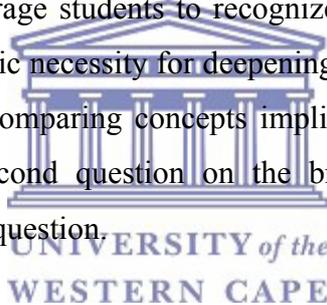
The Physical Electronic assignment was dictated to students in class with no clear instruction about the format. However, students were asked to include their list of references and a two week period was given to conclude the assignment.

Assignment questions:

- 1a. *What are the differences and similarities between SCR and Diode?*
- 1b. *What are the differences and similarities between SCR and TRIAC?*
- 1c. *What are the differences and similarities between SCR and DIAC?*

- 2a. *Give a brief history of the First Integrated Circuit (IC)*
- 2b. *Give a brief history of Vacuum Tube*
- 2c. *Give a brief history of Transistor*

The assignment questions encourage students to recognize, describe, identify, compare and explain concepts, which are a basic necessity for deepening, analyses and creativity. The first question which has to do with comparing concepts implies analysis which is a high order thinking question, while the second question on the brief history of concepts is basic knowledge, a low order thinking question.



In addition, it was a hand written task. In this 21st century, with the vast of electronic devices and infrastructure, students should be encouraged to type their assignment rather than hand write. By so doing, they learn and master how to use computers in whatever form.

6.8.3 ANALYSIS OF THE USE OF LIBRARY AND STUDY SKILLS (GSE 104) ASSIGNMENT QUESTION

The 100 level assignment question was also dictated during class time; the only instruction given was that students should explore both online and print resources. It was for a period of two weeks.

Assignment question:

Discuss the role of information in science and technology.

The assignment question, though brief, is quite broad. The researcher was with the students in the classroom when the assignment was given. While briefing students about the journals, they kept asking how to go about the assignment because they considered the question rather vague. Be that as it may, the question is so broad that students could deal with the topic in a variety of ways even critically, for example looking at the pros and cons of ICTs in African science.

Summary

The analysis of the three assignments reveals that they were in the bracket of lower and higher order thinking based on Bloom's Taxonomy.

The group assignment given to 77 students in 300 level Petroleum Engineering Department in seven groups of 11 students per group was all about "read and summarise", which is a low order thinking question. Besides the group is too large for effective learning.

The students in the Department of Electrical Electronics were given two assignment questions: one had to do with comparing concepts which allow for analysis, a high order thinking question while the other question was on writing a short history which is basic knowledge, therefore, a low order thinking question.

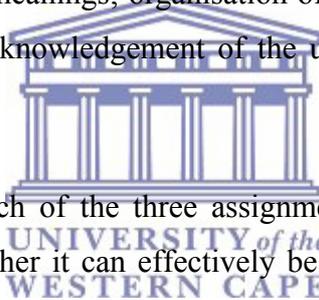
The assignment question given to the 100 level students across the Colleges of Science and Technology was broad and lacked context. However, students could have attended to the topic in a variety of ways and even critically.

6.9 ANALYSIS OF THE ASSIGNMENTS

This section presents a concise analysis of three assignments administered to 300 and 100 level students. The 300 level consists of 50 students from the department of Electrical Electronics and 77 from Petroleum Engineering. Only the Petroleum Engineering students had a group assignment, the others were individual assignments. Notably, the 100 level students are from various departments.

The reason for using students' assignments as data is to ascertain their actual information literacy skills based on their written work vis-a-vis their self-knowledge about their information literacy skills, while other evidence is captured in the survey and lecturers' impression on their information literacy levels as revealed in the open ended interviews.

All assignments are evaluated using the rubric in Appendix 9 prepared by the researcher. The rubric incorporates the various aspects of information seeking in the process of writing an assignment. It draws from ACRL information literacy standards (American Library Association, 2000; ACRL, 2002), specifically standards two, three, four and five. The ACRL standards and Kuhlthau's ISP model have a common ground in terms of the cognitive aspect of learning; however, the affective experience also plays a role that is important in directing learners' cognition and eventual action (Kuhlthau, 2004, 2008). The criteria addressed are students' knowledge of different information resources and formats; selection and synthesis of information to construct new meanings; organisation of content in a manner that supports the format of the assignment; acknowledgement of the use of information sources; in-text citations and proper referencing.



The rubric was piloted using each of the three assignments administered to 100 and 300 levels students, to ascertain whether it can effectively be used to evaluate the assignments. The pilot study revealed that the rubric was good for assessing the students' assignments. However, the criteria for evaluating students' assignment under ACRL standard five were slightly adjusted as the pilot revealed that none of the three assignments had in-text citations.

The researcher was unable to view the marked assignments of any course.

6.9.1 DEPARTMENT AND COURSE: PETROLEUM ENGINEERING; BASIC PETROLEUM GEOLOGY ASSIGNMENT (PNG 315)

This is the only assignment with guidelines as discussed in Section 6.8.1, available in Appendix 11. It was a group assignment in which 77 students were divided into seven groups.

A textbook titled *Basic Petroleum Geology* by Peter Link was used for the assignment. Each group was given certain chapter(s) to read, summarise and present in the form of a research report.

Students submitted typewritten assignments to the course lecturer and electronic copies to the course representative, a student, from whom the lecturer was able to retrieve only 5 group assignments (Groups A, B, D, E, G), which were made available to the researcher. The lecturer said he could not access the electronic assignment for two groups (Groups C, F).

For this assignment, the course lecturer instructed the students to present it in the form of a research report and list their references; students were given examples of APA referencing patterns to follow. Using the ACRL Standards, the assignments were analysed in the following way:

ACRL Standard 2: The information literate student accesses needed information effectively and efficiently.



Students appear to have a fair knowledge of information resources and formats, their purpose and audience, (e.g., popular, scholarly). Of the five groups, one group (E) did not list sources consulted which may have been an oversight or a deliberate omission despite the clarity of instructions in this context. In Figure 18, students agree to the following as the criteria that determine their choice of information source: relevance of information source to their topic, peer-reviewed content, in-depth coverage, and trustworthy and credible authorship as criteria for choosing information, which is confirmed in their choice of information source for their assignment. However, convenience as a factor (Bawden & Vilar, 2006; Griffiths & King, 2008; Head & Eisenberg, 2010; Connaway, Dickey & Radford, 2011) also played out in their use of easy to find sources such as Wikipedia which was also confirmed in the same figure.

ACRL Standard 3: The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.

The assignment is of the “read and summarise” type. Students were asked to read and summarise certain chapters in a book and also to explore additional sources. While this sort of task encourages students to read, understand, explain, synthesise and summarise, it does

not necessarily provide room for an in-depth analysis and synthesis or to allow for the construction of new meaning since students were not investigating a problem.

Inquiry-based learning which is learner driven encourages learners to investigate, explore and build new insights, understandings and meanings (Kulhthau, 2007, 2010, 2012; Zinn, 2012:4). To create a platform for inquiry-based learning, first of all there must be tasks assigned to students that provoke and direct their self-learning; unfortunately, this assignment does not stimulate self-learning but rather encourages students to read, understand and recap in their own words. Perhaps, it is a good way to encourage them to read ahead of the class.

Selected information from various sources could not be ascertained because there was not a single in-text citation. The reason for this obvious shortcoming may due to poor teaching and instructions from the faculty and library.

***Standard 4:** The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.*

The criterion for assessment is the organisation of content in a manner that supports the format of the assignment. For example in the case of a research report: an abstract, introduction, literature review, methodology, presentation and discussion of results, recommendations and conclusion are required (University of Technology Sydney Library, 2013). Being a “read and summarise” type of assignment, it appears it was administered to students in order to encourage them to read ahead of the class lecture. The assignment was not research work because there was actually no problem statement. But students did comply with the assignment instruction, that is, a research report format.

***ACRL Standard 5:** The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.*

Acknowledging the use of information sources, and proper referencing are the criteria used. Through all the assignments, there was no in-text referencing; that is, selected texts taken from the various sources used were not acknowledged. This is unwitting unethical use of information sources due to poor information literacy skills elucidated in some research works discussed in Chapter three, with regards to the study of undergraduates’ information literacy

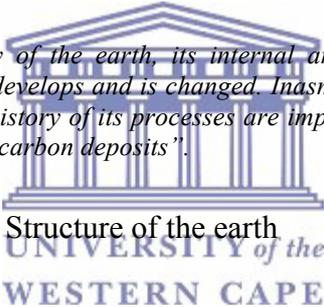
skills in Nigeria by Baro and Fyneman (2009); Isa, Amusan and Umma (2009); Abubakar and Isyaku (2012); Adetimirin (2012); and Ukpebor and Emojoorho (2012).

The assignments were submitted to Turnitin.com software (plagiarism detection software) to ascertain the similarity index with the online sources consulted. Below is the result:

Group A-41%
Group B-14%
Group D-19%
Group E-29%
Group G-5%

Group A has the highest level of similarity index, followed by Group E. In addition, Group A also copied the text below directly from the text book without acknowledging the author.

Paragraph 1, page 1, under the topic, Introduction



“Geology is the study of the earth, its internal and external composition, structure, and processes by which it develops and is changed. Inasmuch as the earth is constantly changing, its processes and the history of its processes are important in the formation and preservation of economic and hydrocarbon deposits”.

On the same page under the topic, Structure of the earth

“Earth structure is fundamental to an understanding of the study of earth processes and earth history, which are so important in exploring for and producing hydrocarbons. Observation of the earth as a planet illustrates three primary aspects of the crust: the atmosphere, the hydrocarbon, the lithosphere.”

Further down in the same paragraph:

“Superimposed upon the surface of the earth is the biosphere, comprising the organic realm of the earth’s life forms that inhabit the three environments and that are often unrestricted as to which three spheres they live in.”

On page 2 paragraph 1

“A definition of the earth, then, includes air masses, oceans, continents, and the life in each of them as the manifestations of its external characteristics.”

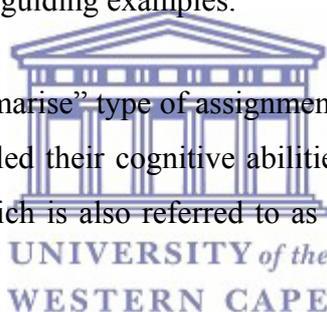
Groups B, D, E, F, did not appear to have copied verbatim from the textbook.

As mentioned earlier, Group E did not include their list of references in their assignment, this coupled with not acknowledging sources in-text portrays an unethical use of information. Group D's assignment had several referencing errors such as missing components and wrong punctuation; they need to improve on this aspect of their academic endeavour. However, Groups A, B, and G listed all sources used but with a few referencing errors, which is good enough in this case.

Summary

An analysis of the assignment reveals that 300 level students of the Petroleum Engineering Department have some knowledge of authoritative sources necessary for scholarly writing; this excludes one group. They were also able to put together their list of references with minimal errors which could be attributed to the fact that the course lecturer gave instruction to that effect as well as providing guiding examples.

However, being a “read and summarise” type of assignment, it did not allow room for critical thinking which could have revealed their cognitive abilities, an important component in the ISP model (Kuhlthau, 2004), which is also referred to as intellectual access by Burnett and Jaeger (2011: 167-168).



It was observed that the students did not acknowledge any source in-text, which is unethical, an indication of poor information literacy skills highlighted by some research works on the study of undergraduates' information literacy skills in Nigeria by Baro and Fyneman (2009); Isa, Amusan and Umma (2009); Ukpebor and Emojorho (2012); Abubakar and Isyaku (2012); and Adetimirin (2012); .

The problem of poor information literacy skills may have been due to poor teaching and instruction being a common problem across the assignments. Ideally, students' assignments should involve enquiry that calls for more than reporting factual information that is readily available (Colorado College Library, 2014), as in the case of this assignment in which students were requested to read and summarise. Such an assignment invites plagiarism which is what the students have done by falsely representing ideas copied as their own.

6.9.2 DEPARTMENT AND COURSE: ELECTRICAL ELECTRONICS ENGINEERING; PHYSICAL ELECTRONICS (EEE 314)

The assignment questions were:

- 1a. *What are the differences and similarities between SCR and Diode?*
- 1b. *What are the differences and similarities between SCR and TRIAC?*
- 1c. *What are the differences and similarities between SCR and DIAC?*

- 2a. *Give a brief history of the First Integrated Circuit (IC)*
- 2b. *Give a brief history of Vacuum Tube*
- 2c. *Give a brief history of Transistor*

The handwritten assignment was administered to students in real class time with the instruction to answer the questions and add their list of references. The lecturer also encouraged the students to go online and gather some information. The assignment was dictated to the students in class; no written instruction was given. Using the ACRL Standards, the assignments was analysed in the following way:

ACRL Standard 2: The information literate student accesses needed information effectively and efficiently.

Of 50 students who participated in the assignment, 28 consulted only non-authoritative sources such as www.answers.com and Wikipedia. Another eight students used print and e-books in addition to the use of non-authoritative sources such as www.answers.com, ehow.com, and Wikipedia. This implies that they need to improve their choice and use of information sources, though this apparent inadequacy may be due to poor curriculum and teaching or disregard for sources used.

In figure 18, a significant number of students appear to agree and strongly agree to the fact that relevance of information source to their topic (68%), peer-reviewed content (60%), in-depth coverage (74%), and trustworthy and credible authorship (78%) constitute the main criteria for choosing a source of information. However, this does not necessarily reflect in the choice of information sources consulted by 36 out of 50 students who participated in the assignment. The remaining 16 did not indicate the sources they consulted at all.

On the other hand, 60% of respondents agree or strongly agree that one of the criteria for choosing information sources is that it must be easy to find. Across the literature reviewed in

Chapter three, convenience is the primary factor that determines the information sources consulted by students which the respondents appear to echo.

Only three students out of 50 consulted a few scholarly sources such as scientific/technical reports, journal articles and other peer-reviewed research works. This implies that the majority of the students are not quite conversant with the different information resources and formats, their purpose and audience (e.g., popular, scholarly) or they simply decided to take the easy and convenient route in their information seeking (Bawden & Vilar, 2006; Griffiths & King, 2008; Head & Eisenberg, 2010; and Connaway, Dickey & Radford, 2011).

ACRL Standard 3: The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system. Students are expected to select and synthesize information to construct new meaning.

Students are expected to select and synthesise information, to construct new meaning, that is, “find trails and pathways” (Kuhlthau 2012: 34). However, perhaps, due to the shallow nature of the assignment questions which only encouraged students to read, understand, explain and summarise their textbook (lower order thinking), rather than go beyond that to higher order thinking which encourages knowledge application, analysis, evaluating and creating (Anderson, *et al.* 2001), students merely listed/itemised the similarities and differences between the items without engaging in any deep intellectual foray into the subject or discourse. Also, all the students had similar brief texts to question two, concerning writing brief histories on some terms. Put differently, there was actually no discussion of any sort in the assignments, a deficiency that can be directly linked to the nature of the question, in that it is incapable of satisfying such requirements as evaluate, critically examine and synthesize.

Standard 4: The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.

The criterion for evaluation is the organisation of content in a manner that supports the format of assignment is one of the aspects of ACRL standard 4. According to the University of Technology Sydney Library (2013), there are different types of assignment and formats. An essay should have an introduction, body, conclusion and a reference list. A research report analyses or describes a problem. Research, scientific and business are three types of reports. In this case, the report should be either research or scientific with the following

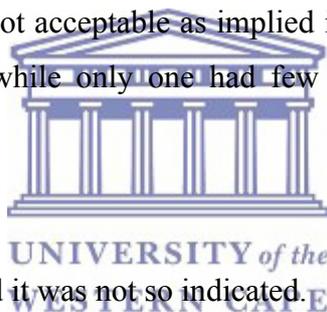
format: abstract, introduction, body (methods, findings, discussion), conclusion and recommendation, references and appendices (if any).

In the assignment, there was no format prescribed by the lecturer, neither did the students follow any format. Again, this shortcoming is a problem with the curriculum and possibly the lecturer.

ACRL Standard 5: The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.

The criteria for evaluation are the acknowledgement of the use of information sources, and proper referencing.

Of the 50 assignments, 36 had a list of references while 14 had none. One cannot rule out plagiarism in this case which is not acceptable as implied in the rubric used. Thirty five (35) had several referencing errors, while only one had few referencing errors. The observed referencing errors are as follows:



1. Wrong punctuation.
2. No date of publication and it was not so indicated.
3. In the case of journals, no names of publishers, no page numbers and no indication of issue and volume.
4. In the case of books, no name of a publisher and number of pages.
5. In the case of Websites, no title of content, and date of retrieval.

The majority of the references cannot be traced because they are only the authors' names and titles, with a few having the date of publication.

Here are examples of the different types of references in the assignment:

Assignment #2

*Homepage of applied magnetic
Homepage of Thayer Walkins*

Assignment #3

Answer.com search

Ask.com search

Assignment #6

Balin, L (2005): The man Behind the microchip
Caruzi, P.E. (2003): A history of modern computing
Hubner, Kurt (1998): The four layer diode in the cradle of silicon valley
Saxena, A. (2009): Invention of integrated circuit.

Assignment #25

www.differencebetween.com
www.treccourse.com
www.wikipedia.com

Assignment #27

Principle of electronics by Engr C.I.B. Ufua
Electrical Technology by B.K. Theraja and A.K. Theraja
www.about.com
www.bookboon.com
Baim, L. (2005)
Sesena, A. (2005) Invention of integrated circuit

It is pertinent to note that none of the 50 assignments had in-text citations; this is another indication of plagiarism and inability to use information ethically due largely to poor information literacy skills



Summary

From the foregoing analysis of 50 assignments of the 300 level students in Electrical Electronics Engineering Department, it appears the students' information literacy level is quite low, even in year 3. This is contrary to the submission of the lecturer who taught the course and gave the assignment as the lecturer rated the students' level of information literacy as excellent/advanced in Section 6.3.3.

It is expected that their information literacy level would have improved over the years (King, 2007). However, this is not the case. The current situation may be connected with poor teaching and instructions which occasioned the level of assignment question, with no clear instructions and format given.

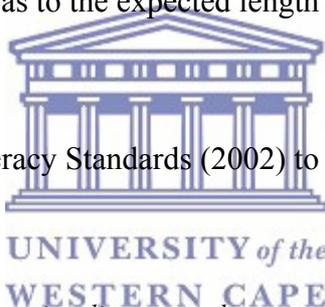
6.9.3 COURSE: USE OF LIBRARY AND STUDY SKILLS (GSE 104)

Assignment question: Discuss the role of information in science and technology.

Three hundred and eleven (311) students submitted GSE 104 assignment printed on A4 paper, some were typewritten, printed on A4 with different font sizes and ranging from 1.5 spacing to double spacing, while about 56 were hand written. While giving oral instructions for the assignment, the lecturer encouraged the students to use both online and print sources of information. Below is a range of assignment lengths (both typed and hand written):

*Half a page: 16 assignments
One page: 195 assignments
Two pages: 84
Three pages: 14
More than three pages: 2*

As there was no instruction given as to the expected length of the assignment, students simply acted on their own volition.



Using the ACRL Information Literacy Standards (2002) to analyse the assignment, the results follow.

ACRL Standard 2: The information literate student accesses needed information effectively and efficiently.

The criterion is to check the students' knowledge of different information resources and formats, their purpose and audience, (e.g., popular, scholarly). Of the 311 students whose assignments were evaluated, 34 indicated Wikipedia as the source used, 17 mentioned www.google.com, while six indicated both Wikipedia and www.google.com. The others did not spell out the sources they consulted.

Wikipedia is a non-authoritative source and therefore unacceptable for scholarly writing such as assignment, at the university level. On the other hand, for those who indicated Google, one could infer that they were not aware that they needed to pay attention to the specific Website consulted for the purpose of proper referencing and/ further reading. In summary, it appears students are not knowledgeable about the different information resources and formats, their purpose and audience, (e.g., popular, scholarly).

ACRL Standard 3: The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system. Students are expected to select and synthesis information to construct new meaning.

A critical analysis of concepts and the incorporation of selected information into one's personal knowledge base is rated as excellent in the rubric but no assignment reflected this. None of the assignments reflected a thorough synthesis of concepts and information, the discussions were incoherent and information selected from various sources was not made clear. This confirms the general complaints in the journals that they could not find direct answers online. Further discussion of this point will follow in the subsequent section. The assignment question itself does not encourage much critical discourse. Besides, as mentioned earlier, the lecturers did not provide any guide to the number of pages for the assignment. Students took advantage and submitted short assignments. Only two assignments were three pages long, others were two pages, and a page and half; both typed and hand written. Handwritten assignments are unacceptable at the university level in this 21st century where students should be encouraged to submit typed assignment, to enhance their technology literacy level which is a critical aspect of information literacy.

Standard 4: The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.

The criterion for evaluation is the organisation of content in a manner that supports the format of assignment. For example, in the case of a research report: abstract, introduction, literature review, methodology, presentation and discussion of results, recommendations and conclusion should be included.

Unfortunately, students were not given any order or format of assignment by their lecturers. However, it is expected that at the university level, for an assignment of this nature, students should write an introduction, the main body of assignment and then the conclusion. Of the 311 assignments, 213 were in these three parts which is commendable. However, the rest of the assignments was not sub-divided, which is unacceptable.

ACRL Standard 5: The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.

The criterion for evaluation is the acknowledgement of the use of information sources, and proper referencing.

Only three students had a list of references, while one had an in-text citation. Those who consulted Wikipedia and conducted a Google search did not go beyond stating “Wikipedia” and “www.google.com”. The Web addresses, titles and other necessary details were not listed. This is unacceptable and can be tagged as plagiarism.

Here is the list of references of the three students who so indicated, with several errors:

#A002

Abduwahab Olarenwaju Issa Abstract
Department of Library and Information Science
Federal Polytechnic Offa
Kwara State Nigeria
Boma B. Obi PhD
Deputy College Librarian
River State University of Education
Google: Business Week in Brigatman and Jeffrey 1986.

#A183

14 references
Adoni, E.E. (2006) *Collection development management in context*. Warri: Etodick Publishers
Clarke, S.O. (1990). *Fundamentals of library science*. Lagos: Functional Publishers

#A311

Authur Murraymona Mohamed 2010
“The role of information and communication
technology in mobilisation of sustainable
development knowledge quantitative evaluation”
Journal of Knowledge Management
Vol. 14 iss 5, pp. 744-758

Summary

From the analysis of the 100 level assignment, one can conclude that their level of information literacy is low. This may be because they are fresh out of secondary school, but it also implies that they did not bring in information literacy skills from secondary school, similar to the findings of King (2007) at the University of the Western Cape. However, not having a proper information literacy programme at FUPRE poses a challenge to the overall academic progress of the students.

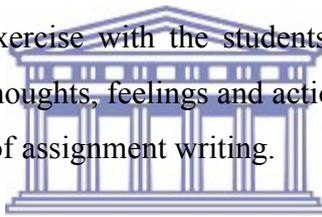
6.10 FINDINGS FROM THE JOURNALS

This section analyses the journaling with 300 level students in the Department of Petroleum Engineering and 100 level students in various departments across the Colleges of Science and Technology, whilst attending to their assignments, which were analysed in Sections 6.9.1 and 6.8.3 respectively. The students were 77 and 10 in number respectively.

6.10.1 MEDIUM AND PURPOSE OF THE JOURNALLING EXPERIENCES

The dialogue journaling took place on WhatsApp Messenger, a cross-platform mobile messaging application which allows instant exchange of texts, audios and videos (www.whatsapp.com). WhatsApp Messenger is compatible with iPhone, BlackBerry, Android, Windows Phone and Nokia.

The essence of the journaling exercise with the students was to understand how they go through their assignments; their thoughts, feelings and actions as explained in Kuhlthau's ISP model, during the various stages of assignment writing.



Kuhlthau's ISP model, one of the frameworks for this study, reveals a process of seeking meaning while seeking information (Kuhlthau, 2008:68). It reveals information seeking from the users' perspective in seven stages (Kuhlthau, 2008:67): initiation, selection, exploration, formulation, collection, presentation and assessment.

The analysis of the journals will confirm the extent to which Kuhlthau's ISP model is applicable in the students' course of conducting their assignments.

6.10.2 PLANNING FOR THE JOURNALS

FUPRE resumed the first semester of 2013/2014 session on the 3rd of March, 2014. Orientation for new students took place from 17th to 24th of March 2014, while lectures were scheduled to commence on the 24th of March. However, lectures did not commence fully until the second week of April. At the commencement of lectures, the researcher, through Heads of Departments met with four lecturers in the College of Science and College of Technology regarding their schedule of big assignments for 100 and 300 level students.

However, it appeared as though, there was no schedule for the administration of course assignments. That is, they had it “in mind” to give the students assignments but were not sure during what week of the semester. One of the lecturers, when asked during which semester week he would administer his assignment said:

I will surely give my students assignments, but I have not decided when it would be.

In addition to the challenge of not knowing exactly when assignments would be administered, the time frame of most assignments was another issue. The students had a number of short term assignments. The time frame for the assignments was from three days to about two weeks.

However, the short time frame for the assignments does not necessarily suit the research model in use for this research, being a process that takes time. Despite the situation on ground, the researcher still made the effort to maximise the opportunity to interact with the students during an on-going assignment.

Again, the challenge of having many short assignments featured during the large group discussion with the students. As a matter of fact, a student also complained about it during the survey, while he was handing in his questionnaire to the researcher.

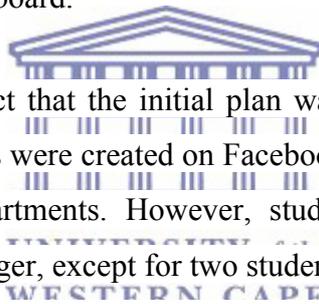
In view of the aforementioned challenges, the researcher had to interact with more lecturers while the questionnaire survey was going on. More departments were contacted, even though efforts had earlier been made in this direction; but then, the further effort did not yield any satisfactory result. Hence, when it became obvious that it was the same pattern across the lecturers contacted, the researcher decided to work with the lecturer who was most supportive in terms of volunteering to be part of the journal process in order to maximize responses from students.

There were 77 students from the 300 level Petroleum Engineering divided into seven groups; each group opened a WhatsApp platform. The lecturer and researcher were present on all platforms. Though not all the students had phones compatible with WhatsApp Messenger, the lecturer advised that they make their comments through their group members. Hence, the platforms were a bit rowdy because it appeared as though it was primarily set up for students

to discuss and work out their assignments, rather than interact with the researcher on their day-to-day experiences with the group assignment. Most group members did not have the opportunity to meet as a result of time constraints, coupled with the fact that they were having lectures and other assignments to attend to.

Journaling with the Electrical Engineering students failed because their lecturer was absent on the WhatsApp platform created for the purpose, hence students did not respond to the researcher's comments and questions other than the daily exchange of pleasantries; they also did not discuss the assignment among themselves on WhatsApp. However, 50 students handed in their written assignments.

For the 100 level students, they were busy with the Use of Library assignment; 10 students took part in the journaling on WhatsApp and Facebook, but communication was scanty because their lecturer was not on board.



Noteworthy to mention is the fact that the initial plan was to interact with the students on Facebook, and indeed chat groups were created on Facebook as part of the preparations while making arrangements with departments. However, students unanimously indicated their preference for WhatsApp Messenger, except for two students in 100 level whose phones were not WhatsApp Messenger compatible, for whose sake a Facebook group was employed.

6.10.3 FINDINGS FROM JOURNALS WITH 300 LEVEL STUDENTS OF PETROLEUM ENGINEERING DEPARTMENT

The Basic Petroleum Geology Assignment (PNG 315) was administered to 77 students of the Department of Petroleum Engineering during class time on Thursday 22nd of May, 2014. The initial submission date was Friday 30th of May, 2014, making it a one week assignment. However, the Lecturer, during the course of the assignment, postponed the submission date to June 3rd, 2014, due to complaints from students about their inability to meet up with the deadline primarily because most groups had not met consequent upon their hectic work schedule.

The WhatsApp platforms for journaling were created on the 27th of May 2014, the 5th day of the assignment. Interactions commenced on the same day, but due to the postponement of the

submission date from 30th May to June 3rd, 2014, this gave the researcher the opportunity to interact with the students on WhatsApp for a week, even though she had face-to-face interactions with them before the commencement of the online chats.

Students were in seven groups: A, B, C, D, E, F, G.

The details of the assignment instruction were handed over to the course representative from whom group leaders made photocopies, for the information of their group members.

The researcher is of the view that the short time span and the later submission date given during the course of the assignment must have affected the pacing and the quality of the assignment. If the assignment was well planned and scaffolded in a way that students are guided to do certain tasks for example, reading the prescribed textbook, taking notes, scouring for information from other sources, writing, etc, it would have helped in no small measure to keenly observe the information seeking process in line with Kuhlthau's model.

Not scaffolding or planning the assignment in order to enable students to tackle specific parts and portions of the assignments at specific timelines under supervision implies that students may not necessarily follow a research or enquiry process as they go through their assignment; or this may invite plagiarism (Colorado College Library, 2014). However, Kuhlthau's model, which forms the basis of this discussion, shows that information seeking is a process of knowledge construction with different cognitive and affective stages (Kuhlthau, 1993, 2003, 2004; Yang, 1997; Wang & Soergel, 1998; Serola & Vakkari, 2005; George *et al.*, 2006).

Despite the shortcomings in the assignment question and its poor mode of administration which did not involve planning and scaffolding, students showed certain cognitive abilities, and they engaged in some physical actions during the course of their assignment. These will be discussed in the light of the Kuhlthau ISP model which is in seven stages: Initiation, Selection, Exploration, Formulation, Collection, Presentation and Assessment.

The affective aspect of Kuhlthau's ISP are the feelings and emotions information seekers experience in the process of the information search (Kuhlthau, 2004:82). Such feelings include uncertainty, doubt, confusion, frustration, optimism, satisfaction and confidence, among others.

Initiation: *this is when a person first becomes conscious of a gap in knowledge or understanding during which the feeling of uncertainty is quite evident, thoughts are vague and seeking is evident.*

The researcher had the opportunity to chat with some of the students face to face at the very early stage; that is, the first two days of the assignment. Their main complaint and concern was that they had too many assignments and hardly had time to work on them diligently. Rather than worry about the specific assignment in question, the issue was about being saddled with too many assignments. Hence, the dominating emotion was that of work or study under stress and pressure, as expressed:

S42 (Group D): At the beginning actually, I think I was not sure of the assignment since we have a short period for compiling and other course work and assignments were at their peak.

S51 (Group E): The major constraint actually has to do with stress and timing. It has not really been easy to create spare time in working on the project. And again, going online to surf for materials in addition to what we were given has not been easy. You know after gathering materials, the next thing to do is to look for a way to correlate all the materials together so there is uniformity. So it has really been stressful doing that!

S71 (Group G): Our daily schedule of lectures is always tight so most of the time we are very busy. Also the Internet connection in the e-library is slow so it is very undependable.

S75 (Group G): Hectic academic activities

Even when interactions started on WhatsApp, students did not seem to express any or much uncertainty or vagueness in thoughts. This may have been due to the fact that the assignment question did not require much critical thinking. They only needed to read a particular portion of a prescribed textbook, and summarise. Even though they were asked to source for more information, there was already a defined scope for which some were glad as expressed by the course representative *S14 (Group B)*, and a few others:

S14 (Group B): The material given to us actually covers the aspect of our research to a reasonable extent. I am thankful that our lecturer was able to give us a concise material for the research.

S44 (Group D): I extracted only a few vital images from Wikipedia, since the lecturer has given us enough information to work on.

S49 (Group D): Actually, the main challenge I faced while doing the project (Rocks) was combining the various ideas I got from the different materials I used.

Researcher: Do you mean you are having problems drawing your own summary from the materials you have? You feel overloaded with information or what? Please kindly clarify

S49 (Group D): Yes, I felt quite loaded with information. For instance, from the basic petroleum geology textbook by Peter Links that we were given. I saw that the main classes of metamorphic rocks were based on origin while some other materials classified it based on texture only which are foliated and non-foliated.

Researcher: So how have you been able to resolve that? S49: I actually gave more preference to the material we were given by partially side-lining the ideas from other materials. I included the textures and used a table to relate the origin and textures.

One could infer from the chats with Group D that they were concluding the assignment on the first day of the WhatsApp chat which was the fifth day of the assignment.

S46 (Group D): Please for the report for geologic consideration and engineering practice, the group members contributing should please submit their part on or before 6 pm (Day 6) on Wednesday so that we can proof read and prepare for the presentation.

And then a caution from a fellow student who thought the group should not be in a hurry to submit:

S47 (Group D): Hello my group leader! Good morning sir. I want to suggest that we should not rush and print our report work today, even though the soft copies are ready. Let all the group members have the soft copies first, so that they (we) can go through it during weekend. Then any error noticed should be communicated to the people in charge of the arrangement to be corrected. Then we can print on Monday and submit. This is to ensure that we have error-free report notes submitted. I also strongly recommend that we should thoroughly read the instruction for the report assignment to ensure full compliance to our distinguished lecturer demands and requirements for the reports work. Thank you all!

S61 (Group F): I happen to be doing the compilation of the different contributions of the group members and I what have discovered so far is that most of us do not know how to arrange and make our information consistent.

From the interactions among the students above, it is also evident that not all the members were involved in the assignment writing which is contrary to the pedagogy of group assignments which involves all members and encourages interactivity as well. Even for those who actively participated in the assignment, it appears they worked individually and then submitted to their team leader for compilation.

S8 (Group A): But I still have a question on how we will go about the compilation of everyone's contribution because I went through victor's own and it was already 8 pages without diagrams.

S31 (Group C): Topics were shared to the 10 members of the group to summarise chapters 1,6 and 8 respectively of a book titled basic petroleum geology by Peterlink and also find some information from other source. Some members submitted their summaries to me yesterday, when compiling it, I arranged the term paper based on first topic to the last topic with the aid of the soft copy of the book we are to summarize, diagrams, presently am trying to insert the necessary diagrams which some of the group members omitted.

S61 (Group F): Tobi Solomon submitted his assignment yesterday, while Cobany did submit this morning remaining Prince and Steven.

These comments show students did not really work together as a group which may have been due to the manner of administration of the assignment as earlier explained. This reveals a

trivialization of the pedagogy of group work which is often overlooked in the process of teaching (Sutton, Zamora, and Best, 2005).

Selection: at this stage, a general problem is identified, and the initial uncertainty often inclines due to some sense of confidence and a readiness to begin information search.

In this assignment, there was no problem to investigate. Hence, students did not necessarily go through the selection phase in which a problem is identified. The assignment question, as discussed in Sections 6.8.1, 6.8.2 and 6.8.3, was a “read and summarise” type, a lower order thinking type assignment using Bloom’s taxonomy revised by Anderson, *et al.* (2001). The assignment only encouraged students to read, understand, explain and summarise. The assignment did not provide room for knowledge application, analysis, evaluation and even design and construction.

Exploration: in the exploration stage, a volume of inconsistent information is encountered. Such information may be overwhelming and incompatible with the topic, hence, the person’s level of confusion and uncertainty increases and low confidence level sets in.

Again, the students did not necessarily go through the exploration stage in which low confidence level is expressed due to excessive amounts of information encountered which may be incompatible with the topic. In this case, students were given the information to work with; that is, they were asked to read and summarise certain chapters of the Basic Petroleum Geology textbook by Peter Link. Put differently, there was no research problem to explore. Hence, they did not experience an intense information search, even though they were asked to seek additional information. Hence, a high level of confusion and uncertainty attributed to the exploration phase (Kuhlthau, 2004, 2008, 20012) of the ISP model and low confidence levels were not evident as students were “spoon fed” with the basic information needed. The same topics/themes could have been allotted to students without necessarily tying them to a particular textbook that narrowed their search.

Formulation: formulation of focus is when confidence begins to increase and uncertainty gives way consequent upon a focused perspective.

Students were focused from the beginning on the end of the assignment, because their task was simple, clear and straightforward; “read and summarise”. Hence, they were confident about achieving their goal of finishing the assignment in good time, if anything, the challenge expressed was that of coordinating the group and finding a convenient time to meet.

Collection: this stage portrays some level of certainty based on focused perspective and hence deep involvement.

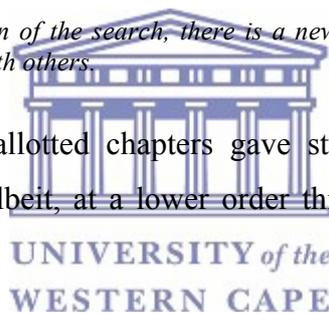
This was not evident in the journals as students had no research problem to solve; hence there was no “focused perspective”. They were only required to read, understand and explain which was implied in a statement by their lecturer during the chat in Group F:

I expect that your report is supposed to teach me. So whether I know the terms or not is not important. You should understand those terms and explain them to me. This is why I said that if the constraint on pages is too tight, I must be informed first before any additional pages are included. I have extended the maximum number of pages for two groups because of this. So, research on those terms and come up with decent explanations to them.

This level of assignment encourages lower order thinking according to Blooms Taxonomy (Anderson, *et al.* 2001; Churches, 2009) because it addressed reading, understanding, remembering and explaining.

Presentation: at the completion of the search, there is a new understanding which informs learning, sharing and communicating with others.

Reading and summarizing the allotted chapters gave students room to learn, share and communicate with their peers, albeit, at a lower order thinking level as occasioned by the type and level of assignment.



Assessment: A positive and conclusive information search gives a sense of accomplishment and increases self-awareness while it is contrary for an information search that is not conclusive.

At the end of the assignment, students expressed some relief, self-confidence, sense of accomplishment and satisfaction.

S7 (Group A): I felt a bit confused and worried, that lasted till yesterday. I feel better now that I am done. At least I can rest easy now.

S44 (Group D): Actually fully satisfied, all work completed.

S59 (Group E) we are satisfied with the work and also confident in our work, to cap it all, we really did a great job. Thanks to all those that really helped to make the compilation easy for us!

Summary

From the analysis of the WhatsApp journals with the 300 level students of Petroleum Engineering Department on the PNG 315 assignment, it was glaring that they did not

necessarily experience Kuhlthau's ISP. In the first instance, the assignment did not include a research problem even though students submitted a research report as required by the course lecturer. Research is an enquiry, a study, an investigation, that involves a process. It is in the process of investigating a problem that Kuhlthau's ISP can actually be employed as a model to determine whether students' experience the physical, cognitive and affective realms. However, from the analysis, one can infer that there is a challenge with the process of teaching and learning at FUPRE, a challenge which hinges on the curriculum and the way it is administered.

6.10.4 FINDINGS FROM JOURNALS WITH 100 LEVEL STUDENTS

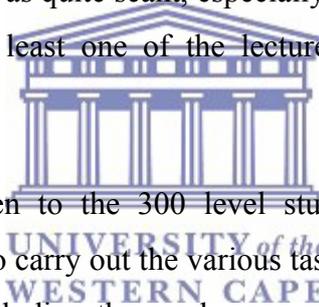
The 100 level students across all the departments in both Colleges of Science and Technology were administered the Use of Library assignment during class time on the 21st of May, 2014. The assignment question was dictated to the students and the lecturer encouraged them to use both print and online sources of information; put differently, there was no written instruction. Also, verbal instructions were not given as to the number of pages of the assignment and format. However, it is the type of assignment that requires students to read from different sources, understand, evaluate, explain, and synthesise, in a manner that presents the assignment as a higher order thinking type, despite the broadness of the question and lack of context, as discussed in Sections 6.7 and 6.8.

The assignment question was *Discuss the role of information in science and technology*. Twenty two (22) students initially volunteered to participate in the journaling, but 10 students dropped out even before arrangements were concluded. The initial suggestion and agreement reached between the researcher, volunteer students and two of the lecturers handling the use of library course was that the journaling should take place on Facebook as all the students confirmed that they were active on Facebook. However, adding their names to the group created was not easily accomplished because for some of the students their Facebook settings only allowed their friends on Facebook to add them to groups. For four students whose names were similar to other user names on Facebook, after adding them, the researcher discovered that they were not FUPRE students and had to immediately remove them.

Consequent upon these challenges, a meeting was held and the consensus was that WhatsApp would be a better option. But two students, whose phones were not compatible with WhatsApp decided to interact with the researcher on Facebook.

Therefore, the journaling for the 100 level students took place on Facebook and WhatsApp Platforms with two and eight students respectively, a total of 10 students. Besides the initial 10 students that left, another two opted out.

After putting in place the platforms for interactions, yet another challenge presented itself; the lecturers who promised their support and who were indeed supportive all along during the various phases of the data gathering did not join the either the Facebook or the WhatsApp platform for interactions with the students. They were only comfortable with setting the stage for the interactions. Therefore, the interaction between the researcher and the students for the period of 10 days on WhatsApp was quite scant, especially when they were rounding up their assignment. The presence of at least one of the lecturers in the chat group could have enriched the journals.



Similar to the assignments given to the 300 level students, there was no planning or scaffolding that guided students to carry out the various tasks involved in assignment writing. The majority of the students, including those who are not part of the journaling, were not clear about the assignment question; many complained to the researcher about the ambiguity of the assignment question. For example, a student who was not part of the journaling said:

The question looks simple yet complicated. It is more than an assignment. I can say it is a topic for a textbook. Science and technology is everything, and information too. So to answer the question satisfactorily will take forever.

The question should have been framed in a manner that allows students to apply it in the context of their specific discipline or in an organisation. The assignment as it is invites plagiarism which could have been avoided or at least minimised if students were asked to report on specifics that may require them to explore factual information (Colorado College Library, 2014).

Besides the verbal instruction that students should source for both online and print materials, there was no guidance while working on the assignment. This is contrary to the researcher's

expectation as the lecturers are all librarians who should apply their knowledge and understanding of information literacy in teaching and learning.

The analysis of the journaling will be discussed in the light of the various stages of the ISP model: Initiation, Selection, Exploration, Formulation, Collection, Presentation and Assessment.

Initiation: this is when a person first becomes conscious of a gap in knowledge or understanding during which the feeling of uncertainty is quite evident.

The researcher observed that a striking number of students did not quite understand the scope of the question or rather, they felt the question was too broad and ambiguous. Hence they were filled with uncertainty and confused too about how to initiate the assignment. This is captured in the following comments made by some students during the journaling:

S101: I think the question is a bit complicated because first of all, what is information? What role is science and technology playing in our present day society?

S102: Yeah, it is kind of complicated.

S103: The assignment seems easy at first. I thought that when I get to the Internet to surf for information the assignment will be easy for me to tackle, but that is not the situation.

S105: The topic is too difficult to understand.

S106: It is difficult. Are we going to discuss the use of information in all aspects of science and technology? This is too much!

Seeing the assignment as difficult goes with a feeling of uncertainty and confusion which were both expressed to the researcher on the WhatsApp platform and during casual face-to-face meetings. In the first week of the assignment, 13 students approached the researcher individually and in a group of two and three to request that the researcher should explain to them how to go about their assignment. It was glaring from this and the general complaints that students may not have been taught any subject related to the assignment.

The first stage of the ISP model is the awareness of an information gap that needs to be filled. It requires the user to seek meaning in order to fill a gap in knowledge and be informed (Kuhlthau, 1994). In the case of the GSE 104 assignment, students are not quite clear as to what meaning to seek due to the broadness of the assignment, with no clear instructions about the scope, context and volume.

Selection: at this stage, a general problem is identified, and the initial uncertainty often reclines due to some sense of confidence and a readiness to begin information search.

While the students were busy writing the assignment, the researcher met some who were part of the journaling and others who were not; based on the interactions with them, it was clear that even as they were busy gathering information, the specific assignment problem seemed elusive to them.

Exploration: in the exploration stage, a volume of inconsistent information is encountered. Such information may be overwhelming and incompatible with the topic, hence, the person's level of confusion and uncertainty increases and low confidence level sets in.

The exploration stage was experienced by a number of students who gathered a lot of information which was not consistent with the topic. It was expressed by some students in the journals and by a number of students who discussed their assignment with the researcher.

S101: I am a little confused about how to put my information together

S102: I met my lecturer and told him it was kind of difficult to get the information needed to tackle the assignment, that I only got information on 'information technology in communication' and not the role of information in technology. He then told me to search on 'information and technology'

S103: Concerning the assignment, it seems to be stressful in the sense that sources of information like Google, Wikipedia are not a reliable source of information for the assignment. The information I am getting are not exactly what I need.

S104: I am still searching for better sources. It is not easy. I had to modify the topic to get some information and try to relate it to the question but it is still tough for me.

S106: Searching for the right information is stressful, and looking for the rightful sources is a problem, what should I do?

S107: I found it difficult to get the rightful information on the Internet. Apart from that, the campus Internet network is not encouraging at all.

S108: All I have been getting is on information technology and communication instead of the role of information in technology. Tired!

S110: I am so stressed and losing motivation to continue doing this assignment. What a heck!

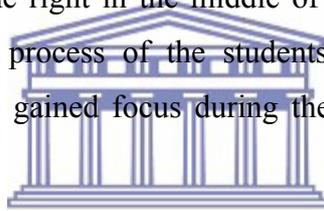
One of the students who opted out of the journaling exercise approached the researcher and lamented:

Please help me. I have downloaded so much information, yet I have no information to work with.

Even though the exploration phase has been identified as an important phase in the process of seeking meaning (Yang, 1997; Wang & Soergel, 1998; Serola & Vakkari, 2005; George *et al.*, 2006; Kuhlthau, 1997, 2008), especially in this era of information abundance, the students were overwhelmed with information because of extensive information search occasioned by the broadness of the question and the lack of context.

Formulation: formulation of focus is when confidence begins to increase and uncertainty gives way consequent upon a focused perspective.

Interestingly, when students had difficulty in putting together their response after gathering so much inconsistent information, some of them complained to their lecturers who then advised them to narrow their response to the use of information in science or in technology, based on their college. This information spread like “wild fire” among the students, though it did not reach some of them. However, many students complied as evident in their assignment scripts. But this information came right in the middle of their assignment, and might have affected the information search process of the students as they were working on their assignment. A few students who gained focus during the formulation phase expressed the following statements:



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S104: I have been able to get some hint but not a direct one. All I need to do is use them effectively and relate them to the assignment.

S106: What I want to do is to browse information, science and technology differently, and then relate the three.

S108: My major problem was not even the poor network but where I can find the answer to the assignment. I googled it but it was giving me importance of information technology in education, medicine etc. even the books in library are all talking about the same so I have to use my own personal knowledge to write down something.

From S108’s comment, one can deduce that the students wants to contextualise the response to be provided based on personal experience and understanding after experiencing difficulty in obtaining a “direct answer” (a commonly used phrase among the students as observed by the researcher).

Collection: this stage portrays some level of certainty based on focused perspective and hence deep involvement.

As mentioned earlier in this section, interactions on WhatsApp started to dwindle somewhere in the middle of the assignment especially when students became deeply involved in writing the assignment. Some of them were in a hurry to finish handwriting so that they could hand it

over to a typist to assist in typing and printing the assignment for a fee. Most of them expressed worries at this stage because of the number of students involved in the assignment; the entire 408 students in 100 level

It must be mentioned however, that many of them have keyboard skills as observed in their use of the desktop computers in the e-library and computer laboratory in College of Science, and their personal electronic devices. However, due to inadequate facilities on campus they seem to only use the facilities to browse online, and not to type.

However, a few students responded when they were deeply involved in the assignment writing.

S104: I used Google though it gave me information on information technology. But I was able to link it to the importance of information in technology.

S109: The assignment requires critical thinking. It is not as difficult. I just did mine yesterday. I totally forgot about it because I thought it would be like a walk in the park since it was just about googling it.

The approach like that of S109 was a typical one among the students in 100 and 300 level students, that is, working on their assignments within a short period of time, and as short as a day which does imply that they do not necessarily follow a process in their assignment writing and they employ the “bad habit” of “googling” as reported in the CIBER Google Generation report of 2008; Williams (2010:12) in the Mimas (www.mimas.ac.uk) report and in EDUCAUSE Centre for Applied Research (ECAR) report by Dahlstrom (2012:5); discussed in Chapter three.

Presentation: at the completion of the search, there is a new understanding which informs learning, sharing and communicating with others.

The researcher observed that at the completion of the assignment, students did not express confidence because, as some of them shared their thoughts on the assignment, they found out that they provided varied responses based on their understanding of the topic, therefore they were not sure if they could be right or wrong. Their sharing was not out of insight gained from the assignment but to compare notes with their friends to enable them to figure out if they were “right” or “wrong”.

Despite the general mood after completing the assignment, some of them were confident in what they did, as expressed (verbally) by S102, the 100 level course representative.

Assessment: A positive and conclusive information search gives a sense of accomplishment and increases self-awareness while it is contrary for an information search that is not conclusive.

As observed by the researcher, a number of students were not satisfied with their work upon completion of their assignment. Two students who had an informal chat with the researcher did mention that it was their first major assignment in their two months in the university, and a difficult one and they hoped that they would pass the assignment. During the journaling a student did express her dissatisfaction thus:

S101: I finished the assignment but I think I got it all wrong.

Researcher: What happened?

S101: I twisted the question the way I wanted and I worked on the role of the Internet (same as information) in science.

Researcher: Why?

S101: I don't know but that was how I understood it then and maybe even now.

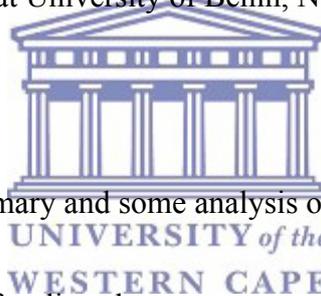
Using the Kuhlthau ISP model, the 100 level students, to some extent, experienced the cognitive and affective stages of the model, and also some physical action during the course of the assignment (Kuhlthau, 1993, 2003, 2004; Yang, 1997; Wang & Soergel, 1998; Serola & Vakkari, 2005; George *et al.* 2006). Although, mention must be made of the fact that the vagueness of the assignment question contributed to the intensified affective experience of the students.

Summary

The analysis of journals with the 100 level students suggests that they seemed to have experienced the affective stage of ISP model intensely; especially the initiation, selection and exploration stages, because the assignment question was vague and broad. Hence, for most of them, focusing was a challenge as the assignment question did not provide room for knowledge application and contextualisation. It was a high order thinking skills assignment as it not only encouraged students to read, understand, describe, define and analyse, but also to construct and create the assignment in some format.

The conduct of assignment during the journaling revealed students' level of information literacy skills. Many of them had challenges with sourcing for information contrary to the claim of their lecturers (L3, L6) in section 6.3.3 who in fact rated them as advance/excellent in terms of having knowledge of types of literature in the field. But contrarily, they were looking for the "exact" information or "direct information", that is, they were looking for an article or a book with the title of the assignment. Their inability to locate the exact match of topic to a book or article upset them until they saw that there was no choice other than to work with the available information. Being their first semester in the university, coupled with the fact that they had not taken any instruction on research methodology or assignment writing, this challenge is perhaps understandably expected. It also implied that the students may not have brought information literacy skills from secondary school to the university that is commensurate with their current level of educational attainment, similar to the findings of Kunakornsakul and Pinit (2012) at the King Mongkut's University of Technology, Thonbur, Ukpebor and Emojoorho (2012:7) at University of Benin, Nigeria.

6.11 CONCLUSION



This chapter has presented a summary and some analysis of the qualitative data.

The presentation and analysis of policy documents reveal that the FUPRE library has not anchored information literacy education as expected of a 21st century academic library which involves teaching core information skills as spelt out by ACRL(2002) and Kuhlthau, *et al* (2007, 2010, 2012) in guided enquiry. Instead, focus is on teaching the traditional role (Curzon, 2004: 40) of the library, which is to train users on how to find and use information resources available in the library.

Evident is the fact that there is no collaboration between the library and the faculties in teaching and learning information literacy skills.

The interview with the University Librarian reveals that FUPRE library is still in the process of reaching the height from which it can fully serve the university community as an academic library due to insufficient infrastructure as observed by the researcher and as expressed by students in the survey and large group discussions. There is an awareness of the need to go beyond teaching library skills to teaching information literacy skills. So far, the library is yet

to incorporate Web 2.0 tools in the discharge of its duties to the university community which is also blamed on low infrastructure.

The interview with two librarians in the e-library reveals that there are only 24 computers available to the university community presently due to space problems. However, soon there will be some expansion to accommodate 130 more computers; the university librarian also confirmed this in the interview. The Internet connectivity has improved due to some upgrading done by the ICT unit. However, students underuse the library and rarely consult with the librarians as revealed in the survey. The librarians also confirmed that students basically use Google search.

It was observed that the 300 level students' interest is beginning to shift to the use of e-books and the librarians are downloading a number of e-books for the benefit of students. The FUPRE library does not allow the use of social networking sites like Facebook, because it is believed that students use such sites for entertainment purposes.

The interview with a staff member of the ICT, the head of the Web unit, confirms that in addition to the 24 computers available for use in the library, there are 70 computers in the department of computer science and mathematics which is available to students from other departments subject to authorization.

The analysis of the open-ended interviews with 12 lecturers reveals that there is a need for more creativity and interactivity during classes rather than passing knowledge from lecturers to students as is largely the case at the moment. In the conducting of the assignment, most lecturers refer students to specific information sources, such as textbooks and online materials.

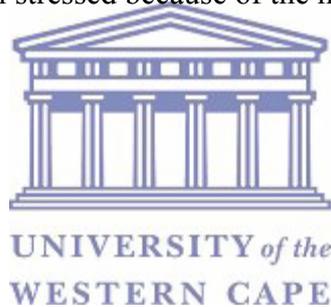
Analysis of the three different assignment questions reveals that they were in the bracket of lower order thinking and higher order thinking skills based on Bloom's Taxonomy.

The majority of the lecturers seem to rate their students' information literacy level above average; however, the assignments reveal that students' information literacy skills are low, though mainly due to poor teaching and learning. Students' use of information is unwittingly unethical.

FUPRE has no Learning Management System (LMS). Some lecturers do communicate with their students via WhatsApp and email; however, the creativity and innovation that Web 2.0 tools bring into teaching and learning is not explored. Put differently, Web 2.0 tools are not incorporated in teaching and learning.

To a large extent, the large group discussions (LGDs) confirmed the findings of the survey, but further revealed is students' poor information literacy skills, similar to the findings of Baro and Fyneman (2009); Isa, Amusan and Umma (2009); Abubakar and Isyaku (2012); Adetimirin (2012); and Ukpebor and Emojorho (2012). This is evident in their "bad habit" of googling, and copying and pasting.

Analysis of the journals with students on WhatsApp revealed that they do experience the affective stage of the ISP to some extent, but this seems coloured by the fact that all through their assignment writing, they feel stressed because of the numerous assignments they have to complete within a short period.



CHAPTER SEVEN

INTERPRETATIONS AND CONVERGENCE OF FINDINGS ACROSS THE PHASES

7.1 INTRODUCTION

In Chapter five the quantitative data which made up the Phase 1 of the research was presented and analysed, while in Chapter six, the focus was the presentation and analysis of the qualitative data from Phases 2 and 3. This chapter is essentially a systematic convergence of the findings from the survey, large group discussions, assignments, journals, interviews and policy documents, while emerging themes across sections are highlighted.

The strength of mixed methods of both quantitative and qualitative research is that it allows for the convergence of similar findings and the juxtaposition of results that seem contradictory. Therefore this further analysis and discussion brings to the fore some exposés in the educational system, challenges faced by students and staff alike, and the unanticipated status quo of information literacy education which negatively impacts on the acquisition of information literacy skills on the part of the students.

The study has used Kuhlthau's ISP model to explore how students seek and use information in the process of assignment writing and in their academic work in general. The ACRL information literacy standards, which have a common ground with Kuhlthau's ISP model in terms of the cognitive aspect of learning, have also been used to assess the information literacy level of the students. The standards were especially helpful in the construction of a rubric for the assessment of students' assignments. The assignment questions were analysed using Bloom's Taxonomy to rank them from low to high order thinking assignments.

The following are the research questions to be answered, using the aforementioned conceptual frameworks as the bases for analysis and evaluation:

- 1) What are the information needs of Nigerian undergraduates in terms of their academic work and everyday life?

- 2) What are the information resources and infrastructure available to undergraduates?
 - a. What access to the Internet and the social media do students have off and on campus?
 - b. What personal electronic devices do undergraduates have and use?
 - c. What online electronic resources such as full text databases are available via the library and other information centres?
 - d. What information literacy education is available to undergraduates?

- 3) What are the information seeking processes of Nigerian undergraduates?
 - a. How do they go about defining and articulating their information needs?
 - b. How do they identify, evaluate and select likely information sources?
 - c. What techniques do they use to search for relevant information in the identified information sources?
 - d. How do they explore a problem and thereby formulate and deepen a focus?
 - e. How do they engage with and analyse the information in their sources?
 - f. How do they synthesise information from various sources?
 - g. Are they able to articulate, organise, synthesise for onward presentation or communication?
 - h. On completion of an assignment, do they reflect on and assess and adjust their information behaviours?
 - i. Are they aware of the ethical, legal and social issues surrounding the use of information and ICTs, either as individuals or as members of a group?

- 4) What are the barriers that undergraduates experience in their information seeking?

7.2 RESEARCH QUESTION ONE: WHAT ARE THE INFORMATION NEEDS OF NIGERIAN UNDERGRADUATES IN TERMS OF THEIR ACADEMIC WORK AND EVERYDAY LIFE?

Information needs are basically driven by either a knowledge or experiential gap that needs to be filled. It evolves from the consciousness that something is either missing or inadequate, which engenders the need to seek meaning in order to gain clarification and be informed (Kuhlthau, 1994, 2004, 2008, 2012). “Information needs are an integral part of everyday living; they are a part of overall information behaviour, and can be understood in the wider

context of the use of information in work, in study or in life generally” (Bawden & Robinson, 2012:189).

The research on information behaviour discussed in Chapter three reveals that students not only seek information for their academic work but also in their everyday life.

In terms of realising their academic goals, students seek information to gain deeper understanding of their course work, complete assignments, write seminar papers, prepare for class discussions, examinations and tests, and to write their final year research papers (Ajiboye and Tella, 2007; Baro and Fyneman 2009; Baro, *et al.* 2010; Ejiwoye and Ayandare 2011; Emmanuel and Jegede 2011; and Adetimirin 2012).

Chapter five, Table 18 reveals that FUPRE students seek information to meet their academic and everyday life needs. The 803 students in both 100 and 300 levels in the Colleges of Science and Technology involved in this research work were writing one form of assignment or another, writing tests as well as reading their course lectures at the time of data gathering.

Everyday Life Information Seeking (ELIS) which focuses on the way and manner in which people acquire information in daily life in the non-work context (Savolainen, 1995; Durrance, & Hinton 2004; Fisher, 2005), has been an area of interest to researchers since the 1990s. Similarly, research across the globe has made clear the fact that students seek information for their everyday life information needs in addition to their academic work.

Studies by Savolainen (1995), Durrance and Hinton (2004), Ajiboye and Tella (2007), and Ejiwoye and Ayandare (2011), among others, reveal that in addition to seeking information for academic purposes, students also seek information for their everyday life information needs. Likewise, FUPRE students do engage in ELIS as evident in the survey, with specific reference to Table 18, which shows that they seek information mainly on careers, finance and health. Other areas of everyday information needs are entertainment, sport, relationships, travel/transport, family, accommodation, legal issues, sexual abuse, crime, music, personal development and religion.

Similarly, in the large group discussions with the 100 and 300 levels, expressions were given to their ELIS. Students need information to learn about various technology applications, to

solve domestic problems such as how to remove stains from clothes, to clarify religious issues, how to balance their religious and academic lives, catering, current global trends, time management and general knowledge.

The most consulted information source by students in their everyday life information seeking is Google.com as revealed in Table 19, followed by Wikipedia and then books in their own collections. Some students also visit social networking sites in their everyday life information seeking.

S4: Most times, I visit Nairaland.com to ask questions. It is a group/discussion forum.

WhatsApp, Blackberry Messenger and 2go are mobile networking platforms for text messaging, audio and video sharing that FUPRE students use in their everyday life information seeking.

However, in writing their assignments, students favour the use of their course notes and print text more as evident in figure 17. This may have been because some lecturers do determine the scope of their information search by giving the students a specific source to use during the assignment as in the case of the assignment given to 300 level students in the Department of Petroleum Engineering, PNG 315 discussed in section 6.9.1. The students also use online sources, most especially Wikipedia as shown in the same figure. In the large group discussion with the 300 level students, the fact was made clear that the type of information they seek largely depends on the lecturers. Some lecturers insist on the particular information they should source for, while in some cases they have enough latitude to broaden their scope of information search.

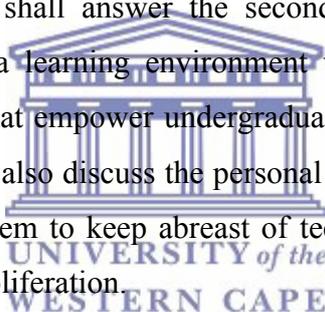
In terms of using social media platforms for academic and entertainment purposes, Table 22 reveals that students use social media platforms for both, but largely for entertainment purposes. This conforms to the findings of Luo (2010:33-37) in a project sponsored by the Association of College and Research Libraries (ACRL) and Dahlstrom (2012) in a study by EDUCAUSE Centre for Applied Research (ECAR).

Research questions two, three and four unravel in greater depth students' information behaviour and their level of information literacy.

7.3 RESEARCH QUESTION TWO: WHAT ARE THE INFORMATION RESOURCES AND INFRASTRUCTURE AVAILABLE TO UNDERGRADUATES?

FUPRE is a specialised university that occupies a strategic position in Nigeria's broad agenda for national development. The country has a national policy objective that is encapsulated in "Nigeria's Vision 20:2020". It is designed upon implementation to drive the country up to the world league of the top 20 economies by 2020. As such it is expected that the education system will enjoy at least the basic facilities requisite for the new vision of education, especially as the first pillar of NV20:2020 is to guarantee the well-being and productivity of the people with education as the bedrock. The key philosophy informing the educational goal is to establish a modern and vibrant education system that ensures the maximum development of the potential of individuals and promotes a knowledge-driven society (National Planning Commission, 2010:147).

With this in view, this section shall answer the second research question by exploring FUPRE's readiness in creating a learning environment that aids the development of the requisite skills and capabilities that empower undergraduates to participate in the process of nation building. This section will also discuss the personal electronic devices available to the students, as it is important for them to keep abreast of technologies and information in the dynamic world of information proliferation.



7.3.1 WHAT ACCESS TO THE INTERNET AND SOCIAL MEDIA DO STUDENTS HAVE OFF AND ON CAMPUS?

The Internet is a crucial channel of information in the 21st century (Tella, *et al.* 2007; Mohd Saad, 2008; Nkomo, 2009; Niemand, 2010; Adetimirin, 2012), and there is a growing utilisation of it and Web 2.0 in the academic life of students, as evidenced in the literature discussed in Chapter three.

Web 2.0, being a 'read-write' Web (Poore, 2009: 41), captures the dynamic trends in the use and design of World Wide Web technology that boosts creativity, communications, secure information sharing, collaboration, interaction, and functionality (Sastrey & Reddy 2010: 2008). These functions allow users to do more than just search and retrieve information. The World Wide Web and Web 2.0 tools, such as social networking sites (Facebook, Twitter,

Yahoo, Google), blogs (Weblogs and moblogs), wikis, video sharing sites (YouTube), slide sharing sites (Slideshare), are having a great impact on information behaviour in the 21st century. Researchers note that social media platforms like *MySpace* and *Facebook* offer students platforms to gather, in the same way youngsters of past generations used to hang out at burger joints and malls (Horizon 2007:12). The Web 2.0 tools offer different ways to communicate with the youth in non-traditional ways that extend beyond physical walls (ALA, 2013:43).

Of the 29 National Technical Working Groups (NTWGs) responsible for the realisation of NV20:2020, two are specifically for Education and Information and Communications Technologies (ICTs), working to ensure that the process of education is enhanced by ICTs, in all its ramifications. The realization of these expectations should be evident in FUPRE, the only university in Nigeria established to meet the human capital demands of the petroleum industry which is the largest in Nigeria in terms of Gross Domestic Product (GDP).

The interviews with the FUPRE University Librarian on the 2nd of April 2014 and the e-Librarians on the 21st of May reveal that in the university with a population of about 2,500 (staff and students) there are only 25 desktop computers in the e-library connected to the Internet via a hybrid connection of WiFi while desktop computers are networked to a LAN. Both staff and students alike can also connect to the WiFi on their personal electronic devices such as laptops, iPads, smartphones, and so on. However, during the large group discussion it was said (Student 6) that Wi-Fi is only effective in the library; it does not work on campus after 4pm.

During the interview, the University Librarian also mentioned that there were 130 computers available but there was no space to put them. On the 28th of March, 2015, the researcher was watching the TV when the news was announced of FUPRE's matriculation ceremony for 2014/2015 session during which a new e-library was launched with 120 computers. A call to the University Librarian confirmed the news, that the e-library was launched on the 26th of March, 2015. It was confirmed from two sources, the University Librarian and one of the staff of the e-library that WI-FI on campus has also improved. This may indicate that FUPRE is fast moving forward in terms of making adequate provision of facilities.

At the time of data gathering, due to the limited electronic resources available in the e-library, an average of 60 students visited the e-library per day and a period of one and a half hours was allocated to each user. When the computers were fully occupied, one of the librarians interviewed said:

We tell them to wait so that others can finish up; it is 1hr 30min per student.

With an extra 120 computers in the e-library, the top two challenges stated by students in their use of electronic resources, which are technical problems (e.g. system hangs, server down time, access speed, etc.) and inadequate information infrastructure on campus in Table 8 (Question 9) of the survey could be resolved. The problem of students underusing the library (Figure 14) may also be a thing of the past. Students would also have to spend less in buying Internet bundles which constrains them financially.

The interview with the Head of the Web Unit on the 24th of April, 2014 revealed that there is a computer laboratory with 70 computers in the Department of Mathematics and Computer Science connected to the Internet, and staffed by a technologist. Students from other departments may use the computer laboratory if authorised.

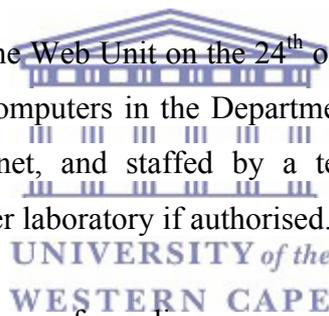


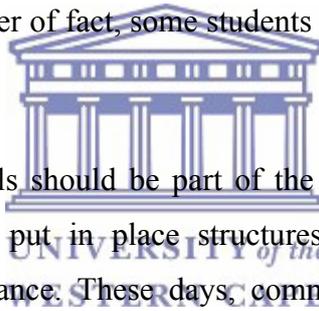
Figure 13 shows students' preference for online sources which raises the question of when and how they access the Internet. At the time of data gathering a large number of the respondents accessed the Internet using the campus Wi-Fi on their personal electronic devices as indicated in Table 6, followed by many who also access the Internet at home. However, the 43 respondents who indicated "other" did spell out in their questionnaires that they buy Internet bundles on their phones to enable them to use the Internet.

Apart from the Internet access on campus, students also accessed the Internet off campus. More than half of them accessed the Internet at home while about one third used cybercafés. In the large group discussions, students (S6 and S15) did mention that they visit the cybercafés. But the concern of one of them (S15) was that FUPRE is in a rural area hence there are no good cybercafés in the neighbourhood. Besides, the charges are high despite the slow Internet connection. All these obstacles impede students' ability to access information when needed.

Part of the responsibilities of a library based on the competency index for the library field compiled by the OCLC's WebJunction (2009:65), is to

understand the importance of having a Web presence beyond the library Web site; investigate and develop the library's presence on social networking sites (Facebook, LinkedIn, Eventful, etc.), and evaluate and implement other tools for extending online access to library content, among others.

The FUPRE library is not faring well in this regards as it does not permit students' use of social media such as Facebook and other social networking sites in the e-library. If students are seen violating the policy, staff members immediately request that they log out otherwise they may run the risk of being sent out. Based on the survey (Tables 22 and Table 23), interview (with librarians), and general observations, students use Facebook, Twitter, YouTube and other social networking sites more for entertainment purposes, but the few who use it for academic purposes should be encouraged. The large group discussions revealed that some students do discuss academic related matters on Facebook, WhatsApp and other social media platforms. As a matter of fact, some students took part in the journaling with the researcher on Facebook.



Besides, the use of Web 2.0 tools should be part of the regular outreach to the university community. The library should put in place structures and strategies that facilitate its visibility, relevance and significance. These days, communication is becoming more and more online due to social networking tools associated with Web 2.0. Libraries ought to tap into these resources to provide information about library services and products in multiple media (OCLC WebJunction: 3).

The majority of libraries across the USA use social networking platforms in their service delivery (ALA, 2012). Baro, *et al.* (2013) in their comparative study of Nigeria and South Africa in the use of social networking sites for service delivery found that Libraries in Africa are also fast adopting the use of Web 2.0 tools in their service delivery, though librarians in South Africa use various Web 2.0 tools more frequently than their counterparts in Nigeria. This was attributed to a lack of awareness, lack of interest, inadequate skills, and unwillingness to embrace emerging technologies on the part of academic librarians in Nigeria. Since students do spend time on social media, it is important to provide regular updates and receive feedback through these platforms rather than simply giving updates

through the university Website (www.fupre.edu.ng), the student union government and notice boards as expressed by the e-librarians.

The primary responsibility of the ICT Unit in the University is to deploy ICT infrastructure and related services for teaching, learning and research in the university community. The National Universities Commission (NUC), Nigeria, has an ICT Department whose vision is:

To assist the NUC to carry out its mandate in the deregulated Nigeria University System by enabling the University and the NUC to take advantage of Information and communication technology to reap from, and deliver, the benefit offered by the information and technology revolution (National Universities Commission: <http://www.nuc.edu.ng/>).

NUC being a commission set up to ensure standards across universities in Nigeria should ensure that universities employ creative and interactive teaching and learning in the world of Web 2.0. An example of a technology that enables such is a Learning Management System (LMS), one that integrates technologies that meet the different needs of both learners and educators. LMS software applications are valuable for “administration, documentation, tracking, and reporting of training programmes, classroom and online events, e-learning programmes, and training content” according to Ellis (2009:1). Support features for learners include: discussion forums, file exchange, emails, online journals, notes, real time chat, videos, individual grades and progress reports (Stockley & Olsson, 2013). As valuable as a LMS is, FUPRE has no Learning Management System platform to facilitate its teaching and learning, and no email accounts offered to students. The only support that comes from the ICT unit is in the areas of online accounts, contact enquiry forms, staff email and technical support. Course content would soon be available online according to the Head of the ICT Unit.

During the large group discussion with the 300 level students, mention was made of a lecturer in the Computer Science Department who uses a LMS in the process of teaching and learning. The student (S21) said that it is a student-lecturer platform where they interact, receive messages and share insights; course notes, assignments and test questions are always made available via the LMS. The student was excited about sharing the “unique” experience of an LMS, which suggested that other students felt they were missing something. If FUPRE makes the use of LMS a matter of policy, it will go a long way to enhance teaching and learning.

7.3.2 WHAT PERSONAL ELECTRONIC DEVICES DO UNDERGRADUATES HAVE AND USE?

Access to information infrastructure is the first level of access in the process of information seeking; it is a necessity before the cognitive or intellectual access can be achieved. Access to information infrastructure is not entirely within the control of information users because it can be enhanced or constrained by external conditions (Oltmann, 2009:6). Be that as it may, studies have shown that students are beginning to break the barrier to physical access. A typical example is a large survey in the USA discussed in Chapters three and five, in which students of various nationalities revealed that students favour the ownership of portable devices such as laptops and phones on which they can gain physical access to the Internet (Dahlstrom, 2012).

Similarly, the survey data presented in Table 7 shows that at least two out of three FUPRE students own smart phones, besides the few who own Java phones that are also Internet enabled. In addition, about one out of two own a laptop. To support this claim, the majority of the students do access the Internet on their personal electronic devices (Table 6). All the students who took part in the LGD favour ownership of electronic devices as they all have smart phones on which they browse the Internet. Some of them own laptops and iPads in addition to their smart phones.

This implies that FUPRE students are largely *digital natives* (Tapscott, 1999) as evidenced in their age brackets in Figure 12. Digital natives are part of the Net Generation - the first generation to grow up in a global environment that was already connected before they were born; that is, they are “*native speakers* of the digital language of computers, video games and the Internet” (Prensky, 2001:2).

7.3.3 WHAT ONLINE ELECTRONIC RESOURCES SUCH AS FULL TEXT DATABASES ARE AVAILABLE VIA THE LIBRARY AND OTHER INFORMATION CENTRES?

The primary educational role of the library, according to the standard set by the ACRL for higher education is “to partner in the educational mission of the institution to develop and

support information-literate learners who can discover, access, and use information effectively for academic success, research, and lifelong learning” (ACRL 2011:9). The path to achieving this feat is first of all to make available information infrastructure, and accessible resources –both print and online, to facilitate the process of teaching and learning.

On the FUPRE Website (www.fupre.edu.ng) there is a library link on which open access journals and open scholarship can be accessed. However, no mention is made of databases and e-books and e-books.

An overview of the library pages shows that open access journals with full text (<http://www.doaj.org>; <http://www.e-journals.org>) and open source reference services (<http://www.refdesk.com>) are available. Also, available are open scholarships (<http://www.lib.umb.edu/drum-journal> abstract accessible without login; <http://dspace.mit.edu-only> accessible to students and staff of Massachusetts Institute of Technology; <http://dash.harvard.edu>, <http://www.lib.umb.edu/drum> and <http://tinyurl.com/4x6fa8z> - theses and dissertations are openly available). Some deadlinks are also listed: <http://www.collectioncanada.ca/thesescanada/index-e.html>10: <http://www.nigeriavirtuallibrary.com>; <http://www.digilib/journals>.



As observed during visits to and use of the e-library in April/May, 2014, and as mentioned by the e-librarians and a 300 level student during a private discussion, FUPRE library is yet to subscribe to any databases and online journals. However, it was mentioned by one of the e-librarians (Diana) that the university management was working towards empowering the library to subscribe to e-journals and databases.

The need to urgently turn this situation around, especially as FUPRE is aspiring to be a top class university with 21st century resources and facilities to train first class students cannot be overemphasized. For the university to be Nigeria’s anchor for vision 2020: 20, it must have state-of-the-art facilities as indicated on FUPRE’s academic development link. Such facilities include adequate provision of information infrastructure, enough space and seating area, a conducive library atmosphere and stable electricity, among others.

7.3.4 WHAT INFORMATION LITERACY EDUCATION IS AVAILABLE TO UNDERGRADUATES?

Information literacy is the ability to recognize an information need, to efficiently access information sources, retrieve the needed information, evaluate and use it ethically in the process of closing any observed gap in knowledge. It forms the basis for lifelong learning (Association of College and Research Libraries (ACRL, 2000:2), and this is central to the mission of educational institutions. Information literacy is common to all disciplines, to all learning environments, to all levels of education (American Library Association (ALA, 2000:2) and the individual must possess information literacy skills in order to gain meaningful intellectual access to information.

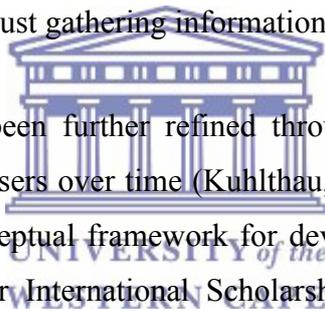
Information literacy skills is dependent on the individual's cognitive abilities (Kuhlthau, 2004), language competence (Bellardo, 1985: 237)) and technological literacy (Jaeger & Thompson, 2008: 168; Burnett & Jaeger, 2011:167-168). The process of teaching and learning therefore, should be an integral part of the curriculum of educational institutions (Owusu-Ansah, 2003: 219; Swartz, *et al.* 2007: 109-122), so that students can learn how to learn. The need for adequate training in information literacy skills acquisition is even relevant in this era of information proliferation according to Tise (2000: 58), Brown, *et al.* (2003: 386), and Buschman and Warner (2005: 12 – 18). It is at the core of what it means to be educated in the 21st century.

In Chapter two, the following models of information literacy education were discussed: the entrance requirement model; the introduction model; the information literacy course; the integrated curriculum or general education model; the learning outcomes model; and the demonstration of mastery model. The essence of these models is to have a standard framework for information literacy teaching and learning across disciplines, to reflect the information literacy standards and learning outcomes as spelt out by the Association of College and Research Libraries (ACRL: 2002, 2011, 2012), an arm of the American Library Association (ALA).

Irrespective of the model adopted in any educational institution, collaboration and partnerships between the librarians/information literacy teachers and faculty members is crucial to the success of this process of lifelong learning (Sun, 2002: 216):

Incorporating information literacy across curricula, in all programs and services, and throughout the administrative life of the university, requires the collaborative efforts of faculty, librarians, and administrators. Through lectures and by leading discussions, faculty establish the context for learning. Faculty also inspire students to explore the unknown, offer guidance on how best to fulfil information needs, and monitor students' progress (Association of College and Research Libraries, 2000: 6).

In terms of teaching information literacy education to foster the desired learning outcomes, the Kuhlthau ISP model (1994, 2004), and guided inquiry (Kuhlthau, 2008:71) have served as conceptual approaches to information literacy, and have been seminal in this regard as it takes into account the cognitive and affective facets of information seeking. The models aid students to a large extent to become deeply involved in extensive exploration of thoughts and ideas before coming up with a personal understanding of their topics and follow up with making presentations rather than just gathering information to please their teachers.



The Kuhlthau ISP model, has been further refined through quantitative and longitudinal methods of diverse information users over time (Kuhlthau, Heinström and Todd, 2008). The model has been in use as a conceptual framework for developing a programme of inquiry-based learning at the Centre for International Scholarship in School Libraries (CISSL), Rutgers University, USA, (Kuhlthau, Heinström and Todd (2008).

Also, consequent upon the efficacy of using Kuhlthau ISP model in teaching and learning information literacy skills as expounded by King's PhD work at the University of the Western Cape, it has been adopted as one of the models in use for teaching Library Science 121 (Information Literacy Course), in a bid to help students develop their thinking skills (King, 2007).

As discussed in Chapter four, apart from the Colleges of Science and Technology, FUPRE has a Department of General and Entrepreneurship Program in charge of nine compulsory courses for students in 100, 200 and 300 levels. These courses are meant to:

expose students to liberal education through which they can develop and expand their awareness of social, cultural and natural environments. The goal is to produce well rounded graduates that are intellectually sound, competent in the use of English and equipped with

entrepreneurial skills to contribute maximally to societal development in an environment of peace and social cohesion.

One of the courses is the Use of Library and Study Skills. Its significance is not highlighted in the objectives of the programme in the FUPRE Course Synopses for General studies and Entrepreneurship programme (See Appendix 7). The head of department is not a librarian and may not know of the need to highlight the importance of information literacy skills in the broad objectives of the department, which may help in no small measure to inform rich content and influence teaching methods.

The course description of Use of Library and Study Skills (GSE 104), a 3-unit course reads:

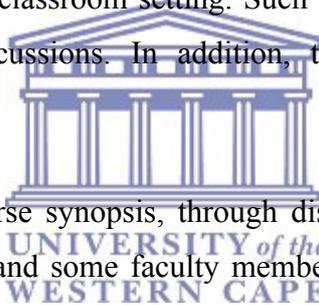
History of libraries, library and education, university libraries and other types of libraries; study skills (reference services), types of library materials, using library resources including e-learning, e-materials etc; understanding library catalogues and classification; copyrights and its implications, database resources, bibliographic citations and referencing.

The course takes students through the 20th century role of the library and types of information sources (Swartz, *et al.* 2007: 109-122, Owusu-Ansah, 2003: 219), which Behrens (1993:124) referred to as library literacy. Using library resources including e-learning, e-materials, copyrights and its implications, database resources, bibliographic citations and referencing appear to be the information literacy that may be relevant to global trends. However, excluded are the 21st century core information literacy skills, which may be acquired following the information search process (Kuhlthau, 2004, 2004, 2007, 2008), guided enquiry (2007, 2010, 2012), and ACRL information literacy standards (ACRL, 2002, 2005, 2011, 2012).

With the evolving landscape in information technology, information literacy education is equally evolving with the emerging technologies; therefore, students need to be information technology literate, and this includes Web 2.0 literacy which has to do with using the Internet as a participatory and collaborative Web. Web 2.0 offers the capacity to help in the exercise of creativity and innovation, problem solving, communication and critical thinking. However, Tise (2000: 58), Brown, *et al.* (2003: 386), and Buschman and Warner (2005: 12 – 18) suggest that with the growth in information, students need more training in the evaluation of information and how to formulate search strategies including the ability to read, understand and interpret information provided electronically.

The teaching methods for the Use of Library and Study Skills as explained in the course outline includes; lectures, individual or group assignments, class presentations and discussions based on the topic of the day.

The researcher was able to observe two classes in the first semester of the 2013/2014 session during the period of data gathering. One of the first things to note was that all 405 students in 100 level across the two colleges were taught together in one large auditorium, and the instructors used microphones. It was a two-hour class per week but split into two sessions. The course was taken by four librarians who shared course content, but they were all present in both classes observed. Learning appeared passive during the classes as there was no interaction between lecturer and students. It was as though the instructor was passing knowledge to the students, something which is contrary to the constructivist approach to learning (Kuhlthau 1991, 1993, 2004, 2008; Todd, 2006; (Kuhlthau, Heinström and Todd, 2008). It was a “chalk-and-talk” classroom setting. Such a large class is also not conducive for class presentations and discussions. In addition, the content of the curriculum is inadequate.



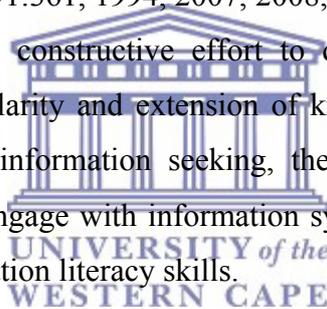
Also evident in the FUPRE course synopsis, through discussions with key informants for example the librarians, students and some faculty members, is the fact that it is a once-off course of which there is no collaboration between the library and the faculty in the teaching and learning of the course. Neither is there any formal structure in place by the university to incorporate information literacy education in other courses at the various departmental levels. This highlights the need for collaboration between faculty (lecturers), librarians and academic administrations as advocated by the Association of College and Research Libraries (2000: 6) and Abubakar and Isyaku (2012:3) - as earlier quoted.

By the year 2020, Igwe (2011) feels that the current young persons, that are undergraduates, will be the key drivers of the economy. This requires a skilled population with the competencies and high capabilities to use and disseminate knowledge, among others, based on the requirements set by the World Bank for transition to a Knowledge Economy (World Bank, 2004:2). Viewed in this regard, FUPRE is offering information literacy education following the *Introduction Model* (Curzon, 2004:38). A key feature is that it runs through a semester only. Clearly, this effort is not enough to ground properly students in information

literacy skills since it is only taken in the first year. The ineffectiveness of this method is acutely noted in students' inadequate information literacy skills as seen in the conduct of the assignment. Generally, they did not have knowledge of how to source for credible information, and how to use information ethically in the process of writing their assignments. This is abundantly revealed in the analysis of their assignments and journals discussed in sections 6.9 and 6.10.

7.4 WHAT ARE THE INFORMATION SEEKING PROCESSES OF NIGERIAN UNDERGRADUATES?

According to Fourie (2004:70) information seeking is a complex process which consists of social, communicative and interactive behaviour. Wilson (2000:49) conceptualises information seeking as “the purposive seeking for information as a consequence of a need to satisfy some goal”. Kuhlthau (1991:361, 1994, 2007, 2008, 2012) on the other hand perceives information seeking as a user's constructive effort to derive appropriate meaning from information for the purpose of clarity and extension of knowledge on a particular issue or topic. To carry out purposeful information seeking, the information user requires some cognitive abilities and skills to engage with information systems. These cognitive skills and abilities are referred to as information literacy skills.



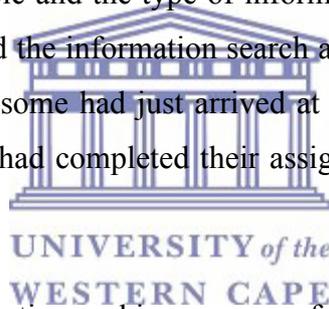
Students in their academic work deal with the complex and unfiltered array of information in various formats which require them to be skilled in determining the validity and authenticity of information sources. The abundance of information in a technologically inclined world requires complementary skills and ability to efficiently utilize information. These sets of skills called information literacy skills are a necessity for undergraduates in all fields of endeavour. The Association of College and Research Libraries (ACRL) (2005:5-6) has a set of five standards used to describe someone who is information literate. An information literate individual is able to:

- *Determine the extent of information needed*
- *Access the needed information effectively and efficiently*
- *Evaluate information and its sources critically*
- *Individually or as a member of a group, uses information effectively to accomplish a specific purpose.*
- *Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally.*

It has been established through some of the literature discussed in Chapters two and three, and this current study that undergraduates do need information in their everyday life and for academic purposes. Once the information need is established, they commence information seeking in order to fill a gap in their knowledge and understanding.

The findings from the survey presented in Chapter five reveal that all the 803 students who participated in this research were writing one form of assignment or the other as indicated in figure 15; the 100 level students were on an individual assignment while their counterparts in 300 level were having either an individual or group assignments.

The formats of the assignments were mainly research reports, essays and oral presentations as indicated in Table 12. As at the time of data gathering, while some students were generally searching for and gathering background information that pertain to the topic, some others were trying to understand the topic and the type of information they needed to complete the assignments, some had completed the information search and were focusing on specifics and information relevant to the task, some had just arrived at an understanding of the topic and what was expected, while a few had completed their assignments. This is based on the data presented in Table 13.



In order to understand the information seeking process of undergraduates, the assignment of the 300 level students in the Department of Petroleum Engineering, on Basic Petroleum Geology (PNG 315) and the assignment of the 100 level students on the Use of Library and Study Skills (GES 104) were examined while writing their group assignments and individual assignment respectively, as reported in sections 6.10.3 and 6.10.4. The assignment scripts of 50 students in the Electrical Electronic Department EEE 314 assignment were also examined.

That being mentioned, it is most pertinent to state that the evidence gathered to address the sub-questions in this section over-lap; hence, they will be dealt with collectively.

7.4.1 INFORMATION SEEKING PROCESS OF THE 300 LEVEL STUDENTS

The 300 level students worked on a group assignment. They were 7 groups of 11 students per group making a total of 77 students. Each group was assigned sections in the textbook titled

“Basic Petroleum Geology” by Peter Links to read, summarise and present in the format of a research report. But they were also asked to source for more materials with similar subject matter.

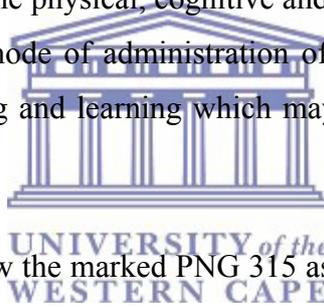
First of all, having up to 11 students in a group is a much too large for a group assignment. This negatively impacted on their assignment writing as it was obvious in the interactions of the students during the journaling that the work was shared among a few members and compiled by the group leaders while some students did not even engage in the group work at all. This reveals a trivialization of the pedagogy of group work which is often overlooked in the process of teaching (Sutton, Zamora, and Best, 2005).

The students were required to read and summarise a portion of a textbook and also source for other materials with similar a subject and context. Therefore, the assignment did not give room for knowledge application, analysis, and evaluation, not to mention design and construction, something that should be seriously considered since they were engineering students; though the aim might have been for students to read ahead the class. However, the assignment type simply narrowed their information seeking process. There was no research problem to investigate; no scaffolding that would have guided them to carry out tasks in specific parts. Therefore, it was a challenge to keenly observe their information seeking process in line with Kuhlthau’s model either face-to-face or in the journals. It is in the process of investigating a problem that Kuhlthau ISP model (Kuhlthau, 2004:82) can be more readily utilised as a lens to study and understand students’ information seeking process.

The apparent level of uncertainty, optimism and confusion/doubt common in the initiation, selection and exploration phases (Kuhlthau, 2004, 2008, 20012) of the ISP model respectively and low confidence levels were not markedly evident as students were “spoon fed” with the basic information needed. Perhaps, the assignment writing might have impacted on them differently if they were given the same themes without a prescribed textbook to work with; although they were also encouraged to seek more information online. Some students did not source for additional resources but only used the book prescribed as observed during one-on-one chat with S6, S33, S45, S61.

From the analysis of the WhatsApp journals with the 300 level students of Petroleum Engineering Department on PNG 315 assignment, it was clear that they did not necessarily experience Kuhlthau's ISP because the assignment was not an investigation or an exploration of a problem which is a process of enquiry. As an example, Table 17 of the quantitative research work in Chapter five reveals that a striking majority of the students appeared to be optimistic irrespective of the stage of assignment they were in. This may well imply that they were having an easy passage with the assignment, an indication that the assignment was not of the HOT skills type. It was neither sufficiently challenging nor required investigating a problem in context. However, among those trying to understand the topic and the type of information they needed to complete the assignment, a number worth noting were confused and frustrated at the early stage of the assignment.

An assignment that requires investigating a problem would have adequately revealed students' experience in terms of the physical, cognitive and affective domains captured in ISP model. On the other hand, the mode of administration of the assignment may suggest that there is a challenge with teaching and learning which may hinge on the curriculum and the way it is delivered.



The researcher was unable to view the marked PNG 315 assignments. However, out of seven group assignments five were accessible (Groups A, B, D, E, G) while the other two (Groups C, F) were corrupted computer files, according to the lecturer.

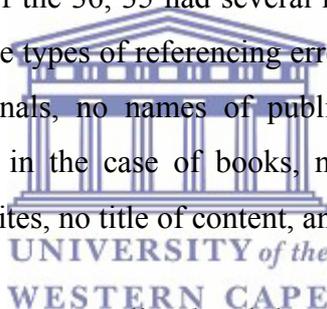
The assignment was analysed using a rubric constructed by the researcher that draws from ACRL Standards two, three, four and five. The exercise revealed that generally, students appear to have some knowledge of authoritative sources for scholarly writing. But being a “read and summarise” type of assignment, it did not allow sufficient room for critical thinking which could have more readily revealed their cognitive abilities, an important component in the ISP model (Kuhlthau, 2004), which is also referred to as intellectual access by Burnett and Jaeger (2011: 167-168).

The lecturer specifically gave the students instructions to compile their list of references for the assignment and a format was given to them as a guide. But at no point was anything said of in-text referencing. That may mean that students are not aware of the necessity of in-text

citations. As this shortcoming that is evident across the assignments, it suggests that they all are ignorant of it. This problem may be directly related to poor curriculum content and classroom pedagogy. Of particular note is the fact that Group E copied verbatim from a portion of the textbook as mentioned in section 6.9.1.

Their assignment scripts gave some clues as to their level of information literacy. Sadly, students did not acknowledge any source in-text, hence texts selected from other sources could not be ascertained. This is unethical and is a clear indication of poor information literacy skills similarly discovered by some research works on the study of undergraduates' information literacy skills in Nigeria by Baro and Fyneman (2009); Isa, Amusan and Umma (2009); Abubakar and Isyaku (2012); Adetimirin (2012); and Ukpebor and Emojorho (2012);

For the EEE 314 assignment discussed in section 6.9.2, 36 out of 50 assignments had lists of references while 14 had none. Of the 36, 35 had several referencing errors while one had a few referencing error. Here are the types of referencing errors: wrong punctuation; no date of publication; in the case of journals, no names of publishers, no page numbers and no indication of issue and volume; in the case of books, no name of a publisher and page numbers; and in the case of Websites, no title of content, and date of retrieval.



To a large extent students' responses were listed and therefore brief. The questions involved stating similarities and differences and also writing brief histories about concepts.

Of the 50 assignments, none cited sources in-text. This is an unwitting use of information in an unethical manner on the part of the students. However, it is instructive to note that their course lecturer rated their level of information literacy as excellent/advanced in Section 6.3.3.

7.4.2 INFORMATION SEEKING PROCESS OF THE 100 LEVEL STUDENTS

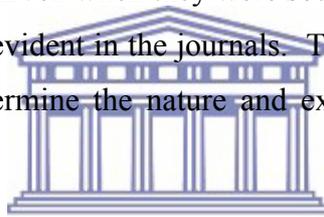
The assignment type for the 100 level students was different from that of the 300 level. It was an essay type which makes it broad and open to a variety of approaches and content depends on the students' cognitive skills and how well they are constructively applied. It is a high order thinking level assignment as it challenges the cognitive skills of students. It not only encouraged students to read, understand, describe, define and analyse, but also to construct

and create the assignment in some format. Instructions did not stipulate the number of words or pages.

The assignment question was *Discuss the role of information in science and technology*.

The assignment was meant for the entire 100 level students across both Colleges of Science and Technology. Similar to the assignments given to the 300 level students, there was no planning or scaffolding that guided students to carry out the various tasks involved in assignment writing.

The 100 level students felt confused and uncertain about how to tackle the assignment because of the broadness of the assignment question, as observed. Therefore initiating the work was a huge challenge as they grappled with clarifying for themselves exactly what content and meaning and to seek. Even when they were sourcing for information, the problem to be addressed was not clear as evident in the journals. This suggests that, to a large extent, the students were unable to determine the nature and extent of their information need as demanded by ACRL standard 1.



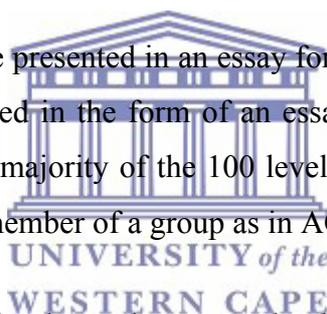
Students experienced the affective of the ISP model intensely; especially the initiation, selection and exploration stages, because of the broadness of the assignment question. For most of them, focusing was a challenge as the assignment question did not provide room for knowledge application and contextualisation.

The journaling exposed students' level of information literacy skills as they progressed through their assignment. Many of the students had challenges with sourcing information contrary to the claim of their lecturers (L3, L6) in section 6.3.3 who rated them as advanced/excellent in terms of having knowledge of types of literature in the field. However, they were looking for the "exact" information or "direct information", that is, they were looking for an article or a book with the title of the assignment. Their inability to locate the exact match of topic in the form of a book or article upset and frustrated them until they arrived at a point where they felt that there was no choice other than to work with the available information. This reveals their inability to access the information needed effectively and efficiently, as implied in ACRL Standard 2. This is also contrary to the data presented in

figure 19 (19a), in which 73% agree or strongly agree that they are clear on the assignment topic and the type of information they need.

Generally, the 100 level students' assignments did not reveal much critical analysis of concepts and the incorporation of selected information into their personal knowledge base. Discussions appear to be an assembly of disjointed facts as it seems the majority copied and pasted from different sources without paying due attention to a synthesis of information and concepts. Of the 311 assignments submitted, only two were three pages while many others were half a page or two pages; and the typed ones were even in large fonts. This may be because there were no instructions indicating the length of the assignment. Some assignments were hand written which implies that students were not encouraged to learn keyboard skills. From all indications, students did not fare well in selecting information to construct new meanings, when their performance is assessed using ACRL Standard 3 as a yardstick.

Of the 311 assignments, 213 were presented in an essay format even though a format was not given. Their content was organised in the form of an essay with an introduction, body and conclusion. This reveals that the majority of the 100 level students are aware of how to use information individually or as a member of a group as in ACRL Standard 4.



The unethical use of information by the students was clearly evident in the fact that there was no assignment with in-text citation, while only three out of 311 had a list of references. Even the referencing pattern had several errors. Those who consulted Wikipedia and conducted a Google search did not go beyond stating “Wikipedia” and “www.google.com”. The Web addresses, titles and other necessary details were not listed. This is unacceptable and is tantamount to plagiarism.

Being their first semester at university, coupled with the fact that they had not taken any instruction on research methodology or assignment writing, this challenge is perhaps understandably expected. It also implied that the students may not have brought information literacy skills from secondary school to the university that is commensurate with the complexity of their current level of educational attainment, similar to the findings of Kunakornsakul and Pinit (2012) at the King Mongkut's University of Technology, Thonbur, Ukpebor and Emojorho (2012:7) at the University of Benin, Nigeria. In table 9, about one

third of the students did indicate that they went through information literacy education before their entry into the university. However, it was observed and also revealed through private interactions with the students that they are not aware of the term “information literacy”, in line with the findings of Gross and Latham (2008: 11-12) in their study of freshmen in Florida State University, USA.

For both levels, Google is the primary search engine that is associated with the Internet for both their everyday life and academic information needs which aligns with the findings of Kerins, *et al.* (2004); the CIBER Google Generation report of 2008, Niemand, (2010:4); Williams (2010:12); Kahlal (2011: 15-21), and Dahlstrom, (2012). Of particular concern in the case of FUPRE students is that the majority do not take note of the Website they gather information from.

7.4.3 INFORMATION LITERACY LEVEL OF NIGERIAN UNDERGRADUATES

The primary aim of establishing the information literacy standards is to provide frameworks for teaching information literacy and also assessing the information literacy level of students (Snelson & Stillwell, 2001: 226). The ACRL Standards of Information Literacy, performance indicators, and outcomes (2000 2005, 2012) is commonly in use in higher education institutions. Over the years, these standards have been used to teach information literacy as well as to assess students’ information literacy levels. A number of research works in this light were discussed in Chapter three.

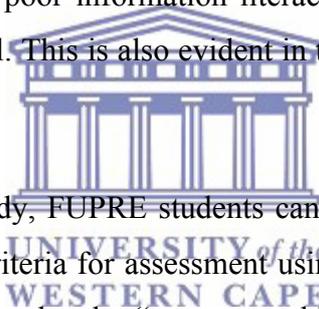
At FUPRE, what is evident is that the 100 level students did not bring information handling skills to the university. They generally had issues with even identifying their information need. They had no knowledge of credible sources and were unable to handle and evaluate information properly. Not a single student used information ethically by citing sources in-text. But they had an understanding of formatting the assignment appropriately.

For the 300 level students, the assignment in which they were given clear instructions seems to have been handled better than the one without instruction. However, across the level, not a single student or group had in-text citations. They were clear as to the information needed, though in the PNG 315 assignment, students were given a specific source to work with and

required to gather more. Even so, group (E) copied directly from the text without acknowledgement. Of all the sources in their list of references, none was cited in-text.

The problem of poor information handling skills has been a growing concern across the globe. Research in Ireland (Kerins, Madden, & Fulton, 2004), the UK (Information Behaviour and the Evaluation of Research by CIBER 2008; Williams 2010:12), the USA (Gross & Latham, 2008), and Nigeria (Baro & Fyneman, 2009; Isa, Amusan & Umma 2009; Abubakar & Isyaku, 2012; Adetimirin, 2012; Ukpebor & Emojoorho, 2012), and Thailand (Kunakornsakul & Pinit, 2012), all reveal that students have poor information handling skills. They are generally unable to evaluate information sources and have the (bad) habit of googling (Williams, 2010:12), which is confirmed in this current study.

King (2007), Kunakornsakul and Pinit (2012:291-298), and Ukpebor and Emojoorho (2012:7) found out that freshmen possess poor information literacy skills as it appears they did not bring such skills from high school. This is also evident in this research work, in the 100 level students' assignment.



Based on the findings of this study, FUPRE students can be categorised as *novices* in their information literacy skills. The criteria for assessment using ACRL standards two, three and five show that the majority fall under the “not acceptable” scale based on the assessment rubric in Appendix 9.

7.5 WHAT ARE THE BARRIERS THAT UNDERGRADUATES EXPERIENCE IN THEIR INFORMATION SEEKING?

Access to information is crucial to satisfactory and fulfilling information seeking. As discussed in Chapter three, Burnett, *et al.* (2008) described three levels of access to information, through which barriers may also set in:

Physical access: It is the first level of access without which further information seeking cannot be achieved. Physical access is a precondition to intellectual access. It has to do with access to information infrastructure, and devices that are a necessity for getting the desired information. The top three on the list of the barriers that hinder information seeking of

FUPRE students is irregular power supply as indicated by about half of the respondents in Table 11, followed by poor access to information resources and lack of funds. These were also expressed in the large group discussions.

Ejiwoye and Ayandare (2011) in their study of information seeking behaviour of undergraduate students in three Nigerian universities discussed in Chapter three found out that electricity is a major barrier to undergraduates in their information seeking. Regarding funds, students complain about their inability to buy data bundles to enable them to chat on their personal electronic devices which they are all in favour of.

Similarly, in Table 8, about two thirds of the respondents experience technical problems (e.g. the system hangs, server down time, access speed, etc.) and the issue of inadequate facilities on campus. This was also expressed during the large group discussions with the 100 and 300 levels students. Oltmann (2009:6) summarises the barriers to physical access as geography, technology and economics. In the case of FUPRE students, geography as a barrier was expressed during the large group discussions; it was said that FUPRE being in a rural area, there are no good cybercafés around and the few available are expensive (economics). And then technology as a barrier has to do with inadequate infrastructure and systems related issues in addition to poor Internet connectivity. That being said, with the installation of 120 computers in the e-library launched on the 26th of March, 2015, the problem of having to use expensive off campus cybercafés may well have been resolved with a stable Internet connection on campus.

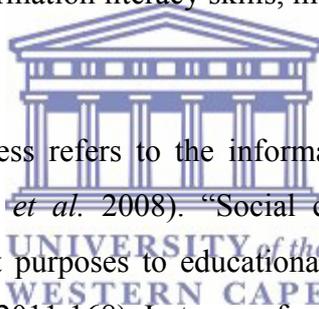
As opined by McCreddie and Rice (1999:51), it is a common but erroneous assumption that access to technology equals access to information; this theory occasions the next level of access.

Intellectual access: An individual must possess information literacy skills to be able to gain intellectual access to information. This is termed the cognitive aspect of information seeking. The individual must be able to figure out the right information needed, must have the ability to understand, critique, evaluate and filter the information and employ it in the accomplishment of set goals, such as assignment writing. Information literacy skills is dependent on the individual's cognitive abilities (Kuhlthau, 2004), language competence

(Bellardo 1985: 237) and technological literacy (Jaeger and Thompson 2008: 168; Burnett and Jaeger, 2011:167-168).

Based on observation and interactions with students, FUPRE students appear to have a good language competency and technological literacy as is evident in their ability to use their phones and Web 2.0 tools in their day to day interactions, in entertainments and academic related matters, although some of them took their assignments to the business centres for typing which may be as a result of convenience and not having access to a personal desktop or laptop.

In Table 8, intellectual barriers expressed by students are their inability to choose appropriate subject headings, keywords, and formulating a good search strategy; added to this is a lack of search skills and problems with choosing appropriate databases. These problems are a reflection of their inadequate information literacy skills, much of which has been discussed in section 7.4.



Social access: This level of access refers to the information behaviours of people within certain social contexts (Burnett, *et al.* 2008). “Social context may range from personal communication for entertainment purposes to educational and work settings to democratic participation” (Burnett & Jaeger, 2011:168). In terms of assignment writing, FUPRE students were able to communicate with their peers and lecturers as evident in the interactions during the journaling exercise. This makes clear the view of McCreadie and Rice’s (1999:54-56) in terms of conceptualizing *access as participation* and as *access as control*. Though not all lecturers came on board with the journaling which may affect “social access”.

Apart from barriers which may be linked to physical, intellectual and social access, students do experience some other barriers. One obstacle is the manner in which assignments are conducted which appears not to give students the room for a thorough and diligent approach to academic tasks as observed and also based on personal interactions with students and in the large group discussions. This problem clarifies “lack of time”, being one of the challenges indicated by students in Table 11. Students seem to be saddled with many short assignments which do not give them enough space to really do some thorough work. While the researcher was planning for the journals, the students were having many short assignments at the same

time, many of which had a deadline for submission of less than a week. The one with the longest time frame was two weeks, even for the group assignment with 11 students per group. So it was quite challenging for the students.

During the survey, as the researcher was going through some completed questionnaires, it was observed that a few 300 level students indicated “none of the above” to question 18 (5.4) which asked how far they had gone with their assignments. Upon chatting with a student to ask for the reason for such an option, the student said :

“They want to kill me with assignments, they are too many” (sic).

This was also echoed in the LGDs and some students complained to the researcher during private discussions.

Based on the interactions with lecturers, it was obvious that most of them give students assignments randomly because it was such a challenge for the researcher to find a lecturer who could give a specific time for the administration of their assignment. Everything seemed uncertain in this regard, hence, the researcher keyed into assignments that were just about to commence or had just commenced. As an example, when the researcher asked one of the lecturers at which week he would administer his assignment, the response was:

I will surely give my students assignments, but I have not decided when it would be.

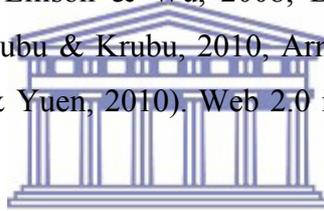
Due to the manner in which assignments were conducted, students appeared unsettled as there was no clear and uniform guidance in the process of assignments, and this scenario could have contributed to the high level of confusion and apprehensiveness observed in students during the assignments.

In conclusion, FUPRE students do face physical and intellectual barriers in their information seeking. In addition to this, having to deal with many short-term assignments with no guidance/scaffolding and in some cases, no clear instructions, put the students under pressure that affect their ability to diligently apply themselves in the process of assignment writing. They mostly used the term “stressful” to describe this condition of learning which, a bane to their information seeking.

7.6 INFORMATION BEHAVIOUR OF NIGERIAN UNDERGRADUATES IN THE WORLD OF WEB 2.0

The improved, upgraded, modernised World Wide Web is aptly described as Web 2.0 (Funk, 2009:xv). It is a “read-write” (Poore, 2009: 41) Web that marks a paradigm shift both in technology and how people interact with one another online in today’s world. The World Wide Web and Web 2.0 tools, such as social networking sites (Facebook, Twitter, Yahoo, Google), blogs (Weblogs and moblogs), wikis, video sharing sites (YouTube), and slide sharing sites (Slideshare), are having a tremendous impact on information behaviour in the 21st century.

Web 2.0 tools offer new ways in which students can be meaningfully engaged in individual and collaborative learning activities (Alexander, 2006; Armstrong & Franklin, 2008; Barnes, *et al.* 2007; Thompson, 2007; Ellison & Wu, 2008; Bonk, *et al.* 2009; Hughes, 2009; Grosseck & Holotescu, 2009; Krubu & Krubu, 2010, Arnold & Paulus, 2010; Ebner, *et al.* 2010; Halic, *et al.* 2010; Hung & Yuen, 2010). Web 2.0 is a trend in teaching and learning that is unique in the 21st century.



Web 2.0 tools possess a lot of teaching and learning potential which has been applied even in higher education (Arnold & Paulus, 2010; Hung & Yuen, 2010); microblogging (Grosseck & Holotescu, 2009; Ebner, *et al.* 2010), wikis (Bonk, *et al.* 2009), and blogging (Ellison & Wu, 2008; Halic, *et al.* 2010).

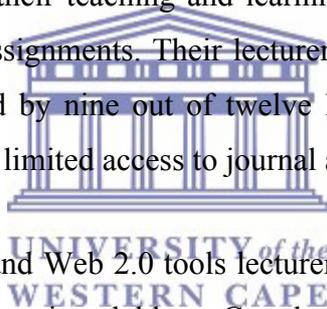
However, the worth and value of Web 2.0 lies in the users’ ICT literacy and cognitive ability to classify, evaluate, and add to the content online (EDUCAUSE, 2007:9). Dohn (2009:344) posits that in order to effectively and efficiently use Web 2.0, the need to possess a “lifelong, life-wide” sets of skills that traverse the boundaries between formal and informal learning are a necessity.

Research by Bennett, *et al.* (2012:525-533) in Australia, Dahlstrom (2012) and Luo (2010:33-37) in the USA, Rudman and Steenkamp (2012:397-400) in South Africa reveals that students seem to be aware of the educational potentials of teaching and learning on Web 2.0 tools such as wikis, blogs and YouTube. However, they tend to use the tools predominantly for social interactions as they do not want to mingle work with play.

The current study reveals that at FUPRE, the situation is not quite different as evidenced in Table 23. The top three social networking platforms undergraduates use for entertainment are social networking (e.g. Facebook, twitter), video sharing sites (e.g. YouTube) and photo sharing sites (e.g. Flickr). While for academic purposes, the data presented in Table 23 shows that Wikipedia, emails, social networking sites (Facebook, Twitter etc) and online discussion forums are the top social media platforms students used for academic purposes.

Students seem to be more familiar with Web 2.0 technologies such as Wikipedia, Facebook and blogs, but not others like Delicious which is a social bookmarking tool that is useful for filing, organising and categorising Web pages for easy retrieval (Redden, 2010: 213-214).

From the large group discussions and journals in Chapter six, it appears that students use Web 2.0 on their own for academic purposes, but the interactivity aspect of Web 2.0 such as blogging, is not incorporated in their teaching and learning by their lecturers. They mostly consult Wikipedia during their assignments. Their lecturers do encourage them to go online and seek information as revealed by nine out of twelve lecturers in section 6.3.3, and yet there are no library databases and limited access to journal articles.



Some of the Web 2.0 platforms and Web 2.0 tools lecturers encourage their students to visit and use are Wikipedia as earlier mentioned, blogs, Google circle, Weblog, Yahoo groups, and forums. However, this is not evident in the students' submissions. Besides, the lecturers are not necessarily part of their online interactions as they only require students visit such sites and take the information they need.

The creativity and interactivity of Web 2.0 is not facilitated by lecturers in their teaching and learning process, but initiated on their (students') own. They interact on WhatsApp and Facebook by sharing thoughts and insights on assignments and other academic tasks. Some students (S4, S5, S7, S8) mentioned that if they have difficult assignments to handle, they do seek assistance from course mates via the WhatsApp platform; they type or take a photo of the question and post it to their friends. Every class/department/level has a WhatsApp Group where they share information and stay in touch both for entertainment and academic purposes. On the WhatsApp platform proposed for journaling with the Electrical and Electronics Department, the researcher was part of the group for three days during which

time students exchanged academic related messages, discussed personal issues and posted lots of jokes which is typical of indigenes of Warri in Delta State where FUPRE is situated.

Some students watch videos on YouTube in order to gain clarity on what has been taught in theory during class time.

All the 100 level students who participated in the large group discussion unanimously said that they do not communicate with the lecturers via email, they do not blog in their teaching and learning, lecturers do not use data projectors in their teaching and students are not aware of Slideshare.

This data is similar to the one presented in Table 24 in which about two out of three students indicated that their lecturers do not incorporate Web 2.0 tools in their teaching and learning. However, referring students to Wikipedia does not translate to using Web 2.0 in teaching and learning since it does not directly encourage interactivity and creativity, in cases where it simply means to view and apply. Wikipedia is an online encyclopedia. On the other hand, if students engage in developing their own wiki, then it is the case of using Web 2.0 for interactivity rather than for consumption alone. The responses show that incorporation of Web 2.0 tools in teaching and learning is not in the university's broad agenda. Hence, it is not surprising that five lecturer respondents (L2, L8, L10 and L11, L12) are not sure whether Web 2.0 tools are helpful in academia.

7.7 EMERGING THEMES ACROSS SECTIONS

Certain themes which emerged across the quantitative and qualitative data analysed in Chapter five and six respectively are herewith discussed.

7.7.1 LACK OF TIME

A feature that is clearly evident across sections is that students are not relaxed enough to really go deep into what they are being taught or required to investigate, hence they complain about lack of time which leads to their being "stressed up"; a common emotional expression. This scenario is a common thread that runs through all data gathered from students: survey (Table 7), LGDs, journals and observation. This, some student expressed thus:

S10: another challenge is that our schedule is so tight and choked and we do not have time for self-development.

S18: if I have an assignment all I need to do is to go to Google, type my search and get the facts, in 20min I am done with my work.

S15: For me it is time factor, the quicker it comes the better.

S11: For me it is both time and convenience because at times we are given assignment and are expected to submit the next day, and others are even pending.

Researcher: Are you not concerned about the quality of the information you got?

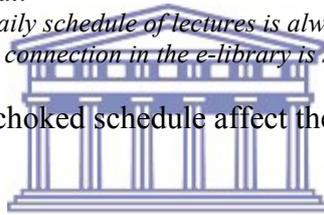
S11: I think the important thing is to do the assignment first of all. For instance we are given an assignment today and we are to submit tomorrow, and we are in school till now, so for me what is important is to do it and submit. But if we have enough time and room to do the assignment, then I can be bothered about the quality of information.

So far, it can be deduced that students study under an academic atmosphere that negatively impacts on their information seeking and their information search process. And this will in turn negatively affect the quality of graduates produced by FUPRE.

S51 (Group E): The major constraint actually has to do with stress and timing. It has not really been easy to create spare time in working on the project. So it is has really been stressful doing that!

S71 (Group G): Our daily schedule of lectures is always tight so most of the time we are very busy. Also the Internet connection in the e-library is slow so it is very undependable.

In terms of how lack of time and choked schedule affect the quality of their assignment, a student has this to say:



S11: I think the important thing is to do the assignment first of all. For instance we are given an assignment today and we are to submit tomorrow, and we are in school till now, so for me what is important is to do it and submit. But if we have enough time and room to do the assignment, then I can be bothered about the quality of information.

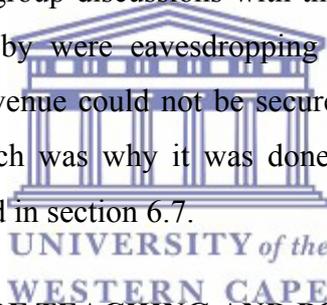
The issue of timing and choked schedule had some effect on the conduct of the large group discussions. For instance in the case of LGD with the 300 level students, the lecturer spent only 30 minutes to teach a class that was normally one hour in order to allow room for the discussion to take as their seem to be no other way out. For both LGDs students appear not to have the required attention much needed to elicit a rich conversation required for FGD, hence the LGDs.

In addition to the issue of securing a good enough venue, students seem to be saddled with so much academic work and as a result did not appear to have the required attention needed to elicit a rich and deep conversation required for the FGD. Rather than cancel it, the researcher decided to make the discussion an informal one.

7.7.2 LACK OF SPACE

FUPRE was established in 2007 and ever since then there has been efforts by the university management and the federal government to endure adequate provision of infrastructural facilities; that is, adequate lecture halls, laboratories, offices, etc, for the smooth running of the university in pursuance of its goals and objectives. During the period of data gathering from March to June, 2014, it was observed that FUPRE does not have enough lecture halls for classes and offices for staff. Most offices of lecturers visited were being shared by two or three persons.

Students have no seating areas or meeting rooms for group discussions in their departments apart from the lecture halls and laboratories. In the library, they only have the foyer which has a long 8-seater. It was the problem of lack of space that affected the conduct of the group discussions with students; large group discussions with the 100 level students took place in the library foyer while passers-by were eavesdropping in addition to noise around the vicinity. Similarly, a conducive venue could not be secured for the large group discussions with the 300 level students which was why it was done after the Entrepreneurial studies lecture in the lecture as mentioned in section 6.7.



7.7.3 TRADITIONAL MODE OF TEACHING AND POOR ADMINISTRATION OF ASSIGNMENTS

As observed in the Use of Library and Study Skills (GSE 104), Introduction to Entrepreneurship (GSE 301) and Physical Electronics Electronic (EEE 314) classes, the mode of teaching leans predominantly on traditional modes of classroom instruction and curriculum content delivery and does little to incorporate technology and modern learning styles. Thus, the teaching and learning process lags behind in comparison to the sort of lively and interactive aspects that should be characteristic of 21st century teaching and learning as is typical in the constructivist approach espoused by (Kuhlthau, 2007,2008, 2012; and Churches, 2009). This imparts negatively in negatively on teaching and learning as echoed by students during the LGDs and even in the journals with the 100 level students.

The traditional approach to teaching and learning with its attendant limitations may have prompted a student (S3) to say this about the use of library course:

S3: for use of library I never like the assignments. Because the library course is never direct (sic). I do not understand it.

In the local social context, when it is said that something is not direct, it means it is ambiguous and unclear. Apart from S3, other students also lent their voices to the same reservation during private chats with the researcher.

While the assignments were going on, students complained about their regimented academic lifestyle of attending classes and getting loaded with assignments. All these put together negatively impacts on their information literacy skills and information seeking process alike.

S10: We are currently in 300 level and we only know the basics of 2 programming languages. When I was in 200 level, I did more of math courses; 11 math courses across the 2 semesters. Why am I doing so much mathematics when I am studying Computer Science, I think it is too much, I don't need it. I did only 2 basic programming languages, C++ and Fortran. A lecturer told us to develop software and use any language. But I did not know what to do because I don't know any language.

Another salient observation is the apparent level of confusion faced by students because they are always attending to one assignment or the other. And unfortunately, the assignments come in randomly. This fact was quite obvious while the researcher was planning for the Journals; it was a mission to find a lecturer who had worked out the administration of class assignments for the semester. As many as were contacted were not sure as evident in the discussion in 6.10.2, detailing the planning of the journals. In the words of one of the lecturers:

I will surely give my students assignments, but I have not decided when it would be.

For Petroleum Geology assignment, the initial submission date was within a time frame of 10 days but due to strong reservations expressed by students, it was extended by four days midway in the assignment. This may have in one way or the other influenced students' pacing of assignment writing and how much they applied themselves.

S23: One problem we have is that for example, we are given on Monday and we are expected to submit by Friday. And between Monday and Friday we have so many lectures. If we now put such an assignment aside to do some others, before we know it, it is Friday. We have too many lecturers that disturb us on doing assignments (sic).

In a situation like this students will almost always hurry over their assignments in a bid to get “something” to submit. This may have prompted a student to remark thus:

S24: For me, I think the lecturers are not keen about the viability or reliability of information. All they are concerned with is whether the assignment is done or not. They don't even show us the output of what we do, so awarding marks is to (sic) their own discretion.

Also, obvious is the fact that FUPRE is not employing any LMS as mentioned by the ICT staff, students, and lecturers alike, and as observed. Therefore, they miss out on the Web 2.0 learners support features which are very crucial in teaching and learning in the 21st century. Such features include discussion forums, file exchange, emails, online journals, notes, real time chat, videos, individual grades and progress reports (Stockley & Olsson, 2013).

7.7.4 NUANCES OF INDIVIDUAL LECTURERS AND THE IMPACT ON STUDENTS' INFORMATION SEEKING AND CREATIVITY

Another theme that featured across the data is the fact that lecturers seem to expect students to conform with their own thinking; this negatively impacts on students' information seeking and creativity. It appears there is no standard policy in place to address how students are evaluated in their tests or examinations, which by extension also affect how the conduct and assessment of their assignments. Consequently, the mode of assessment is at the discretion of the lecturers. For instance students expressed their concerns as follows:

S11: I remember when we were in 100 level, when we were taking a number of general courses together in the college, the lecturers usually share the exam scripts among themselves. They would have written the expected answers (marking scheme) and the person marking will marking exactly according to the marking scheme

Researcher: Okay do you mean the marking scheme is not flexible?

S11: Exactly. For instance if you read the course, understand and put it down in your own words, you may not do well like someone who gave the exact words back to the lecturer. It is very rigid.

S10: The problem in FUPRE is that 70% of us cram. For example if you see a very intelligent student who is in the second class upper range, ask him a question from what he was taught in 100 level, no, let's say 200 level, he may not remember, because all we do is cram.

A lecturer will tell you this is what I want and this is the approach you should use. For example in mathematics, you may think a particular approach is better and you are going to arrive at the same answer but the Lecturer will say “this is what I want”. There is a lecturer in my department, DR.....he will tell us for instance, define a computer. For me, I prefer to define it using my own words but for him he wants some kind of sequence and words. And if you don't conform you will score “0”. So no room for my personal understanding and language.

S12: It all depends on the Lecturer, in my department, some lecturers expect you to explain in your own words, you need not give them what they gave you but they need keywords from you. For example I was asked a question by my lecturer “what is a sediment”, he was looking for

the keywords “weathered materials”, and soon as I used the keywords, the lecturer said I got it. But there are some other lecturers, for instance the one who taught us today, he told us that if we want to pass his course that we have to use the words, the exact words that he gave us.

The inability of students to express their individual self and creativity in the course of attending to their academic work as detailed in the discussion constitute serious impediment to the possibilities for high academic attainments on the part of the students. What this translates to is that students would have to go through one assignment/exam or the other, and possibly be penalised for any omission or commission as set by each lecturer to acquire the skill set required to navigate through the personal nuances of the respective lecturers to “please” them. Besides, demanding that students should regurgitate their (lecturers’) exact words and penalise those who worked contrarily is a way of killing the creativity and individuality of certain students. Under such conditions, information literacy acquisition is reduced to a “dream to come”. While it is true that certain keywords or phrases are very important in elucidating some facts and knowledge, it is also important that students are allowed to lend their voices as well.

Some lecturers encourage their students to use Web 2.0 tools, which they do not incorporate in the process of teaching and learning, while it is not even open for discussions with some lecturers. Yet, a common phraseology from lecturers to students is “go online and look for information”; but without guidance!

That being said, students in a particular department did mention that one of their lecturers employs LMS in their class interactions. While narrating this to the researcher, the atmosphere in the course of discussion was charged with so much joy and youthful energy and it was obvious that for that particular class, students always looked forward to it.

S21: We (computer science) have a new lecturer who studied in Canada who introduced new social media stuff to us. So we have our course notes, assignments, and test questions online. It is a platform called Piasa.

Researcher: Tell me more about the learning platform?

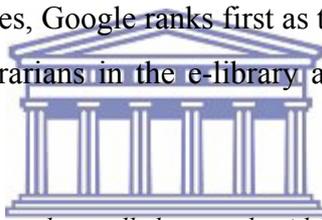
S21: I don’t know but it is a student-lecturer platform, like a classroom. He created a classroom for us where we interact, get messages and share insights. So we get out notes before the class.

7.7.5 THE HABIT OF “GOOGLING”

In 2009, the CIBER Google Generation report expressed concern about the “bad habit” of goggling by students. Similarly, Williams (2010:12) in the Mimas (www.mimas.ac.uk) report, Dahlstrom (2012: 5) in EDUCAUSE Centre for Applied Research (ECAR) report and many other research works across the globe discussed in Chapter three reported the issue of undergraduates making Google their first port of call in the quest for online information to satisfy their needs.

In the same vein, the habit of goggling was expressed across all the findings in this PhD research work; from the data gathered from the lecturers (L2 and L7), interviews with librarians (Paul and Diana) and the students, in addition to the researcher’s observation.

In Figure 16 (Question 22 of the Questionnaire) which is specifically designed to enable ranking of the use of search engines, Google ranks first as the search tools used by students in their information search. The librarians in the e-library also encourage the students to use Google.



Last week Tuesday, a student called me and said he was doing an assignment but did not know how to go about it. I now assisted him. I directed him to Google the assignment. I explained how to search using Google. He was very happy; he only needed information to be able to do his assignment. I think he left with a smiling face.

Students can search through Google on their own, therefore, it is expected that the librarians should advise them to use scholarly articles in a professional way. But evident in the assignment and LGDs is that some students are not aware that the information sources they consult are not on Google but only searched through Google.

7.7.6 THE ACCEPTABILITY OF PLAGIARISM

Generally, poor information literacy skills on the part of the students was evident throughout the qualitative data as revealed in the LGDs, assignments, journals and as observed during private interactions with students. Even though students know plagiarism is wrong as observed from their questionnaire responses, they simply want to type their assignment question on Google and get the exact answer. And it seem acceptable both to students and lecturers alike, otherwise, the 300 level students who are in the third year of their

undergraduate study would have conducted their assignment to reflect some degree of ethics in their use of information.

S4: It's kind of frustrating when you key in your search words in a search engine and the page it gives you are nothing related to what you want. The first page is not related; even the second and the third, are not what you are looking for.

Researcher: Okay, can you give an example?

S4: It is not specific, mostly related to other different stuff. Like, when I googled the role of information in science and technology, it kept on showing me the role of Internet in science and stuffs like that.

Researcher: You mean you would have preferred to see exactly "the role of information in science and technology"?

S4: Yes, exactly.

R: Don't you think if you had read different articles you would have been able to figure out what you needed?

S4: That would kill more time. Oh, it is time consuming.

S11: One major problem we have with attending to our assignments on the net is that we are not able to type the questions directly and get the exact answers that we need.

S25. We surf the Internet and copy and paste most of the time.

In addition to the problem of "copy and paste", students across both levels use information unethically. Not a single student in 100 and 300 level has in-text citations in their assignments; their referencing pattern is also poor.

In summary, FUPRE students seem to be faced with certain factors beyond their control which negatively impact on their ability to acquire information literacy skills.

7.8 CONCLUSION

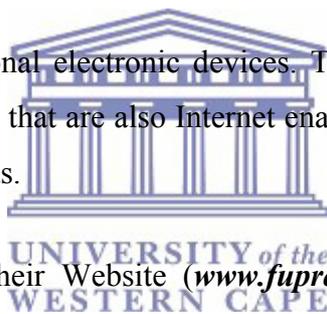
This chapter has attempted to answer the four major research questions of this study by bringing together findings from the quantitative and qualitative research. It has also responded to the broad topic of information behaviour of Nigerian undergraduates in the world of Web 2.0.

Nigerian undergraduates need and seek information in their academic and everyday life. In academia, students seek information to complete their assignments, write their tests, to gain more insight into their classwork and also for the research work. In their everyday life information needs, students seek information primarily on career, finance and health. Other areas of everyday information needs are health, entertainment, sport, relationship, travel/transport, family, accommodation, legal issues, sexual abuse, crime, music, personal development and religion. Google seem to be their first port of call online in their information search process in their everyday life information needs, while for their academic

pursuits it is their course notes first, next is the printed textbook and then Wikipedia. Much of how their information search pans out appear to depend a lot on their course lecturer, just as in the case of the PNG 315 assignment in which students were given a specific textbook to consult.

At the time of data gathering from March to May, 2014, FUPRE had 25 computers in the e-library for students and another 70 in the Department of Computer Science, available for use upon approval. The computers are on WI-FI but networked together by LAN. Then, Internet connectivity was not quite stable and students had to sometimes stand in queues to enable them to use the e-library. However, a new e-library was launched with 120 computers on the 26th of March, 2015, which can serve hundreds of students a day. This may imply that FUPRE is fast moving forward in terms of making adequate provision of facilities available. This is an indication that FUPRE is attending to its infrastructural challenges.

Students favour the use of personal electronic devices. The majority own android phones, while the others own java phones that are also Internet enabled. In addition to these, some of the students own laptops and iPads.



FUPRE library has a link on their Website (www.fupre.edu.ng) via which open access journals and open scholarship can be accessed. However, FUPRE is yet to subscribe to databases and e-books. No concrete mention is made as yet of databases and e-books.

The Library offers the *Use of Library and Study Skills* in the form of an *Introduction Model* (Curzon, 2004:38) that runs through only one semester of a degree at FUPRE. The course takes students through the role of the library and types of information sources (Swartz, *et al.* 2007: 109-122, Owusu-Ansah, 2003: 219), which Behrens (1993:124) refers to as library literacy. Inclusive are e-learning, e-materials, copyrights and its implications, database resources, bibliographic citations and referencing, appear to be the information literacy that may be relevant to modern global trends. However, the teaching and learning of core information literacy skills centred on the ACRL standards is largely absent. This is evident in the way students across the board conduct assignments, especially in terms of the unethical use of information, albeit unwittingly, but seem acceptable. Besides, the assignment

questions were such that they did not encourage the core HOT skills of creativity and innovation as they lacked sophisticated content and contexts.

The Google search engine is the primary search tool used by students, and one which is also a brand associated with the Internet. The top Web 2.0 tools employed for entertainment purposes are social networking (e.g. Facebook, twitter), video sharing sites (e.g. YouTube) and photo sharing sites (e.g. flickr). While for academic purposes, Wikipedia is top on the list, followed by emails, social networking sites (Facebook, Twitter etc) and online discussion forums are the top social media platforms students used for academic purposes.

However, the information source mostly consulted by students when writing assignments is their course notes. Next is their printed textbook and Wikipedia. In some instances, lecturers do tell their students the information sources to consult, as seen in the assignment for the 300 level student in Petroleum Engineering Department.

Students' information search process did not seem to conform to Kuhlthau's ISP model because of the context, revealing a typical and peculiar mode of conduct of the assignments. None of the assignments involved an investigation or problem to solve. They were all short assignments and students had other assignments at the same time. There was no scaffolding of assignments. Scaffolding could have allowed for a systematic observation of students in their process of writing their assignments.

It must be said, however, that 300 students exhibited some of the affective stages of the assignment, as the majority seemed to be optimistic across the various stages of assignment writing, which is an indication that the assignment questions were not significantly challenging, that is, not a HOT skills assignment.

The 100 level students whose assignment question was broad and gave room for individuals to bring in a rich variety of perspectives were mostly confused all through the assignment. They generally lacked confidence and did not even know the sort of information they needed. Most of them did what one may call "guess work" and after submission, they were still perturbed about the possible outcome.

Generally, the students have low information literacy skills: poor search skills, poor knowledge of credible sources, an inability to critique and evaluate information and their sources, and they demonstrated widespread unethical use of information.

The emerging themes across sections are lack of time, lack of space, traditional mode of teaching and poor administration of assignments, nuances of individual lecturers and the impact on students' information seeking and creativity, the habit of "googling", and lastly, the acceptability of plagiarism.

This chapter concludes that FUPRE students have poor intellectual access to information, an indication that they might fall short of the expectations of the nation on its vast human potentials in realising and anchoring Nigeria's vision 20: 2020.



CHAPTER EIGHT

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

8.1 INTRODUCTION

In Chapter seven, the findings from the survey, large group discussions, assignments, journals, interviews and policy documents, were converged while emerging themes across sections were discussed and interpreted. Chapter eight discusses the extent to which the research problem has been successfully addressed and answered.

An overview of the research problem is the starting point for this chapter. Next, the findings of each research question related to the research problem are summarized and discussed against the background and framework of prior research. The last sections deal with the study's contribution to the body of knowledge, the implications of the research for theory, practice and suggestions for further research.

The study investigated the information behaviour of Nigerian undergraduates in the world of Web 2.0. Using FUPRE as a case study, a holistic and in-depth investigation (Feagin, Orum and Sjoberg, 1991) was carried out, using mixed methods. The case study revealed the behavioural conditions through the perspective of the students and other participants, the various parts of the interconnected information behaviour of undergraduates and FUPRE as a typical institutional context. It also helped to understand the data in real-life situations and also the complexities of the academic life of students. Based on the strength of the case study, the research achieved its aim of investigating whether the Nigerian undergraduates have the ability and requisite skills to use resources available in the 21st century for personal and academic development, considered within the context of realising Nigeria's Vision 20:2020.

8.2 AN OVERVIEW OF THE RESEARCH PROBLEM

Chapter one provides a statement of the research problem, which was to investigate the information behaviour of Nigerian undergraduates in the world of Web 2.0. Chapter 1.1. to

1.4, expounds and establishes further premise on which the research problem is based and which is briefly described below.

Within the nexus of the development, acquisition and transfer of knowledge, the Internet is a crucial channel of information (Tella, Tella, Ayeni, & Omoba, 2007; Mohd Saad, 2008; Nkomo, 2009; Adetimirin, 2012; Krubu & Krubu, 2010; Krubu & Osawaru, 2011; and Niemand 2010). In the higher education locale, it has been established that Web 2.0 boosts individual and collaborative learning activities (Alexander, 2006; Marateo, & Ferris, 2007; Thompson, 2007; Armstrong & Franklin, 2008; Ellison & Wu, 2008; Hughes, 2009; and, Halic, *et al.* 2010; Barnes *et al.* 2007).

As information behaviour is a subjective sense making process, there is great demand for undergraduates to keep abreast of the dynamic and progressive developments in technological advancements for life-long learning and information literacy skills. These are curricular graduate attributes and skills set required by the work place in Nigeria, and in the world at large.

Therefore, these trends impose on Nigerian undergraduates the urgent need to acquire information handling skills in the face of the evolving landscape of technology for both personal and organizational development. These skills should be evident against the background of optimal participation in the Knowledge Economy of NV20:2020, and informs the fundamental question of this research which explored whether the Nigerian undergraduates have the ability and requisite skills to use resources available in the 21st century for personal and academic development, which translates to national development.

The Federal University of Petroleum Resources, Effurun - Delta State, Nigeria, was the case site of this study. The choice was based on the fact that it is a specialized university, the only one of its kind in Nigeria and Africa, established to meet the demands of the petroleum industry in terms of the production of a workforce and expertise in Nigeria. The fact that the petroleum industry is the largest industry and the main generator of its Gross Domestic Product (GDP), and the strategic position of the specialized university in national development makes a compelling argument for its appropriateness as a case site.

8.3 CONCLUSIONS OF THE RESEARCH QUESTIONS

Chapter Seven presents the findings arising from each research question which is discussed within the context of this and erstwhile research works reviewed in Chapter three. The four main research questions which form the enquiry of this study are herewith summarised to form a component presenting the information behaviour of undergraduates in the world of Web 2.0.

8.3.1 RESEARCH QUESTION ONE: THE INFORMATION NEEDS OF NIGERIAN UNDERGRADUATES IN THEIR ACADEMIC WORK AND EVERYDAY LIFE

The research question asked: What are the information needs of Nigerian undergraduates in terms of their academic work and everyday life?

The question was answered by triangulating findings from the survey Table 18 with those of large group discussions with the 100 and 300 level students.

FUPRE students do seek information for academic purposes and with respect to issues in their everyday life, as revealed in Table 18. In their academic pursuit, students seek information to gain deeper clarity on what they have been taught by their lecturers, to complete their assignments and projects, and as well, read up for tests and examinations. This aligns with the findings of Ajiboye and Tella (2007); Baro and Fyneman (2009); Baro, *et al.* (2010); Ejiwoye and Ayandare (2011); Emmanuel and Jegede (2011); and Adetimirin (2012).

In addition to seeking information for academic pursuits, Savolainen (1995), Durrance and Hinton (2004), Ajiboye and Tella (2007), and Ejiwoye and Ayandare (2011) opine that students also seek information for their everyday life information needs. Table 18 shows that FUPRE students seek information mainly on careers, finance, health, entertainment, sport, relationships, travel/transport, family, accommodation, legal issues, sexual abuse, crime, music, personal development and religion. The finding in the survey was confirmed in the large group discussions with more depth; when they have specific questions, for instance, how to bake or how to remove stains from their clothes, they google it to find answers. This resonates with the findings in the survey (Table 19) which reveals that students mostly

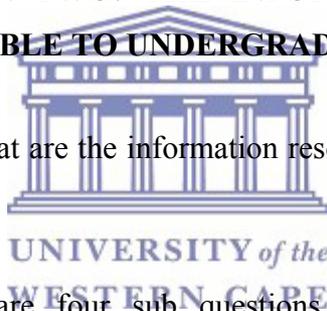
consult Google.com in their ELIS; next is Wikipedia. Students also visit discussion forums such as www.nairaland.com in order to meet their ELIS.

Students tend to favour the use of their course notes and print text more in attending to their assignments (figure 17). Students also use online sources, most especially Wikipedia as shown in the same figure. In the large group discussion with the 300 level students, the fact was made clear that the information source they consult largely depends on the lecturers.

Students use social media platforms for both academic and ELIS (table 22), but largely for entertainment purposes similar to the findings of Luo (2010:33-37) and Dahlstrom (2012). They employ the use of mobile networking platforms such as WhatsApp, Blackberry Messenger and 2go to meet their information needs, be it academic or ELIS.

8.3.2 RESEARCH QUESTION TWO: THE INFORMATION RESOURCES AND INFRASTRUCTURE AVAILABLE TO UNDERGRADUATES?

The research question asked: What are the information resources and infrastructure available to undergraduates?



Under this research question are four sub-questions, under which the answers are summarised:

What access to the Internet and the social media do students have off and on campus?

At the time of data gathering between March and June, 2014, the FUPRE e-library had 25 desktop computers connected to the Internet via a hybrid connection of WiFi. Also available was a computer laboratory with 70 computers in the Department of Mathematics and Computer Science connected to the Internet. However, FUPRE management and the library seem to have made a giant leap in a bid to making adequate provision of facilities available to students by launching a new e-library with 120 computers on the 26th of March, 2015. With this in place, the challenge of inadequate information infrastructure on campus in Table 8 (Question 9) of the survey, which also featured in the LGDs and observed has become a thing of the past.

It is pertinent to note that the FUPRE library has a standing policy against the use of social media in the e-library. Even though the survey (Tables 22 and Table 23), interview (with librarians), and general observation indicate that students use social media more for entertainment purpose, similar to the finding of Luo (2010) and Dahlstrom (2012), it is not sufficient to discourage the use. Contrarily, during the large group discussions students express the usefulness of social media platforms such as WhatsApp and Facebook in discussing academic matters and meeting their information needs. Besides, the journals for this research work took place on the aforementioned social media platforms.

The lack of use of social media in service delivery by FUPRE library implies that it is not moving in the direction of the 21st century academic library. The ALA (2012) disclosed that the majority of libraries in the USA employ social networking platforms in their service delivery. It is the same in South Africa but the situation is different in Nigeria. This, Baro, *et al.* (2013) attributed to a lack of awareness, lack of interest, inadequate skills, and unwillingness to embrace emerging technologies on the part of academic librarians in Nigeria.



Also, FUPRE is not employing the use of Learning Management System (LMS), which has invaluable support for learners; such as, discussion forums, file exchange, emails, online journals, notes, real time chat, videos, individual grades and progress reports (Stockley & Olsson, 2013).

What personal electronic devices do undergraduates have and use?

Similar to the outcome of a large survey in the USA (Dahlstrom, 2012) in which students of various nationalities favour the ownership of laptops and phones on which they can gain physical access to the Internet, the survey (Table 7) reveals that at least two out of three FUPRE students own smart phones, in addition to the few who own Java phones that are also Internet compliant. About one out of two own a laptop. Table 6 reveals that the majority of students do access the Internet on their personal electronic devices. The entire students in the LGDs own smart phones; in addition to smart phones, some own laptops and iPads.

What online electronic resources such as full text databases are available via the library and other information centres?

The primary educational role of the library, based on the standard set by the ACRL for higher education is “to partner in the educational mission of the institution to develop and support information-literate learners who can discover, access, and use information effectively for academic success, research, and lifelong learning” (ACRL 2011:9). FUPRE is working towards subscribing to databases and online journals as mentioned by the University Librarian and staff of e-library, but so far, only some open access journals and open scholarship can be accessed via a link on its Website (www.fupre.edu.ng), listed in section 7.3.3.

What information literacy education is available to undergraduates?

According to Kuhlthau (2004), information literacy skills is reliant on the individual’s cognitive abilities (Kuhlthau, 2004), language competence (Bellardo 1985: 237)) and technological literacy (Jaeger & Thompson 2008: 168 ; Burnett & Jaeger, 2011:167-168; Burnett). Therefore, being what it means to be educated in the 21st century, IL should be part of the curriculum of educational institutions (Owusu-Ansah, 2003: 219; Swartz, *et al.* 2007: 109-122).

FUPRE offers a once off information literacy education in line with Curzon (2004:38) *Introduction Model* which runs through only the first semester of students’ first year. The course, *Use of library and study skills* (GSE 104), is taught by four library staff. What is clearly in evidence is that the course content and the type of model employed are inadequate to properly ground students in what?; it excludes the 21st century core information literacy skills, which may be acquired following the information search process (Kuhlthau, 2004, 2004, 2007, 2008), guided enquiry (2007, 2010, 2012), and ACRL information literacy standards (ACRL, 2002, 2005, 2011, 2012). With the evolving landscape in information technology, information literacy education should incorporate how to formulate search strategies including the ability to read, understand and interpret information provided electronically, as encapsulated in the views of Tise (2000: 58), Brown, *et al.* (2003: 386), and Buschman and Warner (2005: 12 – 18).

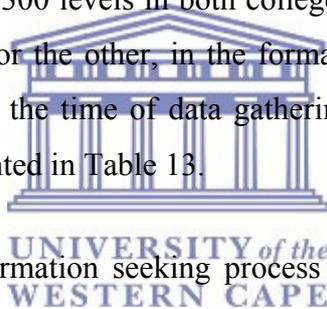
8.3.3 RESEARCH QUESTION THREE: THE INFORMATION SEEKING PROCESSES OF NIGERIAN UNDERGRADUATES?

The research question asked: what are the information seeking processes of Nigerian undergraduates?

This research question has nine sub-questions which were collectively answered primarily because of the over-lap of evidence gathered to address them.

Information seeking is a complex process which consists of social, communicative and interactive behaviour (Fourie, 2004:70). It is the purposive seeking of information in order to satisfy a need (Wilson, (2000:49). In order to have fruitful information seeking, the user must be information literate, according to ALA (1999, 2000).

The 803 students across 100 and 300 levels in both colleges of science and technology were writing one form of assignment or the other, in the formats of research reports, essays and oral presentations (Table 12). At the time of data gathering, they were at various stages in their assignment writing as presented in Table 13.



To have a glimpse into the information seeking process of the undergraduates, the group assignment of the 300 level students in the Department of Petroleum Engineering, on Basic Petroleum Geology (PNG 315) and the individual assignments of the 100 level students on the Use of Library and Study Skills (GES 104) were examined, as reported in sections 6.10.3 and 6.10.4. The assignment scripts of 50 students in the Electrical Electronic Department EEE 314 assignment were also examined.

The PNG 315 assignment was as a group assignment of 11 students per group. The lack of a problem to investigate and the necessary scaffolding made it a challenge to investigate the information search process of students based on Kuhlthau's ISP model (Kuhlthau, 2004:82). The assignment was a read and summarise task. The uncertainty, optimism and confusion or doubt common in the initiation, selection and exploration phases (Kuhlthau, 2004, 2008, 20012) of the ISP model respectively and low confidence levels were not markedly evident in this assignment because students were given an information source (a textbook) to work with.

The assessment of the assignments revealed students unwittingly used information unethically. None of the assignments had in-text referencing which made it a challenge to determine the actual information sources used in context. This is an indication of poor information literacy skills similarly discovered by some research works on the study of undergraduates' information literacy skills in Nigeria by Baro and Fyneman (2009); Isa, Amusan and Umma (2009); Ukpebor and Emojorho (2012); Abubakar and Isyaku (2012); Adetimirin (2012).

For the EEE 314 assignment discussed in section 6.9.2, 36 out of 50 assignments had lists of references while 14 had none. Of the 36, all except one had several referencing errors. None cited sources in-text. However, their course lecturer rated their level of information literacy as excellent/advanced in Section 6.3.3. This implies widespread poor information literacy skills and the acceptability of it by their lecturer.

The individual assignment by the 100 level students was an essay type in which a variety of approaches and content could be employed. It was a higher order thinking skills assignment which challenged the cognitive skills of the students. Unfortunately, there was no planning or scaffolding that guided the students to carry out the assignment. Due to their confusion on how to attend to the assignment because of the broadness of the question, initiating the work was a huge challenge. This suggests that, to a large extent, the 100 level students were unable to determine the nature and extent of their information. However, the students could have responded better to the assignment with some guidance from the Librarians who administered the task.

In the Library and study skills assignment students experienced the affective domain of the ISP model intensely; especially the initiation, selection and exploration stages. Their inability to locate the exact match of topic in the form of a book or article destabilised them; this shows their inability to access the information needed effectively and efficiently. The assignments come across as a compilation of incoherent facts arising from copying and pasting information from various sources, without synthesis. Also, students did not do well in selecting information to construct new meanings. Again, there was no assignment with in-text citation, while only three out of 311 had a list of references with several errors. This suggests that that students did not bring information literacy skills from secondary school to

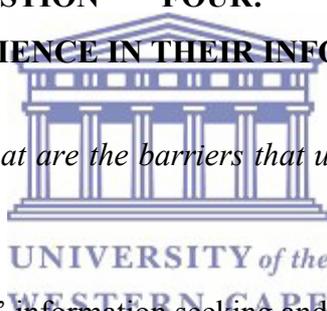
the university, similar to the findings of Kunakornsakul and Pinit (2012) at the King Mongkut's University of Technology, Thonbur, and Ukpebor and Emojoorho (2012:7) at the University of Benin, Nigeria.

Across both 100 and 30 levels, students were aware of how to use information individually or as a member of a group by following a format in their assignment writing.

For both levels, Google is the primary search engine that students associate with the Internet for both their everyday life and academic information needs which supports the findings of Kerins, *et al.* (2004); the CIBER Google Generation report of 2008, Niemand, (2010:4); Williams (2010:12); Kahlal (2011: 15-21), and Dahlstrom, (2012). However, it appears FUPRE students do not take note of the Website they gather information from.

8.3.4 RESEARCH QUESTION FOUR: THE BARRIERS THAT UNDERGRADUATES EXPERIENCE IN THEIR INFORMATION SEEKING

The research question asked: What are the barriers that undergraduates experience in their information seeking?



Barriers as hindrances to students' information seeking and search process were examined using the three levels of access propounded by Burnett, *et al.* (2008):

Physical access: This is the first level of access. The top three on the list of the barriers that hinder information seeking of FUPRE students is irregular power supply as indicated by about half of the respondents in Table 11, similar to the findings of Ejiwoye and Ayandare (2011). Next is poor access to information resources and lack of funds. These were equally expressed in the large group discussions. Table 8 reveals that about two thirds of the respondents experience technical problems (e.g. the system hangs, server down time, slow access speed, etc.) and the issue of inadequate facilities on campus. This was also expressed during the large group discussions with the 100 and 300 levels students.

Intellectual access: As observed and from interactions with students, FUPRE students appear to have good language competency and technological literacy. In Table 8, however, students expressed the intellectual barriers they experience in their information seeking as inability to

choose appropriate subject headings, keywords, and formulating a good search strategy. Added to this is a lack of search skills and problems with choosing appropriate databases. These problems reveal inadequate information literacy skills, discussed in section 7.4.

Social access: In their assignment writing, FUPRE students were able to communicate with their peers and lecturers as evident in the interactions during the journaling exercise.

Besides the barriers stated so far, having to manage many short-term assignments with no clear instructions, guidance and scaffolding impacted negatively on students as most of them did not have the time to attend to their assignments thoroughly. The term “stressful” was a common phraseology among students, being used to describe the tense atmosphere under which they learn; this poses a serious challenge to their information seeking.

8.4 THE STUDY’S CONTRIBUTION TO THE BODY OF KNOWLEDGE IN RELATION TO THE RESEARCH PROBLEM

The fundamental question of this research was to investigate whether the Nigerian undergraduates have the ability and requisite skills to use resources available in the 21st century for personal and academic development, using FUPRE as a case study.



The triangulation of methods which rests on the premise that the weaknesses in each single method is compensated by the counter-balancing strengths of another (Todd,1979:603) revealed some unique variance which otherwise may have been ignored by single methods. Thus, the mixed method employed in this research work has revealed the element of context. The illuminating insights offered by the triangulation of qualitative and quantitative research methods (Denzin,1978: 291) may apply to other Nigerian universities with similar contexts.

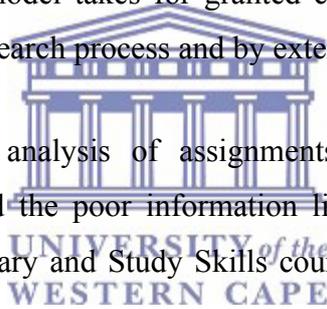
This study confirms previous, local research by Baro and Fyneman (2009); Isa, Amusan and Umma (2009); Ukpebor and Emojorho (2012); Abubakar and Isyaku (2012); Adetimirin (2012), that Nigerian undergraduates have poor information literacy skills, that is, poor intellectual access to information. Generally, students did not know how to choose appropriate key words for their online search. Google was the primary search engine they used to search the Internet which is similar to the findings of Kerins, *et al.* (2004); the CIBER

Google Generation report of 2008, Niemand, (2010:4); Williams (2010:12); Kahlal (2011: 15-21), and Dahlstrom, (2012).

That being said, it appears there is an assumption evident in information behaviour research that students have the ideal kind of education and atmosphere needed to learn and acquire information literacy skills. Hence, there appears to be much attention on students' information behaviour irrespective of the context of teaching and learning. The global publicity of the ACRL information standards and Kuhlthau's ISP model do not readily translate into implementation. Students will learn and acquire information literacy skills if it is an integral part of the curriculum of educational institutions (Owusu-Ansah, 2003: 219; Swartz, *et al.* 2007: 109-122); across all subjects, such that critical thinking, ethical use of information, among others, are being constantly reinforced.

It implies that Kuhlthau's ISP model takes for granted context dependent issues that may impact on students' information search process and by extension information literacy skills.

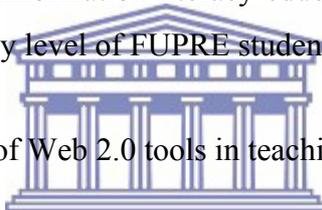
The interviews with lecturers, analysis of assignments and journaling unravelled the undercurrents and factors behind the poor information literacy skills of FUPRE students, beyond the once off Use of Library and Study Skills course which is inadequate. They are highlighted as follows:



- Poor curriculum and learning content: Using Use of Library and Study skills course as an example, the course synopsis (Appendix 7) and course outline (Appendix 8) mainly covers the traditional approach to information literacy education; that is, the approach of training users to be skilled library users. This approach has evolved into information literacy education that aids users to source for information needed, evaluate, critique, analyse and use information ethically, either as an individual or a group. Library has shifted from being storehouse of information resources to learning laboratory.
- Poor teaching and learning methods occasioned by inadequate experience and expertise on the part of the librarians and lecturers who appear ill-equipped to optimally perform in the citadels of higher education against the background of the

evolving landscape of information proliferation of the 21st century, further explicated as conservative attitudes of teaching staff towards the adoption of modern technology, and the “convenient teaching method” of expecting students’ to regurgitate lecturers’ notes.

- Tight class schedules for students which provide little or no room for assignments and self-development;
- Lack of clear and uniform standards on the level and number of assignments to be taken per semester per student;
- Inadequate information infrastructure and facilities;
- Lack of policy regarding information literacy education, are some underlying causes of poor information literacy level of FUPRE students revealed in this study; and
- Lack of policy on the use of Web 2.0 tools in teaching and learning.



These are rare insights into the information behaviour of FUPRE undergraduates which, if addressed, students will have a fairer platform to acquire information handling skills within the higher education context. Not until these issues are addressed as it relates to FUPRE and any other university on the same level as FUPRE in Nigeria, Vision 20: 2020 remains but a far-off dream, as the crop of undergraduates currently in the university are supposed to be in the work force by then.

8.5 IMPLICATIONS OF THE RESEARCH FOR THEORY, PRACTICE AND POLICY

This study has implications for theories in information behaviour, especially in the context of tertiary education. The contributions of this current study to practice and policy are addressed in innumerable ways below.

8.5.1 IMPLICATIONS FOR THEORY

This study on the information behaviour of undergraduates in the world of Web 2.0 concentrates on students' information search process, underpinned by information literacy, a lifelong learning process which gleans from constructivism, a foundation for both inquiry-based learning and the Information Search Process (ISP) theory of Kuhlthau (2004). The study specifically focuses on how students seek meaning in the process of carrying out their assignments, in a bid to understand their information handling skills as they are being prepared for the work place in view of Nigeria's Vision 20:2020.

Kuhlthau ISP model is the primary model used as a lens to examine how students search and use information in their academic tasks. The model could not be applied in its entirety to the study's particular context of teaching and learning because in the nature of the assignments, elements of a guided approach to learning, under which Kuhlthau's ISP may be employed, are missing.

Alternative theories, such as Theory of Change (Quality Education in Developing Countries (QEDC): 2008) could explain the lack of quality education and the type of intervention that would enhance students' learning. While the theory and practice of critical education by Shor (2012) can give insights into tested teaching and learning methods that enhances education through critical and democratic pedagogy for social change, which translates to national development.

For quality assurance in teaching and learning, Quality Education in Developing Countries (QEDC)(2008) strategies and QEDC theory of change under the Hewlett Foundation's Global Development Program (HFGDP) affirm that

if more attention to and accountability for student learning exist in a country (1), if governments and educators have knowledge about effective instructional models that can be scaled (2), and if the necessary resources are in place to ensure student learning (3), policy and practice within the system (from donor practice to teacher behaviour) will change to produce improved student learning (QEDC, 2008:11).

This theory will serve as invaluable at the point of evaluation and genuine intervention in teaching and learning.

Shor's theory and practice of critical education (2012) suggests that, first of all, the curriculum for teaching must be swotted and reconstructed. That being in place, teachers have a critical responsibility to fulfil which hinges on aiding the role of students change from listeners to participants. The theory and practice advocates that the role of the teacher be more mobile and fluid so that dialogue can take place which creates a learning environment for investigating everyday themes, social concerns and academic understanding. It unearths how students can emerge as critical thinkers, enthused learners and information literate citizens.

The current research reveals that in some instances, FUPRE students are like banks where lecturers deposit knowledge which they are expected to regurgitate in their assignments, tests and examinations. The teaching and learning method appear rigid, classes are not interactive, students get bored and tend to lose interest which may negatively impart on class attendance and the enthusiasm much needed for learning. This approach of teaching and learning is a behaviourist, whereby students are conditioned to respond to external stimuli (Webb, 2007; Barker, 2008: 130), an extrinsic motivator. On the contrary, constructivist approach promoted by Shor (2012) encourages teachers to serve as helpers to the students, giving them the opportunity and platform to assume more responsibility in class, lend their voices and give room for creativity and individuality in their learning process. If Shor's approach is put to practice at FUPRE, the teaching and learning process would undoubtedly aid the acquisition of information literacy skills by the student.

8.5.2 IMPLICATIONS FOR PRACTICE

According to the students, the most challenging "school experience" is their tight lecture schedule and having to deal with "too many assignments" which give them no room for self-development. The private and group interactions with the researcher gave them a rare opportunity to express themselves unhindered and without reservations. It also gave them the opportunity to make direct enquiries from the researcher on how to go about their assignments, as in the case with the 100 level students with the HOTS assignment. This implies that a guided approach, where students at least have the opportunity to ask burning questions in the process of conducting their class assignments, will prove invaluable. Tobias

(2009) and Duffy (2009) assert that a process approach to learning is more time consuming than direct teaching, taking into consideration cost-benefit effects.

Some students expressed gratitude for the opportunity to interact with the researcher who provided them with some helpful tips. A lecturer who completed the open-ended questionnaire and was also part of the journaling had a lengthy discussion with the researcher on the concept of information literacy and information literacy education, and immense appreciation was expressed for the insights shared, which would assist in the conducting of classes.

The journaling also provided a rare opportunity to both students and lecturers alike to interact during the assignments. Students were able to chat freely with their lecturer on social media for the first time. The experience set a pace and standard for all parties involved especially the lecturers and the students. They told the researcher that the journaling afforded them a glimpse into the challenges that students face in the process of writing their assignments, especially in the case of group assignments when they need to meet, discuss, brainstorm and garner their thoughts in order to fulfil the purpose of the assignment.

Students equally expressed their joy! Due to the short period of assignment writing, during which they had other competing assignments and lectures, the journaling on the WhatsApp platform gave them the opportunity to discuss what they would have otherwise done face to face even at the inconvenience of meeting.

Students' information handling skills is poor but the fact that some lecturers and librarians rate them as very good and excellent is an indication that there is an assumption that lecturers/librarians are information literate and are therefore capable of teaching learners information literacy. This calls for an urgent need for the university to put in place regular information literacy education in-service programmes for the teaching staff; this will go a long way to enhance their teaching capacity.

Some classes are quite large, but they are mainly those that are general courses taken by students across various faculties and levels. For easy handling and assessment of students, classes should be divided into small groups. For instance the Use of Library and Study Skills (GSE 104) class with 405 students taken by four librarians should be divided into four

classes. One librarian should handle each class rather than having 405 students and four lecturers all together in a class that is being taught by only one librarian probably due to inadequate classrooms.

One of the implications of the research for practice is the need for lecturers to employ Web 2.0 tools in their teaching and learning based on the testimony of one of the lecturers who took part in the journaling experience. Beyond that, deploying a Learning Management System (LMS) with learner support features such as classroom and online events, e-learning, discussion forums, file exchange, emails, online journals, notes, real time chat, etc. will enhance the teaching and learning experience of both lecturers and students alike.

8.5.3 IMPLICATIONS OF THE RESEARCH FOR POLICY

Implications of the research for policy are discussed under information literacy education policy, teaching and learning policy, and policy changes:

Information literacy education policy



- The Nigerian Library Association (NLA) should work in collaboration with the Department of Academic Standards (DASs) of National Universities Commission (NUC) to develop an information literacy education policy by setting a benchmark and ensuring the implementation of information literacy education for Nigerian universities. A curriculum of information literacy education that goes beyond teaching library skills should be in use. The curriculum should bring to bear all the elements and units of information literacy education that would prepare the Nigerian undergraduates for the Vision 20:2020 work place.
- The Introduction Model (Curzon, 2004:38) of information literacy education which is a once off course is both inadequate and ineffective. The ineffectiveness of the model is significantly highlighted in students' lack of knowledge of types of information, how to source for credible information, and how to use information ethically in the process of writing their assignments. According to FitzGerald (2011: 40) information literacy skills of students is best addressed in a systematic way. Therefore, there should be an information literacy education policy in place that aids the systematic

teaching and learning of information literacy across all courses and levels, thereby expanding the introduction model to an Integrated Curriculum Model in which information literacy training is part of an academic course, involving teaching research skills for a specific assignment or research work (Byerly, *et al.* 2006: 589). Baker and Curry (2004: 96) are of the opinion that information literacy skills are best learned when embedded in the learning within a subject area. The achievement of this feat rests solely in the collaboration between the faculty, librarians and academic administrations (Kuhlthau, 2010 & 2012; FitzGerald, 2011); this would also aid the scaffolding of lessons in order to meet course objectives (King, 2011:22).

Teaching and learning policy

- FUPRE should have a policy in place regarding the use of a Learning Management System (LMS), in addition to the face-to-face approach. This will encourage a hybrid system of teaching and learning in the face of Web 2.0, an important element in the 21st century teaching and learning process.
- The mode of teaching appears to impede students' creativity and individuality as some lecturers expect them to conform to their own way of thinking by way of encouraging them to regurgitate what they have been given in their classes. This should be vehemently discouraged by the university management, and faculty should take steps to expunge it altogether. Constructivism is about creativity and creativity is about individuality, which university education should encourage particularly in the evolving landscape of Web 2.0, the 21st century read and write Web. In addition, it is preferable to have a flexible rubric for assessing students' assignments, texts and examinations.

Policy changes

- The research reveals that students are faced with too many assignments that appear counterproductive, more so that they engage mainly lower order thinking skills. It appears assignments are given randomly without coordination from the Academic Planning Unit (APU), faculty and/department. To address this problem, the APU should set a benchmark for all faculties and by extension, the departments. Such

benchmarks should form part of the discourse during Faculty Board Meetings (FBMs) that are held before the commencement of every semester, where the general academic welfare of the students and strategic planning for the implementation of the curriculum are discussed. Such meetings should bring on board the type/scope and number of assignments including learning outcomes.

- Students use social media for entertainment and academic purposes, though more for academic purposes. Hence, the university library should revisit the policy against the use of social media in the library and also advertise services and products on social media as libraries do it across the USA (ALA: 2012). The use of notice boards and Students Union Government (SUG) solely to reach out to students is outdated; it should be complimented by the social media platforms.
- Complaints about “lack of time” ran throughout the qualitative data, meaning that students’ lecture time table is extremely crowded. Therefore, this study suggests that the time table should be constructed in a manner that allows ample time for self-learning.
- The university library should enrich their information base by subscribing to databases, e-journals and e-books, while the librarians should encourage the use of credible sources and information when students request assistance. This will go a long way to lending strong support to the mission of the university by training graduates who are employable.

8.6 RECOMMENDATIONS FOR FURTHER RESEARCH

The study recommends the following further research:

1. The students in the study and also the lecturers seem to be aware of the concept of plagiarism yet they accept it on the one hand by the unethical use of information on the part of the students, and on the other hand by lecturers who appear indifferent. This warrants further research into the ethics of information use in the university environment.
2. Lecturers advise and expect students to go online and search for information, yet they are not taking immense advantage of online resources, evident in the fact that during

assignments, the majority of students rely on their course notes and print textbooks. It will prove invaluable insights to investigate what lies behind the double standards.

3. The mode of teaching and learning, and assessment of students do have a tremendous effect on the information behaviour of students. A study focused on determining the nexus between the attitude and teaching styles of lecturers on the one hand, and the impact on students' information seeking as the path to knowledge acquisition on the other, could be further investigated; this becomes necessary in the face of the insinuations of individual lecturers in their expectations that students should conform to their thinking.
4. Students mentioned "lack of time" as one of the challenges affecting their information seeking. They hardly have time to attend diligently to their assignments and course work. Therefore, a study on time, as a factor influencing information seeking will prove invaluable in restructuring their academic schedule to create time and room for take home assignments and self-development.
5. Students expressed some reservations about the limitations of their curriculum and inadequate practical experience, both of which influence their information behaviour and information literacy skills. Investigating the curriculum for the purpose of advising the Academic Planning Unit would be of great importance.

8.7 CONCLUDING REMARKS

This chapter reviewed the research problem and the research questions, and discussed the extent to which the research problem and questions have been successfully addressed through the findings.

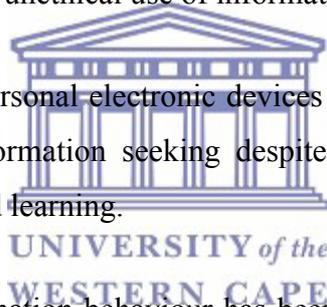
The research problem concerned itself with investigating the information behaviour of undergraduates at the Federal University of Petroleum Resources (FUPRE), Effurun, Warri, Nigeria. The background to the problem detailed a scenario in which Nigeria as a nation is in dire need of an information literate population who can key in appropriately into the 21st century work place to aid in anchoring Vision 2020. Four main questions were developed to address students' information needs in terms of their academic work and everyday life; the

information resources and infrastructure available to them; their information seeking processes, the barriers they experience in their information seeking and the main question of their information behaviour in the world of Web 2.0.

This final chapter provided a summary of the results of research question against the data collected by the various data collection methods and tools, and against the surveyed literature.

This chapter has drawn attention to the study's contribution to the body of knowledge with regards to the research problem. The current study agrees with earlier research conducted in Nigeria, that undergraduates have inadequate information literacy skills such as inability to choose appropriate subject headings, keywords, and formulating a good search strategy, lack of search skills, problems with choosing appropriate databases, the "bad habit" of googling and widespread plagiarism due to unethical use of information.

Students favour ownership of personal electronic devices and also use social media both in academic and everyday life information seeking despite the fact that the FUPRE is not employing a LMS in teaching and learning.



The literature on students' information behaviour has been expanded by this study. One of the strengths of this study is in revealing the nuances in teaching and learning as they relate to lecturer-student interactions and the impact on students' information seeking process.

The chapter has provided evidence of how the ISP model has been used, but not successfully applied because of context related challenges. Therefore, the theory of change (QEDC:2008) could be employed for the evaluation of the teaching and learning process, and intervention by stake holders will serve in rebranding and overhauling the educational system. Shor's theory and practice of critical education (2012). Shor's theory and practice of critical education (2012) advocates the revision and reconstruction of curriculum, and how to empower education through critical and democratic pedagogy for social change. When the underlying factors affecting the information literacy acquisition are addressed through these models, then the ISP model will be a veritable tool to study the ISP of students.

In terms of practical application this research has demonstrated that students can be guided in the process of teaching and learning, and that Web 2.0 can also serve to benefit both students and lecturers alike in their interactions. Eight points were made in terms of the implications of the research for policy which related to information literacy education policy, teaching and learning policy and the need for some policy change. Finally, to conclude this chapter, five recommendations were made about further research.



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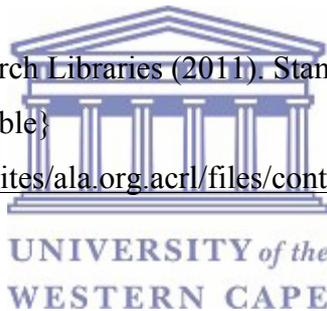
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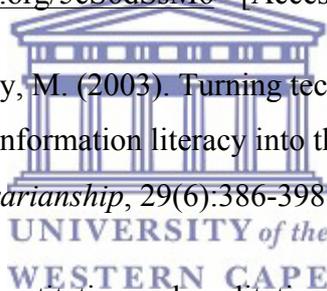
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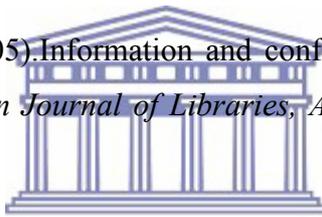
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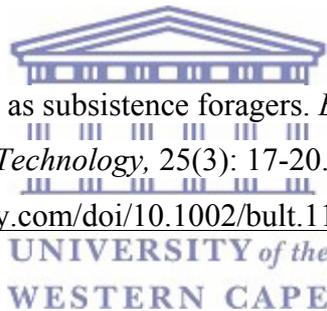
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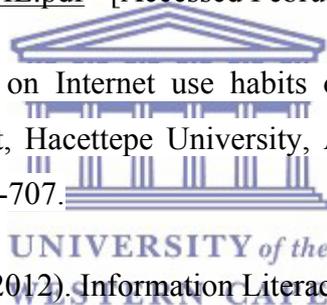
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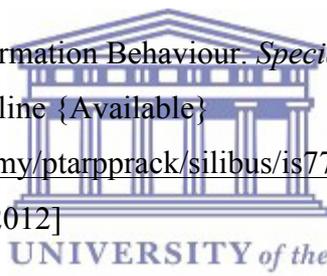
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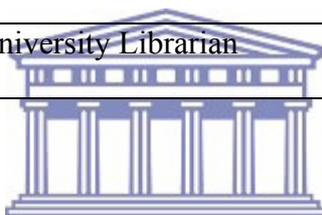
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APPENDICES

Appendix 1: Schedule of Qualitative data gathering at FUPRE

Interview Schedule

Date	Interviewee	Type of Interview
2 nd April, 2014	University Librarian	Oral/Face-to-face
24 th April, 2014	ICT Staff/Head of Web Unit	Oral/Face-to-face
May 15-June 5 th , 2014	12 lecturers (L1-L12)	Written
21 st May, 2014	e-Librarian (Paul)	Oral/Face-to-face
21 st May, 2014	e-Librarian (Diana)	Oral/Face-to-face
13 th August, 2014	University Librarian	Oral/Telephone
28 th March, 2015	University Librarian	Oral/Telephone



Large Group Discussions

Date	No. of Participants	Level	Venue
June 4 th , 2014	15	300	Library Foyer
June 4 th , 2014	17	100	Lecture Hall

Journaling

Period	No. of Participants	Level	Social media platform
22 nd - 30 th of May, 2014	77	300	WhatsApp Platforms A, B, C, D, E, F & G
21 st May - June 3 rd , 2014	8	100	WhatsApp Platform 100
21 st May - June 3 rd , 2014	2	100	Facebook

Appendix 2: Information Literacy Standards, Performance Indicators, and Outcomes (Association of College and Research Libraries (ACRL:2002, 2011, 2012)

Standard One

The information literate student determines the nature and extent of the information needed.

Performance Indicators:

1. The information literate student defines and articulates the need for information.

Outcomes Include:

- a. Confers with instructors and participates in class discussions, peer workgroups, and electronic discussions to identify a research topic, or other information need
 - b. Develops a thesis statement and formulates questions based on the information need
 - c. Explores general information sources to increase familiarity with the topic
 - d. Defines or modifies the information need to achieve a manageable focus
 - e. Identifies key concepts and terms that describe the information need
 - f. Recognizes that existing information can be combined with original thought, experimentation, and/or analysis to produce new information
2. The information literate student identifies a variety of types and formats of potential sources for information.



Outcomes Include:

- a. Knows how information is formally and informally produced, organized, and disseminated
 - b. Recognizes that knowledge can be organized into disciplines that influence the way information is accessed
 - c. Identifies the value and differences of potential resources in a variety of formats (e.g., multimedia, database, website, data set, audio/visual, book)
 - d. Identifies the purpose and audience of potential resources (e.g., popular vs. scholarly, current vs. historical)
 - e. Differentiates between primary and secondary sources, recognizing how their use and importance vary with each discipline
 - f. Realizes that information may need to be constructed with raw data from primary sources
3. The information literate student considers the costs and benefits of acquiring the needed information.

Outcomes Include:

- a. Determines the availability of needed information and makes decisions on broadening the information seeking process beyond local resources (e.g., interlibrary loan; using resources at other locations; obtaining images, videos, text, or sound)
 - b. Considers the feasibility of acquiring a new language or skill (e.g., foreign or discipline-based) in order to gather needed information and to understand its context
 - c. Defines a realistic overall plan and timeline to acquire the needed information
4. The information literate student reevaluates the nature and extent of the information need.

Outcomes Include:

- a. Reviews the initial information need to clarify, revise, or refine the question
- b. Describes criteria used to make information decisions and choices

Standard Two

The information literate student accesses needed information effectively and efficiently.

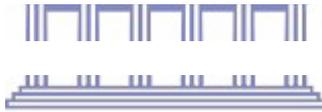
Performance Indicators:

1. The information literate student selects the most appropriate investigative methods or information retrieval systems for accessing the needed information.

Outcomes Include:

- a. Identifies appropriate investigative methods (e.g., laboratory experiment, simulation, fieldwork)
- b. Investigates benefits and applicability of various investigative methods
- c. Investigates the scope, content, and organization of information retrieval systems
- d. Selects efficient and effective approaches for accessing the information needed from the investigative method or information retrieval system
2. The information literate student constructs and implements effectively-designed search strategies.

Outcomes Include:



- a. Develops a research plan appropriate to the investigative method
- b. Identifies keywords, synonyms and related terms for the information needed
- c. Selects controlled vocabulary specific to the discipline or information retrieval source
- d. Constructs a search strategy using appropriate commands for the information retrieval system selected (e.g., Boolean operators, truncation, and proximity for search engines; internal organizers such as indexes for books)
- e. Implements the search strategy in various information retrieval systems using different user interfaces and search engines, with different command languages, protocols, and search parameters
- f. Implements the search using investigative protocols appropriate to the discipline
3. The information literate student retrieves information online or in person using a variety of methods.

Outcomes Include:

- a. Uses various search systems to retrieve information in a variety of formats
- b. Uses various classification schemes and other systems (e.g., call number systems or indexes) to locate information resources within the library or to identify specific sites for physical exploration
- c. Uses specialized online or in person services available at the institution to retrieve information needed (e.g., interlibrary loan/document delivery, professional associations, institutional research offices, community resources, experts and practitioners)
- d. Uses surveys, letters, interviews, and other forms of inquiry to retrieve primary information

4. The information literate student refines the search strategy if necessary.

Outcomes Include:

- a. Assesses the quantity, quality, and relevance of the search results to determine whether alternative information retrieval systems or investigative methods should be utilized
 - b. Identifies gaps in the information retrieved and determines if the search strategy should be revised
 - c. Repeats the search using the revised strategy as necessary
5. The information literate student extracts, records, and manages the information and its sources.

Outcomes Include:

- a. Selects among various technologies the most appropriate one for the task of extracting the needed information (e.g., copy/paste software functions, photocopier, scanner, audio/visual equipment, or exploratory instruments)
- b. Creates a system for organizing the information
- c. Differentiates between the types of sources cited and understands the elements and correct syntax of a citation for a wide range of resources
- d. Records all pertinent citation information for future reference
- e. Uses various technologies to manage the information selected and organized

Standard Three

The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.

Performance Indicators:

1. The information literate student summarizes the main ideas to be extracted from the information gathered.

Outcomes Include:

- a. Reads the text and selects main ideas
 - b. Restates textual concepts in his/her own words and selects data accurately
 - c. Identifies verbatim material that can be then appropriately quoted
2. The information literate student articulates and applies initial criteria for evaluating both the information and its sources.

Outcomes Include:

- a. Examines and compares information from various sources in order to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias
- b. Analyzes the structure and logic of supporting arguments or methods
- c. Recognizes prejudice, deception, or manipulation

- d. Recognizes the cultural, physical, or other context within which the information was created and understands the impact of context on interpreting the information.
3. The information literate student synthesizes main ideas to construct new concepts.

Outcomes Include:

- a. Recognizes interrelationships among concepts and combines them into potentially useful primary statements with supporting evidence
 - b. Extends initial synthesis, when possible, at a higher level of abstraction to construct new hypotheses that may require additional information
 - c. Utilizes computer and other technologies (e.g. spreadsheets, databases, multimedia, and audio or visual equipment) for studying the interaction of ideas and other phenomena
4. The information literate student compares new knowledge with prior knowledge to determine the value added, contradictions, or other unique characteristics of the information.

Outcomes Include:

- a. Determines whether information satisfies the research or other information need
 - b. Uses consciously selected criteria to determine whether the information contradicts or verifies information used from other sources
 - c. Draws conclusions based upon information gathered
 - d. Tests theories with discipline-appropriate techniques (e.g., simulators, experiments)
 - e. Determines probable accuracy by questioning the source of the data, the limitations of the information gathering tools or strategies, and the reasonableness of the conclusions
 - f. Integrates new information with previous information or knowledge
 - g. Selects information that provides evidence for the topic
5. The information literate student determines whether the new knowledge has an impact on the individual's value system and takes steps to reconcile differences.

Outcomes Include:

- a. Investigates differing viewpoints encountered in the literature
 - b. Determines whether to incorporate or reject viewpoints encountered
6. The information literate student validates understanding and interpretation of the information through discourse with other individuals, subject-area experts, and/or practitioners.

Outcomes Include:

- a. Participates in classroom and other discussions
 - b. Participates in class-sponsored electronic communication forums designed to encourage discourse on the topic (e.g., email, bulletin boards, chat rooms)
 - c. Seeks expert opinion through a variety of mechanisms (e.g., interviews, email, listservs)
7. The information literate student determines whether the initial query should be revised.

Outcomes Include:

- a. Determines if original information need has been satisfied or if additional information is needed

- b. Reviews search strategy and incorporates additional concepts as necessary
- c. Reviews information retrieval sources used and expands to include others as needed

Standard Four

The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.

Performance Indicators:

1. The information literate student applies new and prior information to the planning and creation of a particular product or performance.

Outcomes Include:

- a. Organizes the content in a manner that supports the purposes and format of the product or performance (e.g. outlines, drafts, storyboards)
 - b. Articulates knowledge and skills transferred from prior experiences to planning and creating the product or performance
 - c. Integrates the new and prior information, including quotations and paraphrasings, in a manner that supports the purposes of the product or performance
 - d. Manipulates digital text, images, and data, as needed, transferring them from their original locations and formats to a new context
2. The information literate student revises the development process for the product or performance.

WESTERN CAPE

Outcomes Include:

- a. Maintains a journal or log of activities related to the information seeking, evaluating, and communicating process
 - b. Reflects on past successes, failures, and alternative strategies
3. The information literate student communicates the product or performance effectively to others.

Outcomes Include:

- a. Chooses a communication medium and format that best supports the purposes of the product or performance and the intended audience
- b. Uses a range of information technology applications in creating the product or performance
- c. Incorporates principles of design and communication
- d. Communicates clearly and with a style that supports the purposes of the intended audience

Standard Five

The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.

Performance Indicators:

1. The information literate student understands many of the ethical, legal and socio-economic issues surrounding information and information technology.

Outcomes Include:

- a. Identifies and discusses issues related to privacy and security in both the print and electronic environments
 - b. Identifies and discusses issues related to free vs. fee-based access to information
 - c. Identifies and discusses issues related to censorship and freedom of speech
 - d. Demonstrates an understanding of intellectual property, copyright, and fair use of copyrighted material
2. The information literate student follows laws, regulations, institutional policies, and etiquette related to the access and use of information resources.

Outcomes Include:

- a. Participates in electronic discussions following accepted practices (e.g. "Netiquette")
 - b. Uses approved passwords and other forms of ID for access to information resources
 - c. Complies with institutional policies on access to information resources
 - d. Preserves the integrity of information resources, equipment, systems and facilities
 - e. Legally obtains, stores, and disseminates text, data, images, or sounds
 - f. Demonstrates an understanding of what constitutes plagiarism and does not represent work attributable to others as his/her own
 - g. Demonstrates an understanding of institutional policies related to human subjects research
3. The information literate student acknowledges the use of information sources in communicating the product or performance.

Outcomes Include:

- a. Selects an appropriate documentation style and uses it consistently to cite sources
- b. Posts permission granted notices, as needed, for copyrighted material

Source: <<http://www.ala.org/acrl/standards/informationliteracycompetency#useofst>>

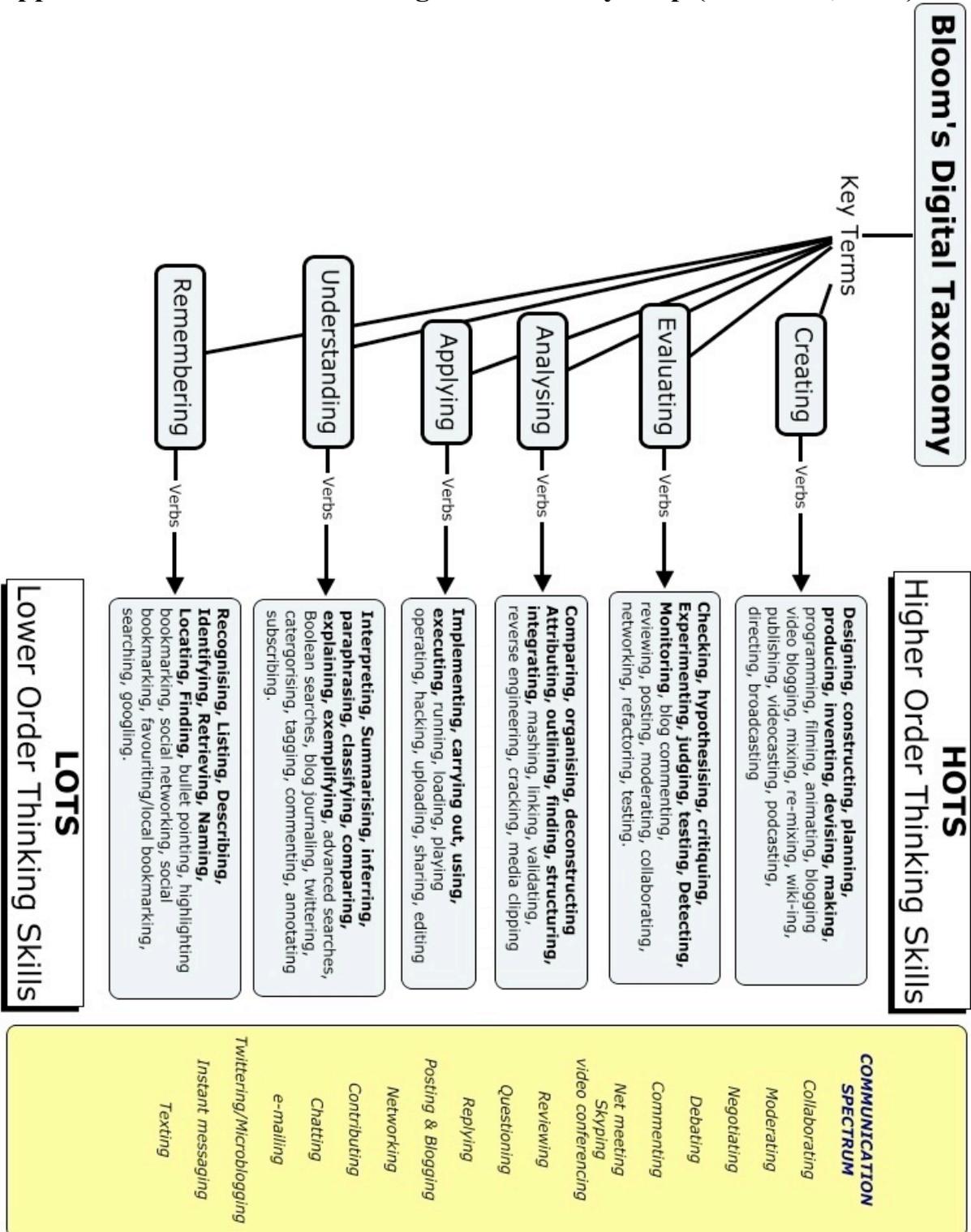
Appendix 3: The Progression and Development of Kuhlthau's Information Search Process from 1985-2008

Progression and Development of Kuhlthau's Information Search Process		
Date	Title of Selected Research Reports	Significance
1985	A Process Approach to Library Skills Instruction. <i>School Library Media Quarterly</i> , 13 (1), 35-40.	First study of the ISP with 25 HS students
1985	An Emerging Theory of Library Instruction. <i>School Library Media Quarterly</i> , 16 (1), 23-28.	Process is important in teaching research
1988	Perceptions of the Information Search Process in Libraries: A Study of Changes from High School Through College. <i>Information Processing & Management</i> , 24 (4), 419-427.	Transference of skills from high school to college: a survey study
1988	Longitudinal Case Studies of the Information Search Process of Users in Libraries. <i>Library and Information Science Research</i> , 10 (3), 257-304.	In depth case study of six students from high school through college
1988	Meeting the Information Needs of Children and Young Adults: Basing Library Media Programs on Developmental States. <i>Journal of Youth Services in Libraries</i> , 2 (1), 51-57.	Connecting cognitive-developmental stages to learning in libraries
1989	The Information Search Process of High-, Middle-, and Low-Achieving High School Seniors. <i>School Library Media Quarterly</i> , 17 (4), 224-228.	Large scale examination of the ISP high school seniors
1989	Information Search Process: A Summary of Research and Implications for School Library Media Programs. <i>School Library Media Quarterly</i> , 18 (5), 19-25.	Practical application using the model of the ISP in schools
1990	Validating A Model of the Search Process: A Comparison of Academic, Public, and School Library Users. <i>Library and Information Science Research</i> , 12 (1), 5-32.	Confirmation of the ISP in various types of libraries With Turock, George and Belvin
1991	Inside the Search Process: Information Seeking from the User's Perspective. <i>Journal of the American Society for Information Science</i> , 42 (5), 361-371.	Highly cited article on cognitive and affective aspect of information seeking
1993	Implementing a Process Approach to Information Skills: A Study Identifying Indicators of Success in Library Media Programs. <i>School Library Media Quarterly</i> , 22 (1), 11-18.	Identified inhibitors and enablers of implementing the ISP in K-12 contexts
1993	A Principle of Uncertainty for Information Seeking. <i>Journal of Documentation</i> , 49 (4), 339-355.	Explanation of the impact of emotion on the ISP
1994	Students and the Information Search Process: Zones of Intervention for Librarians. In <i>Advances in Librarianship</i> , Academic Press, 57-72.	Introduction of critical moments where students need assistance and guidance
1996	The Concept of a Zone of Intervention for Identifying the Role of Intermediaries in the Information Search Process. <i>Proceedings of the American Society for Information Science Annual Meeting</i> , 367-376.	Develops notion of a "Zone of Intervention" for library and information services

1997	Learning in Digital Libraries: An Information Search Process Approach. <i>Library Trends</i> , 45 (4), 707-723.	Information technology and the ISP, the problem of seeking meaning from abundance of information
1999	Student Learning in the Library: What Library Power Librarians Say. <i>School Libraries Worldwide</i> . 5 (2), 80-96.	Using library for inquiry learning
1999	Accommodating the User's Information Search Process: Challenges for Information Retrieval System Designers. <i>Bulletin of the American Society for Information Science</i> , 25 (3), 12-16.	Implication of ISP for information system design
1999	The Role of Experience in the Information Search Process of an Early Career Information Worker: Perceptions of Uncertainty, Complexity, Construction and Sources. <i>Journal American Society for Information Science</i> , 50 (5), 399-412.	Comparison of novice/expert use of ISP in the workplace
2001	Information Seeking for Learning: A Study of Librarians Perceptions of Learning in School Libraries. <i>New Review of Information Behaviour Research</i> , 2, 31-46.	ISP of students in science projects With McNally
2001	Information Search Process of Lawyers: A Call For 'Just For Me' Information Services. <i>Journal of Documentation</i> , 57 (1), 31-46.	Evidence of ISP in the workplace and need for creating meaning With Tama
2001	The Information Search Process (ISP) A Search for Meaning Rather than Answers. <i>Doshisha Journal of Library and Information Science</i> , 1 (6), 31-46.	Uncovers problem of seeking meaning from information
2001	Rethinking Libraries for the Information Age School: Vital Roles in Inquiry Learning. <i>Proceedings of the International Association of School Librarianship Annual Meeting</i> , Auckland, New Zealand.	Consideration of changes in schools to prepare students for ISP in workplace
2004	Meeting the Challenge of Intellectual Access: Vital roles for librarians. Margaret Mann Lecture, School of Information, University of Michigan.	ISP in the context of education and the workplace that indicate new roles for librarians
2006	Information Literacy through Guided Inquiry: Preparing Students for the 21st Century. <i>Proceedings of the International Association of School Librarians Annual Conference</i> , Lisbon, Portugal.	Guided Inquiry for preparing students for information environment
2008	From Information to Meaning: Confronting Challenges of the Twenty-first Century. <i>Libri</i> , vol. 58, 66-73.	Moving away from concentration on technology of searching to using information for learning, problem solving and creativity.

Source: <http://comminfo.rutgers.edu/~kuhlthau/research_interests.htm>

Appendix 4: Bloom's Revised Digital Taxonomy Map (Churches, 2009)



Appendix 5: Survey questionnaire



INFORMATION BEHAVIOUR OF NIGERIAN UNDERGRADUATES IN THE WORLD OF WEB 2.0: THE CASE OF FEDERAL UNIVERSITY OF PETROLEUM RESOURCES, DELTA STATE, NIGERIA, A SPECIALIZED UNIVERSITY

Dear Respondent

I am seeking your assistance in a survey of the information behaviour of Nigerian undergraduates in the world of Web 2.0 using the Federal University of Petroleum Resources, Effurun, Delta State, as case study. The main purpose of the research is to better understand your information needs, the information sources you consult and how you meet such needs particularly using online media and the interactive Web 2.0. The outcome of the study will give some insights into undergraduates' information behaviour, and this can inform information literacy education and curriculum.

I kindly ask for your time to complete the following questionnaire and return it at your earliest convenience. Your free and frank feedback will be taken as an important contribution to the present research work. The results of this questionnaire are essential to the completion of my PhD at the University of the Western Cape in South Africa. I assure you that the information you provide will be accorded the highest confidentiality and used solely for the purposes of this research study. It will have no impact on your academic coursework.

Your invaluable effort in completing this survey is greatly appreciated.

Thanking you in advance for your time.

Dorcas Krubu

Mobile Number: 07036360662; Email: dkrubu@gmail.com

For more information contact:

Dr. Sandy Zinn, szinn@uwc.ac.za; Prof. Genevieve Hart, ghart@uwc.ac.za

Appendix 5: continued

Section A: Demographic information

Please tick or circle where appropriate

1. Sex: Male Female:

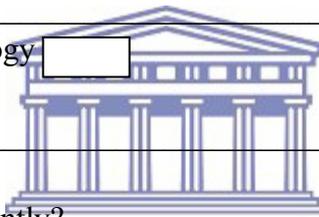
2. How old are you? _____

3. What is your home/native language _____

4. Which college and department are you in?

A. College of Science
Department _____

B. College of Technology
Department _____



5. What level are you currently?

	Item	Tick as appropriate
A.	100 level	
B.	200 level	
C.	300 level	
D.	400 level	
E.	500 level	

Appendix 5: continued

SECTION A: GENERAL ACADEMIC INFORMATION SEEKING BEHAVIOUR

6. Please describe the problem you experience when undertaking a big course assignment by responding to the following statements.

	Item	Scale				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
A.	When I receive an assignment I often feel unsure on how to begin to find information.					
B.	When I receive an assignment I worry that I do not understand what is expected.					
C.	In course assignments it is not clear when to stop looking for information.					
D.	I read to explore the background and bigger picture first.					
E.	I am able to find useful information quickly.					
F.	I trust my Google searches to give me the best information.					
G.	I prefer searching for information online directly rather than via the library.					
H.	Librarians are a useful source of help in my information-seeking.					
I.	When I hand in my assignment I am confident that it is of high quality.					
J.	I know how to cite my sources correctly so that I am not guilty of plagiarism.					

7. How and where do you access the Internet in order to complete your assignments? Tick as many as appropriate.

	Item	Tick as many as applicable
A.	Campus computer labs	
B.	Library computers	
C.	My own laptop/notebook/IPAD/tablet/phone using WIFI on campus	
D.	Residence (Hostel) computer labs	
E.	At home	
F.	Cybercafé - off campus	
G.	I don't use the Internet at all	
H.	Other? Please specify	

8. Do you own any the following personal electronic devices on which you can access the Internet to aid your academic information seeking? Circle as many as appropriate

	Item	Tick as many as applicable
A.	Desktop computer	
B.	Laptop / notebook	
C.	iPad or other tablet device	
D.	Smart phone	
E.	Other? Please specify	

9. What are the problems you have using electronic resources when searching for information for your assignments? (You may choose more than one).

	Item	Tick as many as applicable
A.	Operating the physical devices	
B.	Not enough facilities on campus	
C.	Technical problems (e.g. system hangs, server down time, access speed, etc.)	
D.	Choosing appropriate database	
E.	Choosing appropriate subject headings, keywords, and formulating a good search strategy.	
F.	Other? Please specify	

10. Does the university library have adequate provision of the following electronic resources?

	Item	Tick as many as applicable
A.	Online databases	
B.	e-Books	
C.	Online Reference Sources (e.g. encyclopaedia, indexes, abstracts, On - line Public Access Catalogue (OPAC)	

11. How did you learn information seeking skills? Tick if "Yes"

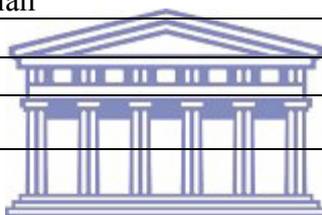
	Item	Yes
A.	Through formal course organized by the Library on information literacy	
B.	Through information literacy education before your entry into the university	
C.	Through one on one guidance from Library staff	
D.	University credit-bearing course	
E.	Through guidance from Lecturers	
F.	Is it through guidance from other students?	

12. In the last week have you visited the university library?

Yes	No

13. If you answered “yes” to Question 11, what was your purpose in using the library?

	Item	Tick as many as applicable
A.	To use OPAC (catalogue) to find book	
B.	To use databases to find articles and information	
C.	To use computer facilities to access online web sites & blogs	
D.	To use computer facilities to email	
E.	To access social media (eg, to consult with a Librarian via Skype)	
F.	To use study / reading space	
G.	To watch a video/film	
H.	To use seminar room	
I.	To use printing facilities	
J.	To browse the book shelves	
K.	To return a book	
L.	To find a journal on shelf	
M.	To consult with a librarian	
N.	To read a newspaper	
O.	To meet with friends	
P.	Other? Please specify	



	Item	Tick as many as applicable
A.	Lack of funds/finance	
B.	Poor access to information resources	
C.	Poor infrastructure	
D.	Lack of search skills	
E.	Irregular electricity supply	
F.	Lack of time	

14. Which of the following factors hinder me in my information seeking ?

SECTION C: REFLECT ON THE COURSE ASSIGNMENT THAT YOU ARE BUSY WITH AT THE MOMENT OR HAVE JUST COMPLETED – AND PLEASE ANSWER THE FOLLOWING QUESTIONS

15. What is/was the topic of the assignment? _____

16. What type of assignment do/did you engage in?

	Item	Tick as appropriate
A.	Individual assignment	
B.	Group/Paired assignment	

21. In looking for the sources you need(ed) for your assignment what search tools have you used?

	Item	Tick as appropriate
A.	Reading list provided by lecturer or in assignment hand-out	
B.	Library catalogue (OPAC)	
C.	Online bibliographic & full text databases to find journal articles	
D.	Google or another search engine	
E.	Google Scholar	
F.	Wikipedia	
G.	Classmates and friends	
H.	Other? Please specify	

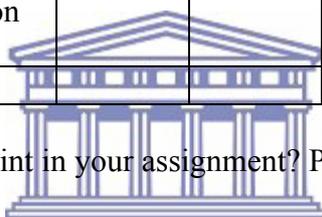
22. Which of the following information resources have you used so far in the assignment?

	Item	Tick as many as applicable
A.	Course notes (print or electronic)	
B.	Notes given in course (shortlists etc)	
C.	Print textbooks	
D.	e-Books	
E.	Personal interaction with lecturer or tutor (face to face or by email/sms)	
F.	Personal interaction with librarian (face to face or by email/sms)	
G.	Technical reports	
H.	Theses and dissertations	
I.	Newspaper articles	
J.	Journal articles	
K.	Government web sites	
L.	Web pages	
M.	Wikipedia articles	
N.	Online discussion groups (listservs, chat rooms)	
O.	Blogs	
P.	Facebook postings	
Q.	Other social media (e.g.)	
R.	Other? Please specify	

23. How do you choose your information sources? Please rate the following criteria in order of importance:

	Item	Order of importance				
		Not Important				Very Important
		1	2	3	4	5
A.	Easy to find					
B.	Easy to understand					
C.	Relevant to the topic					
D.	Content has been peer-reviewed (assessed by experts before publication)					
E.	In-depth coverage					
F.	Trustworthy and credible authorship					
G.	Personal recommendation by lecturer or tutor					
H.	Personal recommendation by librarian					
I.	Recently published					

24. How do you feel at this point in your assignment? Please respond to the following statements



	Item	Scale				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
A.	I am clear on the assignment topic and the type of information I need					
B.	I have done enough background reading to be clear on the significance of my topic					
C.	I do not understand the scope of the topic and what is expected of me					
D.	I feel overwhelmed and unable to deepen my focus					
E.	I am unable to engage with and analyse the information and their sources					
F.	I am unable to synthesize information from various sources					
G.	I am not satisfied after the completion of my assignment					

SECTION D: EVERYDAY LIFE INFORMATION SEEKING

25. Have you had an occasion to look for information to solve a personal problem in the following areas in the last month?

	Item	Tick as appropriate
A.	Study related issue	
B.	Legal issue	
C.	Sports/hobby	
D.	Entertainment or leisure	
E.	Accommodation	
F.	Travel / Transport	
G.	Health	
H.	Crime	
I.	Sexual abuse	
J.	Relationship issue	
K.	Money issue	
L.	Career	
M.	Family	
N.	Other? Please specify	
O.	Name the source you used	

26. Where did you look for the information you needed?

	Item	Tick as many as appropriate
A.	Personal interaction with a professional	
B.	Email a friend or someone you trust	
C.	Personal interaction with librarian (face to face or by email/sms)	
D.	Library books	
E.	Books in your own collection	
F.	Newspaper articles	
G.	Journal articles	
H.	Government web sites	
I.	NGO web sites	
J.	University web site	
K.	Google or other search engine	
L.	Wikipedia	
M.	Online discussion groups (listservs, chat rooms)	
N.	Blogs	
O.	Facebook postings	
P.	Other social media (e.g.)	

27. Did you find the information you needed?

	Item	Tick as appropriate
A.	Yes	
B.	No	
C.	Some but I am still looking for more	

SECTION E: INFORMATION BEHAVIOUR ON WEB 2.0

28. Which of the following social media platforms do you use and for what purpose?

	Online channel/Source	Purpose	
		Academic purpose	Entertainment and socializing
A.	Social networking (e.g. Facebook, twitter)		
B.	Video sharing sites (e.g. YouTube)		
C.	Photo sharing sites (e.g. flickr)		
D.	Blogs (Weblog, moblog and diaries)		
E.	Online discussion forums eg. yahoo group, Google circles		
F.	Emails		
G.	Virtual worlds (e.g. Second life, Sims)		
H.	Wikis (e.g. Wikipedia)		
I.	Social bookmarking tools (e.g. Delicious)		
J.	Slide sharing sites (e.g. SlideShare)		
K.	Other(s)? specify		

29. Are any of the Web 2.0 tools and platforms mentioned above in Question 28 incorporated in your learning by your lecturers?

A.	Yes	
B.	No	
C.	If yes, please specify	

30. Do you use any of the aforementioned sources in Question 28 to do any of the following?

	Item	Tick as appropriate
A.	To create blogs	
B.	To add audio clips to blogs, facebook entries, Youtube	
C.	To add video clips to blogs, facebook entries, Youtube	
D.	To make entries	

Would you be willing to take part in the next phase of the study?

If so please give your email address so I might contact you.

Name: _____

Email address

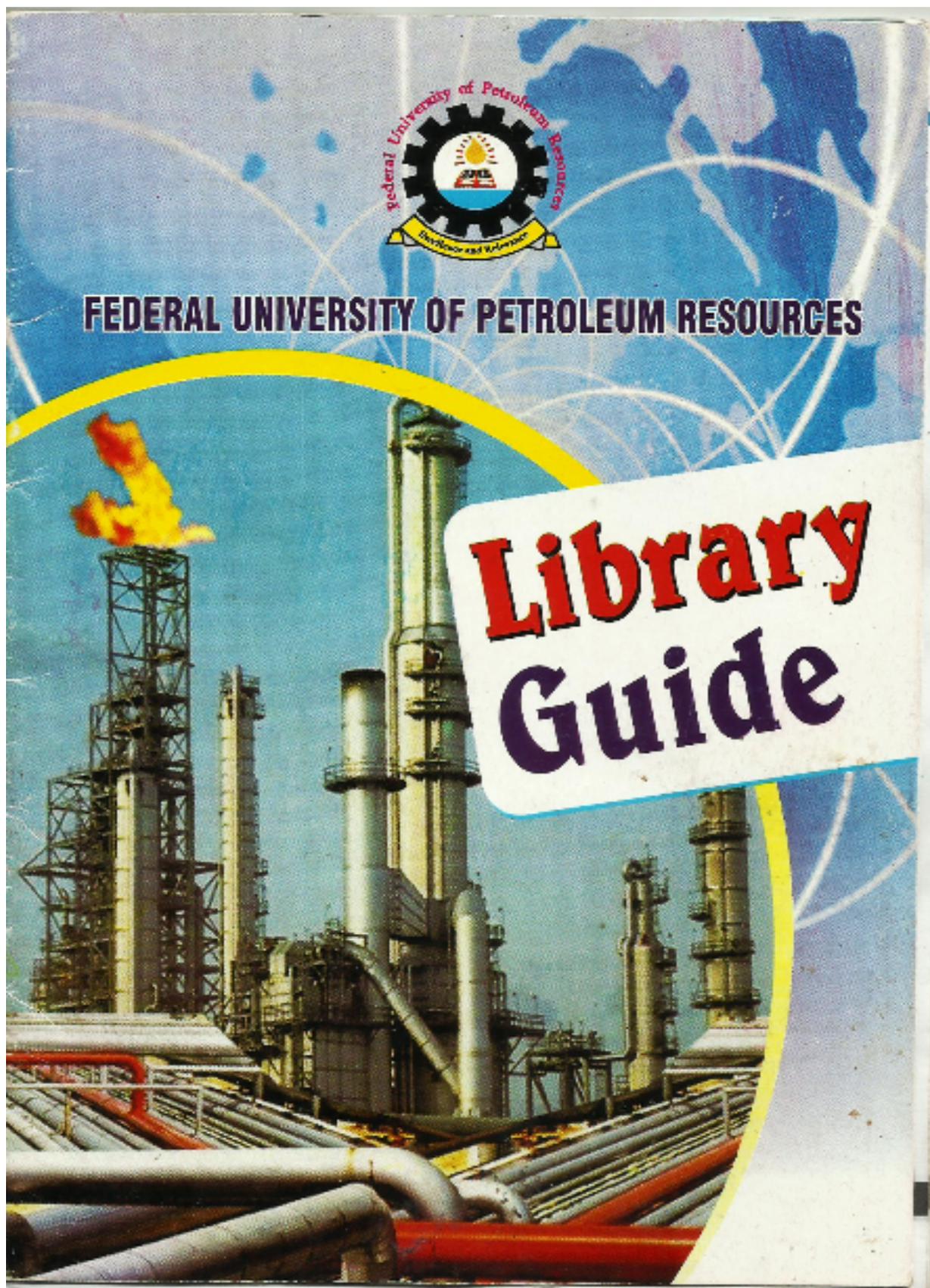
Telephone

number _____

I assure you that this will not affect the confidentiality of your answers .
Thank you very much for your valuable comments /suggestions and time.

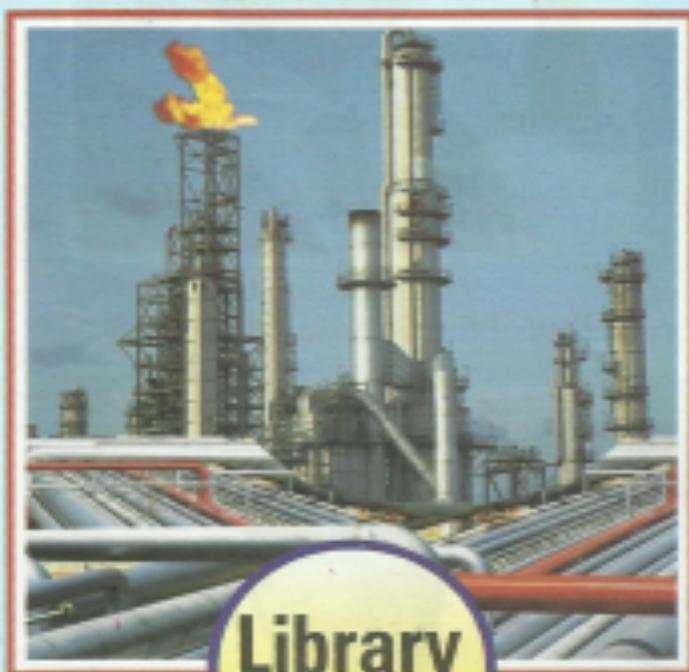


Appendix 6: Library Guide





**FEDERAL UNIVERSITY OF PETROLEUM RESOURCES
EFFURUN**



**Library
Guide**

*First Published 2014.
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All enquiries should be directed to:
The Librarian,
Federal University of Petroleum Resources, Effurun, Nigeria.
GSM: +234 (0) 8033828062*

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Questions to Reflect on

- Do you know what your University Library is to you?
- Do you know that a library is to an information seeker what the hospital is to a sick person?
- Have you ever thought of the fact that it is easier for a camel to go through the eye of a needle than for an undergraduate to pass out of the University without adequate use of the library.

Do not hesitate to ask for help when the need arises as there will always be a trained member of staff to assist you.

Please enjoy the services of the University library. Happy Reading...

BRIEF HISTORY OF FUPRE LIBRARY

The Federal University of Petroleum Resources, Effurun (FUPRE) Delta State, Nigeria was established in March 2007, under a Federal Government of Nigeria initiative. It is aimed at building a specialized University to produce a unique high level manpower and relevant expertise for oil and gas sector in Nigeria and worldwide.

The groundwork for the commencement of the University Library started with the assumption of duty by a Principal Librarian, Mr. Mathew I. Okoh on September 6th, 2010. However, the library became operational in October 2011 after the recruitment of staff. At the time of opening to users, the library had in stock the following titles: books – 3000, Journals – 85 and a database of over 2000 electronic Journal articles in Oil and Gas, General sciences, Engineering, ICT and Earth Science.

Presently the library serves its constituents colleges of Science and that of Technology. An e-library with functional internet facilities that provides access to varieties of educational materials is in place.

VISION STATEMENT

To become world class center of excellence in support of teaching, learning, research, consulting and extension services.

BROAD GOALS AND OBJECTIVES OF THE LIBRARY

- Develop collections of sufficient quality, size and diversity to support learning, teaching and research requirements of the University.
- Position the library to serve as gateway for coherent and easy access to major national and international information and research resources through a variety of communications media.
- Create and disseminate scholarly information and information resources that reflects the strength of the University.
- Create a library environment that induces, encourages and facilitates research and learning.
- Create an online catalogue of the library collection and link catalogue searching to a document delivery service.
- Keep up-to-date and abreast of new knowledge, technological breakthroughs and scientific discoveries and make them available and accessible to users in a variety of formats.
- Create a library without walls.
- Develop core collections relevant to the needs of the University and immediate cultural environment.

- Co-operate with other Universities and research libraries, nationally and internationally, with a view to providing academic and research materials that will be at the disposal of all students, academic and non-academic staff.
- Computerize the library processes and get fully connected to the internet in order to enjoy and take advantage of the global library services of networking and resource sharing.
- Encourage the collation, documentation, preservation and dissemination of local research findings.

12 Vision Statement

Reference collection: These are books and special materials that serve as guide to specific information, and cannot be borrowed. They include Dictionaries, Encyclopaedia, Handbooks, Maps, Atlases, etc.

Reserve Collection: These are books that are in heavy demand by users or that are rare prints; they are shelved in the circulation and are made available to users.

Serials collection: These consist of a wide range of journal titles as well as a collection of Newspapers, Magazines. Current issues of these materials are arranged on display stand.

E-Resources: The electronic resources available in the library section of the library include:

- CD-ROM: Information in various disciplines are stored in CD-ROMs. Some of them were acquired with accompanying texts while others came independently.

OPENING HOURS

DURING SESSION

Mon – Friday	8:00am – 6:00pm
Saturdays	9:00am – 2:00pm

SEMESTER BREAK & LONG VACATION

Monday – Friday	8:00am – 4:00pm
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LIBRARY HOLDINGS

There are various types of materials in the University library which include:

- Open access collection.
- Reference collection.
- Reserve collection.
- Serials collection.
- E-Resources.

Open Access Collection: These form the bulk of the library holdings and consist of textbooks which are arranged in the open shelves. Users are allowed to borrow a limited number of them as stipulated in the borrowing rights and privileges.

Reference collection: This refers to those books and special materials that serve as guide to specific information, and cannot be borrowed. They include Dictionaries, Encyclopedia, Handbooks, Maps, Atlases, etc.

Reserve Collection: These are books that are in heavy demand by users or that are rare prints; they are shelved in the circulation and are made available to users.

Serials collection: These consist of a wide range of journal titles as well as a collection of Newspapers, Magazines. Current issues of these materials are arranged on display stand.

E-Resources: The electronic resources available in the e-library section of the library include:

- CD-ROM: information in various disciplines are stored in CD-ROMs. Some of them were acquired with accompanying texts while others came independently.

- Database of over 2000 electronic journal articles in various core areas.
- Access to NUC Virtual library.
- FUPRE e-resources.

Access Points

Access points are indicators to where library materials can be located within the library. The access points are: Computer terminals, List of holdings, and Enquiry desk.

LIBRARY SERVICES

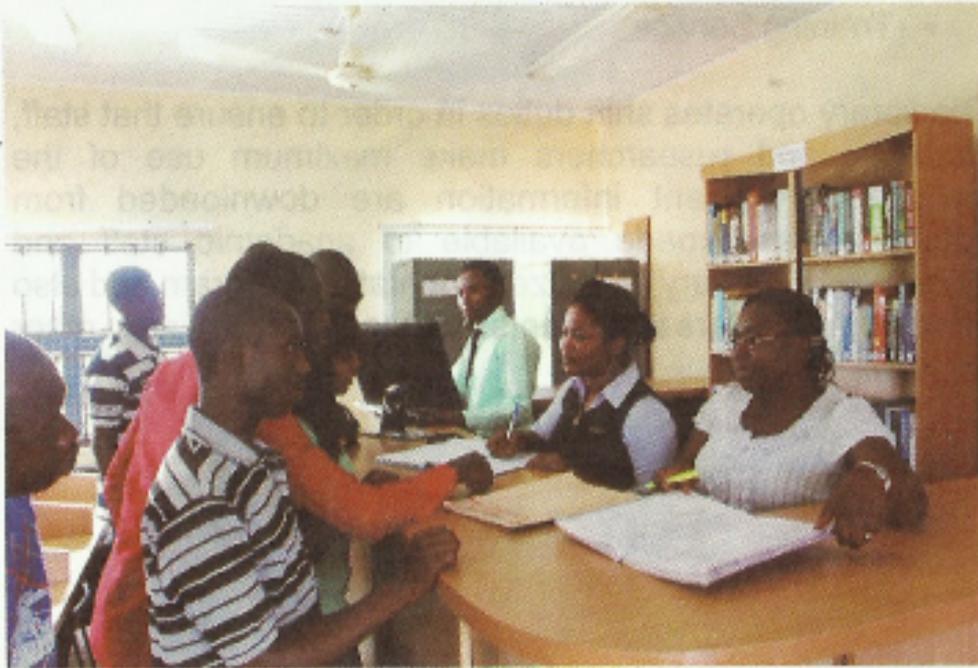
FUPRE library is the hub of academic activities of the institution. Students, staff and researchers make use of the library for learning, teaching, research and development. The services of the library include:

- Loan Service.
- Reference Service.
- Inter-Library Loan Service.
- E-Library Service.
- Current awareness service.
- Training Service

The library operates shift duties in order to ensure that staff, students, and researchers make maximum use of the materials. Relevant information are downloaded from databases and made available to academic staff and students. The library organizes orientation program and also gives referral letters to students for research activities to other libraries.

CIRCULATION DESK

This section is involved in registration of Library users, loaning/returning and shelving of library materials. Other functions performed by the circulation desk staff include; checking in materials returned, monitoring damaged materials and routing them to the appropriate staff for repair or replacement and collecting statistics on Library use etc.



Cross section of students at the circulation desk being attended to by library staff

REFERENCE DESK

Reference renders assistance to library users in the area of meeting enquiries and other research endeavors. It also includes formal and informal instruction in information skills and assistance in the use of reference sources.



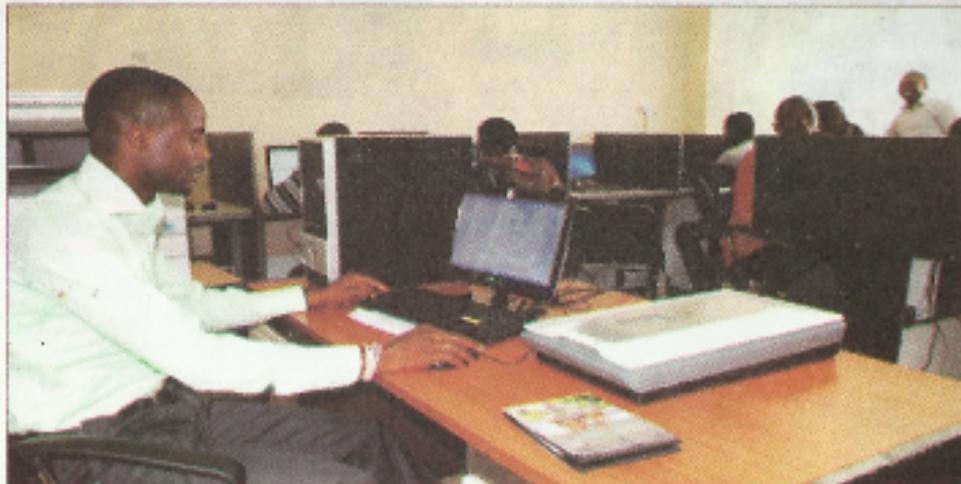
Cross section of students at the Reference desk being attended to by library staff

E-LIBRARY

The e-library provides internet services to users. It houses e-resources including some databases, which can be accessed and downloaded by staff and students. The FUPRE e-resources and NUC virtual Library can also be accessed in the e-library.



Cross section of students in the E-library



Picture showing staff and students in the E-library surfing the Net

ORGANIZATION OF LIBRARY MATERIALS

The books in the library are arranged by subjects using the library of Congress Classification Scheme (LC). The general outline of the scheme is given here for guidance.

- A - General works, Encyclopedia etc.
- B - Philosophy, Psychology Religion
- C - Auxiliary Science of History
- D - History, General & old world
- E & F - American History
- G - Geography, Anthropology Recreation
- H - Social Sciences
- J - Political Science
- K - Law
- L - Education
- M - Music
- N - Fine Arts
- P - Language and Literature
- Q - Science
- R - Medicine
- S - Agriculture
- T - Technology/Engineering
- U - Military Science
- V - Naval Science
- Z - Bibliography & Library Science.

LIBRARY REGULATIONS

The following are eligible users of the library:

- Council members and their immediate families.
- Senior members of staff of the University.
- Students of the University.
- Junior staff of the University.
- Members of the local community: professionals, students etc. from other Universities authorized by the University Librarian.

BORROWING RIGHTS AND PRIVILEGES

- Council members, academic staff and other senior members of staff have maximum number of 4 books each at any one time for a period of one (1) month.
- Students of the University have maximum of 2 books each at any one time for a period of two (2) weeks.
- Junior members of staff have maximum number of 2 books each at any one time for a period of two (2) weeks.
- Immediate families of council and senior members of staff may be granted borrowing privileges by the University librarian. Their privileges will not normally exceed those of undergraduates.
- The University Librarian may grant members of the local community borrowing privileges.
- Overnight loans are issued during the last hour before closing time. Users may borrow Journal issues not more than two (2) which must be returned by 10:00am the

following working day.

- Library materials can be placed on reserve at the instance of heads of Departments, academic staff and even Students.
- Books borrowed must be returned immediately, when on recall.
- A Loan may-be renewed on application for one further period as long as no other users request for the material
- Academic/teaching staff with special reasons are requested to state clearly the length of loan required if they desire to use the materials for a longer period.
- Required items not held by the library can be obtained for readers in another Library.



Cross section of students in the reading hall

LIBRARY DECORUM

- Users are expected to behave in a considerate manner and not to distract others attention by talking loudly or by disturbing.
- Smoking, drinking and eating are not permitted in the library.
- Umbrellas, briefcases and bags are not supposed to be brought into the library. However, where they are brought, they may be placed at the owner's risk in the students locker area.
- Users are not allowed to sleep in the library.
- The use of handsets/mobile phones are prohibited in the library.
- Reservation/colonization of seats is not allowed in the library.
- Children are not normally allowed in the library.
- Fighting and quarreling in the library attracts stiff penalties.
- Reading tables and chairs must not be moved from their positions.
- Indiscriminate pulling down of books in the library is not allowed.
- Users are prohibited from writing on the tables.
- It is an offence to deface/mutilate any library material.

LIBRARY GUIDE

Printed by ameha jamak Press 0703139999

<http://repository.uwc.ac.za>

Appendix 7: The FUPRE Course Synopses for General studies and Entrepreneurship program

Federal University of Petroleum Resources, Effurun, Nigeria: Course Synopses: Page 2 of 140

GENERAL STUDIES AND ENTREPRENEURSHIP PROGRAMME

PHILOSOPHY, AIMS AND OBJECTIVES

The aim of the General Studies and Entrepreneurship Programme is to expose students to a course of liberal education through which they can develop and expand their awareness of their social, cultural and natural environments. The goal is to produce well rounded graduates that are intellectually sound, competent in the use of English Language and equipped with entrepreneurial skills to contribute maximally to societal development in an environment of peace and social cohesion.

The objectives of the programme include:

- Acquisition of a body of situational relevant knowledge outside of the respective field of specialization of the students for productive, healthy living and promotion of peaceful coexistence.
- Development of competence in the use of English Language as a tool for their studies and effective means of communication in the society and in their future employment/enterprise.
- Prepare students for a post university life with opportunities for job competencies and entrepreneurial skills.

COURSE STRUCTURE

Course Code	Course Title	Credit (units)	Semester	Status
GSE 101	Communication in English	3		C
GSE 102	African Culture and Civilization	3		C
GSE 103	Government, the Society and the Economy	3		C
GSE 104	Use of Library and Study Skills	3		C
GSE 105	Basic Communication in French	2		C
GSE 201	Philosophy and Logic	3		C
GSE 202	Peace and Conflict Resolution	3		C
GSE 301	Introduction to Entrepreneurship	3		C
GSE 302	Contemporary Health Issues	3		C

COURSE DESCRIPTIONS

- 1. GSE 101: Communication in English** 3 units
 Effective communication in English. Language skills in listening, speaking, reading and writing. Aspects of sound patterns in English, units of grammar, types and functions of clauses, composition, types and functions of paragraph, punctuation marks, direct and indirect reported speech. Voice: active and passive, tense, concord/agreement, interpretation. Exercises in reading comprehension, writing and listening. Phonetics, art of public speaking and oral communication, figures of speech. Research skills, writing of term papers and research papers.
- 2. GSE 102: African Culture and Civilization** 3 units
 The individual, society, environment, language, ethnicity, race and culture; dynamics of culture change with reference to cultural and social history vis-à-vis archaeological studies; African cultural heritage and progress from the earliest times to the present with specific mention of features such as farming, metallurgy, trade, urban and rural life. Rural and urban life in Nigeria with emphasis on the socio-cultural and ecological factors predisposing to the rural urban dichotomy, family, economics, politics and belief systems.

3. GSE 103: Government, the Society and the Economy

3 units

Concepts and scope of psychology; concepts of society and the typologies of society, politics and government, structure, nature and characteristics of government, tiers of government; concepts of economics, types of economies, fundamentals and problems of economies. Concepts of development, characteristics of developed and developing economies; growth and development in the Nigerian economy since independence. Man and the environment; uses of human and natural resources.



4. GSE 104: Use of Library and Study Skills

3 units

History of libraries, library and education, university libraries and other types of libraries; study skills (reference services), types of library materials, using library resources including e-learning, e-materials etc; understanding library catalogues and classification; copyrights and its implications, database resources, bibliographic citations and referencing.

5. GSE 105. Basic Communication in French

2 units

Introduction to French; alphabets and numeracy for written and oral communication in French; conjugation and simple sentence construction based on communication approach, comprehension and reading of simple texts.

6. GSE 201. Philosophy and Logic

3 units

Introduction to the nature of philosophy; its scope, problems and key concepts. The nature and scope of logic. Laws of thought as aids to rational inquiry and their role in the formation of arguments. The role of symbols in logic. Kinds of logical statements. Kinds of logical equivalence and conditional statements and their definition in symbolic logic. The rules of inference and their application in the evaluation of deductive arguments.

7. GSE 202: Peace and Conflict Resolution

3 units

Basic concepts in peace studies and conflict resolution. Peace as vehicle of unity and development. Conflict issues, types of conflicts, causes of conflicts and violence in Africa, the indigene/settler phenomenon, peace building, conflict management, peace mediation and peace keeping, alternative dispute resolution, dialogue/arbitration in conflict resolution, role of international organizations such as ECOWAS, African Union and United Nations in peace keeping and conflict resolution.

8. GSE 301: Introduction to Entrepreneurship

3 units

Introduction to entrepreneurship and new venture creation; theory and practice of entrepreneurship; the opportunity, forms of business; staffing, marketing and the new venture; determining capital requirements, raising capital; financial planning and management. Starting a new business, feasibility studies; innovation; legal issues; insurance and environmental considerations. Possible business opportunities in Nigeria; case studies.

9. GSE 302: Contemporary Health Issues

3 units

Diet, exercise and health. Basic information on nutritional deficiency diseases, malaria and other parasitic infections, hypertension, diabetes, heart, kidney and liver diseases, and sexually transmitted diseases. Basic information on HIV/AIDS: history, epidemiology, impact, transmission and predisposing factors, prevention and management.

Appendix 8: the Use of library and study skills (GSE 104) course outline

FEDERAL UNIVERSITY OF PETROLEUM RESOURCES, EFFURUN (FUPRE)

USE OF LIBRARY AND STUDY SKILLS (GEDS 104)

COURSE OUTLINE

PURPOSE: This course was designed to introduce students to the functions and resources of a library. Emphasis will be on library organization, procedures, services, fundamentals of classification and cataloguing, automation, referencing, basic reference materials study skills and general print and non-print materials.

GOAL: To provide students with knowledge and skills in order to intelligently and competently use library facilities, tools and resources.

OBJECTIVES OF THE COURSE

This course will achieve the following:

1. Acquaint students with the parts of a book and the different types of libraries including the use of media materials;
2. Provides basic guidance on referencing of books, journal articles and electronic documents (web pages, online journal articles etc.) used for assignment or research;
3. Assist students understand the purpose of the University library, the kind of materials it acquires and their physical arrangement and organization;
4. Enable students to have a general idea of classification systems used in libraries;
5. Help students to know or have knowledge of how to select books in their subject areas as well as enhance their spiritual growth;
6. Enable students know how to use the Online Public Access Catalogue (OPAC) and have ability to search for information beyond the catalog e.g. internet searching; and
7. Familiarizing students with major reference books both general and specialized and to educate them how to improve their study skills.

RECOMMENDED TEXT

(These textbooks are available in the library)
Odiase, J.O.U., Unegbu, V.E., and Haliso, Y.L. (2001). Introduction to the Use of Library Information Sources.

Unegbu, V. E. (2013). How to Study.

Oyinloye, J.M.A. (2012). Study Skills and Entrepreneurship Development. Ola Jesu Printers. Omu-Aran.

SUPPLEMENTARY

1. Edoka, B. E. Introduction to Library Science
2. Gate, J. K.: Guide to the Use of Libraries and Information Sources 5th ed.
3. Olantokun: Understanding the Library : A Handbook on Library use.

TEACHING METHOD

Lectures, individual or group assignment, class presentations and discussions based on topic for the day. Students are responsible for reading ahead of the class and be prepared to discuss.

TEST/EXAMINATION

There will be continuous assessment test and final examination. The final examination will contain simple and German objective questions.

ATTENDANCE

Attendance is mandatory. Students are expected to attend classes regularly and promptly. Exceptions in class attendance can be made for illnesses or valid emergencies with evidence. Ethical and honest behavior is expected of students

GRADING

The final grade will be based on the *fulfillment* of the class requirements valued as stated below.

- | | |
|--------------------------|-----|
| 1. Attendance | 5% |
| 2. Continuous assessment | 25% |
| 3. Final Exam | 70% |

Daily Class Schedule: this class schedule is subject to adjustment.

Date	Topics
Week 1	Introduction History of libraries
Week 2	<ul style="list-style-type: none">• Types of Library with emphasis on academic library• Sections of the library
Week 3	Introduction to cataloguing and classification Introduction to Library Catalogue
Week 4	Parts of a book
Week 5	Organization of library information resources with emphasis on how to locate materials
Week 6	Introduction to Library information resources (book, journal, CD ROMs)
Week 7	How to study
Week 8	Introduction to Electronic resources and Databases
Week 9	<ul style="list-style-type: none">• Introduction to Bibliographic citation and Referencing (e.g. APA, Chicago referencing styles etc.)• Copyright issues• Plagiarism
Week 10	Library automation, Software and Module (use of OPAC with emphasis on automated library)
Week 11	Revision and Continuous assessment test
Week 12	Free week
Week 13	Final Examination

Appendix 9: Information Literacy assessment rubric for assignments

Information literacy standard	Criteria	Scale			
		Not acceptable	Needs improvement	Good	Excellent
ACRL Standard 2: The information literate student accesses needed information effectively and efficiently.	Knowledge of different information resources and formats, their purpose and audience, (e.g., popular, scholarly)	Use of only non-authoritative sources such as www.answers.com , ehow.com , and Wikipedia	Use of print textbooks or eBooks and non-authoritative sources such as www.answers.com , ehow.com , and Wikipedia	Use of a few scholarly sources such as scientific/technical reports, journal articles and other peer-reviewed research works	Use of several scholarly sources such as scientific/technical reports, journal articles and other peer-reviewed research works
ACRL Standard 3: The information literate student evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system.	Selection and synthesis of information to construct new meaning	Incoherent discussion of concepts and poor synthesis of selected information	Analysis of concepts and incorporation of selected information without necessarily putting it into personal knowledge base	Some critical analysis of concepts and partial incorporation of selected information into personal knowledge base	Critical analysis of concepts and incorporation of selected information into personal knowledge base
Standard 4: The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose.	Organisation of content in a manner that supports the format of assignment. For example in the case of research report: abstract, introduction, literature review, methodology, presentation and discussion of results, recommendations and conclusion	Order of assignment completely different from the expected format of assignment, is, wrongly ordered	Several errors in the order of the component of the assignment	Minor error in the order of the component of the assignment	Follows the format of the final outcome of assignment
ACRL Standard 5: The information literate student understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.	Acknowledging the use of information sources, and proper referencing In-text citation and proper referencing	No references No in-text citations	Several referencing errors, such as missing components and wrong punctuations Cites few sources in references list or cites some sources in-text but not in the reference list	A few referencing errors Cites several sources in references list	Almost no referencing errors Cites all sources in the reference list

Appendix 10: Open-ended interview for lecturers



INFORMATION BEHAVIOUR OF NIGERIAN UNDERGRADUATES IN THE WORLD OF WEB 2.0: THE CASE OF FEDERAL UNIVERSITY OF PETROLUEM RESOURCES, DELTA STATE, NIGERIA, A SPECIALIZED UNIVERSITY

OPEN-ENDED INTERVIEW FOR LECTURERS

1. What Department are you?
2. What is your position as a Lecturer?
3. When you give your students any assignment, do you tell them where they should search for information?

If yes, which source(s) do you refer them to?

4. To what extent are your students able to seek the needed information for academic purposes?
5. To what extent are they able to synthesize information gathered and apply them in solving academic tasks?
6. When you give your students assignment, do you insist that they go online to browse for materials?
7. In attending to their assignment, do they take into cognizance the ethical issues concerning the use of information? For example, citing and acknowledging sources correctly.
8. Are students able to generate their own meaning through interactions during the course of your Lecture, or you typically teach/lecture them and give them sources for further reading? Kindly explain.
9. Are you aware of the concept, “information literacy”?

If yes, are your students information literate?

10. Do you employ Web 2.0 tools such as social networking (facebook, twitter), blogs (weblog, moblog, dairies), online discussion forum (yahoo groups, google circles), and wikis (eg Wikipedia) in the teaching and learning processes?

If yes, please specify.

Are they helpful in teaching and learning?

If no, kindly give your reason(s).

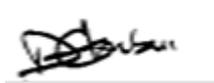
11. Do you consider Wikipedia a credible source for teaching and learning?

12. Do you communicate with your students via email or through any of the aforementioned social networking sites?

If yes, please specify.

If no, kindly give your reason(s)

Thank you for your time



Dorcas Krubu; dkrubu@gmail.com; 07036360662

Appendix 11: Instructions for Basic Petroleum Geology Assignment

GENERAL INSTRUCTIONS

There are three categories for this assignment. Two or three groups will be assigned to each category, but will each prepare report(s) as assigned to the category. Similar materials will be assigned to the groups within each category; however the reports will be prepared independently by each group.

ANY TWO GROUPS WITHIN A CATEGORY THAT PRESENT THE EXACT SAME REPORT(S) WILL HAVE ALL ITS MEMBERS SEVERELY PENALIZED.

To prevent having similar reports, each group is advised to source for other materials to improve on its reports. All materials are gotten from Basic Petroleum Geology by Peter Link.

All members of the group are advised to participate in this exercise. A separate document stating the contributions of each group member will be prepared. Each group will submit a report and the “contributions” document. There will be a presentation of the report. The group will select members that will discuss the findings of the report. These members are expected to highlight the major findings in their work (especially the relevance of what has been researched to the Petroleum Industry and the Engineering Profession) during their presentation.

There will be minimum of two (2) presenters per group, and each group will be allowed ONLY TEN (10) MINUTES to present the group report. The soft copies of the materials have been given to the Course Representative. Therefore, all groups should collect both hard and soft copies from him.

ALL REPORTS (BOTH HARD AND SOFT COPIES) ARE DUE ON FRIDAY 30TH MAY, 2014.

Outlined below are the categories and what is expected.

1. Earth Structure; Depositional Basins; Post Depositional Processes

The materials for this category include:

- _ Chapter 1 (Earth Structure),
- _ Chapter 6 (Depositional Basins), and
- _ Chapter 8 (Post Depositional Processes).

Each group in this category will prepare **three (3) reports**, each report on each of these chapters. Chapter 1 will not be more than 12 pages, Chapter 6 not more than 10 pages, and Chapter 8 not more than 5 pages. **IF ANY OF THESE REPORTS REQUIRE MORE THAN THE MAXIMUM NUMBER OF PAGES STATED (depending on information from other sources except the materials given), THE LECTURER SHOULD BE CONTACTED FIRST!**

Culled diagrams (figures and tables) and equations if any, are **MANDATORY**. The usefulness of each subject matter, both in the Petroleum Industry and the Engineering Profession, should be stated. The group members who are to present the findings for the

group should highlight important parts of the work and how the information gathered can be used in the real world.

2. Rocks; Geological Considerations and Engineering Practices

The materials for this category include:

- _ Chapter 3 (Rocks), and
- _ Chapter 12 (Geological Considerations and Engineering Practices).

Each group in this category will prepare **two (2) reports**, each report on each of these chapters. Chapter 3 will not be more than 12 pages, Chapter 12 not more than 20 pages. IF ANY OF THESE REPORTS REQUIRE MORE THAN THE MAXIMUM NUMBER OF PAGES STATED (depending on information from other sources except the materials given), THE LECTURER SHOULD BE CONTACTED FIRST! Culled diagrams (figures and tables) and equations if any, are MANDATORY. The usefulness of each subject matter, both in the Petroleum Industry and the Engineering Profession, should be stated. The group members who are to present the findings for the group should highlight important parts of the work and how the information gathered can be used in the real world.

3. Petroleum Traps

The materials for this category include:

- _ Chapter 10 (Petroleum Traps).

Each group in this category will prepare **one (1) report**. The report should not be more than 30 pages. IF ANY OF THESE REPORTS REQUIRE MORE THAN THE MAXIMUM NUMBER OF PAGES STATED (depending on information from other sources except the materials given), THE LECTURER SHOULD BE CONTACTED FIRST! Culled diagrams (figures and tables) and equations if any, are MANDATORY. The usefulness of each subject matter, both in the Petroleum Industry and the Engineering Profession, should be stated. The group members who are to present the findings for the group should highlight important parts of the work and how the information gathered can be used in the real world.

GROUPS AND THEIR CATEGORIES

- GROUP “A” = Earth Structure; Depositional Basins; Post Depositional Processes
- GROUP “B” = Petroleum Traps
- GROUP “C” = Earth Structure; Depositional Basins; Post Depositional Processes
- GROUP “D” = Rocks, Geological Considerations and Engineering Practices
- GROUP “E” = Petroleum Traps
- GROUP “F” = Earth Structure; Depositional Basins; Post Depositional Processes
- GROUP “G” = Rocks, Geological Considerations and Engineering Practices

FORMAT FOR THE REPORT

The report will be typed using a *font size of 12, line spacing of 1.5*, and margin setting of *Left = 0.9in, Right = 0.8in, Top = 0.8in and Bottom = 0.8in*. The only fonts that are allowed for the report are *Calisto MT, Times New Roman and Calibri*. Diagrams (figures or tables) can be culled (copied) from any source, but the source of the diagram must be stated under the diagram.

The minimum number of pages for the reports is half the maximum number of pages. In the case of “Post Depositional Processes”, the minimum number of pages required is three (3).

The maximum number of pages, as stated under each category, does not include references, which should be part of the report.

The report should be divided into *Introduction*, *Objective*, *Body of the Report* and *Conclusion*. For each item discussed in the report (NOTE that all items in the materials given MUST be discussed), there must be a conclusion at the end. This conclusion discusses the relevance of the item discussed in the Petroleum Industry and the Engineering profession at large. For instance, if Depositional Basins are discussed, how do these, or the knowledge thereof, affect the Petroleum Industry. Also, what kind of depositional basins can be found in the Niger Delta, and why?

Below is the format for Referencing

_ Ezekwe N., Smith S., Wilson M., Humphrey M. and Murphy J., *Performance of Peripheral Waterflood Project in the Main Body 'B' Reservoirs (Stevens) at the Elk Hills Oil Field, California*, SPE 21759, 1991.

_ Ezekwe N., *Petroleum Reservoir Engineering Practice*, Prentice Hall, 2010 pp 728 – 741.



Appendix 12: Request for permission

Department of Library and Information Science
University of the Western Cape
Bellville 7535, South Africa
October 15, 2012

The Registrar,
Federal University of Petroleum Resources
PMB 1221, Effurun
Delta State, Nigeria

Dear Madam,
Request for Permission to Carry Out PhD Research Work on the Information Behaviour of Nigerian Undergraduates in the World of Web 2.0 at FUPRE

I am a Lecturer in Ambrose Alli University, Edo State and currently a year-1 PhD candidate in the Department of Library and Information Science, University of the Western Cape, South Africa. I humbly write to seek permission to use the Federal University of Petroleum Resources (FUPRE), Effurun, as my proposed PhD research case site.

My proposed PhD research project is on the information behaviour of Nigerian undergraduates in the world of Web 2.0, namely, the interactive World Wide Web which has radically transformed the mode of teaching, learning and even recreation. My interest on the topic stemmed from anecdotal evidence of information handling skills of undergraduates based on classroom experience both in China and Nigeria.

In order to explicate the information behaviour of Nigerian undergraduates, I have chosen to use FUPRE because it is the only specialised university of its kind in Nigeria and Africa; besides, FUPRE occupies a unique position in the provision of human resources to the petroleum industry which is the largest industry in Nigeria in terms of the generation of Gross Domestic Product (GDP).

The proposed research will be in three phases in 2013:

Phase 1-Quantitative survey of 100 and 300 level students in Colleges of Science and Technology
Phase 11-Interviews with staff of Library, ICT unit and lecturers.
Phase 111- Focus group discussions with students and journaling on social media.

As part of the requirement for the submission of my PhD proposal to the Faculty Board and Senate Higher Degrees Committee, I need your consent to carry out the research and a letter of consent/approval which I am expected to submit along with my proposal before the 26th of October, 2012.

If granted permission to use FUPRE as my PhD case site, I will report my findings to the university and as well donate a copy of my thesis to the university Library.

Yours sincerely,



Dorcas E. Krubu
PhD Candidate
University of the Western Cape, Belleville, South Africa
Student Number: 3206754; **Email:** 3206754@uwc.ac.za; dkrubu@gmail.com

Appendix 13: Approval Letter

**FEDERAL UNIVERSITY OF PETROLEUM RESOURCES
EFFURUN, NIGERIA.**



Office of the Registrar

Ag. Registrar: **Chief (Mrs.) R. A. Egborge**
B. Sc. (Hons.), M.P.Sc. (Ibadan), MNIM, KSP

Mobile: 08023401229
E-mail: egborgerosalyn@yahoo.co.uk

FUPRE/REG/EST/Vol. 1/001 31 October, 2012

Dorcas E. Krubu,
Department of Library & Information Science,
University of the Western Cape,
Belleville 7535,
South Africa.

Dear Krubu,

Re: REQUEST FOR PERMISSION TO CARRY OUT PHD RESEARCH WORK IN
THE UNIVERSITY

I write to convey the Acting Registrar's approval for you to avail yourself with the facilities of the Federal University of Petroleum Resources, Effurun for your research work.

Please feel free to approach any Department, Division or Unit of the University for enquires where deem relevant for the proposed work

Please accept my warm regards.


Duke Anoenmah
Deputy Registrar (P)
For: Ag. Registrar

Appendix 14: Assignment questions/topics/themes (Question 15 of Survey)

Serial No.	Assignment questions/topics/themes	Number of students
1	Autocad design and machine engine mini project	26
2	Chemical engineering and thermodynamics calculations	4
3	Chemical reaction engineering and transport phenomenon	3
4	Constant pressure and volume pressure in adiabatic system	6
6	Discuss the 8-units operations in the petroleum industry	23
7	Discuss the difference between pollution and contamination	11
8	Discuss the history of the earth using Nebula Hypothesis	79
9	Discuss the PVT properties of Gas	18
10	Discuss the recycling of biodegradable waste and its economic importance.	3
11	Discuss the role of information in science and technology	41
12	Discuss the role of religious activities and its origin with respect to science in the world today.	37
13	Discuss the structure, function and mechanism of a motor wiper	16
14	Discuss water as fuel	21
15	Explain drainage and inhibition	6
16	Gas mixtures and crude oil systems	13
17	Homogenous reactions	6
18	Hybridization and molecular structure	18
19	Prove Lagrange's theorem	18
20	Provide information on transistor-transistor logic (TTL)	18
21	Simulate an hydraulic ball valve using matlab	13
22	Soil formation and vacuum distillation. Discuss	6
23	Soil formation in the zones of Nigeria	10
24	The scope of conflict resolution	32
25	Trigonometry	14
26	Types and objectives of the Library	74
27	Volumetric properties of pure fluids	5
28	What are the similarities and differences between God and stone in relation to Being	39
29	What do scientists in the field of chemistry mean by "inert pair of electron"?	25
30	Why is water molecule regarded as a perfect example of hydrogen bonding	6
31	Write a brief history of chemical engineering	5
32	Write on drilling engineering (directional drilling)	3
33	Write on inhibition and drainage	9
34	Write on the concept of entrepreneurship and what is a business plan?	70
Total		706