INTERNET-BASED INFORMATION BEHAVIOUR OF HIGH SCHOOL LEARNERS IN ASHANTI REGION OF GHANA

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B.A., M.A. (*Library and Information Studies*)

Submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in the Information Studies Programme, School of Social Sciences, College of Humanities, University of KwaZulu-Natal, Pietermaritzburg, South Africa.

DECLARATION

I, Philip Kwaku Kankam, declare that:

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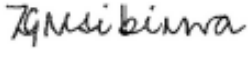
Signed: 

DEDICATION

This thesis is dedicated to the glory of the Almighty God. I also dedicate it to my beloved mother for her support.

ABSTRACT

The study examined the Internet-based information behaviour of high school learners in the Ashanti region of Ghana. It looked into the online information needs of learners, how they retrieve and evaluate online information sources as well as the challenges they face when accessing online information. The survey design was used to survey three public schools for the study. The three participating schools for the study were St. Louis senior high school (SHS), Effiduasi SHS and Simms SHS. The survey design allowed methodological pluralism for the collection of both quantitative and qualitative data for the study. The tools for data collection were a self-administered questionnaire for the learners and ICT teachers as well as semi-structured interview schedules used to interview the Heads of ICT departments (HICTDs) and librarians. Pre-testing of research instruments, triangulation of research data, cross-tabulation of results and consideration of ethical issues were carried out to ensure validity and reliability of the results. The quantitative data were analysed with SPSS and the qualitative data were analysed through the use of thematic content analysis. Wilson's (1999) model of information behaviour and Ellis's (1989) behavioural model of information seeking strategies were employed as the theoretical framework for the study. A hundred percent response rate was achieved from the learners, HICTDs and librarians, and 81.8% from the ICT teachers.

The results showed that learners could access the Internet at their school's computer laboratories. It was revealed that learners had both academic and personal online information needs, and were accessing multiple Internet sources to satisfy their online information needs with search engines as the predominant source and Google as the most popular. The study discovered that learners lacked the competencies needed for effective retrieval of online information. Learners were found not to apply advanced search options but relied on basic strategies like 'keyword' search. The study also found that learners' evaluation of online sources was poor. Clearly, learners were not introduced to advanced search options and online evaluation criteria, and this affected their Internet-based information behaviour. The study highlighted that librarians were not playing the required role to develop learners' information literacy skills. The major challenges learners faced when accessing information on the Internet were slow Internet connection and Internet access restrictions. The study recommends improvements in information literacy instructions and Internet

infrastructure at schools for learners. The study has also developed a proposed guideline on Internet information literacy instruction based on the findings of the study to inform policy on the curriculum.

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LIST OF ABBREVIATIONS

ARPA	Advanced Research Projects Agency
ARPANET	Advanced Research Projects Agency Network
AUP	Acceptable Use Policy
DARPANET	Defence Advanced Research Projects Agency Network
DTPB	Decomposed Theory of Planned Behaviour
EduNet	Education Network
EduNet	Education Network
EFA	Education For All
GES	Ghana Education Service
HICTD	Head of Information and Communication Technology Department
HTML	Hypertext Mark-up Language
HTTP	Hypertext Transfer Protocol
ICT	Information and Communication Technologies
ICT4AD	Information and Communication Technology for Accelerated Development
IFLA	International Federation of Library Associations and Institutions
IL	Information Literacy
IP	Internet Protocol
ISP	Internet Service Provider
KNUST	Kwame Nkrumah University of Science and Technology
Lab	Laboratory
LAN	Local Area Network
LIS	Library and Information Studies
LSE	Lower Secondary Education
MoE	Ministry of Education
NCES	National Centre for Education Statistics
NCP	Netware Core Protocol
NSF	National Science Foundation
NSFNet	National Science Foundation Network
PTA	Parent-Teacher Association

SHS	Senior High School
SPSS	Statistical Package for Social Sciences
TAM	Technology Acceptance Model
TCP	Transmission Control Protocols
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UK	United Kingdom
UKZN	University of KwaZulu-Natal
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
UNISA	University of South Africa
URL	Uniform Resource Locator
USA	United States of America
USE	Upper Secondary Education
WAN	Wide Area Network
WLAN	Wireless Local Area Network
WWW	World Wide Web

CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1 Introduction

The focus of this study is on investigating the Internet-based information behaviour of high school learners in the Ashanti region of Ghana. This foundational chapter introduces the background and the research problem. It outlines the research objectives, key questions, and theoretical framework of the study. The chapter also provides an overview of the research design and methods applied by the study. It further defines key terms used in the study and briefly provides the structure of the thesis.

1.2 Background to the study

Today's information-rich environments provide many opportunities for learners, as they allow access to a variety of information sources without temporal and geographic constraints. Information is a vital commodity needed for the advancement of human societies as well as a tool that serves as intellectual capital (Al-Aufi, Al-Azri, and Al-Hadi, 2017:1). Students at all levels of education need information to succeed in academics since "information remains the major ingredient in taking decisions and assists in reducing the degree of uncertainty" (Otoide, 2015:81).

The use of the Internet coupled with other Information and Communication Technology (ICT) tools for accessing information has "increased dramatically over the past decade and the Internet has become an important academic tool" (Mei et. al., 2016:74). It can be said generally that the Internet technology "has become an integral part of all aspects of the life of twenty-first-century learners" (Mandalios, 2013:470). Clearly, the Internet through the World Wide Web (WWW) has become a powerful source of information (Quintana, Pujol, and Romaní, 2012). Hence access to information sources, particularly electronic sources, has increased exponentially as the number of schools, libraries, and homes connected to the Internet has grown.

Similarly, the use of the Internet has increased among adolescents over the years (Tzavela et al., 2015) with studies showing an extensive use of the Internet by learners (Salomon and Kolikant, 2016:143). What is new within the current information age, however, "is the challenge posed by

the huge extent" and availability of the information on the Internet (Mandalios, 2013:471). The Internet serving as a source of unlimited information to satisfy information needs of users cannot be overemphasised, and when searching for information, it has been found that most students instinctively begin their research by using the Internet (Mizrachi, 2010; Herring, 2011; Al-Aufi, Al-Azri and Al-Hadi, 2017). Studies have also shown that, learners feel more comfortable finding and using online information (Lanning and Turner, 2010; Chang and Gomes, 2017). A review of existing literature clearly depicts that, young people constantly access the Internet for their specific information needs (Valkenburg and Peter, 2011; Koutamanis et. al., 2013; Tzavela et al., 2015; Utz, 2015; Oeldorf-Hirsch and Sundar, 2015).

Particularly, the Internet has become a major player in the access and use of information (Khoo, 2014); for example, the Internet "has become a prominent and influential environment in terms of high use and acceptance" of information among learners (Al-Aufi, Al-Azri, and Al-Hadi, 2017:1). This clearly shows that the Internet has changed the information behaviour of information users over time and therefore it is important for information providers to understand these behavioural changes. A thorough understanding of user and information behaviour has been identified as fundamental to the provision of successful information services (Baro and Onyenania, 2010); hence a thorough understanding of it is critical in information service delivery. Information behaviour has been an important human activity since the evolution of human kind, as humans always seek information to gather, store, interpret and use for various purposes (Case, 2012).

Information is needed because it affects people's lives and people need information to obtain answers to specific questions. Similarly, high school learners need information for academic and non-academic activities (Grefins, 2011). A study by Seaman (2012) reported that high school learners were constantly seeking information for their academic and personal development. A number of studies have also showed that young people seek online information for a number of reasons including communication, entertainment, socialisation, to compensate social anxiety, and others (Rideout, Foehr and Roberts, 2010; Desjarlais and Willoughby, 2010; Tsitsika et al., 2014).

It has been identified, however, that a need for information is a psychological construct which is closely related to other constructs such as motivations, beliefs and values (Case, 2012).

Particularly, high school learners' need for information has been found to be one of the cognitive needs of childhood and this helps them to appreciate things, the environment, as well as the society (Khadli and Kumar, 2011).

Information seeking is noted to be a conscious effort to access information in response to a need or gap in knowledge (Case, 2012). People therefore seek information to deepen and broaden their knowledge; hence information seeking becomes a primary activity of life. A study by Akar (2015:37) asserted that learners were the most regular and popular users of the Internet worldwide. Due to Google's popularity, it has been reported that, learners overwhelmingly rely on it to the exclusion of many academic search tools (Kolowich, 2011) in their quest to seek online information. The report showed that Google greatly influenced learners' online information behaviour. Online information behaviour is the actions and conduct of information users while in pursuit of information specifically housed on the Internet (Nkomo, 2009). Online information behaviour of learners has been studied widely in the field of information studies especially in the developed countries (Georgas, 2014; Malliari et. al., 2014; Borca et. al. 2015; Mills and Angnakoon, 2015; Tzavela et. al., 2015; Leeder and Shah 2016).

Although, the use of the Internet has been identified as an effective and efficient educational tool, in most African countries the Internet as well as other Information and Communication Technologies (ICTs) are not fully grasped (Ajiboye and Tella, 2007:40). The use of the Internet by high school learners in Ghana for academic purposes has been found to be low due to learners' "low competence level in ICT usage" and limited ICT infrastructure in schools (Buabeng-Andoh and Issifu, 2015:1285). This situation is not different in other African countries, for example, Woreta, Kebede and Zegeye's (2013) study in Ethiopia and Asaolu and Fashanu's (2012) study in Nigeria revealed that ICT knowledge and utilisation among learners were not encouraging. Although, Ghana has witnessed a number of educational policy reforms, progress towards full integration of ICT has been slow for several reasons (Grimus, 2013).

A study by Julien and Barker (2009:14) found that learners "see Google as being 'the' Internet, and they use these two terms interchangeably, seeing them to be one and the same thing". The use of the Internet by high school learners enable them to access online information and share or

communicate such information with peers of same interests and values (Barg and McKenna, 2014). Studies have shown that learners were able to access the Internet for online information themselves (Malliari et. al., 2014; Borca et. al., 2015). However, Georgas (2014) maintained that learners accessing information on the Internet without support especially for academic purposes, posed a number of challenges since they were not examining their topics to identify keywords and related terms when conducting an online search; instead were heavily relying on the language of their research topics.

ICT infrastructure and accessibility may not pose much challenge in the advanced countries, for example in Italy, Borca et al. (2015) opines that 95% of high school learners have personal computers at home and 66% of them surf the Internet every day. In Greece, almost every learner (95.9%) has access to a personal computer at home with more than 86% having access to the Internet (Malliari, 2014). However, in Africa, ICT infrastructure and internet accessibility is a challenge that hinders learners quest to seek online information (Ajiboye and Tella, 2007; King, 2007; Osei, Larbi, and Osei-Boadi, 2014).

The Internet and other ICTs infrastructure in the advanced countries therefore contrast the facilities that are available in schools in developing countries such as Ghana. It has been found that, there exists limited Internet and ICT infrastructure in high schools in Ghana (Atuahene and Owusu-Ansah, 2013). Studies in Ghana have also showed that majority of high school learners neither had access to Internet in school nor a personal computer at home to access the Internet (Agyei and Voogt, 2011; Amenyedzi, Lartey, and Dzomeku, 2011; Quarshie and Ami-Narh, 2012; Atuahene and Owusu-Ansah, 2013; Osei, Larbi, and Osei-Boadi, 2014). Learners' lack of Internet at schools and homes as indicated in earlier studies negatively affect them in their quest to access online information to satisfy their information needs.

Although, integration of ICT in education seems slow in Africa, it is worth noting that governments are making efforts to prioritise ICT usage in education. For example, in South Africa, ICT "has been evolving since 1996 and is embedded within a broader national government economic, social and development strategy" in the education policy framework. There exists an Education Network (EduNet), and an "e-rate" policy in South Africa; the Education Network policy seeks to network

all public schools and education and training institutions; and the e-rate policy provides a discounted access to Internet services to education institutions in South Africa (Isaacs, 2007:5-8). Again, the Department of Education (2005) has also put in place a policy guide for school principals on managing ICTs in South African Schools.

It is worth noting that, integrating Internet and other ICTs in the delivery of education in high schools at this current information age is a major boost towards a quality secondary education. According to the United Nations Educational, Scientific and Cultural Organisation (UNESCO), a secondary education of quality helps young people realise their full human potential and take their place in society as productive, responsible, and democratic citizens (UNESCO, 2016). Secondary education therefore helps in providing the optimum environment for preparing young people, mostly adolescents to be healthy and productive adults for participation in social, political, and economic developments (Jacob and Lehner, 2011). However, a 2016 report by United Nations Children's Fund (UNICEF) asserted that,

> Secondary education is still reserved for a privileged fraction of the population in many countries. In the majority of countries in sub-Saharan Africa, for example, less than half of secondary-school-age adolescents are enrolled in secondary school, leaving millions of young people entering the workforce without the necessary academic and life skills.

Provision of secondary education differs from country to country. In Uganda, secondary education comprises 4 years of lower secondary education (LSE) called 'O' level and 2 years of upper secondary education (USE) called 'A' level. In Argentina, by contrast, the primary and LSE cycle are combined to form 9 years of compulsory basic education followed by a 2 to 6-year non-compulsory secondary education and training cycle. In South Africa, secondary education comprises of 3 years of LSE termed as the "general education and training phase" and 3 years of USE called "further training and education phase" which awards the National Senior Certificate (Education System South Africa, 2015:3).

In Ghana, secondary education comprises 3 years of LSE called Junior High School and 3 years of USE called Senior High School. Nigeria's secondary education system is the same as Ghana's (Education in Nigeria, 2016). A report on basic statistics and planning parameters for senior high

schools in Ghana (2015:2) showed that enrolment in senior high schools keeps increasing. The report further indicated that Ashanti region has the highest number of high schools in Ghana.

Clearly, ICT is changing and reforming all levels of education drastically and it has therefore been embraced by all stakeholders including managers of secondary schools as an important element of education (Scardamalia and Bereiter, 2014). All over the world countries have realised the benefits of the emerging information age characterised by information and communication technologies (Buabeng-Andoh and Issifu, 2015:1282). It can therefore be said that the 21st Century has witnessed and embraced a period of universal acceptance of the important role of ICT in educational development (Willinsky, 2014). Integration of ICT into the educational curricula has therefore been acknowledged as a basic component of education that provides learners with opportunities to "develop widely valued skills and abilities such as literacy and numeracy around computing and communications devices, software, applications, and systems" (Tran and Stoilescu, 2016:50).

The role of ICT in education has motivated countries all over the world to integrate ICT in their educational curricula. The development of ICT curriculum and integration of ICT in education help and offer potential as well as abilities to improve teaching and learning activities (Livingstone, 2012). In Ghana, ICT has become a basic subject from basic education to high schools. The content of the ICT subject at the basic level focuses on basic appreciation and hands-on experience. The Ministry of Education (MoE) posited that computer literacy and use of computer as well as Internet applications were the focus at the high school level (MoE, 2015:20). ICT in education delivery in Ghana therefore has three pillars:

- ICT as a learning and operating tool;
- ICT as integrated into the teaching and learning; and
- ICT as a career option for students (MoE, 2015:18).

Particularly, ICT is driving national development efforts worldwide and most countries are therefore maximising ways of facilitating their development process through the development, deployment, as well as the exploitation of ICTs within their educational curricula (Buabeng-Andoh and Issifu, 2015:1282). For example, Australia's advanced ICT policies in its curriculum "has

accrued an established education system able to participate in the global shift, from material production to knowledge economy, where intellectual resources are the basis for economic growth" (Tran and Stoilescu, 2016:50). Ghana has therefore integrated ICT in its educational curricular; hence all high school learners in Ghana are required to study ICT as a core course every academic term.

Similarly, ICT affects the production of knowledge and the learning process (Scardamalia and Bereiter, 2014). Thus, an ICT curriculum should be able to understand the various elements of theoretical and practical ICT gadgets, tools, software programmes and skills that will assist learners to make valuable contributions in various aspects of learning (Tyner, 2014). The content of the ICT curriculum for high school learners in Ghana has therefore been designed to offer knowledge and skills to learners in order to give them the opportunity to develop the interest in ICT, acquire ICT literacy skills, and apply the skills in solving everyday problems in their academic and social life. The Ghana Education Service's (GES) design of the curriculum was based on themes and one of the six themes is the Internet which requires the study and use of the Internet for communication and accessing information from the Internet for academic and social informational needs (GES, 2010).

It is important to note that information literacy keeps changing over time as the Internet continues to be in constant state of evolution and the use of technologies keep improving; thereby compelling people to become more technologically driven (Whitmore, Agarwal and Xu, 2015). There is therefore the need for Information Literacy programmes that will assist students in identifying the information they need, selecting the right information and using it effectively in solving problems as well as meeting their information needs (Lanning and Turner, 2010). A study conducted by Malliari et al. (2014) among high school learners in Greece, recommended the need to incorporate information literacy instruction into secondary education, with information literacy learning outcomes embedded in the high school curriculum. This is in support of International Federation of Library Associations and Institutions' (IFLA) Guidelines on Information Literacy for Lifelong Learning (IFLA, 2010:27); which prescribes the need for schools to develop an information literacy programme that is part of the curricula since information literacy requires sustained development throughout all formal educational levels, primary, secondary, and tertiary; hence the

need for school librarians "to participate in a teaching course or recognised qualification to be part of the institutional information literacy endeavour".

According to the Internet World Stats (2015), the Internet diffusion in the Republic of Ghana was 19.6% and there were 5,171,993 internet users. Studies have shown that high schools in advanced countries have a regular source of Internet; hence Internet access for high school learners is not much of a challenge. For example, a report by the National Centre for Education Statistics (NCES) in 2004 revealed that as at 2003, 100% of public schools had access to the Internet in the United States of America (USA). However, an e-Readiness Assessment Report (2009) by the Ghana Education Service revealed that more than 80% of public high schools had no Internet access, although there have not been subsequent published reports in Ghana. A study by Sarfo and Ansong-Gyimah (2011) among high school learners in Ghana also revealed that more than 60% of the learners were not able to access the Internet at schools.

The Ashanti region according to the Government of Ghana's website (2016) is centrally located in the middle belt of Ghana. The region has the highest population (4, 780, 380 people) among the 10 regions of Ghana according to the 2010 census of Ghana report. The region has good infrastructure such as electricity that creates an enabling environment for ICT usage. Internet Service Providers (ISPs) and all the telecommunication providers in Ghana (e.g. MTN, Vodafone, Airtel, etc.) have their presence in the region for mobile communication service provision as well as Internet service provision through broadband, mobile data, fibre optic cabling, and others.

The region also has many public educational institutions including universities, a polytechnic, nursing training colleges, teacher training colleges and high schools as well as other private institutions. ICT infrastructure in the educational institutions, are greatly established in the tertiary institutions especially the Kwame Nkrumah University of Science and Technology (KNUST), the oldest and largest university in the region. The KNUST has partnership with organisations such as Huawei, Vodafone, and others for ICT infrastructural provisions.

According to the Ministry of Education's report on senior high schools (2015:13), the regional distribution of senior high schools in Ghana showed that Ashanti region had 142 senior high

schools (both private and public) making it the region with the highest number of high schools in Ghana.

1.3 Purpose of the study

The increasing growth of ICTs motivated this study to investigate how high school learners interact with information available through the Internet in order to satisfy their academic and personal information needs. The use of the Internet has posed some difficulties in relation to learners' intellectual access, extraction, and use of information; hence this technology did not come without problems and challenges (Xanthidis and Nikolaidis, 2014) for its users. Information users are required to possess certain skills in order to retrieve the desired information from the Internet to satisfy their information needs (Olorunfemi and Mostert, 2012).

A study conducted by Osei, Larbi and Osei-Boadi (2014) in high schools in Ghana showed that a number of teachers were not adopting ICT in their teaching due to lack of adequate infrastructure and skills. However, more learners in Ghana, as shown by Quarshie and Ami-Narh (2012) increasingly used the Internet for educational purposes. This study was therefore concerned with the information behaviour and skills of high school learners as well as their ability in evaluating information retrieved from the Internet.

The focus of the current study was on how high school learners seek information when using the Internet and places or spaces where they acquire online information. The study of the Internet-based information behaviour of high school learners is a contribution to future development of services that are offered by high schools in support of the learners' information needs. Therefore, the outcome from this study is expected to improve teaching, inform curriculum by examining how learners retrieve and evaluate online information to help address possible gaps in the field of study.

This study investigates the Internet based information behaviour of high school learners in Ghana. The study aimed at providing a comprehensive and in-depth study in relation to identifying the online information needs and online information behaviour of the high school learners in Ghana. The outcome of this study is expected to be beneficial to the Management and stakeholders of the

high schools in Ghana to meet the online information needs of learners in the various high schools in Ghana. In this regard, the findings will enable decision makers to improve and update their educational policies established with the aim of providing effective services including instructional and infrastructural services to meet the online information needs of learners more effectively. Furthermore, the findings originating from this study will help to improve the online information services offered to high school learners and add to the growing body of knowledge in this area of research by filling gaps in the literature.

1.4 Problem statement

According to Preedip and Vinit (2011), the emergence of the Internet has put wide impact on the provision of information services. Although, there is plenty of everything on the Web but not all of it is of a high quality (Quintana, Pujol and Romaní, 2012). It is believed that high school learners who are generally fit to be described as Generation Y people have integrated technology from the early stages of their lives. However, it is important to study how development of the Internet and other ICTs have influenced their information behaviour since a study conducted by Georgas (2014) showed that these learners seemed to have little conceptual understanding of how online information is structured and how online searches work. The study's findings attest to the fact that many learners lacked Internet information literacy skills.

In Ghana, a study by Atuahene and Owusu-Ansah (2013) highlighted limited ICT infrastructure and inadequate Internet facilities among high schools; and these challenges as argued by Amenyedzi, Lartey and Dzomeku (2011) had negatively affected high school learners' effective Internet use, retrieval and evaluation skills. This is in support of Malliari et al.'s (2014) study that found that learners were not frequent evaluators of the information they used. Similarly, lack of information retrieval skills has been found to compel learners not to examine their topics to identify keywords and related terms, instead relying heavily on the language of their research topics (Georgas, 2014).

Clearly, lack of effective Internet information literacy skills among high school learners contributes to learners' inability to evaluate online information sources. Most high school learners had been found not using any of the evaluation criteria in evaluating online retrieved sources

(Malliari et al., 2014). These are in support of Shiweda's (2013) study among high school learners that revealed that, most high school learners in Namibia lacked information searching and retrieval skills, and were therefore not able to combine, and use appropriate and effective keywords for their search. The same study pointed out high school learners' poor level in assessing the quality and the accuracy of information found online.

In Ghana, it has been found that most high school learners do not have Internet at home; however they use mobile phones outside school to access the Internet (Sarfo and Ansong-Gyimah, 2011). Although the ICT curriculum for high school learners prescribe the teaching of computer and Internet literacy skills, a study conducted by Amenyedzi, Lartey and Dzomeku (2011) among high school learners in Ghana, showed that more than 60% of high school learners were unable to use the Internet effectively. These attests to the fact that, where to search, how to search, and how to find the best and most appropriate information or material on the Internet is a real issue (Quintana, Pujol and Romaní, 2012) among high school learners in Ghana. Particularly, the Internet is currently a major player in relation to how information is accessed and used by all persons including learners, and this increases the need for further research in order to understand the information behaviour of learners (Khoo, 2014; Al-Aufi, Al-Azri and Al-Hadi, 2017). Therefore, a study on the Internet-based information behaviour of high school learners in Ghana is of essence.

Similarly, the role of librarians in information literacy programmes in schools is crucial in facilitating learners' efforts to acquire information competencies. However, there seems to be a gap in literature especially in the context of Ghana on the role of librarians towards the facilitation of high school learners acquisition of online information literacy skills. The International Federation of Library Associations and Institutions' (IFLA) Guidelines on Information Literacy for Lifelong Learning (2010:4) indicates that, the development of information competencies should take place throughout learners' lives, especially during their educational years, where librarians, as a part of the learning community and as experts in information management, have or should assume the key role of facilitating information literacy. It is therefore important to understand the role librarians play on the the development of online information literacy skills of high school learners in Ghana.

1.5 Aim and objectives of the study

The aim of the study was to investigate the Internet-based information behaviour of high school learners in the Ashanti region of Ghana. This aim was achieved through these objectives:

1. Determining the online information needs of high school learners in Ghana.
2. Identifying major challenges faced by high school learners when seeking information on the Internet.
3. Investigating how high school learners in Ghana retrieve and evaluate online information.

1.6 Research questions

From the purpose of the study and the research problem, the following research questions were posed:

1. Where and when do high school learners access the Internet?
2. What are the specific purposes for which high school learners search information on the Internet?
3. How do high school learners gather and select information from the Internet?
4. How do high school learners evaluate and judge their online information sources?
5. What roles do librarians play in facilitating high school learners to acquire Internet information literacy skills?
6. What are the challenges faced by high school learners when searching for information from the Internet?

1.7 Theoretical framework

A number of information behaviour models depict information behaviour as a more general field of investigation that presents information-seeking behaviour as a sub-set of the field which is concerned with the methodologies people employ to discover, and gain access to information resources and computer-based information systems (Wilson, 1999). This study adopted Wilson's (1999) Information Behaviour Model and Ellis' (1989) Behavioural Model of information Seeking Strategies. These models and studies that have used them are discussed in detail in Chapter Two.

1.7.1 Wilson's (1999) Information Behaviour Model

This model suggests that information seeking behaviour arises because of a need perceived by an information user and in order to satisfy that need, the information user makes demands upon formal or informal information sources or services. According to Wilson (1999), these demands result in success or failure to retrieve relevant information. Success in retrieving relevant information then compels the information user to make use of the information found and may either fully or partially help in satisfying the perceived need of the user as depicted by the model. However, failure of the retrieved information satisfying the need of the user will compel the user to reiterate the search process. The model also shows that part of the information- seeking behaviour process may involve other people or users through information exchange; hence information perceived as useful may be passed on to other people, as well as being used by the person himself or herself.

This model is suitable for the current study because as Wilson (2005:34) stated,

> Wilson's model is a very general model and is not only hospitable to theory that might help to explain the more fundamental aspects of human behaviour, but also to various approaches to information seeking behaviour and information searching.

This model however remains one of macro-behaviour but its richness lies in its expansion coupled with the inclusion of other models of information behaviour (Wilson, 1999). In addition, he argues that, this model helps to explain in part why people engaged or did not engage in information seeking, and what motivates or hinders a person from seeking information.

1.7.2 Ellis' (1989) Behavioural Model of information Seeking Strategies

Ellis' (1989) model outlines eight features an information seeker uses to seek information successfully; and they are *starting, chaining, browsing, differentiating, monitoring, extracting, verifying,* and *ending.*

This model clearly shows that 'starting' initiates information seeking process and the process 'ending' ends it through a final search process (Wilson, 1999). The penultimate stage of this model is 'verifying' where evaluation is done to check the accuracy of information. The strength of this

model lies in the fact that it is based on empirical research and the model has been tested in subsequent studies such as Ellis and Haugan (1997).

1.8 Research methodology and methods

This section presents briefly the research methods and design that were used for the purpose of this study. The complete research methodology, however, is clearly presented and discussed in Chapter Four of this study under the research methodology section. This study adopted the post-positivism paradigm because it allows the combination of methodologies and thus enables methodologies to compliment individual limitations, and exploits respective benefits (Shenton, 2004). This study also employed the mixed-method approach and the survey design since the survey design allows methodological pluralism and multiple data collection techniques (Creswell, 2009).

The population for this study includes all Grade 12 learners, all heads and teachers of the ICT departments and librarians of St. Louis Senior High School, Effiduasi Senior High School and Simms Senior High School. Simple random sampling and stratified sampling were used for the selection of the learners. All heads and teachers of ICT departments and librarians in the three schools were included in the study due to their population size, hence no need for selection. The data for the study were derived from responses to questionnaire and interviews. The Statistical Package for Social Sciences (SPSS) version 21 was used to generate descriptive and frequency tables.

1.9 Scope and limitations of the study

Public high schools in the Ashanti region of Ghana were employed for the study since such schools had good administrative structures and good infrastructure. The nature of the study required the study to be conducted in an environment where there is a well-resourced computer laboratory with Internet connectivity and access for learners; with a resourced library and librarian thus, public high schools without these facilities and human resources (librarians and ICT instructors) were excluded from the study. Schools that did not have these resources in place over the last two years prior to the study were also excluded from the study based on the assumption that the learners to

be recruited for the study from such schools might not have had enough experience with the technology. Therefore, the study selected three schools that had the necessary infrastructure and human resources required for the study - St. Louis Senior High School, Effiduasi Senior High School, and Simms Senior High School. These schools were also selected in order for the study to include variety (city, major town, small town schools) from the region.

The assumption underpinning the focus on Grade 12 learners was that, the Ghana Education Service's ICT Curriculum for Senior High Schools (2010) prescribes the topic of Internet (introduction to internet, Internet use, online retrieval, etc.) to be taught at SHS 2 (Grade 11); hence Grade 10 students would not have been effectively exposed to the Internet, while Grade 11 learners might still be studying how to use the Internet. It was therefore assumed that, of all high school learners, the Grade 12s were the most likely to have used the Internet and had more experience with the technology. Moreover, as Shiweda (2013) opines, many of the Grade 12 learners in the following year would be heading for university and other tertiary institutions where they would have to interact with the Internet for their academic needs, and thus expected to be "Internet savvy". The study is limited to these three schools in the Ashanti region of Ghana hence the results may not therefore, be widely generalised.

1.10 Definition of key terms and concepts

This section outlines the operational definitions of key terms used in this study. According to Kumar (2011:55), 'operational definitions' are interchangeably applied to explain key terms used in a study.

1.10.1. Information

Defining and examining the concept of information is too vast (Bitso, 2011:18) and the trouble in defining it is due to the assumptions of utility, physicality, structure/process, intentionality, and truth (Case, 2012:56-57). Kuhlthau (2008:68) therefore asserted that "the impact of information is what the user is interested in and what motivates the information seeking". Information, in many cases "turns into a priority commodity but its creation often requires considerable costs and the

efforts of a highly skilled-specialist" (Elyakov, 2010:63). Information can therefore be said to be "a peculiar commodity" (Vickery and Vickery, 2004:27).

Information can be seen as "whatever appears significant to a human being, whether conceiving from an internal world or external environment" (Case, 2012:46). Kaniki (2001:191) defines and contextualises "information as ideas, facts, and imaginative works of the mind and data of value, potentially useful in decision making, question answering, and problem solving". Kaniki's definition of information is used for this study since it clarifies the meaning of the concept of 'information' by highlighting the main purpose of information such as for decision making process and problem solving.

1.10.2 Information needs

An information need could be seen as an explicit need that "activates a conscious analytical process of information seeking" (Allen, 2011:2165). It could also be presented as "recognition that one's knowledge is inadequate to satisfy a goal" and this definition guides the current study (Singh and Satija, 2006:27).

1.10.3 Information-seeking behaviour

Information-seeking behaviour could be seen as "a phenomenon that often defies generalization and escapes observation because it varies depending on people, situations, and objects of interest" (Case, 2002:5). Wilson (2000:49) defines information seeking behaviour as

> The purposive seeking for information as a consequence of a need to satisfy some goal. In the course 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.

This study adopted Wilson's definition.

1.10.4 Information behaviour

Information behaviour is "a broad term that covers information needs, information-seeking behaviour, information searching and information use" (Stilwell, 2010:3). Similarly, information

behaviour is seen as an umbrella in the field of library and information studies (LIS) (Case, 2000:49). 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". Wilson's definition of information behaviour is accepted for the purpose of this study.

1.10.5 Online information behaviour

Although, information-seeking has a long history, information-seeking using the Internet is a relatively new phenomenon (Nkomo, 2009:19). Huang's (2007) definition of online information behaviour as all activities that users conduct on the Internet, be it goal-directed searching or just surfing without a specific purpose is accepted for the purpose of this study.

1.10.6 Information Literacy

Information literacy is "the ability to locate, evaluate, and use information wisely" (Kuhlthau, 2008:71). For the purpose of this study Information Literacy encompasses both Internet literacy and Internet information literacy (Kim and Yang, 2016:441-442). The terms 'Internet literacy' and 'Internet information literacy' are further explained in Chapter Three.

1.10.7 Internet

The Internet is defined as a publicly available computer network consisting of a worldwide network of computer networks that use the TCP/IP network protocols to facilitate data transmission and exchange. It is therefore the largest system of connected computers around the world that allows people to share information and communicate with each other (Online Cambridge Dictionary, 2016). This definition is used for the current study. Services such as the World Wide Web (WWW), electronic mail (email), online chat, and others operate on the Internet.

1.10.8 Internet access

This is the ability to connect to the Internet (Online Cambridge Dictionary, 2016). Internet accessibility is subject to the rates of data signal and this attests to the fact that users could access

the Internet at different speeds (Techopedia, 2017). Some authors argue that Internet access should not only be referred to physical connection but ability to use (Lipp, 2002; Caldwell et al., 2008; Haugen, 2014). For the purposes of this study, however, Internet access is used to refer to physical connection.

1.10.9 Internet connection

It is the process that enables individuals and organisations to connect to the Internet using computer terminals, computers as well as mobile devices. Internet connection types include dial-up access and broadband options such as ISDN, DSL, Cable, wireless, and so on (Haugen, 2014; Perkins, 1997).

1.10.10 Learners/Students and Grade/SHS

The current study was carried out at a South African university and the settings of the study were located in Ghana. In South Africa, persons that attend high schools are called 'learners' and 'Grade' is used to distinguish the levels of these learners. In Ghana, persons that attend high schools are called 'students' and 'SHS' is used to distinguish the levels of the students. In this regard, Grade 12 learners mean the same as SHS 3 students. For the purposes of this study, 'learners' and 'Grade' were used to define persons that attend high schools.

1.11 Ethical consideration

Written informed consent and verbal consent as well as parental consent (where needed) were sought and obtained from all participants as well as permission from school authorities. Participants' confidentiality was also assured and the ethical policy of the University of KwaZulu-Natal (UKZN) was well followed. UKZN's plagiarism policy was followed with the use of anti-plagiarism software, "Turnitin". The ethical procedure for this study is discussed in detail in Chapter Four.

1.12 Structure of dissertation

The thesis was structured according to the following chapters:

Chapter 1: Introduction

This chapter addresses the general problem area, defines the research questions, explains the reason for choosing the topic, and outlines the research approach of the thesis, limitations and key assumptions as well as contribution to be made by the study.

Chapter 2: Theoretical framework

The presentation and analysis of Wilson's (1999) Information Behaviour Model and Ellis'(1989) Behavioural Model of information Seeking Strategies were carried out in Chapter Two. These information behaviour models were found to be suitable for this study.

Chapter 3: Literature review

A comprehensive survey of prior research on the topic is analysed in this chapter. The analyses were combined with Introduction. It also provided background/context to the research as well as provision of documentary value to the research.

Chapter 4: Research methodology

Chapter Four presents the research methodology and methods selected to investigate the Internet information behaviour of high school learners. The chapter includes the research approaches, research paradigm, and design of the study, the choice of methodological population, sampling techniques, data collection methods, and instruments used for data analysis.

Chapter 5: Presentation of results

The fifth chapter of the study presents the findings from the self-administered questionnaires and the semi-structured interviews.

Chapter 6: Findings

This chapter presents the discussion and interpretation of findings of the research.

Chapter 7: Summary, conclusion, and recommendations

The Chapter outlines a summary of the findings of the study, conclusions, as well as recommendations that arose from the study.

1.13 Summary of the chapter

Chapter one introduces the study to the readers by highlighting the main components of the study as discussed and outlined in chapters two through seven. This chapter therefore presents the background to the study and outlines the research problem, followed by the problem statement and key questions to be asked. The study's significance and delimitations were also discussed in this chapter. The research design and the methods used as well as the theoretical frameworks applied were briefly presented with the significance of the study also highlighted. The structure of the whole thesis was also outlined in this chapter. Chapter Two follows this chapter and it discusses the theoretical framework of the study.

CHAPTER TWO: THEORETICAL FRAMEWORK

2.1 Introduction

According to Neuman (2011:85), theoretical framework can be defined as a theoretical system that generally comes with assumptions, concepts, as well as specific social theories. Theories are "systematic sets of interrelated statements intended to explain some aspects of social life" (Babbie, 2007:43). The fundamental idea of 'theory' as opined by Punch (2005:16) is to help in explaining whatever is being studied, providing meaning to more abstract terms than the terms used to describe it. This shows that theories serve as analytical tools for gathering facts (Bless and Higson-Smith, 1995:23). Hence, the "quest for theory is intimately entwined with the quest for improvement and mastery" (Chigona and Licker, 2008:58).

A theoretical framework can also be defined as a collection of theories and models from the literature which underpins a positivistic research study (Hussey and Hussey, 1997). It is a collection of concepts that are interrelated in determining what things to measure and what statistical relationships to look for, with the aim of influencing how researchers design a study and how data are collected and analysed for a study (Bertram, 2004:143).

According to Chigona and Licker (2008:58), a theoretical framework provides four benefits:

1. The ability to make predictions. The second benefit is purely procedural.
2. It allows researchers as well as those managing or offering an innovation to proceed systematically in observing or measuring some things and not having to measure everything.
3. It helps in explaining what is happening, using the terms of the theory.
4. It helps put the theory under stress to improve it.

Chapter Two presents a general overview of information behaviour models and technology acceptance models found to be relevant for this study and it particularly discusses Wilson's (1999) model of information behaviour and Ellis' (1989) behavioural model of information seeking strategies as the specific models underpinning the present study. In order to show the relationship between attributes of the theoretical framework with objectives, sub-questions and data collection

instruments used, Chapter Two revisits the objectives of this study and follows systematically the key questions underpinning this study as they are outlined in Chapter One.

This chapter is therefore presented in the following subsections:

- Information behaviour models;
- Technology adoption and acceptance theories;
- Wilson's (1999) model of information behaviour;
- Literature review of Wilson's (1999) model;
- Other studies based on the Wilson's (1999) model; and
- Applicability of Wilson's (1999) model to the present study.
- Ellis' (1989) behaviour model of information seeking strategies;
- Literature review of Ellis' (1989) model;
- Other studies based on the Ellis' (1989) model;
- Applicability of Ellis's (1989) model to the present study.

2.2 Information Behaviour Models

Wilson (1999:249; 2000:49) defines information behaviour as "the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking and information use". Pettigrew, Fidel and Bruce (2001) point out that information behaviour takes place within a certain context, which could either be the workplace or an everyday life setting. This is corroborated by Savolainen (2007:112), who opines that information behaviour helps to understand how people search for relevant information that can be used in different contexts. Context, as defined by Case (2002) refers to the precise use of both person and situation to help frame research. Taylor (1991:218) also describes context as "information use environments". Cool (2001:8) describes contexts as "frameworks of meaning" while Johnson (2003:736) refers to contexts as "frameworks for meaning systems or interpretation".

Although, many scholars have examined the notion of context in relation to information behaviour in their studies (Talja, Keso, and Pietilainen, 1999; Cool, 2001; Dey, 2001; Markless, 2009), Dervin (1997:13) has concluded that there is no "term that is more often used, less often defined,

and when defined, defined so variously as context". Agarwal (2011: 48) also argues that "despite the seemingly widespread and growing attention to the notion of context in information seeking, the concept remains ill-defined and inconsistently applied". Pettigrew et al.'s (2001) included "context" in their definition of information behaviour and this is supported by Courtright (2007:276) who opines that most researchers consider context to be a "frame of reference" for information practices and information behaviour.

Some literature uses the term "setting" to represent context (Byström, 1996; Allen and Kim, 2001; McKenzie, 2004). Allen and Kim (2001) define context in relation to socially defined settings where information users are found. It includes the "environment" in which users interact with information (Bates, 2009:2381); hence context may be used to represent information use environments. Dervin (1997:32) further describes context as "something you swim in like a fish. You are in it. It is in you". Allen and Kim (2001:1) again assert that "the relationships between contexts, situations, and tasks are complex" for example, Allen (1997:119) uses the terms context and situation interchangeably. However, Case (2007:13) sees the concept of context to relate to "a particular combination of person and situation". By adding "combination" of person and situation to the definition of context, du Preez (2015:29) believes that "Case does three things: he adds situation as an element of context; he places context in a social environment; and he implies that context can also be described by using a combination of elements".

A situation is "a set of related activities, or a set of related stories, that occur over time" (Sonnenwald, 1999:3). This definition depicts that situations are the building blocks of context. McCreadie and Rice (1999:59) define situation as "the particular set of circumstances from which a need for information arises, along with the awareness, however unclear, that information may be useful in addressing the situation". Cool (2001:9-10) outlines six ways that the concept of situation has been studied in information science literature:

- Problematic situation, where situation is considered an "individual-level internal cognitive state".
- Socio-cognitive perspective to define situation through "the social basis of mind and ways in which meanings are constituted through interaction".

- Situation action model to "explain human action, in particular human-machine communication, as an interactive process that is responsive and adaptive to elements in the technology use environment".
- Theory of Situation Awareness to "understand the cognitive processes, group dynamics, and communication behaviours through which individuals and team members develop and maintain correct and mutually ratified consensus about the state of affairs in complex, dynamic task environments involving interaction with information technology."
- Person-in-Situation model to "explain how human information processing and decision-making capabilities, along with other individual variables, interact with situational level variables on task performance".
- Situation as an information environment to examine situation by looking into the environment of information use such as "institutional, organizational, or work task settings; physical elements of the information resource environment; or situations of accessibility to information."

For the purpose of this study, situation was treated based on the Person-in-Situation model that consolidates individual-level factors and situational-level factors to examine the process of information behaviour of high school learners. In relation to 'context' therefore, this study followed the precise combination of person and situation that helps to frame research (Case, 2002:3).

Wilson (1999:250) describes a model as a "framework for thinking about a problem and may evolve into a statement of the relationships among theoretical propositions". Although both models and theories present simplified versions of reality, models use diagrams to do so in a concrete manner. Models are also linked more to the real world than theories but both of them are used to identify and describe relationships between concepts (Case, 2012). Wilson (1999:250) asserts that most models "are statements, often in the form of diagrams, that attempt to describe an information-seeking activity, the causes and consequences of that activity, or the relationships among stages in information-seeking behaviour".

According to Luyten and Blatt (2011), most models are derived from theories. Johnson (2003) advises researchers to better understand the meaning and the application of the term 'theory' prior to selecting appropriate model(s) for a study. Welman, Kruger, and Mitchell (2005:21) define theory as a "statement or a collection of statements that specify the relationships between variables with a view to explaining phenomena such as human behaviour". Busha and Harter (1980:13) also define theory as "assumptions, definitions, and propositions which explain a group of observed facts or phenomena in a field or discipline". Babbie (2007:43) believes that theories are "systematic sets of interrelated statements intended to explain some aspects of social life". According to Reynolds (1971:10-11) 'theory' is used to provide meaning in four different ways:

- Set of laws that empirically support generalisations;
- Interrelated set of definitions and propositions;
- Causal descriptions of processes; or
- Prescriptions of social behaviours that are desirable, concepts that are vague, or hypotheses that are untested.

The benefit of creating models can be said to switch "the emphasis of a project from the specific situation at hand" to represent "a more general phenomenon that can be explored in other contexts" (Shenton and Dixon, 2003:5). Four types of information behaviour models are therefore identified and described by Shenton and Dixon (2003):

- Instructional model
- Grounded model
- Narrative model and
- Synthesised model.

They further explained that Belkin's (1980) and Dervin's (1999) models are instructional models since the models relate more to skills development rather than actual behaviour hence are idealised representations that attempt not to represent reality. Grounded models as depicted by Bates (1989); Ellis (1989); Belkin, Marchetti and Cool (1993); Wilson (1999), Shenton and Dixon (2003) are derived directly from research and thus try to portray behaviour. For example, Wilson's (1999) model consists of phases of behaviour that describes in a sequential manner the actions and

feelings of the participants. Narrative models as argued by them are similar to grounded models in that they are found in the research. However narrative models are imposed by researchers in order to present findings in a logical progression (for example, Kuhlthau, 1993). Synthesised models on the other hand are derived from analysis of past research and may or may not be followed by further studies conducted in order to further investigate and/or substantiate them (Shenton and Dixon, 2003).

The area of information behaviour has been researched for many years and as Wilson (1999:250) mentioned, “research in information behaviour has occupied information scientists since before the term 'information science' was coined”. Many models have been developed, but it is important to note that all “models that have been developed to date by information behaviour researchers are not necessarily applicable to all user groups” (Du Preez, 2008:29). Moreso, changes can be made on an existing model “after first comparing it against the real world and confirming that modifications are warranted” (Case, 2002:114). In this current study, however, there is the need to acknowledge key related information behaviour models that exist in literature. Majyambere (2014:40-41) categorises such related models into five:

1. General information behaviour models
    - Belkin (1980) model of Anomalous States of Knowledge (ASK).
    - Dervin (1983) sense-making approach to information seeking.
    - Wilson (1981, 1999) model of information behaviour.
    - Wilson and Walsh (1996) model of information behaviour.
2. Information seeking models
    - Taylor (1968) model of information seeking.
    - Krikelas (1983) model of information seeking.
    - Ellis (1989, 2005) model of information seeking behaviour.
    - Savolainen (1995) everyday life information seeking model.
    - Savolainen (2006) schematic model of information seeking.
3. Information searching and retrieval models
    - Kuhlthau (1989, 1991, 1993, 1997, 1999, and 2004) information search process model.
    - Marland (1981) and Irving (1986) information skills model.

- Hepworth (2004) information service model.
- Ingwersen (1996, 1999) information retrieval process model.

4. Digital information related models
    - Choo (1999, 2000) model of information seeking on the web.
    - Marchionini (1995) model of information seeking in electronic environments.
5. Discipline or task-related information behaviour models
    - Byström and Järvelin (1995) task complexity and information seeking and use.
    - Leckie, Pettigrew, and Sylvain (1996) general model of the information seeking of professionals.

Three of these related models are briefly discussed. The three models that are briefly discussed below relate to the current study since they are both general information behaviour models and information searching and retrieval models.

2.2.1 Dervin's Model 1983

Dervin's (1983) sense making model contained the four following basic elements: situation, gap, outcome, and bridge (Wilson, 1999); these elements are summarised in the form of a diagram. Dervin opines that information has meaning only in the context of the constraints on the human observing and/or creating it, thus, relative to its creator and meaningful only in that context (Dervin, Foreman-Wernet and Lauterbach, 2003:200). This model depicts that people have different perspectives about the world and reality, therefore the human condition becomes a struggle through an incomplete reality. This shows that "humans make sense individually and collectively as they move: from order to disorder, from disorder to order" (Dervin 2000:40-41). This process of reasoning is described by Dervin as sense making and this representation of Sense-Making shows a person facing a "gap" – a situation that the person needs to make sense of.

Dervin (1986) points out time, space, movement, and step taking as some major factors in this model. Romanello, Dervin and Fortner (2003) assert that the factors and elements in the model's representation consists of the:

- Situation or the time-space contexts;

- Gap or the information needs;
- Sense-making and sense-unmaking of the individual;
- Bridge or the assemblage of ideas, emotions, attitudes and memories, from the past, present and future moments that the individual constructs to negotiate the gaps and uses to move from one moment to the next; and
- Outcomes or the information uses or helps and hurts that the individual puts into newly created sense.

This model highlights the importance of perceiving information activity as a dynamic and flexible process and it is believed that this model has contributed positively in the field of information behaviour (Huotari and Chatman, 2002). According to Niedźwiedzka (2003), a benefit of this model is its ability to enhance the meaning of attention and cognitive discomfort. A study conducted by Wilson and Walsh (1996) on this model proposes an incorporation of 'activating mechanism' in the gap between “situation” and “outcome” which they therefore included in their updated model.

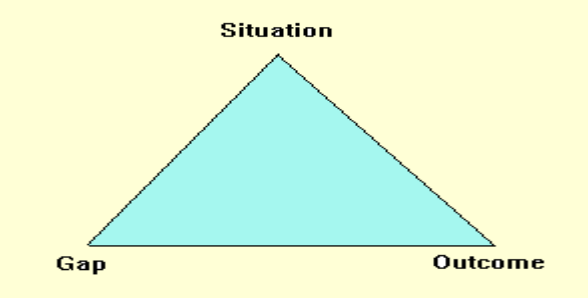

Figure 2. 1: *Dervin's (1989) Sense Making Triangle (*Source: Wilson, 1999:253)

Wilson (1999:254) prefers the use of the bridge metaphor as presented in Figure 2.2.

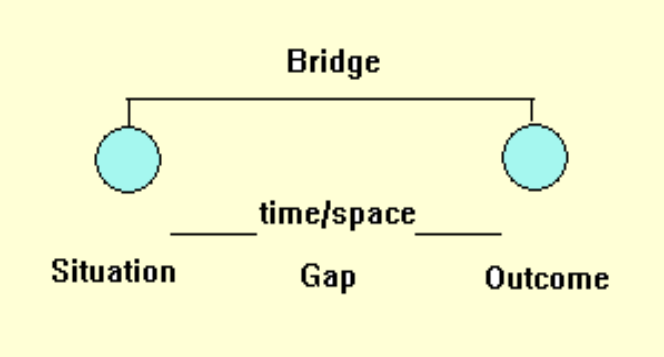

Figure 2.2: Dervin's Sense Making Model Re-drawn Source: Wilson, 1999:254)

Although Dervin's (1983) Sense-making approach could be associated with Wilson's 1999 model since it deals with the perception of a need for information (Wilson 2005:335), it is however, important to note that the focus of this study is on information behaviour which goes beyond the need for information. This situation therefore makes Dervin's (1983) model unsuitable for the current study.

2.2.2 Kuhlthau's Model of Information Search Process 1991

Wilson (1999) maintains that Kuhlthau's (1991) model supported Ellis's work with addition of some other stages including thoughts, the information search process, appropriate information tasks, the associated feelings and actions. The Information Search Process (ISP) was developed on the basis of research in library users, initially school students (Kuhlthau, 1991). It has since been used in other studies, particularly of students (Hyldegård, 2006; Kuhlthau, Heinström and Todd, 2008) and security analysts (Kuhlthau, 1999).

This model represents information seeking as a process with consecutive stages. The stages in Kuhlthau's model include Initiation, Selection, Exploration, Formulation, Collection, and Presentation. Kuhlthau's Information Search Process (ISP) model therefore presents the information-seeking process as:

- **Initiation:** This is to become aware of the need for information when facing a problem.
- **Selection:** Identifying and choosing a general topic for seeking information.
- **Exploration:** Seeking and investigating information on the general topic.

- **Formulation:** Fixing and structuring the problem to be solved.
- **Collection:** Gathering pertinent information for the focused topic.
- **Presentation:** Completing information-seeking, reporting and using the result of the task. (Kutlthau, 1991)

Myers (2002) and Kuhlthau and Tama (2001) have used this model to investigate the information behaviour of health care practitioners and lawyers respectively. Kalbach (2009) believes this model is very comprehensive since it connects uncertainty with cognitive and physical factors. A reason for not choosing this model for the current study was that, unlike Ellis's model that focuses on the information seeker's activities, the ISP model focuses on affective and cognitive aspects (feelings and thoughts) at each stage (Kuhlthau, 2005).

2.2.3 Hepworth's Model of Information Seeking (2004)

Hepworth (2004) model provides four main categories with each category having at least a subcategory:

- the sociological data (roles, norms, tasks),
- the psychological data (knowledge, cognitive, affective and style states),
- the behavioural data (behaviour),
- the source data (source character and behaviour).

This model investigates and cites psychological factors in detail thereby confirming Wilson's (1999) and Ingwersen's (1996) frameworks. Additional factors and elements about the information users' norms, roles and tasks makes Hepworth's model (2004) very comprehensive. This model analyses Wilson's model's (1999) attributes of "activating mechanisms" and passive/active search as psychological data with cognitive state and style state as its subcategories. In addition, the "current cognitive state" of Ingwersen's (1996) model is categorised as psychological factors (Hepworth, 2004).

This model was not suitable for the current study because it explores in-depth cognitive and psychological state factors and their influence on information behaviour. Moreover, "further

research is required to test the usefulness of the [model's] framework in different contexts" (Hepworth, 2004:706).

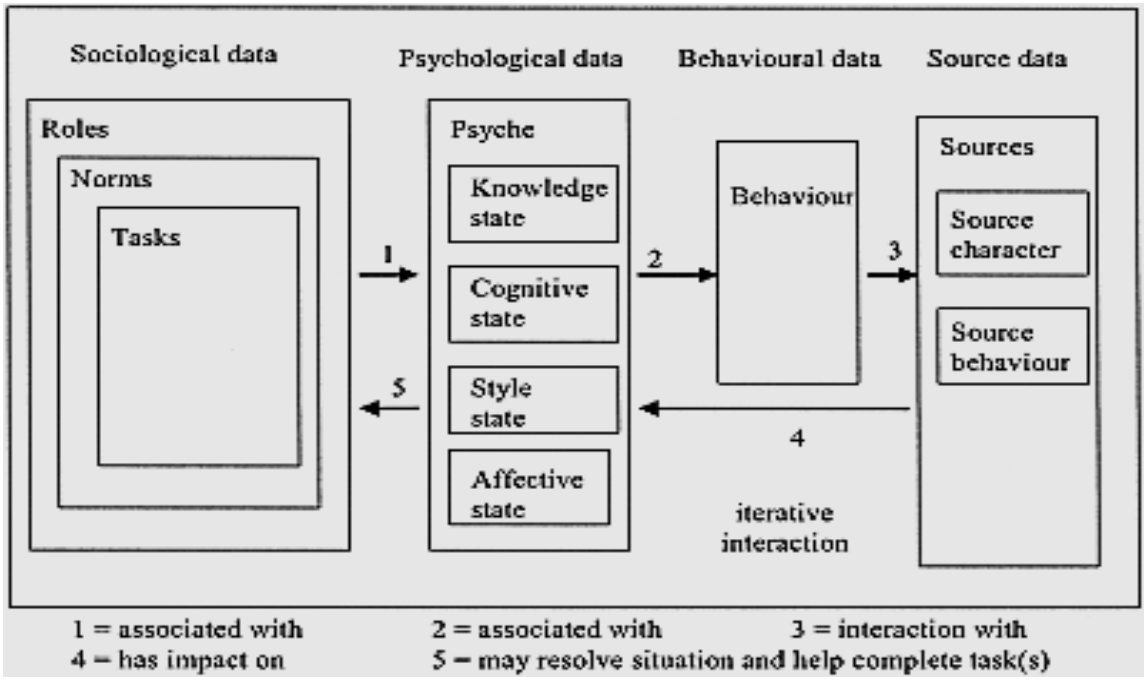

*Figure 2.3: Hepworth's Model (*Source: Hepworth, 2004:705)

2.3 Technology Adoption and Acceptance Theories

Access to computer technology such as the Internet has a direct influence whether an individual uses the Internet (Ma, Andersson, and Streith, 2005). Although availability of technology does not guarantee the use of technology, it is important to note that users' information behaviour on technology such as the Internet is greatly affected by access and adequacy of Internet infrastructure such as computing facilities and Internet connectivity (Okello-Obura and Ikoja-Odongo, 2010). Tao (2008) opines that the successful implementation of technology depends highly on users' acceptance of the technology, hence users' decisions on the selection and use of technology to enhance the acceptance and also increase the use of the technology.

Technology acceptance refers to "an individual's psychological state with regard to his or her voluntary or intended use of a particular technology" (Hu et al., 1999:96). Technology acceptance and adoption theories have been adapted for use in many fields and are widely used in academia and businesses today (Magee, 2002). These theories and/or models have been developed and used

by scholars to explain behavioural intention as well as to predict users' acceptance of computer technology (Taylor and Todd, 1995). These models are therefore used to predict the probability of usage (Han, 2003). Examples of such models include:

- Theory of Planned Behaviour (TPB) - used to examine determinants of information system adoption and usage (Lu et al., 2003).
- Theory of Reasoned Action (TRA) - applied to investigate individual acceptance of technology (Davis, Bagozzi, and Warshaw, 1989).
- The Decomposed Theory of Planned Behaviour (DTPB) - identical to TPB but provides better explanatory power than the TPB (Taylor and Todd (1995).
- Technology Acceptance Model (TAM) - specific to information system usage (Mathieson, Peacock, and Chin, 2001).

Kripanont (2007) believes that these theories have been extensively used in understanding users' behaviours in the field of information systems.

2.3.1 Technology Acceptance Model (TAM)

The most widely accepted used model to explain the acceptance of technology systems is the TAM (Taylor and Todd, 1995; Kowitlawakul, 2011). It is therefore believed to be the most popular among information systems researchers (Agarwal and Prasad, 1999). According to Sahin and Shelley (2008), TAM usefully provides a framework for the explanation of the impact of attitudes and intentions' variables of a technological application use. Hence the focus of this model is on individual's acceptance of technology by using intention or usage as a dependent variable (Venkatesh et al., 2003).

Davis, Bagozzi and Warshaw (1989) asserted that, TAM presents both perceived usefulness and perceived ease of use as beliefs about a new technology that influence an individual's attitude towards using that technology. This model has therefore been useful in predicting and explaining technology adoption and use in various situations (Dillon and Morris, 1996). The use of TAM has greatly helped researchers to measure and understand perceived usefulness and perceived ease of use on behaviour intention (Hu et al., 1999:94). In terms of behaviour measuring, technology

acceptance can be measured by actual technology use (usage behaviour) as well as by intention to use (behaviour intention) (Szajna, 1996).

Many researchers have applied TAM in their studies, for example, a study by Hu et al. (1999) applied TAM to investigate physicians' intentions to use telemedicine technology; Roberts and Henderson (2000) also used this model in examining government workers' experience in the use of computers; Tao (2008) used TAM to determine students' intentions to use electronic resources; Vijayasarathy (2004) also applied TAM to explain consumer intention to use online shopping; Kowitlawakul's (2011) study on nurses' intentions to use electronic Intensive Care Unit (eICU) technology also applied this model.

Although TAM is a widely used model, Gafen and Straub (1997) caution that it may not predict technology use across all cultures. Malhotra and Galletta (1999) in their study to extend TAM to account for social influence observed that TAM had theoretical and psychometric problems. Mathieson, Peacock and Chin (2001), in their study, extended TAM to include influence of perceived user resources. They noted that the theory has a limitation of taking into account variables that are important predictors of technology usage. These limitations of TAM make it unsuitable for the current study since the study is not only concerned about technology usage but information behaviour.

2.4 Wilson's (1999) model of information behaviour

Wilson (1999:249) defines information behaviour as "activities a person may engage in when identifying his or her own needs for information, searching for such information in any way, and using or transferring that information". Case (2007:120) opines that "Information behaviour approaches are typically regarded as models because they focus on specific problems". Wilson's (1999) model is a representation and an update of his 1981 and 1996 models. This model was designed to "propose an integration of…models into a more general framework" (Wilson, 1999:249). Ingwersen and Järvelin (2005:67) point out that "Wilson's model is a general summary model".

Although there were few models at the time Wilson's general model of information behaviour was being developed (Wilson, 1999:250), he nested some elements of specific models such as Ellis' features of information-seeking behaviour; thereby developing his model into a macro-model that attempted to embrace all facets of information-seeking behaviour. Wilson therefore believes that his model:

> offers a view of the existing research as a set of 'nested' models bound together by a dependency upon one another…with finer and finer details of human information seeking and searching behaviour (Wilson, 1999:249).

Hence, this model is based on generic needs in general situations (Beverley, Bath and Barber, 2007:13). Wilson's (1999) model can therefore help understand vital features of human behaviour including high school learners, since it is a general model.

Wilson (1999:250) believes that using a model helps in achieving the general objectives of the study and contributes greatly towards the provision of effective answers to research questions. According to Beverley, Bath and Barber (2007:14), Wilson's (1999) model embodies the following questions about information behaviour:

- Why some need prompt information seeking more so than others (stress/coping theory);
- Why some sources of information are used more than others (risk/reward theory); and
- Why people may, or may not, pursue a goal successfully, based on their perceptions of their own efficacy (social learning theory).

Particularly, Wilson's (1999:251) model aimed at outlining the "various areas covered by what the writer proposed as 'information-seeking behaviour', as an alternative to the then common 'information needs'" and it is based on the assumption that information seeking begins with a perceived need for information by a user. This implies that the user identifies and then defines this need, before seeking information in order to meet the information need which then solves the problem. Wilson (1999:252) thus shows two key points that his model is based on:

- The model considers an information need as a secondary need that arises out of a more basic or primary need;

- When discovering information to satisfy a need, the information seeker tends to meet with barriers of different kinds and these barriers include personal, interpersonal, and environmental barriers.

Wilson's (1999) assertion of need is corroborated by Chowdhury and Chowdhury (2011:26) who also maintained that “information need is not a primary need, but a secondary need that arises out of another need”. Needs include a conscious need (expressed) and an unconscious need (unexpressed) (Case, 2007). Expressed or articulated need is an actual perceived need which demands an answer; whereas unexpressed needs are usually not recognised, as information needs (Davies and Harrison, 2007:79). Unconscious needs therefore do not cause active information seeking behaviour (Henefer and Fulton, 2005:226). Wilson (1977:44) maintains that unconscious needs may be passive and it might not necessarily cause an individual to seek information.

Wilson’s (1999) model indicates that an information user often has different needs and these needs determine the information systems and sources to be used, thereby influencing the ways in which the information would be used. Grunig (1989:209) believes that a need is an inner motivation state that involves action. However, Wilson (1999) describes needs in terms of uncertainty. Uncertainty in this sense is caused by the presence of barriers and Wilson (1999:265) defines it as “a discrepancy between the typifications applied to the life-world and a phenomenon that, at first sight, cannot be fitted into those typifications”. Besides, Adams (2010:69) sees uncertainty as “a cognitive condition that can lead to an affective state of anxiety and lack of confidence”. On the issue of barrier, Ikoja-Odongo and Mostert (2006) support Wilson's assertion by indicating that internal factors (personal) and external factors (environmental) may create barriers to obtaining useful information. For example, “interpersonal problems are likely to arise whenever the information source is a person” (Wilson, 1997:559).

This model also depicts that “part of the information- seeking behaviour may involve other people through information exchange and that information perceived as useful may be passed to other people” (Wilson, 1999:251). The information user is therefore expected to utilise information or exchange information received with other people personally. The model therefore identifies the user as the focus of the information needs, but introduced the term "intervening variables" to

represent factors that may affect information-seeking behaviour. Intervening variables, unlike barriers, “may actually be supportive of information use as well as preventive” (Wilson, 1999:256). Beverley, Bath and Barber (2007:14) point out that these “intervening variables” may be involved in an individual’s information behaviour.

The overall framework of Wilson's (1999) model also identified an “active search” mode that included behaviours. This model therefore recognises the existence of different types of search behaviours: passive attention, passive search, active search, and ongoing search (Beverley, Bath and Barber, 2007:14). If a search for information is successful, then the user “makes use of the information found and may either fully or partially satisfy the perceived need – or, indeed, fail to satisfy the need and have to reiterate the search process” (Wilson 1999:251).

The model thus indicates that information users have needs and these needs may come from the previous level of satisfaction or non-satisfaction with information they acquired. Information users in satisfying their information needs consult formal and informal information sources (Wilson, 1999:251), hence the next action after a user recognises the need for information is information seeking activities. For example, a high school learner in need for information for a class assignment may consult the Internet. These activities lead to receiving either useful (success) or unhelpful (failure) information. Wilson (1999:257) therefore perceived information processing and use to be necessary components of the feedback loop, if information needs were to be satisfied.

Wilson’s (1999) model of information behaviour is well established and can make a valuable contribution to our understanding of information behaviour in the context of all groups of users (Beverley, Bath and Barber, 2007:27). This model is suitable for the current study since the study is within the field of information behaviour and within the pattern of understanding information seeking behaviour of users (Wilson, 2008), within its context (Courtright, 2007). The simplicity and comprehensiveness of Wilson’s model also allows the consideration of a strong connection that exists between a ‘user’ and ‘use’, hence appropriate for investigating the Internet-based information behaviour of high school learners.

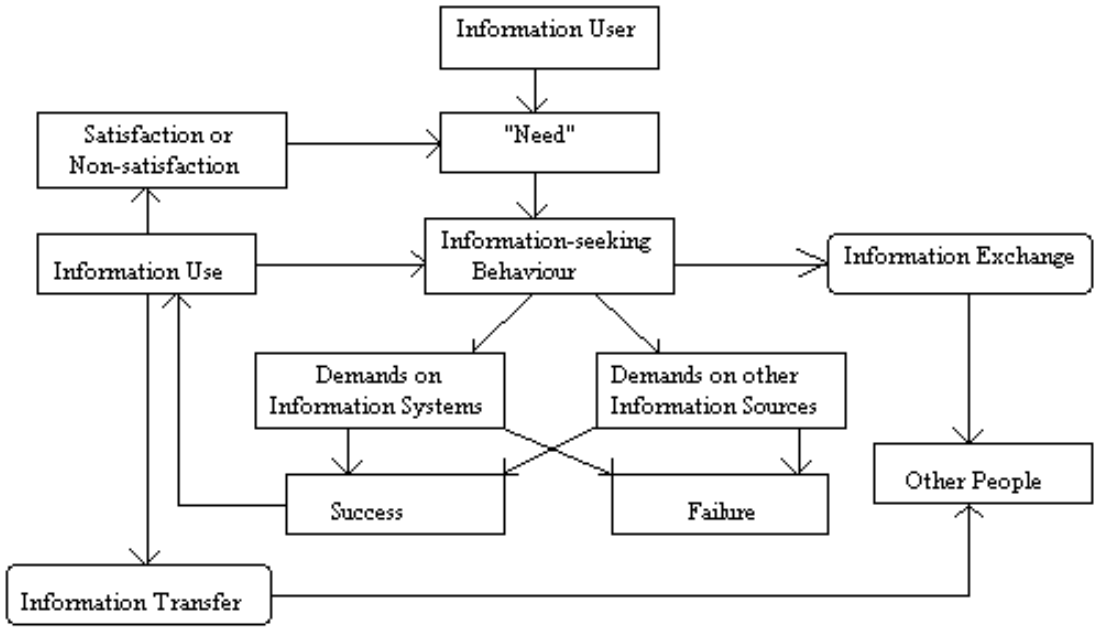

*Figure 2.4: Wilson's Information Behaviour Model (*Source: Wilson, 1999:251)

2.5 Literature review of Wilson's (1999) model

According to Spink (2010:35), information behaviour is a cognitive process which is not taught, however, it is innate to people to the extent that humans "are able to consciously understand that they need to undertake behaviour processes of information finding, organising and using to make sense of their environment". Foster, Urquhart and Turner (2008) believe that there exist varieties of theories in the field of information behaviour because these theories are often based on work done mostly by a researcher and Wilson's (1999) model confirms this assertion. However, there exists weak theories and lack of commitment to build on past findings in the field of information behaviour which Case (2002:284) calls a "history of complaint" about the quality of research in LIS. Although progress has been made in the development of theories in information behaviour (Vakkari, 1998), Järvelin and Wilson (2003) maintained that the progress has been slow.

Models are more fundamental and broader as compared to scientific theories because they set the preconditions of theory formation and provide the methodological and conceptual tools for formulating hypotheses and theories (Järvelin and Wilson, 2003). It is however important as

argued by Kumar (2011:38) to review a specific model to be used for a research study systematically.

Wilson (2005:31) asserts that the development of his general models of information behaviour in 1981 and 1999 as well as his model with Walsh (Wilson and Walsh, 1996) has taken a noteworthy period of time. Case (2012:135) considers Wilson's (1999) model to be one of the most general models of information seeking behaviour that are empirically used in information behaviour research. Clearly, Wilson's (1999) model primarily refers to 'systems, sources, and people' as sources and this makes it more of a general model (Case, 2012:157). It therefore "seems likely that the model will continue to evolve as more and more researchers use it as a basis for thinking about the problems of human information behaviour" (Wilson 2005:36).

Lowe and Eisenberg (2005:63) opine that Wilson's (1999) model is one of the popular skills models for information problem solving. For example, Makri, Blandford and Cox (2008:3) used Wilson's model in reviewing the information seeking models throughout different studies of information behaviour in terms of problem-solving activity. Many key authors such as Belkin, Borgman, Choo, Cole, Dervin, Ellis, Erdelez, Fidel, Ford, Ingwersen, Kuhlthau, Nilan, Pettigrew, Savolainen, Sonnenwald, Spink, Vakkari, and Wersig have also referred and/or used Wilson's model in their works (Wilson 2005:35).

Wilson's (1999) model sees information needs as the foundation of information seeking behaviour; hence there should be a sense of need in order to seek information. Case (2007:136) asserts that stress/coping theories depicts possible explanation for why some needs prompt information seeking more than others. Weigts et al. (1993) present various types of human needs to include need for new information; need to elucidate the information held; need to confirm information held; need to elucidate beliefs and values held; and the need to confirm beliefs and values held. Wilson (2006:663) in this case outlines examples of such basic human needs which include need for food, domination, and to learn a skill. According to Case (2012:5), an information need attests to the "recognition that your knowledge is inadequate to satisfy a certain goal that you have".

Wilson's (1999) model again explains why some resources are used more than others and the reason for people's ability and inability to pursue a goal successfully based on the perceptions of their own efficacy. The concept of "self-efficacy" as expressed by Case (2007:136) is a possible explanation why some people could or could not pursue a goal successfully in accordance with the perceptions of their own efficacy. Bandura (2000) therefore believes that self-efficacy is critical in knowledge and skill acquisition as well as goal accomplishment.

Wilson (1999) in his model presents “activating mechanisms” as motivators which impact on how a person searches for information. Case (2002:119) maintained that these activating mechanisms are linked with five key intervening variables:

- demographic background;
- environmental variables;
- characteristics of the sources;
- psychological predispositions; and
- one’s social role.

Wilson’s model (1999) also includes potential barriers to information seeking: psychological, demographic, interpersonal, environmental, and information source barriers (Wilson, 1997). During the information seeking process, the information seeker tends to meet with barriers of different kinds and these barriers include personal, interpersonal, and environmental barriers (Wilson, 1999:252). Studies have also established a negative relationship between these barriers and information seeking. For example, Pettigrew, Durrance and Unruh (2002) have cited economic and geographic factors (such as lack of money and infrastructure) as barriers to information seeking.

According to Case (2002:115-116), Ellis’s (1989) model of information seeking behaviour and Kuhlthau’s (1991) model of searching processes are universally applicable to any domain. Wilson (1999) also concluded therefore that, Ellis`s (1989) search features (model) and Kuhlthau`s (1988) Information Search Process can be related easily to Wilson`s active search mode of information seeking behaviour. Particularly, the information encountering often contributes to the passive

search mode (Ross, 1999:783) and Wilson's (1999) model therefore incorporates both 'active and passive search' modes. Erdlez (2005:34-35) on his part notes that Wilson's model embraces Ellis's (1989) model in relation to behaviour characteristics of an information user/seeker in terms of information seeking behaviour and information searching processes, especially within the 'active search' mode.

Wilson regards Ellis`s (1989), Kuhlthau (1988) and his own models (1981 and 1996) as information behaviour models since they are all concerned with generalised behaviours surrounding the initiation of information seeking and, with a broader perspective of the information search than simply the use of computer based information retrieval systems (Wilson, 1999:258). Wilson's model does not incorporate the fixed hierarchy of the steps/stages in Ellis' model throughout the information seeking process, although, Wilson's (1999) model considers the important contribution of Ellis (1989) and Kuhlthau (1991) models within the information behaviour sub-fields. Moreover, Dervin's sense-making theory's general model feature (Ingwersen and Järvelin 2005:62) and information-seeking model feature (Wai-yi and Dervin 1999:4) as shown by Wilson (1999) explain how Dervin's work relates with Wilson's (1999) general model.

Nevertheless, Knight and Spink (208:212) argued that Wilson's (1999) model lacks a clear description of how users interact with an information retrieval system "in order to find and retrieve the data" they seek. They further explained that Wilson simply labeling an attribute of his model "as 'information seeking behavior' needed to be defined and explored". As observed by McKenzie (2003:37), Wilson's (1999) model "represents successive searches for information on a single problem, but they do not account for the wide variety of information practices" like environmental scanning, chance encounter lay referrals and others that exist in users' accounts of ELIS. These limitations however, did not affect the use of the model for this study since the current study was not focused on ELIS.

According to Godbold (2006:np), sequential progression of information behaviour as depicted in Wilson's (1999) model is not always the case when users are seeking information since "the order of information seeking tasks may be reversed or convoluted, and includes dead-ends, changes of direction, iteration, abandonment and beginning again". This study did not follow strictly the

sequential progression as depicted in the model. The study however, applied appropriate attributes of the model that matches the objectives of the study.

2.6 Other studies based on the Wilson's (1999) model

Wilson's (1999) model is a well-established model and has been adopted and applied by a number of researchers to investigate information behaviour. The scope of the model is broad since it attempts to cover most of what is considered as belonging to information behaviour (Wilson, 1999:251). The role of a model is to provide a framework for analysis in a study (Moore, 2002:303) and a number of researchers in the field of LIS have successfully used this model for their studies. For example, Cao et al. (2016) applied this model for their study "Modelling Online Health Information-Seeking Behaviour in China: The Roles of Source Characteristics, Reward Assessment, and Internet Self-Efficacy"; Guðmundsson (2011) used this model to investigate Swimming coaches' information-seeking behaviour on the World Wide Web.

Moreover, Du Preez (2008) used this model to study the information needs and information-seeking behaviour of consulting engineers. Shieh, Broome, and Stump (2010) when examining the relationship between self- efficacy and health information-seeking in pregnant women, applied this model; and Das (2013) used this model for the investigation of information-seeking among pregnant women.

Shiweda (2013) used this model to investigate web-based information behaviour of high school learners in Oshana region of Namibia. Majyambere (2014) also applied Wilson's (1999) model when investigating information seeking behaviour of humanities/arts international postgraduate students in public universities of KwaZulu Natal province of South Africa. The use of Wilson's (1999) model in previous studies helped the researcher to identify the strengths of the model such as the ability to integrate it with other significant theories of information behaviour (Case, 2002); as well as limitations and criticism of the model, for example, Niedzwiedzka's (2003:3) study revealed that the model imposes some conceptual difficulties on researchers.

2.7 Applicability of Wilson's (1999) model to the present study

Selecting the relevant model and determining whether the selected model is appropriate for a study is a critical task (Stilwell, 2010) since each model has its own weaknesses and strengths and not all models in the sub-field of information behaviour are based on empirical tests (Ikoja-Odongo and Mostert, 2006:154). The current study regards Wilson's (1999) model to be more comprehensive and appropriate to the problem and population under study than other models because Wilson's (1999) model allows for a description and explanation of users' information behaviour hence a reason for its use for the current study. The successful application of this model in previous related studies as outlined above motivated the positive expectation of relevant findings of this study.

According to Birmingham (2000:26), there exists the need to review literature related to a study's research questions and theoretical attributes. Kumar (2011:40) also notes that core variables gained from a theoretical framework form the solid basis for research inquiry. In presenting the general picture that reflects the relationship between the theoretical framework of the study, the objectives of the research and the research questions, Table 2.1 was used. Table 2.1 therefore depicts the data collection tools used to collect relevant research data together with attributes of the theoretical framework hence a mapping of the theoretical attributes to the research objectives, questions, and instruments are presented below:

Table 2.1: Mapping of Wilson's (1999) model's framework attributes to research objectives, questions and tools

Research Objectives	Research Questions	Attributes of Wilson's (1999) model	Instrument(s)
Determining the online information needs of high school learners in Ghana	Q1. Where and when do high school learners access the Internet? Q2. What are the specific purposes for which high school learners search information on the Internet?	Demands on information systems. Information need and information use	• Literature • Questionnaire • Interview
Identifying major challenges faced by high school learners when seeking information on the Internet	Q6. What are the challenges faced by high school learners when searching the Internet for information?	Information seeking behaviour and failure	• Literature • Questionnaire • Interview
Investigating how high school learners in Ghana retrieve and evaluate online information	Q3. How do high school learners gather and select information from the Internet? Q5. What roles do librarians play in facilitating high school learners to acquire information literacy skills?	Information seeking behaviour	• Literature • Questionnaire • Interview

Source: Field data (2017)

The first research question refers to the place and spaces Internet is used by high school learners to access information and the second question refers to the specific online information needs of high school learners. Wilson's (1999) model's attributes of 'demands on information systems' and 'need' were applied when investigating the first and second research questions respectively. This study focuses on investigating the information behaviour of a particular group of people, namely high school learners. Wilson's (1999) model's attribute of 'information seeking behaviour' is a core variable of the model which is related to information behaviour and this was linked with questions 3 and 5 as depicted in Table 2.1.

2.8 Ellis' (1989) behavioural model of information seeking strategies

Ellis (1989) behavioural model was developed based on analysis of the information seeking patterns of academic social scientists hence Ellis's framework of information-seeking behaviour (1989) is based on empirical research. The analysis of the observed patterns of information seeking during the interviews with the scientists was based on grounded theory research method, thus the strength of Ellis's model is that it is based on empirical research (Järvelin and Wilson, 2003:6-8). Ellis's (1989) behavioural model is a textual model of information seeking which consists of eight features and this model prefers to use the term 'features' rather than 'stages':

1. Starting: The first activity which represents the beginning of the information seeking process (Ellis, 1989:179). Starting is the initial activity an information seeker undertakes when seeking information. This is the activity to locate key people operating in the field (Ellis and Haugan, 1997:395). Wilson (1999:254) sees this stage as "the means employed by the user to begin seeking information, for example, asking some knowledgeable colleague".

2. Chaining: This activity refers to "following chains of citations or other forms referential connection between materials" (Ellis, 1989:179). This includes following up references cited in sources consulted as well as identifying materials that cite those sources hence chaining of references could be either backward or forward (Ellis, 1989:179).

3. Browsing: This is the third activity through which the information seeker conducts a "semi-directed or semi-focused searching in an area of potential interest" (Ellis, 1989:179). However, semi-directed or semi-structured searching in an area of interest excludes random browsing.

4. Differentiating: At this stage the information seeker filters the information sources based on the "nature and the quality of the material examined" (Ellis, 1989:179). This attests to filtering sources by judging their quality, relevance and other characteristics. Differentiating therefore helps to "restrict a search to a limited number of sources or types of source, to exclude certain sources or types of source from the search, and to rank material identified by source or type of source" (Ellis, 1989:179). According to Ellis, Cox and Hall (1993:179), differentiating incorporates using known differences between information sources used in order to filter the nature and the amount of information examined.

5. Monitoring: This stage is the maintenance of awareness which requires "maintaining awareness of developments in a field through the monitoring of particular sources" (Ellis, 1989:179). Ellis and Haugan (1997:369) add maintaining awareness of "technologies in a field through regularly following a particular source" to the monitoring stage; hence "keeping up-to-date or current awareness searching" (Wilson, 1999:254).

6. Extracting: This is where an information seeker systematically identifies and examines "a particular source to identify material of interest" (Ellis, 1989:179), thus searching through a source to identify relevant material.

7. Verifying: This is "by checking the accuracy of information" (Wilson, 1999:254).

8. Ending: This stage is the tying up of "loose ends through a final search" (Wilson, 1999:254); hence completion of the information seeking activities.

Ellis's framework of information-seeking behaviour (Ellis, 1989) shows the relationship among categories is not linear. According to Ellis (1989), not all researchers follow the same pattern and

some of the researchers may even not follow all the activities as mapped in the model. There is therefore a lack of linear relationship among categories making these properties the building blocks of the behavioural model's flexibility.

2.9 Literature review of Ellis' (1989) model

Ellis (2009:140) considers this model to be among the most cited models in the literature of information seeking behaviour which has been successfully applied to investigate the information seeking behaviour of individuals with different roles and tasks in many disciplines, although, the model doesn't address the "influence of cognitive nor affective factors" on the information behaviour of individuals. The strength of this model as opined by Katsirikou and Skiadas (2011) is that it can be used in multiple knowledge fields and among all user groups. The success of the model is due to the extensive empirical research during the development phases of the model (Wilson, 1999). Turnbull (2005:397) is also of the view that Ellis' (1989) model has provided a strong foundation for the development of other information behaviour models such as Choo's (1998) model of information-seeking.

According to Ellis (1989:178):

> The detailed interrelation or interaction of the features in any individual information seeking pattern will depend on the unique circumstances of the information seeking activities of the person concerned at that particular point in time.

The model is therefore intended to describe the information-seeking activities of individuals. Clearly, Ellis's (1989) model "appears to sit between the micro-analysis of search behaviour (starting, chaining, extracting, verifying, ending) and a more macro-analysis of information behaviour generally (browsing, monitoring, differentiating)" (Wilson, 1999;255). Ingwersen and Järvelin (2005) maintained that Ellis's behavioural model falls within three fundamental interrelated characteristics at the same time:

- Process model
- Summary model
- General model

It is important to note that there is no claim by Ellis to the effect that the different behaviours constitute a single set of stages but it is clear from Ellis's (1999) model "that 'starting' must initiate a process and that 'ending' must end it" (Wilson, 1999:254). Ellis, Cox and Hall (1993:359) assert that 'starting' feature includes "activities characteristic of the initial search for information". To elaborate on this definition, Ellis and Haugan (1997:395) indicate that 'starting' is "characteristic of the initial search for information to obtain an overview of the literature within a new subject field or to locate key people operating in this field".

Wilson (1999:254) again noted that it "seems reasonable to suggest that 'verifying' is a penultimate stage in a process and that 'extracting' must follow on from specific search behaviour such as 'browsing'". Choo (1999) then considers differentiating, monitoring and extracting as information seeking activities in the information search mode. Meho and Tibbo (2003:570-571) on their part consider only six generic features from Ellis's (1989) model: starting, chaining, browsing, differentiating, monitoring, and extracting. They therefore see "verifying" and "ending" as extra features. To corroborate, "verifying" and "ending" according to Ellis, Cox and Hall, (1993:364-365) were additional activities identified after the initial framework had been described. They went on to define "verifying" feature as checking the information and sources found for accuracy and errors, whereas the "ending" feature reflects searching for pieces of information to bridge knowledge-gaps.

Wilson (1999:254) concludes, "'extracting' is not information behaviour of the same kind as 'browsing', or 'chaining' or 'monitoring'". He goes on to suggest that 'differentiating' is a filtering process, while "browsing, chaining and monitoring are search procedures". Extracting also may be regarded as a performed action on information sources. The model's features or components can interact in various ways in different information-seeking patterns and therefore does not represent a set of stages or phases that any or all researchers constantly follow when seeking information (Ellis, 2005).

According to Ingwersen and Järvelin (2005), the features of Ellis's model do not provide any design specifications directly for interactive systems, but the model's features provide activities that information seekers and users might be required to accomplish through use of the systems.

Ellis's (1989) model is not presented as a diagrammatic model, however, Wilson (1999:254) has proposed a diagrammatic presentation of Ellis's (1989) model in Figure 2.5 below to show that Wilson and Ellis's models "are intended to function at different levels of the overall process of information seeking and this fact is demonstrated by the ability to nest one within the other".

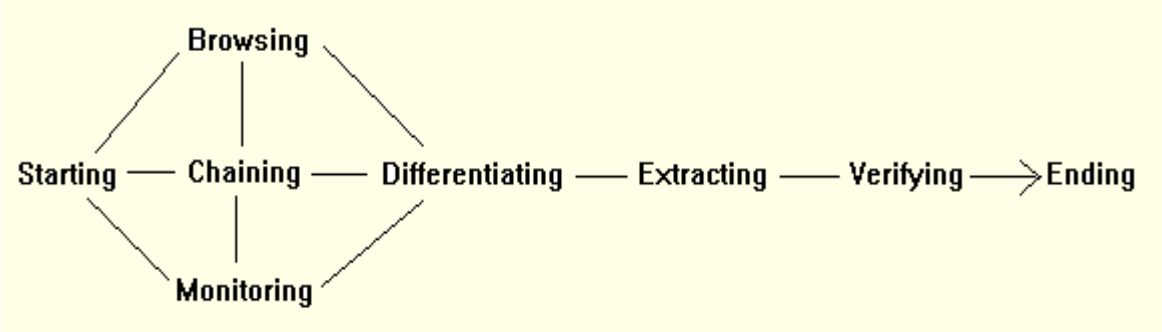

Figure 2.5: A Process Model Based on Ellis' Characteristics (Source: Wilson, 1999:255)

Literature of other studies has used different terminologies for some features in Ellis's model. For example, Ellis and Haguan (1997) used "surveying" in place of the term "starting" and also identified the activities of "distinguishing" and "filtering" instead of "differentiating" when studying information behaviour of oil company engineers and scientists. They maintain that distinguishing involves "ranking information sources according to their relative importance based on own perceptions"; and filtering is the "use of certain criteria or mechanisms when searching for information to make the information as relevant and as precise as possible (Ellis and Haguan, 1997:399)". Both of them can therefore be seen as more specialised differentiating behaviours.

Adeyinka (2016:215) opined that the weakness of Ellis's (1981) model "remains its almost one-dimentional approach to the concept of the contextual variables of the observed information seeking behaviours". He further noted that Ellis "placed a heavy emphasis on the electronic systems environment context being sought". However, this was not a limitation to the current study since the emphasis of the study is on the electronic environment (Internet). A limitation of the model as noted by Robson and Robinson (2013:172) is that Ellis's (1981) model "does not consider the user's information needs or the context in which the needs arise". The current study overcame this limitation through the use of Wilson's (1999) model's attribute of 'Information need'.

2.10 Other studies based on Ellis' (1989) model

Ellis's (1989) model has been used and also reviewed positively by researchers within the field of Library and Information Science (LIS). For example, Ellis, Cox and Hall (1993) used it to investigate the information behaviour within the physical sciences as well as engineers. The model has also been applied on research scientists by Ellis and Haugan (1997). Spink et al. (2002) also reviewed the model in relation to successive searching.

Robson (2013) also applied Ellis's (1989) model for the study "modelling information behaviour: linking information seeking and communication". Ford et al. (2002) have also reviewed this model in relation to cognitive styles in information seeking. Makri, Blandford and Cox (2008) also applied this model when investigating the information-seeking behaviour of academic lawyers. Wilson et al. (2002:704) has also reviewed this model in relation to uncertainty and its correlates and the study concludes that:

> The problem-solving model is recognised by such researchers as describing their activities and that the uncertainty concept, operationalised as here, serves as a useful variable in understanding information-seeking behaviour.

Sutton (1994), when examining "the role of attorney mental models of law in case relevance determinations: an exploratory analysis", applied Ellis's model as a theoretical lens for analysis. Elwani (2016) also applied this model for his study on "the information behaviour of individual investors in Saudi Arabia".

Meho and Tibbo (2003) also on their part reviewed Ellis's (1989) model on social scientists with the aim of finding out if the findings of the model were still applicable at the time where electronic information seeking has become more popular. A significant finding of their study was the inclusion of information managing feature which involves "filing, archiving, and organising information collected or used in facilitating their research" (Meho and Tibbo, 2003:582). The empirical and experimental base of Ellis's (1989) model can be said to have influenced research in information behaviour (Katsirikou and Skiadas, 2011).

2.11 Applicability of Ellis's (1989) model to the present study

The review of literature and discussion of the theoretical framework has provided a better understanding of the applicability of Ellis' (1989) model for the purpose of this study. The successful application of the model in previous related studies has also contributed to the suitability of the model for the purpose of the current study. Table 2.2 below depicts the relationship between Ellis's (1989) model, the research objectives, and research questions:

Table 2.2: Mapping of Ellis' (1989) model's features to research objectives, questions and tools

Research Objectives	**Research Questions**	**Attributes of Ellis's (1989) model**	**Instrument(s)**
Investigating how high school learners in Ghana retrieve and evaluate online information	Q4. How do high school learners evaluate and judge their information sources?	Differentiating and verifying	• Literature • Questionnaire • Interview

Source: Field data (2017)

As shown on Table 2.2, Ellis's (1989) model's features "differentiating" and "verifying" are linked with research question four. These features were applied to investigate how learners evaluate and judge their online information sources.

2.12 Summary of the chapter

This chapter covers the theoretical framework of the study and has reviewed several information behaviour models. This chapter therefore provides the relevant information seeking models considered to contribute to the better understanding of the theoretical framework of the study. Wilson's (1999) and Ellis's (1989) models of information behaviour were used as the theoretical framework for this study. These models which were initially introduced in Chapter One (section 1.7) have been academically reviewed within the context of the present study. The elements or

features of both Wilson's (1999) model and Ellis's (1989) model have been reviewed to show its applicability to the present study.

Mapping of these elements or features to the research objectives and research questions are also provided in this chapter. To ensure usability of the models' main attributes which formed the framework and provide the primary guidance for the development of the literature review, the data collection tools for the study have been mapped with the research questions and core variables of the framework (Table 2.1s and 2.2). The application of Wilson's (1999) model and Ellis's (1989) model by researchers in previous related studies of information behaviour have also been identified and discussed in this chapter. This chapter is followed by Chapter Three which systematically discusses and reviews related literature of the study.

CHAPTER THREE: LITERATURE REVIEW

3.1 Introduction

This chapter reviews relevant literature on Internet-based information behaviour of high school learners. A thorough review of related literature for a study is the foundation as well as inspiration for useful and substantial research (Boote and Beile, 2005:3). A good review of related literature therefore provides a robust foundation to rely on when conducting a research project (Bowers and Stevens, 2010:94). If the "literature review is flawed, the remainder of the dissertation may also be viewed as flawed" (Randolph, 2009:1). Literature review helps in situating a study within existing research (Boote and Beile, 2005:3). Hence the role of this chapter is to position the study in the existing body of knowledge and evaluate what has been done on the subject as well as identify research gaps that provide the rationale for the current study. This is in support of Kumar's (2011:31) assertion that review of related literature assists in identifying and filling gaps in the researcher's knowledge.

The aim of a literature review is to gain "a general familiarity with the current research conducted in a subject area" (Gravetter and Forzano, 2009:588). This implies that, a review of related literature puts the "research project into the context by showing how it fits into a particular field" (Somekh and Lewin, 2011:17). Moreover, literature review "enables a researcher to develop a clear understanding of the research topic; establish what has already been researched on the topic and identify gaps, which the researcher's own study can fill" (Nengomasha, 2009:51). Collectively understanding and advancing the goal of a research, requires the researcher or scholar "to understand what has been done before, the strengths and weaknesses of existing studies, and what they might mean" (Boote and Beile, 2005:3); and these are achieved through a review of existing literature.

Writing a bad review of related literature for a study is a major way to derail a research dissertation (Randolph, 2009:1). It is an established fact that, a review of related literature provides a "sound theoretical overview of the existing research findings, theories, and models in terms of the specific research problem" (Fox and Bayat, 2007:36). It is therefore reasonable to use good literature when found for the conduct of a literature review (Punch, 2000:45). Similarly, a good review of related

literature “needs to indicate the different views, agreements, disagreements and trends of thought on the topic of research and be accurately portrayed and acknowledged in the text” (Stilwell, 2000:173). In order to conduct a successful research, a researcher therefore first needs to have a significant understanding of the existing literature in the field of study (Boote and Beile, 2005:3).

Kumar (2011:34) maintained that, there are three major sources to consult for existing academic literature in almost all fields of study: books, journals and the Internet. The current study was mindful of the fact that, a review of related literature for a study is a means of showing an author’s knowledge about the field of study (Randolph, 2009:3). The literature review therefore sets the context of the study in a broader sense by clearly demarcating what is as well as what is not within the scope of the study with the aim of justifying those decisions (Boote and Beile, 2005:4).

According to Blaikie (2010:18), a review of related literature for a study should focus only on relevant literature in order to answer the research questions satisfactorily. Hence literature reviewed for the current study was conducted based on the themes of the study and the themes were derived from the specific research questions guided by theoretical variables of the study. The research questions for the current study were:

1. Where and when do high school learners access the Internet?
2. What are the specific purposes for which high school learners search information on the Internet?
3. How do high school learners gather and select information from the Internet?
4. How do high school learners evaluate and judge their online information sources?
5. What roles do librarians play in facilitating high school learners to acquire Internet information literacy skills?
6. What are the challenges faced by high school learners when searching for information from the Internet?

3.2 Brief history and overview of the Internet

According to Davison, Burgess and Tatnall (2003), the Internet can simply be referred to as “the Net”. The Internet is a worldwide system of computer networks which allows users at any one

computer to get information from any other computer or directly communicate with other users on other computers (Whatis, 2016). The Internet is known to consist of a three-level hierarchy composed of backbone networks, mid-level networks, and sub networks which span many different physical networks around the world with various protocols, mainly the Internet Protocol (Hyperdictionary, 2016).

A research programme of the United States of America (USA) Department of Defence was the beginning of the Internet. The USA Department of Defence in their quest to investigate a way to guarantee a permanent command and control network for communication in the 1960s as a way of dealing with a possible break out of a third world war devised a project termed ARPANET. The ARPANET is an acronym for the "Advanced Research Projects Agency Network". The letter D for Defence is sometimes included in the acronym to be referred to as DARPANET. The core networks forming the Internet therefore started out in 1969 as the ARPANET by the United States Department of Defense through their Advanced Research Projects Agency (ARPA) (WordIQ, 2016).

The ARPANET development and design were carried out in 1969 by Bolt, Beranek and Newman who were contracted by the Advanced Research Project Agency (ARPA) of the USA Department of Defence (Glister 1993:14). The original aim was to create a network that would allow users of a research computer at one university to be able to talk to research computers at other universities. The universities that the ARPANET project linked together their computer systems in the USA were:

- The University of Utah,
- The University of California in Los Angeles,
- The University of California in Santa Barbara, and
- The Stanford Research Institute.

The purpose was to enable the transfer of information across the computer network in such a way that, if part of the network should be destroyed through attacks (such as nuclear attack), other parts of the network would still continue to function (Banks 1997:11). This shows that a side benefit of the ARPANet's design was that, the network could still function even if parts of the network were

destroyed in the event of an attack or other disasters, because messages and/or information could be routed or rerouted in more than one direction in the network (Whatis, 2007).

The ARPANET progressively grew into the Internet since the Internet was based on the thinking that there would be a number of independent networks of rather arbitrary design, beginning with the ARPANET as the pioneering packet for switching network with the vision of including packet satellite networks later on (Leiner et al., 2012). The progress of the ARPANET and the development of other networks made it clear that there was a need for methods of communicating between these different networks. In 1983, the ARPANET changed its core networking protocols from Netware Core Protocol (NCP) to Transmission Control Protocols or Internet Protocol (TCP/IP), marking the start of the Internet, as we know it today. The TCP/IP, which are an entailed system of protocols used for wide area networking were therefore developed to enable communication between different networks and these made the Internet possible (Glister 1993:14).

A protocol is a set of conventions that determines how data will be exchanged between different programmes (Leiner et al., 2012). The development of these protocols made the Internet well established as a technology for supporting a wide community of researchers and developers, and it began to be used by others for everyday computer communications.

The National Science Foundation's (NSF) building of a university backbone called the NSF Network (NSFNet) in 1986 was another important step in the development of the Internet. The Internet was almost entirely unknown outside universities and corporate research departments until the coming of the World Wide Web (WWW) in 1990. The Internet was accessed mostly via command line interfaces such as Telnet that enabled remote login (Hyperdictionary, 2005). The WWW was developed by a programmer (Tim Berners Lee) at the European Particle Physics Laboratory (CERN) near Geneva in 1989. The World Wide Web (WWW) which is often referred to as the 'Web' is one of the services offered by the Internet and allows one to "surf" the Internet through clickable "hypertext links" also called "hyperlinks". The Web therefore organises Internet Information using hypertext links (Tatnall et al., 2002). Since the 1990, the Web has grown to become highly commercial and a widely accepted medium for many things such as advertising, brand building, and online sales and services.

Banks (1997:34) opined that “the Web consists of a worldwide collection of electronic documents” and the name of each electronic document is webpage. The Web’s original spirit of cooperation and freedom has survived this explosive transformation largely with the result that, most of the information available on the Internet is free of charge. The searching activities on the Web is mostly conducted through the use of search engines. Examples of popular and efficient search engines include Google and Yahoo which share common features and are standardised to some extent (Peshave and Dezhgosha, 2005:2). It is important to note that, a document or a file has to be located before a search engine can tell the user where the document or the file is. The key for such navigation through the Web is the uniform resource locator (URL) and browsing is done on the Internet with a Web browser such as Microsoft Internet Explorer and Mozilla Firefox.

While the web, primarily in the form of Hypertext Mark-up Language (HTML) and Hypertext Transfer Protocol (HTTP), is the best-known aspect of the Internet, there are many other protocols in use which support applications such as email, Usenet, chat, remote login, and file transfer. Email is one of the most widely used services on the Internet and it has practically replaced the Postal Service for short written transactions. The email could therefore be described as the direct transfer of letters, memos and documents between computers attached to the same local-area network (LAN) or wide-area network (WAN) (Tatnall et al., 2002).

During the 1990s, the Internet successfully accommodated the majority of previously existing computer inter-networks. The need for inter-network growth is often attributed to lack of central administration of the Internet and its non-proprietary since there is no central computer running the Internet (Tatnall et al., 2002).

The Internet is viewed as an electronic community that interacts for leisure, commerce and research (Davison, Burgess and Tatnall, 2003). The Internet today is a public, cooperative, and self-sustaining facility accessible to hundreds of millions of people worldwide. According to the Internet World Stats (2016) as shown in Table 3.1, the number of Internet users in the world is 7,340,093,980. Asia has the highest number of Internet users in the world, although, their Internet penetration rate is better than Africa only. Internet penetration rate attests to the percentage number

of Internet users in a given population. Although, Africa is the second largest continent in the world, after Asia, in size and population, its Internet penetration is the lowest in the world. As depicted in Figure 3.1, Africa's Internet penetration rate is 28.6% which is below the world average of 46.4%. Africa has the lowest household Internet penetration in the world but there is still a significant increase in the use of the Internet in Africa (Frimpong and Vaccari, 2015:398).

Table 3.1:World Internet statistics

WORLD INTERNET USAGE AND POPULATION STATISTICS JUNE 30, 2016 – Update						
World Regions	**Population (2016 Est.)**	**Population % of World**	**Internet Users 30 June 2016**	**Penetration (% Population)**	**Growth 2000-2016**	**Users % of Table**
Africa	1,185,529,578	16.2 %	**339,283,342**	28.6 %	7,415.6%	9.4 %
Asia	4,052,652,889	55.2 %	**1,792,163,654**	44.2 %	1,467.9%	49.6 %
Europe	832,073,224	11.3 %	**614,979,903**	73.9 %	485.2%	17.0 %
Latin America / Caribbean	626,054,392	8.5 %	**384,751,302**	61.5 %	2,029.4%	10.7 %
Middle East	246,700,900	3.4 %	**132,589,765**	53.7 %	3,936.5%	3.7 %
North America	359,492,293	4.9 %	**320,067,193**	89.0 %	196.1%	8.9 %
Oceania / Australia	37,590,704	0.5 %	**27,540,654**	73.3 %	261.4%	0.8 %
WORLD TOTAL	**7,340,093,980**	**100.0 %**	**3,611,375,813**	**49.2 %**	**900.4%**	**100.0 %**

Source: Internet World Stats (2016)

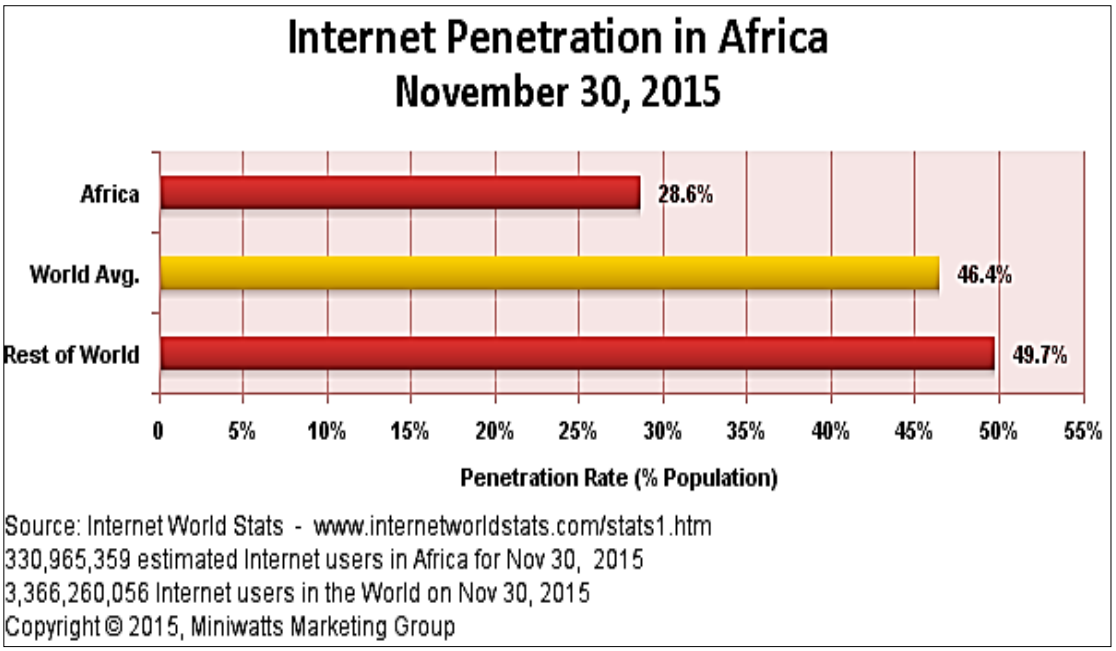

Figure 3.1: Internet penetration in Africa (Source: Internet World Stats, 2016)

According to the Internetlivestats (2016):

> In 2014, nearly 75% (2.1 billion) of all internet users in the world (2.8 billion) lived in the top 20 countries. The remaining 25% (0.7 billion) is distributed among the other 178 countries, each representing less than 1% of total users. China, the country with most users (642 million in 2014), represents nearly 22% of total, and has more users than the next three countries combined (United States, India, and Japan). Among the top 20 countries, India is the one with the lowest penetration: 19% and the highest yearly growth rate. At the opposite end of the range, United States, Germany, France, U.K., and Canada have the highest penetration: over 80% of population in these countries has an internet connection.

In the year 1995, Ghana became the second country in sub Saharan Africa to have full Internet connectivity (Tevie, Quaynor and Bulley, 1996:1). However, the Internet penetration did not progress rapidly until 2006. As depicted in Table 3.2, the Internet penetration rate in Ghana has witnessed significant growth from 0.2% in the year 2000 to 19.6% in the year 2015. In the year 2012, the Internet penetration rate of Ghana was 17.1% and this was higher than Sub-Sahara Africa's average of 15.2% (ITU, 2013).

Table 3.2: Ghana Internet usage and population growth

YEAR	Users	Population	Penetration
2000	30,000	18,881,600	0.2 %
2006	401,300	21,801,662	1.8 %
2008	880,000	23,382,848	3.8 %
2009	997,000	23,887,812	4.2 %
2015	5,171,993	26,327,649	19.6 %

Source: Internet world stats (2016)

3.2.1 Internet and education

All over the world, as opined by UNESCO (2014:59):

> There is a growing body of research, government initiatives, and promising practices which support the view that, when technology is properly implemented in a systemic and coherent way with teachers' commitment and support, then students can develop meaningful knowledge, skills, values and attitudes which can empower them for lifelong learning and gainful employment.

The Internet has within a very short time become one of the effective tools in educational delivery with many countries regarding the understanding and mastering of its basic skills and concepts as essential element of education (Meenakshi, 2013:4). The development and use of Internet and other ICTs in education are providing solutions to enhance traditional delivery modes and pedagogies in the educational sector. Governments all over the world are therefore integrating ICTs in their educational sectors in order to improve teaching and learning by empowering teachers and learners with technology. For example, the Broadband for All Initiative in South Africa is designed to help address technological inclusion by minimising the divide between the connected and unconnected.

The Internet is a major technological tool that provides important opportunities for its adoption and use in educational institutions. The development, acceptability and adoption of the Internet

and other ICTs by countries all over the world provide clear and great opportunities for enhancing quality teaching and learning (Van Reijswoud, 2009). These advancements towards the use of the Internet have changed the methodology of education and this has therefore made the Internet a very powerful tool within the educational sector (Jain, 2016:769). Technological development and increasing growth of the Internet connectivity have also helped in the building of inclusive and participatory knowledge societies as well as access to quality education. Similarly, it has also been found that, successful employment of ICT in education has helped in the promotion of effective teaching and learning (Gholami et al., 2010).

The Internet again provides a vast amount of information for learners and this has also made it the modern engine of progress by having a far more invasive effect on education (Jain, 2016:769). According to Denvir (2016:204), the Internet is offering a platform for information exchange, much of which is freely provided by a number of stakeholders for educational purposes. The development of digital technologies and increasing advancement of the Internet is so vivid that countries all over the world cannot afford to overlook the positive role of the Internet and other ICTs for improved access to education as well as enhancement of educational equity, quality, and relevance (UNESCO, 2014:56). Educators as well as learners are particularly applying an increasing number of learning tools via the Internet for teaching and learning.

During the World Education Forum in Dakar in the year 2000, 164 countries adopted a strategy termed “harness new ICTs to help achieve Education for All (EFA) goals” This strategy stresses the link between education and the Internet and other ICTs as key enablers for sustainable development in the area of education. The strategy also advocates for the affordable use of the Internet and other ICTs towards the bridging of the 'digital divide' (UNESCO, 2014:56) by providing improved ways towards quality teaching and learning. This is in support of Kumar’s (2016:138) study that found that, the Internet and other ICTs over the years were providing new and improved ways of working in education with ICT becoming both a field of study as well as an important dimension in education.

The Internet can therefore be said to offer “previously unavailable options for interaction with information for informal-to-formal learning” (Mills and Angnakoon, 2015:134). Current systems

of education that are empowered by ICT driven infrastructure have a great opportunity of bringing up to the centre stage an ensured academic excellence, quality delivery and management in a knowledge based society (Jain, 2016:769). This stems from the fact that, the Internet is becoming the integral part of education that enlarges society. It could therefore be said that the growing trend of education currently is based on the availability of the Internet and other ICTs in educational institutions. The Internet is therefore serving as an important resource towards development of many areas of knowledge society.

Clearly, the Internet and other ICTs are currently improving teaching and learning and now serve as important tools for teachers in performing their pedagogical roles in educational environments. It is therefore important to promote the development and use of the Internet and other modern technologies for teaching and learning (Kumar, 2016:138). Since the Internet has become an integral part of our knowledge society, the need to embrace it by accepting and adopting the Internet to improve learning and teaching, in this era of modern technological society should be emphasised (Shah and Empungan, 2015).

Mills and Angnakoon (2015:134) opined that the Internet and other "ICT tools provide a choice in options for learning". The Internet has therefore made it easy for learners to acquire the skills they need to progress in their educational career since it motivates the learners to get good thinking skills and remain well informed (Jain, 2016:769). The application of the Internet and other ICTs for teaching and learning promotes educational delivery since it helps in accessing unlimited relevant information through the provision of efficient and effective services to take care of the informational needs of learners (Bede, Termit and Fong, 2015).

The positive impacts of technologies such as the Internet on education has motivated educational institutions to restructure their educational programmes and infrastructure so as to minimise the technological gap in teaching and learning between now and future; this is compelling instructors and learners to adopt and use the Internet and other ICTs in and out-of-classroom works (Kumar, 2016:139). Particularly, the influence of the Internet in learners' lives is too vivid to ignore; thus, it is important for educational institutions to develop and implement policies for the use of the Internet and other ICTs to improve teaching and learning (Meenakshi, 2013:5). Most learners these

days are able to use a computer and the Internet with majority of them using social media platforms for the sharing of information or thoughts among themselves. Instructors have also incorporated the use of the Internet and social media to get in touch with their learners by sharing information and delivering instructions through the technology (Jain, 2016:770).

The current study understands that, the employment of the Internet and other ICTs in education is widespread and are continually and generally regarded as tools that empower instructors and learners to make significant contributions in teaching and learning. This depicts that, learners' achievements and improvement in learning could be linked to the effective development and integration of ICTs in their educational career (Meenakshi, 2013:3).

UNESCO (2014:59) has outlined six strategies that provide enabling conditions for effective implementation of ICTs to contribute to educational development:

- The creation of holistic learning environments;
- Capacity-building and empowerment of students and teachers to use technology in meaningful ways;
- Content and curriculum development to facilitate the integration of ICTs;
- Assessment of authentic learning;
- Addressing the gender gap; and
- Exploiting emerging opportunities such as mobile learning.

3.2.2 Internet and Education in Ghana

Countries all over the world are adopting and implementing strategies that will help make their educational systems very effective and efficient for a desired outcome due to the role education plays in socio-economic development (Victor, 2013). In this technological age, the role of an effective integration of the Internet and other ICTs in education cannot be overlooked by countries both developed and developing since the rapid growth in and constant evolution of the Internet and other technologies have made the world knowledge-driven (Buabeng-Andoh and Yidana, 2015:104). Countries are therefore putting measures in place for the adoption, implementation, and integration of ICT in their educational sector (Prasad, Lalitha and Srikar, 2015). The

development and integration of ICT in Ghana's education is offering teachers and learners the essential tools to help them succeed in teaching and learning (Appiahene, Kesse and Ninfaakang, 2016:22).

Ghana was the first country in sub-sahara Africa to open-up its telecommunication sector resulting in increased growth of ICT infrastructure; and Ghana has over the years made much progress in putting in place measures to accommodate the usage of Internet and other ICTs in the education sector (Opoku, Badu and Alupo, 2016:185). There have been a number of policies and programmes formulations in Ghana towards the making of ICT education accessible to all students because of successive government's recognition of the important role ICT plays in education (Sekyi, 2012). The current policies of ICT usage in education put in place by the government of Ghana aim at employing the Internet and other ICTs towards socio-economic development (Tamakloe, 2014). The ICT competence development in Ghana was therefore planned both as an ICT subject, and as an integral component taught in all subject disciplines (Quaicoe, Pata, and Jeladze, 2016:4889).

The Internet and other ICTs play an important role in development and maintenance of a country's economic growth and Ghana is currently changing the old system of classroom teaching and learning through the development and integration of ICT in its educational system thereby making learners in Ghana become more technology oriented (Appiahene, Kesse and Ninfaakang, 2016:23). The integration of ICT into teaching and learning is seen as a priority by many governments and educational institutions in Ghana (Buabeng-Andoh and Yidana, 2015:105).

The government of Ghana has over the years championed the use of the Internet and other ICTs in education for improved educational outcomes. They have outlined for example "The Education Strategic Plan (2003-2015) and (2010-2020) of the Ghana Education Service" which are geared toward identifying the role and need for ICT in the educational sector to help achieve the aims of the "Education Strategic Plan, which are carved into Access, Quality, Gender and Inclusiveness, and Education Management" (Natia and Al-hassan, 2015:114).

According to the Ministry of Education report (2003), a committee for National ICT Policy and Plan Development was set up in the year 2002 by the government of Ghana for the formulation of

ICT policy. This committee consequently developed the Information and Communication Technology for Accelerated Development (ICT4AD) Policy which was adopted and implemented by the government of Ghana. The policy outlined the plans and strategies in a framework of how ICTs can be used to facilitate the national goal of "transforming Ghana into an information and knowledge-driven ICT literate nation" (ICT4AD, 2003). This policy provided the basis for Ghana's vision for the information age and was part of the "Government of Ghana's commitment for a comprehensive programme of rapid deployment, utilisation, and exploitation of ICTs within educational sector and other sectors in the country" (Buabeng-Andoh and Yidana, 2015:105).

The objective of the policy was to improve human technical expertise and the training of instructors and experts in the use of the Internet and other ICTs in education. The policy takes into consideration the provision of key socio-economic development frameworks which are contained in Ghana's Vision 2020. The ICT4AD policy also outlined 14 cardinal pillars and the promotion of ICT in education was the second pillar, which projected "the deployment and exploitation of ICTs in education" as a priority and the focus was on prioritising training, research and generation of resources for expansion of ICTs (Natia and Al-hassan, 2015:114). The Government of Ghana through the Ministry of Education in furtherance to the ICT4AD policy, on the basis of promoting ICT in education, set up a committee for the review of the whole educational system to recommend ways for the integration of ICTs in Ghanaian education.

The committee worked under the theme "Meeting the challenges of education in the twenty-first century" and made recommendations on educational reforms that were technology driven. The recommendations of the committee propelled the Ministry of Education to formulate a draft policy called "ICT in Education Policy" in the year 2008. The framework of the policy prescribed how the Internet and other ICTs should be introduced and implemented in senior high schools in Ghana in order to meet the challenges of education in the global information age (MoE, 2008).

The objective of the policy was

> To enable all Ghanaians including teachers and students in either the formal, informal and non-formal systems to use ICT tools and resources to develop requisite skills and

> knowledge needed to be active participants in the global knowledge economy at all times (MoE, 2008:28).

The policy proposed the introduction of ICT as both a core subject and elective subject in schools. In addition, the policy proposed the integration of the Internet and other ICTs to support educational management as teaching tools for all subject areas as well as administrative functions (Buabeng-Andoh and Yidana, 2015:105).

The Ministry of Education as a way of examining and establishing "the extent to which ICTs are being exploited and deployed to facilitate education and training efforts within the country" conducted a study in 2009 under the theme "e-Readiness Assessment of second-cycle institutions in Ghana" (MoE, 2009:22). The study revealed that there existed inadequate ICT infrastructure such as lack of computers and Internet access in most of the senior high schools across Ghana; hence the need for measures to be taken in addressing them. The level of computer literacy as revealed by the survey was also low in the country and was identified as a major factor limiting the use of the Internet and other ICTs in education.

Similarly, the Basic School Computerisation policy was launched in the year 2011 by the government of Ghana through the Ministry of Education for the introduction of computers and e-learning into the entire education system. The Ministry of Education in 2012 therefore through a partnership with an ICT company in Ghana, 'rLG' introduced the "teacher laptop and ICT project" where teachers were trained in ICT and equipped with laptops to help in research, teaching and learning across a variety of subject areas (Natia and Al-hassan, 2015:114). These policies by the government of Ghana have helped in the development and integration of the Internet and other ICTs in the educational system of Ghana.

In addition to making the teaching and learning of ICT a compulsory subject across all levels of education in Ghana, there also exist national programmes that have been created to integrate ICT into teaching and learning especially in the universities to mitigate problems resulting from the large enrolment of students at that level (Sarfo and Ansong-Gyimah, 2010). Sekyi (2012) maintained that, the speed with which ICT is developing in the educational sector of Ghana and its impact on socio-economic activities cannot be overemphasised. The Internet and other ICTs

are driving national development efforts globally and Ghana is exploring ways of facilitating their development process through the development, deployment and the exploitation of ICTs in its educational system (Buabeng-Andoh and Yidana, 2014:1282).

The integration of the Internet and other ICTs in Ghana's educational system is not without issues since lack of access to appropriate technologies exists in most places and in most schools, thereby hampering the effective use of the Internet and other technologies by teachers and learners for teaching and learning (Appiahene, Kesse and Ninfaakang, 2016:23). Schools in Ghana are provided with digital service opportunities, such as electricity, free ICT skills training for teachers and free ICT tools and infrastructure for schools, but in reality, not all of these services are available in all the schools in the country. For example, some schools are yet to have Internet access and some teachers are not yet trained for ICT skills (Quaicoe, Pata, and Jeladze, 2016:4889).

The Government of Ghana recognises the need for ICT in education; however, the state of ICT infrastructure and tools in the educational sector of Ghana are not encouraging as access to Internet and other ICTs are below standard making it difficult for the effective use of the Internet for teaching and learning; This is because “many of the schools especially do not have ICT tools and equipment and the few schools with ICT tools and equipment complained of inadequacy” (Natia and Al-hassan, 2015:122).

In Ghana, studies have shown that, teachers’ access to ICT tools is better as compared to learners (Quaicoe, Pata, and Jeladze, 2016; Natia and Al-hassan, 2015). This could probably be due to computers made available to teachers who are pursuing distance education and the distribution of laptops to teachers by the Ministry of Education through the “teacher laptop and ICT Project”. Although, teachers’ access to ICT tools such as computers are encouraging, it has been revealed that, their ability to use them for teaching is weak; thus, the ability and capacity of teachers to effectively perform through the use of the Internet and other ICTs is low due to lack of regular training and poor Internet access (Natia and Al-hassan, 2015:123).

3.2.3 School library and Internet Acceptable Use Policies

The school library in many institutions serve as a technology hub that "meets many different learning needs and preferences, such as working alone, working with others, relaxing, and positive socialising with the school librarian, teachers and other students" (Harper, 2017:51). Librarians in schools are therefore expected to aid overcoming the difficulties of digital literacy since information professionals are well situated to "shape curricula to accompany changes in Internet access policy and to help students acquire the digital-literacy skills they need" (Batch, 2015:66). The need for a school library policy is crucial since it serves as the foundation of a professionally managed library resource centre (Turner, 2006:59). Policies are defined "as principles or rules that are intended to shape decisions and action" (Bosco, 2011:3).

A school library policy is viewed as the "backbone of all other policies, such as development plans, and is the philosophy for the strategic management of each individual school library" (Turner, 2006:59). Tilke (1998:14) asserted that a "school library policy is a definition of the role of the school library". The school library provides physical and virtual resources for learners' academic, personal and emotional needs, thus, "policies and procedures for using the school library facility and its resources should be thoughtfully developed in order to promote use of the library space and its resources" (Harper, 2017:51). The School Library Manifesto designed by IFLA/UNESCO (1999) emphasises that "the policy on school library services must be formulated to define goals, priorities, and services in relation to the school's curriculum." Thus, a school library should be coped "within a clearly structured policy framework that recognises the library as a core resource and centre for reading and inquiry (IFLA, 2015:22).

A school library policy is the basis on which the growth of the library is built and it concentrates on the effective use of library and information-based resources to provide "the curriculum and the promotion of life-long and independent reading and learning" (Mojapelo, 2015:44). Knuth (1995:290) argued that an effective policy of a school library has the ability to push development onward and "non-existent or poorly devised policy hinders development at every phase from conceptualisation, planning, implementation through qualitative improvement efforts.

Particularly, policy of a school library standardises provisioning and indorses focused intervention (Du Toit and Stilwell, 2012:124). It is important to note that, the existence of a library policy does not generally assure the development of well-organised and functional school libraries, however, "its inherent value cannot be over emphasised" (Mojapelo and Dube, 2014:3). Turner (2006:60) advocates that the school library policy must not be a sizeable document, but "it should be a clear and concise summary of what the library currently does in the school and its aspirations".

A good policy acknowledges and outlines policy problems clearly, and because the "school library policy is embedded in education it should take into account educational frameworks such as outcomes-based teaching and learning" (Du Toit, and Stilwell, 2012:128). The school library policy therefore needs to provide the conclusive realistic statement of the status of the library and its staff and the "fact that a school has an operating library means that there is some formal or informal policy about it" (Turner, 2006:60). The IFLA/UNESCO's (2002:3) School Library Guidelines asserted that "the school library should be managed within a clearly structured policy framework".

Since the school library policy is founded on the objectives of the school library, individual libraries need to have a policy to reveal their own unique culture because a school library policy serves as "a written statement of the aims and functions of the school library" (Turner, 2006:60). A policy of a school library should reflect a dedication to equal access and foster use of the library rather than dissuade since "policies should facilitate the equitable use of the library by all students" (Harper, 2017:51).

According to Turner (2006:61-62), the school library policy shows good library management and thus serves the following purposes:

- It can be used as a tool of advocacy that explains the role and function of the library and librarian in the wider school environment to all stakeholders in the school.
- It helps in overcoming confusion about how the library can assist teachers, learners, other staff, and parents.
- It demystifies the library to its users by clearly outlining its aims and objectives.

- The status of the librarian and the place of the library in the school can be clarified by a policy that has been authorised by senior management and disseminated to stakeholders.
- If the policy is the core philosophy of the library, problems of misuse of the library and misconceptions about the librarian's role can be authoritatively solved.
- It also demonstrates the strategic management skills of the person producing the policy and so can raise his or her profile in the school community.

The growth in Internet usage in libraries and schools are compelling school administrations to struggle with appropriate policies to regulate its acceptable use and future developments (Sun and McLean, 1999:1). However, policy limitations "ought to be addressed and accommodated in such a way that the policy will make allowances for new developments and anticipated change" (Du Toit and Stilwell, 2012:128). Bosco (2011:2) argued that, ICT policies in schools have two dimensions: ensuring that "students are protected from pernicious materials on the Internet" and enabling "student access to the extensive resources on the Internet for learning and teaching". An Internet Acceptable Use Policy (AUP) stipulates these two dimensions and it provides, in some cases, legal rules that lessen the chance of conflicts. These polices are therefore to ensure guidelines, rules, reasonable procedures, non-discriminatory and neutral viewpoint restrictions on Internet access and computer use at school (Batch, 2015:63).

An AUP for a school Internet facility is a written agreement that outlines the terms and conditions for Internet use and this document precisely "sets out acceptable uses, rules of online conduct and access privileges as well as covering penalties for violations of the policy, including security violations and vandalism of the system" (Sun and McLean, 1999:7). To corroborate, Batch (2015:63) asserted that the "policy should advise Internet users of their rights and responsibilities and should describe unacceptable behaviours, the penalties for violations, and how to appeal a decision imposing a penalty". These attest to the fact that schools' Internet AUPs concentrate on preventing harm to learners or misuse of the schools' Internet facilities and in many cases, the viewpoint of the AUP seems to suggest that the Internet facilities contain more risks than advantages (Bosco, 2011:3).

In 2003, the UN ICT Task Force envisaged the problems and difficulties growing economies faced in planning for the incorporation of ICTs into national education and training systems and their recommendation resulted in the birth of Global e-Schools and Communities Initiative (GESCI). The GESCI has over the years engaged in expert provision of ICT Policy advice and strategic planning for Information and Communication Technology for Education (ICT4E) and development by working closely with government partners to improve the ability of future developers of education policy to "develop and implement policy and strategy that cost-effectively utilises e-learning with the objective of improving the quality of, and access to, education at the primary, secondary and vocational levels" (GESCI, 2014:2).

In 2006, the GESCI commenced the Ghana e-Schools and Communities Initiative as the framework for all ICT in Education initiatives in the country. The GESCI through this initiative assisted Ghana Ministry of Education to create its first ever Curriculum Framework in 2009. Other beneficiaries of GESCI initiatives and interventions in Africa are Kenya, Namibia, and Rwanda.

The NEPAD e-school's initiative is also another intervention towards the development of ICT policies and infrastructure with the aim of imparting ICT knowledge and expertise to young people of Africa in primary and secondary schools. The implementation approach of this initiative is based on "continental coordination and national implementation" (Kinyanjui, 2007:180). Hence, this initiative has helped many African countries such as Algeria, Burkina Faso, Ghana, Lesotho, etc. to improve on their ICT delivery and policies in schools.

The most common policy stand of school management and administrators on Internet use by learners is the reliance on blocking and filtering to remove access to harmful sites and others basing their policies on the "premise that children need to learn how to be responsible users and that such cannot occur if the young person has no real choice" (Bosco, 2011:3). McPherson (1997) as cited by Sun and McLean (1999:8-9) proposed that an Internet AUP for a school should include the following components:

- **Privilege**- The use of the Internet by a student in school is a privilege, and not a right that can be suspended if unacceptable behaviour occurs. The school reserves the right to make

all final decisions on what is considered inappropriate use of the Internet within the school classrooms or labs.

- **Etiquette**- Most students bring little experience in Internet usage to the classroom, so rules of etiquette should address
  a). appropriate language;
  b). politeness; and
  c). privacy.
- **Security**- A lost or stolen password, trying to access another individual's account, or destroy the data of another are all security breaches.
- **Vandalism**- Any malicious attempt to create, upload, or download any computer virus; deliberate and wilful acts to damage equipment or software; delete nonpersonal files, to hack, or any attempt to break into another system constitutes vandalism.
- **Legal issues**- Violation of copyright laws, stealing of data or access codes, defamation and privacy have legal consequences.
- **Warranties**- Schools should not be held accountable for the loss of data, service interruptions, mis-deliveries, non-deliveries, or the accuracy or quality of information obtained.

Hanson (1997) and IFLA School Library Guidelines (2015:22-23) asserted that school administrators, librarians and ICT officers should develop and implement Internet AUPs. Critical to the accomplishment of AUP policies is the sense of possession of the policies by their major target - learners. In this case, possession necessitates that learners "understand the policies, the reason why they are put in place, and accept them" since learners' involvement in policy formation can assist in generating learners "buy in" (Bosco, 2011:3). Turner (2006:68) also advised that, "for a school library policy to be effective, it needs to be produced in consultation with internal and external professionals and agencies" (Turner, 2006:68). It is therefore important to add that, once the school library policy is adopted, all staff and learners should be trained in appropriate implementation for its success (Batch, 2015:66).

In developed nations, "such as the United Kingdom (UK), the United States (US) and Japan, schools have functional libraries because they are guided and directed by clearly defined school

library policies and guidelines" (Mojapelo, 2015:46). Many researches have stressed the need for African countries to develop national legislated policies on school libraries to promote the development and growth of libraries since it is a crucial tool in rolling out effective school library and information services (Stilwell, 2009; Du Toit and Stilwell, 2012; Hart, 2013; Mutungi, Minishi-Majanja and Mnkeni-Saurombe, 2014; Paton-Ash and Wilmot, 2015).

Lack of a school library policy impedes the efforts and initiatives required for effective provision of information services at school (Hart, 2013; Stilwell, 2009). In South Africa, school library policy development "seems to be a series of missed opportunities and even though the process has been ongoing", there is the need for such policies to address inequalities as well as contribute to change in order to "promote the development of school library services" (Du Toit and Stilwell, 2012:125). According to Le Roux (2002:11), "the absence of national school library policy guidelines is of great concern to the school library profession as this has an adverse effect on the provision of school library services and curriculum reform initiatives in South Africa".

Many countries in Africa are not having functional school libraries and a major contributing factor to this is lack of national school library policies in these countries. A legislated school library policy helps in fronting the organisation and sustainability of standardised and well-stocked practical libraries in schools (Hart, 2013 and Paton-Ash and Wilmot, 2015). A study by Du Toit and Stilwell (2012) found that, efforts and initiatives towards the enactment of school library policies in Namibia and Swaziland had not been encouraging. In Botswana, Baffour-Awuah (2002) opined that development of school libraries are hindered due to lack of a national policy to outline standards in guiding a national foresight towards school library development. Mutungi, Minishi-Majanja and Mnkeni-Saurombe (2014) also in their study bemoaned the negative effects of lack of a legislated school library policy in Kenya. In Uganda, Magara and Batambuze (2009:142) asserted that, there are setbacks in the establishment and development of functional school library development due to lack of a legislated policy on school libraries.

In Ghana, the situation with school libraries and their policy formulation is not much different from what prevails in other African countries (Omenyo, 2016:24). Studies have found that, many schools do not have well-resourced and functional libraries due to lack of a legislated policy to

regulate the establishment of libraries in schools (Donkor, 1999; Amavi, 2008; Bentum, 2012). The GESCI and Nepad e-School initiatives assisted the Ghana MoE with policy frameworks on ICT developments in schools but these policy frameworks are yet to be legislated. Lack of a legislated school library policy in Ghana has made it possible for some schools to operate without providing for functional school libraries (Alemna, 2000; Alemna, 2002; Banbil, 2011).

Although the establishment and development of school libraries in Ghana have not been fully achieved partly due to government's lack of commitment in the establishment of library policies and guidelines, many schools that have libraries have also failed to develop polices and AUPs to regulate the management of these libraries and their resources (Agyekum and Filson, 2012; Omenyo, 2016).

3.3 Internet access of high school learners

The Internet seems to be the most preferred source of information for high school learners worldwide and studies in the advanced countries have found that, most learners started accessing the Internet at a very young age (Czerniewicz and Brown, 2010:367; Malliari, et al., 2014:272). Accessing the Internet for online information provides the advantage of a faster access as well as extensive information pools and these advantages compel many learners in high schools to regularly search for information on the Internet (Sugihartati and Harisanty, 2014:25). It is evident that, the Internet could be accessed everywhere including homes, shops, schools, and in public places such as airports, hospitals and many other places.

Although the nature of high school learners' access to the Internet has dramatically changed over time, it is estimated that over ninety percent of learners in the USA are online and this percentage has been consistent since 2006 (Madden, et al. 2013:3). More than 85% of learners in the advanced countries are believed to access the Internet several times a day with over 80% of them having a personal computer (98.5%) and more than 70% accessing the Internet from their homes (Montagni et al., 2016:3). Shiweda (2013:23) had also asserted in her study that, many learners in developed countries live in homes that are connected to the Internet thus are able to access the Internet from home. This wide availability of Internet has made it easy for high school learners to reach the information they need easily and this ease of reach has to a large extent brought along changes in

the information seeking and retrieving behaviour of learners since information on the Internet is "almost free moneywise" (Özmen, 2015:779). Access to the Internet has therefore, undoubtedly, changed learners' information behaviour (Sharahi et al., 2014:615).

Shiweda (2013:22) in her study maintained that the

> Internet has become an essential component of every library, allowing it to function as a gateway to vast reserves of dispersed information and thus transforming the way students, scholars and librarians think about collections and service.

She further opined that most learners in Namibia access the Internet from their school libraries and this has changed how learners view the collections and where they can find information. Studies have established that, most high school learners are able to access the Internet at their schools and the infrastructure for Internet access in these educational institutions is primarily located in the institutional libraries, computer laboratories and offices (Nkomo, 2009; Krige, 2009). It is also evident that, the use of personal computers for Internet access is also increasing among learners (Malliari, et al., 2014).

It is also becoming increasingly common for high school learners to use a mobile device as their primary means of accessing the Internet (Atwood, 2016:8). Smartphone usage and adoption among learners have "increased substantially and mobile access to the internet is pervasive and one in four [teenagers] are 'cell mostly' internet users, who say they mostly go online using their phone" (Madden et al., 2013:1-2). Although, earlier studies have shown that a number of high school learners had a computer or had access to one at home, it was clear from those studies that, majority of the learners were accessing the Internet via cell phones, tablets and other mobile gadgets regularly since majority of them were having smart phones that gave them access to the Internet. (Atwood, 2016:93; Combes, 2009:36). Mobile phones have therefore significantly improved learners' access to the Internet since they provide the opportunity for learners to access content with mobile Internet or Wi-Fi even in times when electricity is off (Grimus, 2015:113).

A common perception is that, most high school learners are using smartphones all the time since more than two-thirds of these learners have their own smartphones. A study by Rideout (2015;15), however found that, almost all the learners who had smart phones accessed the Internet via their

phones every day, and in any given day, they spent an average of 3 hours accessing the Internet. The use of smartphones to access the Internet can therefore be said to afford high school learners more flexibility and ability to work and communicate anywhere, anytime, and space.

3.3.1 Accessing the Internet via mobile phones

Mobile phone abundance is changing Internet access dramatically for learners all over the world (Porter et al., 2016:23). Accessing the Internet through mobile phones has become part of peoples' daily lives and it has been found that the use of mobile phone for Internet access "in a learning system is very effective especially in the secondary and higher secondary level students" (Hasan et al., 2016:52-53). Particularly, the use of mobile phones by young people for Internet access has increased significantly across Sub-Saharan Africa over the last decade (de Bruijn, Nyamnjoh and Brinkman, 2009; Porter et al., 2012). Mossberger, Tolbert and Anderson (2017:1587-1588) maintained that "the Internet is increasingly mobile, as the surge in ownership of Internet-enabled smartphones indicates" and people who frequently access the Internet through mobile phones "tend to be young".

Currently, users have adopted the use of mobile phones for Internet access at a faster rate than any technology device (Meeker and Wu, 2013, Farago, 2012). Clearly, most mobile phone users relish many forms of Internet access and accessing the Internet through cell phones provide them advantages of mobility and portability which in some ways afford "even greater convenience and more continuous use" (Mossberger, Tolbert and Anderson, 2017:1589).

Most learners access Internet through mobile phones because they are less expensive than laptop and desktop computers (Mossberger, Tolbert and Anderson, 2017:1589). Nevertheless, mobile phones compare to laptop and desktop computers have small screen sizes and keyboards that make them difficult to use for many online activities (Goldman, 2012; Wortham, 2011). A study by Smith and Page (2015:15) found that almost half of users who accessed the Internet via mobile phones had difficulties in accessing online contents.

3.3.2 Studies related to Internet access of High School learners

According to Rice et al. (2015:756-748), more than ninety-five percent of high school learners in the United States of America (USA) use the Internet, with more than half of them accessing the Internet several times within a day. Additionally, majority of these learners have their own cell phones connected to the Internet and thus access the Internet exclusively from their phones and this allows them more private Internet use. Their study further revealed that homes of high school learners were the highest-rated Internet access point since one-third of them accessed the Internet from their cell phones mostly at home.

In addition, it is reported that about one-third of high school learners in the USA used the Internet for at least one hour in a given day, while less than 3% reported never using the Internet. A study by Rideout (2015:56) in the USA showed that, about ninety percent of high school learners had either a laptop or computer at home and most of these gadgets were connected to the Internet. However, majority of these learners according to the study preferred using their smart phones as Internet access points. High school learners in the USA who were using smartphones as their primary Internet access point were likely to spend more time online than learners using computers (Atwood, 2016:94).

The three studies conducted in the USA (Rideout, 2015; Rice et al., 2015; Atwood, 2016) depict that most high school learners have regular access to the Internet both at home and school. This could be attributed to the technological advancement in the country. Although, learners were found to spend more time accessing the Internet in a day (Rideout, 2015; Atwood, 2016), it was also evident from the study (Rideout, 2015) that learners spend lesser time accessing the Internet. These contradictions could stem from the fact that both studies were state-based studies (Rice et al.'s study in Los Angeles and Atwood's study in Utah), whiles Rideout's study was countrywide. It is important to note that, these studies were conducted among learners who live in a developed country with much improvement in their ICT infrastructure. The current study therefore brings different perspective into learners' access to the Internet since it was conducted in an environment (Ghana) that has a technological advancement gap compared to the USA.

According to Herout (2016:1057), it is quite common that high school learners are better equipped than their instructors in relation to Internet access and competencies since modern technology is mostly used by the youth on a daily basis. His study among learners in Czech Republic revealed that, about 90 % of learners owned a mobile phone and thus accessed the Internet via their phones. On average, most of the learners accessed the Internet at early stages of their lives and about 75% of them were able to access the Internet on their devices freely as they wished (Herout, 2016:1062).

Borca et al.'s (2015:52) study in Italy among high school learners found that, over 90% of learners had personal computers at home with majority of them accessing the Internet every day. The study further indicated that, only 11% of learners surfed the Internet for less than an hour each time, while 52% surf the Internet for 1 or two hours each time, and 30% of learners surfing from 3 to 6 or more hours each time.

According to Malliari et al. (2015:273), majority of high school learners in Greece were exposed to the use of the Internet at the Primary School level. Their study among high school learners depicted that, almost all learners in Greece had Internet access in their schools with more than 85% of them having access to the Internet in their homes. Regarding computer and Internet use, almost 50% of learners spent between 1 and 3 hours per day using the Internet. The study further indicated that male learners were heavier users of the Internet than female learners.

The European countries, Italy, Greece, and Czech Republic have good ICT infrastructure compared to Ghana. It is therefore not surprising to find learners been exposed to the Internet in these countries at early stages of their lives. However, the studies found that majority of learners in Greece and Italy were exposed to the Internet at early stages of their lives (Malliari et al, 2015; Borca et al., 2015) as compared to learners from Czech Republic (Herout, 2016). Although, all the three countries are located in Europe, the contradictions in learners' Internet exposure age could be attributed to the fact that there exist technological gaps among countries in Europe.

In Africa, a study by the University of South Africa (UNISA) Bureau of Market Research (2012) on "Cell phone living and learning style among secondary school learners in Gauteng", South Africa showed that, about 90% of high school learners had their cell phones connected to the

Internet, whereas more than half of learners had access to the Internet on their personal computers. The study maintained that, high school learners' access to the Internet via their cell phones helped them complete their class work and assignments; thus learners' reliance on the Internet via cell phones was motivated by their frequent searches for subject related information to assist them in the completion of their school assignments. The prevalence of cell phone usage among high school learners in South Africa as revealed by the study depicts the popularity of Internet access via cell phone among learners. Particularly, the study highlighted that cell phone usage among learners were not restricted in South African high schools. In Ghana however, learners were not allowed to use mobile phones at school. Thus, the current study highlights how or the space learners in Ghana were able to access Internet via cell phones since high schools in Ghana do not allow learners to use cell phones at school (Grimus and Ebner, 2016).

Another study in South Africa by Czerniewicz and Brown (2013:48) also showed that, most learners from disadvantaged backgrounds and areas without infrastructure such as basic electricity were not able to afford devices such as personal computers due to financial constraints. They further stated that such 'poor' learners in South Africa accessed the Internet at community centres, work places, schools, and libraries. The current study again brings to light if learners in Ghana were able to access the Internet in public spaces as revealed in the study conducted in South Africa.

In Namibia, there exist an EduNet initiative which is a public/private partnership between the Xnet Development Alliance Trust (Xnet), Telecom Namibia and the Ministry of Education and the core function of this initiative is "to provide affordable, reliable and equitable connectivity and access to information for all educational institutions". Internet access for learners is therefore made possible through EduNet, ExNet, Telecom and the Ministry of Education. This initiative has connected more than 300 schools to the Internet making majority of learners in Namibia able to access the Internet from school. The government of Namibia also in 2012 announced "free Internet access provision to schools, other educational institutions, clinics, hospitals and free use of Internet access at libraries" which serves as key components for a pro-poor approach in providing "learners and citizens with access to electronic information and e-governance service'" (eLearning Africa, 2012).

Moreover, a study by Shiweda (2013:62) among high school learners in Namibia also revealed that learners' access to the Internet via cell phones was on the increase, however, the use of the cell phones to access Internet mostly occur after school hours and during weekends.

A study by Tayo, Thompson and Thompson (2016:2-3) in Nigeria also showed a significant number of high school learners having neither a personal computer nor laptop. The study further found that, majority of these learners in Nigeria were accessing the Internet through Cybercafés or cell phones. Personal ownership of computers and personal Internet access were mostly therefore available to learners in Nigeria via cell phones and Cybercafés.

Studies in Africa on high school learners access to the Internet as depicted in Namibia (eLearning Africa, 2012; Shiweda, 2013), Nigeria (Tayo, Thompson and Thompson, 2016), Uganda (Ybarra et al., 2008), Tanzania (Benard and Dulle, 2014), etc. clearly highlighted lack of Internet infrastructure at high schools. The challenge of Internet accessibility and adequate Internet infrastructure for learners at high schools as revealed in these studies seemed to be a common problem in Africa. However, these studies depict that different approaches were employed by governments and institutions to solve these challenges. For example, In Namibia, there existed a direct government intervention in tackling this deficiency through EduNet initiative (eLearning Africa, 2012), while direct government's intervention seemed absent in Nigeria (Onuoha, Joye and Uwannah, 2013). Particularly, these studies highlight the challenges faced by learners; the current study looked beyond these challenges by highlighting how high school learners in Ghana were accessing information on the Internet in the midst of these challenges and prescribing ways of improving learners' Internet information behaviour.

The literature has made it clear that governments in Africa are making efforts in the development of ICT in education. For example, the Broadband for All Initiative in South Africa, the Edu Net, and ExNet in Namibia as well as the ICT4D in Ghana are all geared towards the development of ICT in education. It is however clear that the approaches differ from country to country.

3.3.3 Internet access of high school learners in Ghana

High school learners in Ghana are now of a generation that can be described as Internet savvy since it is common to see most educational institutions connected to the Internet and providing Internet access to educators and learners (Frimpong and Vaccari, 2015:398). The interest of accessing the Internet among high school learners in Ghana keeps increasing (Akom, Asante and Adjei-Frimpong, 2016:21).

Clearly, knowledge acquisition in ICT through the educational system of Ghana as well as Internet availability across the country are being capitalised upon by learners who own smart phones or other mobile devices for accessing the Internet in their homes, schools and public places (Kwabia, 2015:4). The ownership of mobile devices among high school learners in Ghana has reached a sufficient range for integration in educational activities since more than 80% of learners own either a mobile phone or tablet with Internet connection (Grimus and Ebner, 2016:9). Similarly, most high schools in Ghana have well equipped computer laboratories with some of them having Internet access for learners coupled with about 40% of high school learners in Ghana living in homes that have access to the Internet (Akom, Asante and Adjei-Frimpong, 2016:21).

Although, majority of high schools in Ghana have well equipped computer laboratories (Akom, Asante and Adjei-Frimpong, 2016:22), "low number of computers and poor maintenance resulting in uncountable virus attacks, insufficient connectivity, frequent power outages makes it nearly impossible" for most high school learners to access the Internet via their schools' computer laboratories and this compel learners to use mobile devices to compensate for the limited access to computers and Internet (Grimus and Ebner, 2016:12).

Internet use among learners in Ghana is officially limited to computer laboratories during school hours in high schools (Grimus and Ebner, 2016:14-15). However, limitation of computers with Internet access motivate learners to access the Internet via their mobile devices when they get the opportunity.

3.3.4 Purpose(s) of accessing the Internet by learners

Using the Internet to search for information remains one of the most popular web activities for learners since the Internet provides an additional information channel (Eynon and Malmberg, 2012). Learners use the Internet to search for answers on their own and keep themselves current on important topics through use of online information (Mills and Angnakoon, 2015:136). Learners are the most frequent and widespread users of the Internet and they use the Internet to access knowledge and information (Akar, 2015:36-37).

They do not only use the Internet for information and knowledge acquisition, but they also use it to engage their friends in social conversation and participate in cyber communities (Ito et al., 2008). The purpose of accessing the Internet among high school learners is therefore not limited to information searching since they also use it for communicating through electronic mail and social media platforms (Adeyemo, 2016:91). A study by Akar (2015:48) among high school learners concluded that using the Internet for educational purposes among learners is low, thus "infrequent" among adolescents. Similarly, it is established that learners mostly interact with their peers through the Internet as well as share information on the Internet with posts and tweets (Mills and Angnakoon, 2015:136).

Learners mostly use the Internet for socialisation and general culture since learners tend to manage their relationships via the Internet rather than in real life and this compel them to feel the need to use the Internet for communication and social interaction (Akar, 2015:47). Learners' level of Internet usage in finding information as well as in learning dimensions are found to remain at a low level as compared to using the Internet for communication (Rahardjo et al., 2016:33-38). Studies have found that, learners spend considerable time using the Internet to engage in activities such as communication and social interaction (Adetoro and Sodipe, 2013).

In contrast to Akar's study, Lo and Ahmadian (2014:53) found that, high school learners frequently access the Internet mainly for educational purposes such as class assignments. A study by Malliari et al. (2014:276) among high school learners on the other hand revealed that, only one third of learners were accessing the Internet for both personal and educational reasons with more than half of them accessing the Internet only for personal reasons. Another important purpose for learners

on the Internet is to maintain social relationships (Gauducheau, 2016:45). The Internet is therefore not only continually providing learners "with information but also enabling them to connect with one another and express and share their viewpoints and emotions" (Kim and Yang, 2016:438).

3.4 Conceptualisation of online information needs of high school learners: introduction

This section contextualises the online information needs of high school learners. The study and conceptualisation of online information needs require firstly the understanding of the concepts of 'information' and 'information needs'. The concept of information needs varies from one group to another thus this section contextualises the information needs of high school learners. This attests to the fact that, this section mainly focuses on the literature concerning the online information needs of high school learners. Thus, this section begins with the review of literature on the concepts of 'information' and 'information need' and then moves on to the discussion of online information needs. It is important to note that the terms 'information' and 'information need' were earlier clarified in Chapter One so as to contextualise the implication for the online information needs of high school learners.

3.4.1 Information

Information is an essential part of all facets of life and its acquisition and understanding serve as important raw material in decision making, policy formulation and implementation for growth and survival (Urhiewhu, Okeke and Ukoma 2015:88). The ability to make effective and efficient "use of information brings about individualistic and societal gains that have direct impact on the" lifelong learning competencies of all persons - including learners - as well as skills needed for the critical use of information (Al-Aufi, Al-Azri, and Al-Hadi, 2017:1). The term 'information' made an early appearance between 1372 and 1386; hence information is an old English term (Schement, 1993:177).

Information is essential to societal development and without adequate information, much cannot be achieved especially when making a decision or acquiring knowledge. Wang (2015:773) rates information as the number two level of cognitive objects that embodies the semantics of data or facts collected from the real-world and yielded through mental processes. He further rates it as the

third essence to matter and energy for modelling the natural world. Information is therefore valuable since it affects the behaviour of users when taking critical decisions in relation to outputs (Mishra et al. 2015:3). Moreover, "without information no adjustment to nature is possible for either mankind as a whole or an individual" (Elyakov, 2010: 64). Information is therefore the crucial weapon for developing a community or a society (Mishra et al. 2015:3).

Although information is vital in all aspects of human activities, it does not have a single definition applicable for all human activities at all times (Wilson, 2006:659). The definition of information usually involves words such as data and knowledge (Sanders, 2016:223). The concept of information is therefore closely related to these two concepts: data and knowledge (Case, 2012:47).

It is not surprising that confusion sometimes arise when these three concepts – data, information and knowledge – are used because the definitions for knowledge to a larger extent elicit words like data (facts) and information, thus, explanations of these concepts complete an unproductive circle of definitions (Sanders, 2016:223). It is therefore difficult to avoid confusion when using these three concepts of data, information, and knowledge interchangeably (Brown and Duguid, 2000:2). Similarly, "knowledge and information collapse each other" when defining them (Frické, 2009:140).

Data is from the Latin word *datum* which means a fact as well as a premise (Stoll, 2016:2). "Measurements and representations of the world around us" can be described as data (Ikoja-Odongo and Mostert, 2006:146). Data can therefore be defined as a set of objects or facts that is seen as the raw material for the creation of information (J¨ager et al., 2015:115). This implies that, data is not the better option always but the "raw material" for creating the better option (Cong and Pandya, 2003: 26). According to Sanders (2016:223):

- Data is not the same as information.
- The so-called information overload is in fact a data overload.
- Observation: Unorganised data is of little value.
- Data is independent of a relationship (just numbers or words) until it is linked then it becomes knowledge.
- Data often requires context to make knowledge.

Although Sanders (2016:223) maintained that information overload is actually data overload, studies have shown that there exists much difference between data and information (Stoll, 2016; J¨ager et al., 2015; Wang, 2015). Sanders (2016:223) believe that information is a transformed data hence the data that makes no meaning to the user is the "so called information overload" but Savolainen (2015:619) maintained that not all information are helpful to users; and users quest to access information to satisfy their information needs end up getting information that are not useful to their needs and this is categorised as information overload. He further opined that the vast amount of information on the Internet makes it a potential source of information overload. In support, Braasch et al. (2013:180) asserted that questionable information sources produce information overload since they have the potential of producing unuseful information.

Information on the other hand is from the Latin word *informatio* which means formation or conception and it is the principle stem of where to inform (Stoll, 2016:2). Information is a form of abstract objects, that is perceived by human brains and represented by communication and cognitive systems; thus, anything intangible that the brain may acquire and process or any data that a computing/communication system may manipulate and convey (Wang, 2015:773). This attests to the fact that, data through a process of change is systematically arranged and processed to become information (Giannetto and Wheeler, 2000:3). Information therefore consists of data (J¨ager et al., 2015:115) and it is regarded as "data that has been gathered, processed, and analysed to provide a useful result" (Case, 2002:62).

Knowledge, however, involves belief and truth as well as logic and proof; thus, it "is not the symbolic representation derived in a model from information received, but the emitted response, which, ambiguously, can also be spoken or written words" (Sanders, 2016:223). This sometimes becomes the source of confusion between knowledge and information since it can be argued that information turns into knowledge when human beings form justified and true beliefs about the world (Case, 2012:73). Knowledge is therefore a step further than information because it is obtained from knowers that link information and data to something higher, for example, through experience or transactions (J¨ager et al., 2015:115). Similarly, "information depends on a

collection of data and knowledge is based on accumulation of experience" (Choo, Detlor, and Turnbull, 2000:29).

Information can be said to be an increment of knowledge that can be derived from data (Stoll, 2016:2). However, the process of getting knowledge involves adaptation since knowledge is the persistent and appropriate response to a given input (Sanders, 2016:226). This depicts that "knowledge is power" (Grix and Watkins, 2010:9). The role of information, however, is to 'reduce uncertainty' (Mark and Pierce, 2001:476) and information in this sense reflects three senses which are process, knowledge and thing (Case, 2012:51).

This study was mindful of the fact that, the differences and criticisms about the expectations and definitions of the concept of 'information' made by different scholars was not to negate the importance of the concept but to complement and bridge the gap in understanding the meaning of the information concept (Case, 2012:51). This study considered all opinions and explanations from different scholars as outlined in this section on the meaning of the concept of information and the study has applied Kaniki's (2001) definition of 'information' as indicated in Chapter One (section 1.10.1). Kaniki's definition was found to be appropriate for this study since it broadly clarifies the meaning of the concept of 'information' in the context of LIS by highlighting the main purpose of information including the decision-making process and problem solving.

3.4.2 Information need

It is an established fact that "all people seek and use information" (Case and Given, 2016:12). Information need is a situation or task which depends on many factors and changes as the person goes from one stage of task to the next (Das, 2014:130). It can be said to be the motivating factor for people to seek information (Ikoja-Odongo and Mostert, 2006:147). Information needs are therefore factual situations in which there exists an inseparable inter connection with 'information' and 'need' (Prasad, 2000:7). Although Burnkrant (1976:22) argued that 'need' was a psychological concept referring to a mental state of a "desired future goal", Wilson and Walsh (1996) maintained that 'need' was a cognitive recognition which helps in providing meaning and order through a person's curiosity, that is the desire to be informed and need to know.

It is clear that, “information originates and generated because there exists a need or an interest”, so a need is said to be a want of something, which one cannot do without (Prasad, 2000:7). People seek information because they need it and this shows that people seek information in order to satisfy their information needs (Case, 2012:85; Chatman, 2000:10).

Wilson (1981) opined that information need was a subjective experience that occurs only in the mind of the person in need of information. However, Prasad (2000:7) emphasised that information need was an objective need and these needs are oriented towards reality, practice, and task. It has therefore been observed that, the process of identifying an information need stems out from the need to become informed (Zawawi and Majid, 2001:25). In order to ascertain information needs, one must therefore discover how the users choose, formulate, and express their basic questions regarding their activities (Miranda and Tarapanoff, 2007).

In a quest to clearly present information need, Wilson (1997:553) outlines three categories of it:

- the need for new information
- the need to elucidate the information held
- the need to conform the information held

Taylor (1962:392-394) on the other hand, asserted that information need could be defined in four ways:

- The actual, but unexpressed, need for information: he termed this the ‘visceral need’.
- The conscious, within-brain description of the need: known as the ‘conscious need’.
- The formal statement of the question: he referred to this as the ‘formalised need’.
- The question as presented to the information system: he termed this as the ‘compromised need’.

In addition, an information need is “a statement of what the user does not know” (Belkin, Oddy and Brooks, 1982:64). It can be defined as a state when one perceives that there is a gap between the information and knowledge available to solve a problem and the actual solution of the problem (Miranda and Tarapanoff, 2007). Information needs therefore take place in a situation where a user becomes aware of an information gap in his/her state of mind that prevent his/her from meeting

the satisfaction of a desired goal (Case, 2007:333). Hence an information need is the recognition that one's knowledge is inadequate to satisfy a goal, within one's context / situation at a specific point in time (Ormandy, 2010).

According to Prasad (2000:7) an information need is a condition in which certain information assists in the achievement of a genuine purpose. He further argued that studying information needs achieves these three objectives:

- explanation of observed phenomena of information use or expressed need;
- the prediction of instances of information use;
- the control and thereby improvement of the utilisation of information through manipulation of essential conditions.

An information need could be seen as a relationship between information and information purpose which results in two necessary conditions of information need: the presence of an information purpose and the information in question which contributes to the achievement of the purpose (Prasad, 2000:7). Botham and Bergenholtz (2013:28) argued that the need for information was either a primary need or secondary need. Primary need as argued by them was the "need for the information itself" and secondary information needs are "the need to have access to the required information tools or sources and the need for information on how to use these tools or sources".

These imply that, information need could be expressed as an "input-process-output model" with three basic components: "problem, problem solving process and solution" (Prasad, 2000:8). The problem according to the model is analysed in order to ascertain a need for information and this is an indication of uncertainty in knowledge with solution resolving the uncertainty situation for the purpose of filling the gaps in the knowledge. Information needs in this context therefore present two dimensions: quality and variability (Ingwersen and Järvelin, 2005:297). These attest to the fact that information need is a cause of information seeking (Kadli and Kumbar, 2011:1).

3.4.3 Internet-based (online) information need

The Internet is one of the latest reforms to impact on education since Web searching has become one of the most active information tasks (Nkomo, Ocholla, and Jacobs, 2011:1). Information is an

important resource needed by all people to conduct their work successfully and the use of the Internet to search for information by learners is largely prompted by their academic activities such as assignment, examinations and research (Soyemi and Mojisola, 2015:81). Information needs of learners as indicated earlier include both academic and personal information needs, thus they revolved around the learning process, research activities, and everyday life of learners (Majyambere and Hoskins, 2015:77).

Zickuhr, Rainie, and Purcell (2013) in their study found that, majority of learners were not accessing the library because they were able to conduct their research more conveniently through the use of the Internet. It has been confirmed that, learners heavily rely on the Internet to find information (Zhang et al., 2015:87). This attests to the fact that, the growth of the Internet has created a system with new facilities that are competing with the traditional sources of information; hence using the Internet to search for academic and personal information increasingly serves as the first option for learners in their quest to find information (Soyemi and Mojisola, 2015:82). It was therefore not surprising when a study in Ghana among high school learners revealed that learners used the Internet to "explore new learning materials and also conduct research on their own initiatives" (Buabeng- Andoh and Yidana, 2015:108).

3.4.4 Internet and Information seeking among learners

Information is now regarded as the central focus of life since it is treated by many people including learners as a commodity, thus, traded for a price (Bhattacharjee and Sinha, 2016:266). The Internet is an important tool for accessing information. The number of people using the Internet grows very fast thereby increasing the impact of Internet usage in sectors such as education (Lo and Ahmadian, 2014:48). The Internet is noted to serve as a digital object tool and this tool has enriched the learning experience of learners by giving them new forms of access to information (Anyaoku, Nwafor-Orizu, and Oguaka, 2015:153). This has made it possible for high school learners to access the Internet to benefit from the resource of information available on it (Liu et al., 2013:21).

An information need differs from one person to another and this means that the need for information among learners will not be the same though it might be similar (Bhattacharjee and Sinha, 2016:266). People require information as their fundamental need in executing their tasks

and this need eventually turn to become a motive of information seeking activities (Sugihartati and Harisanty, 2014:21). Information-seeking activities help in solving daily problems thus the "mastery of life" (Savolainen, 1995:262). This implies that, information and information needs have use or purpose in human lives and both can be satisfied by seeking or browsing (Case and Given, 2016:5).

It is important to note that, seeking information on the Internet has become extremely popular with learners and this has contributed to the Internet becoming part of learners' everyday lives (Gauducheau, 2016:44). A study by Owolabi (2007) revealed that, learners used the Internet as their major source of information for their academic and personal development. This was confirmed by Soyemi and Mojisola's study (2015:87) which showed that, learners mostly rely on the use of the Internet information sources to complete their "class assignment, write project and research, and to update knowledge".

Seeking information on the Internet is a goal-directed behaviour and this differs from undirected Internet surfing, in which "individuals are exposed to information with no specific informational need" (Liu et al., 2013:26). Nkomo (2009:19) maintained that information-seeking has a long history; however, Internet-based information seeking is a "relatively new phenomenon".

Information seeking is a complex communication process that involves the interaction between the information seeker, the information, as well as the information provider (Khosrowjerdi and Iranshahi, 2011). It is the process where an individual goes about searching for information, and this process requires the information seeker to apply personal knowledge, skill or personal information for the purpose of solving a problem (Olorunfemi and Mostert, 2012). It could be defined as "a conscious effort to acquire information in response to a need or gap" in one's knowledge (Case and Given, 2016:6). Information seeking has been established as the most commonly discussed concept in LIS.

The tasks, attempts and actions that are carried out by a person "to solve an information need or problem through his cognitive, emotional and physical actions done in any environment of his search" sums up the process of information seeking (Ogba, 2015:3). On the other hand, Internet-

based information seeking requires the information seeker to search through the Internet in order to extract relevant information that satisfies his/her information needs (Soyemi and Mojisola, 2015:87). Internet-based information seeking is therefore seen as the process information users engage to change their state of knowledge by using information sought on the Internet (Nkomo, 2009:19)

Seeking information on the Internet "constitutes a strategy as an individual actively seeks information and is aware of what is needed" (Gauducheau, 2016:44). It is however clear that, Internet-based information seeking has become "an important component of learners' daily Internet use" since learners frequently seek information on the Internet to solve daily life problems (Liu et al., 2013:21). Learners frequently access the Internet in search of relevant materials related to their academic works as well as acquiring relevant information for knowledge achievement (Lo and Ahmadian, 2014:48). The process of seeking information on the Internet has been noted to enhance learners' life satisfaction in information seeking (Anyaoku, Nwafor-Orizu and Oguaka, 2015:153; Liu et al., 2013:26).

Although, information needs of high school learners seem quite different and complex compared to the information needs of tertiary students, their information needs and use of online sources is just like tertiary students' online information needs (Chang and Gomes, 2017:349). Both tertiary students and high school learners access online information sources to satisfy their information needs in the areas of learning, games, and entertainment (Grefins, 2011; Chang and Gomes, 2017). The Internet serves as a source for readily available information resources; and the availability of these resources online have been revealed as a motivation for learners to seek information from it to solve their learning or research problems on any topic, as well as to improve their knowledge (Anyaoku, Nwafor-Orizu and Oguaka, 2015:153).

Seeking information on the Internet by learners to solve problems in their daily life also promotes their sense of environmental mastery and increases their psychological well-being (Liu et al., 2013:26). Studies have shown that, most high school learners use online sources to seek information for personal development and the process of seeking online information increasingly serves as their first option in their quest to access information for personal development (Soyemi

and Mojisola, 2015:83; Swintter, 2013). It has therefore become natural for learners to "use the Internet to conduct information-seeking activities regarding their studies or personal lives" (Gauducheau, 2016:44).

3.5 Information behaviour of learners

Studies on information behaviour have a very long history (Case, 2014). 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". Information behaviour as an umbrella term is used to encompass other concepts such as information need, information use, and information retrieval in the field of Library and Information Studies (LIS) (Stilwell, 2010:3; Case, 2007:81). The use of the broader umbrella term 'information behaviour' alerts researchers to the "fact that there are many and varied behaviours and contexts that shape how we work with information" (Case and Given, 2016:5).

Information behaviour looks into people's information needs and information use, "either purposefully or passively", for various work-tasks related to everyday lives (Fisher and Julien, 2009:317). It therefore includes information seeking as well as the totality of other unintentional behaviours and purposive behaviours; such purposive behaviours may not involve seeking, for example, "actively avoiding information", whereas unintentional behaviours include "glimpsing or encountering information" (Case and Given, 2016:6).

Information behaviour starts with uncertainty which then represents the activity used to find information (Case, 2002:5). It has been "written about in thousands of documents from several distinct disciplines" since all disciplines and humans need and use information (Case and Given, 2016:15). The centrality of information behaviour and its development has greatly affected information literacy among all persons including learners (Orlu, 2016:27). The study of Internet-based information behaviour is therefore of essence since scholarly information and communication has "undergone a transition from print to electronic that appears to be reaching completion" (Anglada, 2016:173). Undoubtedly, the use of the Internet to access electronic information has steadily brought major changes to human information behaviour in all walks of life (Kadli and Hanchinal, 2015:62).

The emergence of the Internet has largely made information behaviour more "integrated and less dictated by sources and institutions" (Case and Given, 2016:5). This implies that, the Internet and other digital environment have brought new ways and practices of human information behaviour (Furi and Balog, 2016:62). Clearly, the Internet has revolutionised all sphere of human activity and has taken into its savvy the information behaviour of people such as learners; hence information behaviour of learners "has got totally changed in the prevailing electronic information environment" (Singh and Mahapatra, 2016:471).

Studies on information behaviour have been conducted in "many different contexts, with a variety of people" including learners (Case and Given, 2016:12). However, very little research has investigated "factors influencing information behavior in a non-Western society" (Gaston, 2017:3). This attests to the fact that, the volume of information behaviour literature "varies geographically, with research being more abundant in developed economies" as compared to developing economies such as Ghana (Al-Aufi, Al-Azri, and Al-Hadi, 2017:2).

Information behaviour of learners is one of the objectives that need to be designed and planned by instructors in order to help detect learners' information needs (Sales, Pinto and Fernández-Ramos, 2016:1). Learners of current generation are young people - who are due to arrive at University in the next few years – "grew up in an environment dominated by the Internet and mobile devices"; thus their information behaviour differs from the behaviour of previous older generations (Furi and Balog, 2016:64).

It has been found that, the Internet serves as a tool for partial information gathering and learning for learners. It has also been argued tentatively that, there is a tendency for learners to access information on the Internet mostly than other sources of information (Kadli and Hanchinal, 2015:62). Similarly, learners of today are unique since their birth coincides with the introduction of the graphical web and the Internet and their information behaviours therefore differ from other generations who gained their "knowledge in a traditional way – through books and libraries, and who often relied on the help of a mediator such as a librarian" (Furi and Balog, 2016:64). It is worth emphasising that, the Internet and other electronic media have reduced the time that learners

spend in locating and accessing information; thus the increase in the amount of information available on the Internet, improvements in discovery tools and enhancements in accessibility have all affected information behaviour of learners (Anglada, 2016:173).

3.5.1 Searching and retrieval skills of learners

The Internet in recent years has provided easy access to enormous amounts of information and learners have embraced this opportunity by increasingly accessing the Internet to get information (Kroustallaki et al., 2015:156). The Internet is offering abundant and diverse information, which enable learners not only to access up-to-date information but also to seek information of their own interests (Tsai, Hsu and Tsai, 2012:246). However, it has been indicated that, Google and the Internet in general is creating "a challenge for learners to determine what information is genuine" for selection and retrieval (Al-Aufi, Al-Azri, and Al-Hadi, 2017:1).

For modern learners, the Internet and other online environments are a significant space of experience in their growth process (Borca et al., 2015:49). The worldwide Internet seems to be the main source of information for high school learners (Malliari et al., 2014:272). They are therefore faced with the challenge and the responsibility using the diverse strategies and skills that now "exist for the location, retrieval, handling, and dissemination of information" on the Internet (Sales, Pinto and Fernández-Ramos, 2016:3).

Internet-related functions have integrated into learners' daily lives and activities, and with the rapid proliferation of users, "evidence has begun to emerge suggesting that Internet use may fulfill different developmental needs" (Borca et al., 2015:49). The Internet and other online settings provide different and continuously available information which requires online information users to acquire the competence and the capacity needed to seek out online information that is based on knowledge, abilities and skills from the Internet (Sales, Pinto and Fernández-Ramos, 2016:3; Moskina, 2013:1). However, it has been found that, learners apply skills that are inconsistent and irregular when searching for information from the Internet for assignments by moving between "newly acquired strategies to earlier, less effective ways of searching, reading and evaluating information" (Kroustallaki et al., 2015:157). This shows that, learners "often lack the necessary skills to effectively use online resources" (Kroustallaki et al., 2015:156).

It has been reported that, learners overwhelmingly rely on Google to the exclusion of many academic search tools in their quest to seek online information (King, 2014; Tsai, Hsu and Tsai, 2012; Kolowich, 2011). Learners "see Google as being 'the' Internet and they use these two terms interchangeably, seeing them to be one and the same thing" (Julien and Barker, 2009:14). Asher, Duke, and Wilson (2013:473) confirmed in their study that, learners treat "almost every search box like a Google search box, using simple keyword searches" in majority of their searches on the Internet. Although learners rely heavily on search engines for information searching, learners need to be mindful that, search engines are very advanced in providing contextual and personalised results by combining explicit queries with implicit feedback (Koesten, Kacprzak and Tennison, 2016:2).

Internet searching is a "dynamic process that evolves over relatively short time periods" (Kroustallaki et al., 2015:157). The command as well as knowledge of information competence are therefore important for effective online information search, since these competences provide online information users the ability to achieve the "skills needed to know, on the one hand, how to define and structure an information need, by identifying the key concepts and the terms that describe the search profile" (Sales, Pinto and Fernández-Ramos, 2016:4). It also helps users to determine the needed information and the usefulness of the information; as well as how to manage the "strategies, techniques and tools for formulating the search and selecting suitable resources" (Sales, Pinto and Fernández-Ramos, 2016:4).

Although, King (2014:27) maintained that, different search strategies may be used by learners when seeking information from the Internet, studies that employed learners to experiment this dynamic process over a short period of time showed that learners were likely not familiar with the process of searching for information from the Internet, since they were lacking the different skills needed for a successful search activity (Koesten, Kacprzak and Tennison, 2016:1).

Studies on exploring learners' Internet searching strategies mostly take advantage of two major categories: implicit and explicit strategies. An "implicit strategy is to have students self-reflect on their searching behaviors through a questionnaire or interview" during/after Internet searching

tasks, while an explicit strategy refers to the usage of searching strategies to record directly "the user's behaviors, such as observation and transaction logs" (Tsai, Hsu and Tsai, 2012:247).

Studies in the 2000s have focused especially on learners' "computer user discourse, typified by portrayals of 'digital natives' or the 'net generation'", and the notion of learners or young people being confident and 'expert' Internet users has proliferated Western rhetoric for quite some time now (Furi and Balog, 2016:63). However, a number of studies have revealed that, learners lacked the competence and skills to effectively search and retrieve information from the internet (Singh and Mahapatra, 2016; Borca et al., 2015; Kadli and Hanchinal, 2015; Georgas, 2014; Malliari et al., 2014). It has been found that most learners fail to use appropriate keywords when searching for information from the Internet (Dalal, Kimura, and Hofmann, 2015), since they often "encounter difficulty in specifying appropriate keyword terms and use" (Kroustallaki et al., 2015:157).

According to Sales, Pinto and Fernández-Ramos (2016:4) searching effectively for information on the Internet includes all the competences required for solving an information need once the knowledge gap has been identified. These competences include:

- knowing about the topic so as to be able to clarify and define the limits of the search profile;
- being aware of the scope required in terms of topic and time;
- having knowledge of the level of thoroughness/precision needed;
- having the right language to work with;
- using the right type of document needed; and
- employing the right types of search tools.

Learners being exposed to online media early in life may have helped to develop good parallel processing skills; however, there are some drawbacks such as the overdependence on search engines and skills such as keyword search (Furi and Balog, 2016:64). "Contrary to the popular view, there is little evidence that young people are expert searchers or even that their search prowess has improved with time." (Williams and Rowlands, 2007:9). It has been reported that the search performance of learners significantly worsens during unguided Internet searching especially among lower grades (Kroustallaki et al., 2015:157).

Similarly, a number of learners do not use quotation marks when searching for information from the Internet, even if doing so would have improved the search results (Dempsey and Valenti, 2016:203). The simplest and most common techniques like "one keyword" are used very often by learners when searching for information with advanced techniques like ‘searching within results’ or ‘searching for similar results’ rarely used by learners (Malliari et al., 2014:272-277).

Although, learners prefer keyword searches, it has been found that most of them change terms when a search is unsuccessful, yet, their new choice for search terms most often “seemed little more than a guess” (Dalal, Kmura and Hofmann, 2015:671). For example, learners who employ inappropriate keywords are often unable to consider synonyms and this makes them search with “colloquial or informal terms that are part of their everyday vernacular” (Dempsey and Valenti, 2016:204).

Moreover, learners exhibit improper use of searching tools such as Boolean operators when searching for information on the Internet, yet only a few of them either express “confusion or frustration as to why the results did not change the way they expected” (Dalal, Kimura and Hofmann, 2015:670). It is therefore evident that learners’ lack the skills and experience to construct efficient and sophisticated search strategies and a possible explanation for the relatively low level of search competence among learners may be that learners “acquired searching skills on their own, without any formal training, and as a result, they used the simplest and most common techniques for retrieving information” (Malliari et al., 2014:277).

As indicated, the Internet and other online tools are serving as prominent electronic information sources which are considered extremely important tools for effective teaching, learning, and research (Kadli and Hanchinal, 2015:67). Similarly, the range of content available on the Internet is so wide and this offers learners the opportunity to pursue interests and expertise that otherwise would not be possible (Borca et al., 2015:56). However, a number of learners are completely unaware that their search strategies are to “blame for the mismatched or unsatisfying results” they received during their search for information on the Internet (Dalal, Kmura and Hofmann, 2015:671). For instance, spelling errors have caused real problems for learners when searching for information on the Internet and learners who did not pay attention to a misspelled keyword, or

were not aware that they have misspelled a term, had their results limited and potentially irrelevant (Dempsey and Valenti, 2016:203).

In order for learners to effectively search and retrieve information from the Internet or other electronic sources, the learner or information seeker is supposed to have sufficient knowledge and competence to retrieve the desired piece of information from the electronic resources available (Singh and Mahapatra, 2016:477). According to Sales, Pinto and Fernández-Ramos (2016:4), dealing with these requirements or competencies successfully requires the learner to acquire the following:

- a set of core skills related to knowledge of the terminology of the subject matter;
- a sufficient command of suitable search strategies;
- the ability to access automated catalogues, databases and electronic sources of information;
- a command of strategies for searching for information on the Internet; and
- the ability to use informal sources of electronic information.

3.5.2 Evaluation of Internet information sources by learners

The wide availability of information on the internet has made it easy for people including learners to access the information they need and this ease of reach has brought "changes in the information seeking, retrieving and processing behaviour" of learners (Özmen, 2015:779). High school learners access a wide variety of information sources from the Internet daily and given such diverse information sources require them to have competence in evaluating and integrating high quality information from the Internet (Braasch et al., 2013:180). Information source evaluation is "metacognitive knowledge and skills used to judge and control the quality of one's knowledge sources" (Kim and Hannafin, 2016:385).

Some information accessed from the Internet have some disadvantages since many Internet resources are not of good quality and these Internet "information resources tend to be misleading" (Moskina, 2013:1). This implies that, the uncertain quality of information on the Internet can be problematic (Sin, 2015:466). The Internet is "boundless and democratic" making it offer a vast amount of information thus information retrieved from the Internet requires careful checking for the evaluation of such information to take into account the peculiarities of the Internet (Sales, Pinto

and Fernández-Ramos, 2016:5). However, it has been found that, "information evaluation is knowledge and skills taken for granted or inappropriately addressed" in many high school programmes (Kim and Hannafin, 2016:385).

The Internet has inundated us with vast information "much of it unvetted" and given the amount of information available on the Internet on each field of study, it has become increasingly difficult for learners to assess the authenticity and reliability of the information they retrieved from the Internet (Damico and Panos, 2016:275; Gauducheau, 2016:44). According to Damico and Baildon (2015:61), Internet information sources:

> can be complex in several ways: provenance or authorship and sponsorship are sometimes difficult to discern; the purposes of sources can be vague or be intended to deceive; the structure, language features and knowledge demands of sources can make it challenging to evaluate the content's accuracy; and it is often relatively easy to corroborate the view of one source by locating another source with the same perspective, argument or set of facts.

Similarly, the large amount of information on the Internet does not make it easy for learners to find "pragmatically appropriate resources", since a number of potentially useful information resources are often not found by them (Moskina, 2013:1). The situation is so because the analyses of people's attitude towards information retrieval and processing starts with understanding how the information to be processed is chosen and evaluated (Özmen, 2015:780). Nevertheless, assessment of the quality of the information sources by learners have been found to be problematic, since many "young individuals tend to have a rather vague idea of the criteria on which information seeking should be based" (Gauducheau, 2016:44).

Learners' inability to critically evaluate source characteristics of documents retrieved from the Internet potentially leads to comprehension and learning detriment as a result of "information overload and an inappropriate usage of questionable sources" (Braasch et al., 2013:180). Although, learners may readily filter key sources of information from the Internet, they sometimes, "ignore ways in which those sources might be incoherent or incomplete" (Kim and Hannafin, 2016:384).

Information provided by an Internet source may have its own limitations. It is therefore important to look for reliable online information sources when accessing the Internet and these reliable sources are those we trust the author, creator, or sponsor of the online information to have done due diligence to ensure that the information presented and the claims made "are accurate, reasonable, and substantiated with quality evidence" (Damico and Panos, 2016:275; Paglieri et al., 2014:176). It is important to note that assessment and evaluation of Internet information sources' reliability is not an end in itself but it is viewed and understood best in most cases as part of an "analytical process that emphasises the extraction of useful, relevant evidence to answer questions" (Damico and Baildon, 2015:61).

The idea of learners accessing online information regularly on the Internet at this current information age requires them to contend with the credibility of vast information available to us. Reliability and credibility are companion concepts which are often used interchangeably to imply trustworthiness; however, "discerning the trustworthiness of information", is not a straight forward task (Damico and Baildon, 2015:51-52). Since the trustworthiness of online information cannot be overlooked, it is important for learners to evaluate the quality of the resources obtained from the Internet based on source attributes once they obtain the information resources they consider potentially relevant from the Internet (Sales, Pinto and Fernández-Ramo, 2016:5).

In order not to overlook the trustworthiness of online information, it is important for learners to apply the "sourcing heuristic" which is "looking first [at] the source of the document before reading the body of the text" (Wineburg, 1991:77). However, there are established linkages between high school learners' "discrimination of document reliability based on source attributes" such as author, date and type of publication (Braasch et al., 2013:180). An advantage of evaluating and observing the quality of online information is that, it helps in feeding back the assessment of the information source with such feedback intelligently distributing "among different features of the source—e.g., competence and sincerity" (Paglieri et al., 2014:176).

Internet information sources present particular challenges for learners since they struggle to garner a larger conceptual understanding of reliability and "often use superficial or irrelevant criteria to evaluate sources (Damico and Baildon, 2015:52). Lack of source evaluation has been observed as

a reason that lead poorer learners to be relatively inattentive to source information; and studies have found that, it compels learners to spend considerable time accessing and reading information from documents that are not reliable, making them develop less accurate understanding of the information they require from the Internet to satisfy their information need (Malliari et al., 2014; Braasch et al., 2013; Taylor, 2012).

In addition to an escalating array of Internet information sources to "grapple with, the topics or issues that these sources are tied" to can also be very complex making it difficult for learners to evaluate such sources (Damico and Panos, 2016:275). It is therefore not surprising that, many high school learners who have not received training on evaluation of online sources rarely "attend to source features in order to evaluate for reliability" (Braasch et al., 2013:181). This implies that, acquisition of information competence for evaluation training is a series of skills. According to Sales, Pinto and Fernández-Ramos (2016:5), the evaluation training should focus on the acquisition of skills such as the:

- knowing how to assess the quality of resources;
- recognising the author's ideas;
- familiarity with the types of information sources;
- recognising how up-to date the sources are; and
- knowing the most significant information.

Alexander and Tate (1999) asserted that information users should focus on the following five criteria: accuracy, authority, objectivity, currency, and coverage when evaluating information sources. Clearly, Information Literacy instruction equips learners to acquire these competences in judging the authenticity and reliability of Internet information sources; since it helps learners "to look for those sources of information which have an established authority" and other criteria (Singh and Mahapatra, 2016:479). Similarly, it equips learners to emphasise and verify source attribution such as identifying the author of an information source, the motivation of the author, how the source came into being as well as the audience that the information was intended for (Damico and Baildon, 2015:51-52). A quality Information Literacy programme for learners should therefore include source evaluation aspects of teaching learners:

- how to identify good sources;

- how to recognise and interpret the idea held by the author of a text;
- how to distinguish the relevant authors and institutions in their thematic area; and
- how to organise learning according to learners' level of previous knowledge and the time they have available (Sales, Pinto and Fernández-Ramos, 2016:4-5).

3.6 Information Literacy

The advent of the Internet and access to large amounts of complex information which need to be processed and evaluated have made Information Literacy (IL) increasingly vital for all persons since information is accessed and used by everybody for specific purposes or tasks (Gilmour et al., 2016:59). Information literacy has been known in different names such as "Library Orientation, Bibliographic Instruction, user's education, and information skills training" (Lavante, 2016:110). It is found in the "convergence of thinking from many developments, disciplines, sectors, and areas of research" (Horton, 2007:13).

The term 'Information Literacy' was first used by Paul G. Zurkowski during the year 1974 in the National commission on Library and Information science (Deshmukh and Kulkarni, 2016:107). To corroborate, Lavate (2016:111) opined that Paul G. Zuurkowski coined the term IL by defining information literates during the 1970's as people trained in the application of information resources for their work. Information literacy could be seen as "the ability to locate, evaluate, and use information wisely" (Kuhlthau, 2008:71).

The increasing dependence on Internet sources' information has made Internet literacy and Internet information literacy vital resources. Internet literacy could be defined as the "ability to access, understand/analyse/evaluate and produce information", while Internet information literacy is the information user's ability to use the Internet to "sift through information to achieve certain needs" and the term 'produce' in this sense refers to the "operating skills and general communication competency required to make expressions and formulate messages that fit the medium" (Kim and Yang, 2016:441-442). For the purpose of this study IL encompasses both Internet literacy and Internet information literacy.

Information Literacy is an understanding and set of abilities information users require to recognise when information is needed by providing them the abilities to locate, evaluate and use the needed information effectively (Deshmukh and Kulkarni, 2016:10). Information literacy instructions are noted to "remain efficient, to guarantee a better outlook for graduates in their lifelong search and use of information" (Al-Aufi, Al-Azri, and Al-Hadi, 2017:2). It has been found that, the ability to develop the IL skills of learners depends on learners "having a certain base level of ICT knowledge and being fairly confident using the Internet" (Gosling and Nix, 2011:99). It is therefore important for computer literacy training of learners to "precede IL training" (Naido and Raju, 2012:34).

The role of IL in learning cannot be overemphasised. It helps in lifelong learning through abilities since it contributes to the development of the information skills needed by the information user to handle the information technology such as the Internet used by him/her to access and retrieve information (Lavate, 2016:110). Learners, due to their studies and learning are found to access online information frequently (Leeder and Shah, 2016; Kolowich, 2011). However, literature have shown the reality that learners are not as information literate as is hoped, with instructors overwhelmingly believing that achieving a state of information literacy is a laudable goal towards learners' effective information acquisition (Sandercock, 2016:6). It has also been found that, many learners enter high schools without a strong foundation in information literacy competence (Davis and Watson, 2017:30), thus the need for information literacy instruction to be taken seriously at high schools.

An objective of IL programme is the "development of skills and competencies" that enable information users to recognise an information gap and "construct alternative strategies for information" retrieval and use (Lavate, 2016:111). Deshmukh and Kulkarni (2016:109) asserted that effective IL programme helps:

- information users to become independent learners;
- information users to develop information Literacy skills;
- information users to acquire knowledge from multiple sources;
- make the common people part of information technology;
- librarians to develop, access, and improve their skills and competencies; and
- to increase information accessibility and use.

Information literacy therefore empowers the ability to access, evaluate, and use information by the individuals in the information society (Lavante, 2016:110). It has been noted that, access does not only refer to owning a device but also "having the operational knowledge and essential skills required to use it". The understanding, analysis and evaluation of information resources is therefore the information processing skills that information users apply "when encountering an infinite supply" of Internet messages or information (Kim and Yang, 2016:442). This implies that, it is important for information users, in addition to owning devices, acquire skills and competences through IL training that will enable them effectively access information.

It is important for Information Literacy instructors and other stakeholders to be mindful of the fact that information users have varying competences in "determining the credibility and accuracy, and making the best use of information" (Al-Aufi, Al-Azri, and Al-Hadi, 2017:1). Thus, the idea of IL training should not be described as a "thing" but rather something we "do" (Elmborg, 2012:78). The current age we find ourselves is competitive and the importance of IL increases day by day, since we find ourselves in the age of information explosion making the role of librarians very important since the "librarian has to organise Information Literacy programme" for information users (Deshmukh and Kulkarni, 2016:107). Although, libraries have been supporting academic institutions on effective access to information for teaching and learning, "there is a mounting case that librarians should play a more significant role in the development of information literacy skills" (Johnson et al., 2015). Librarians however, "can only play a more significant role in the classroom" when teachers, instructors, management and leadership "all agree that information literacy is, in fact, a laudable goal" (Sandercock, 2016:3).

A study by Lwoga (2013:7) in Tanzania revealed that librarians' role in information literacy training improved the IL skills of students year-over-year. However, in order for librarians to work and collaborate with instructors to teach information literacy skills and produce information literate learners, librarians have to understand what faculty and instructors "perceive are the information literacy competencies" of their learners, "what information literacy skills" the instructors are teaching them already and "what skills" the instructors perceive the learners require the most assistance with (Sandercock, 2016:3).

All academic institutional stakeholders need to embrace IL in the early stages of learners' academic life, since "it is too late to wait until secondary school to teach these skills" (McFarlane and Roche, 2003:156). Students' educational level has been found to have impact on their information literacy skills, since students in higher levels possess higher literacy skills than those in lower levels (Kousar and Mahmood, 2015:56). This stems from the fact that, many students were not introduced to IL in their early stages at school.

A good IL programme requires a complete paradigm shift that will "foster sustainable consistency and alignment throughout the curriculum" (Bruch and Wilkinson, 2012:13-14). Infusing IL "into the curriculum is long, hard, and often frustrating work", since IL tends to continually evolve and is simply not achieved quickly; "it takes time, and not only chronological time, but an understanding of institutional time" (Baker and Gladis 2016:337-351). Information Literacy concentrates on "cognitive and transferable skills, such as problem solving, evaluation and communication skills" because it teaches skills and competencies for using the wide range of information tools such as the Internet and other primary sources in moulding information solution to users' informational problems (Lavante, 2016:110-111).

The need for IL programmes is therefore very essential due to rapid increases in the stream of information because of the information revolution that the Internet has provided us with (Lavate, 2016:111). Instructors believe that their learners' "weakest skill is in the ability to critically evaluate and subsequently, compare information sources for credibility" when accessing information from the Internet (Sandercock, 2016:6). However, information literacy keeps changing over time as the Internet continues to be in constant state of evolution and the use of technologies keep improving with people becoming more technologically driven (Whitmore, Agarwal and Xu, 2015). Therefore, there is the need for Information Literacy programmes to have a holistic approach by assisting learners to improve all their weaknesses in identifying their information need, selecting the relevant information, and using the right information in solving problems as well as meeting their information needs (Lanning and Turner, 2010).

The idea of improving learners' IL skills through IL training at school is important since learners are taught the ability to utilise Internet resources efficiently through IL programmes and this helps them to effectively access the wealth of materials available on the Internet (Sandercock, 2016:19). Integrating IL training in school curricula is therefore the way to go. For example, a study conducted by Malliari et al. (2014) among high school learners in Greece recommended the need to incorporate information literacy instruction into secondary education, with information literacy learning outcomes embedded in the high school curriculum to improve learners IL skills. This is in support of IFLA's Guidelines on Information Literacy for Lifelong Learning (2010:27) which prescribes the need for schools to develop information literacy programme that is part of the curricula since information literacy requires sustained development throughout all formal educational levels: primary, secondary, and tertiary. IFLA's Guidelines on Information Literacy for Lifelong Learning (2010:27) also highlighted the need for school librarians "to participate in a teaching course or recognised qualification to be part of the institutional information literacy endeavour".

Studies have also pointed out that gender to some extent has a link to information literacy. For example, Liu and Sun's (2012) findings indicated that males were better than females in three aspects of information literacy, namely information consciousness, information competency and information ethics. However, to be more effective, an information literacy programme should take into consideration certain factors and "for better results, the instruction should be of relevance to learners' lives, learning styles, and information requirements" (Malliari et al., 2014:272).

Information Literacy should not be observed as just learning facts but it is about learning to learn a skill that lasts for a lifetime (Sandercock, 2016:23). It therefore exists in the form of an "intellectual framework for lifelong learning" (Bundy, 2004:11). The connection between information literacy on one hand and learners' performance as well as academic achievement on the other hand cannot be over-looked. A study conducted by Wong and Cmor (2011) revealed that, Information Literacy instruction correlates positively with learner's performance. This implies that, learners' inability to retrieve information to satisfy their information needs could be linked to lack of effective information literacy instruction. A possible explanation to this relatively low level of search competence among high school learners "may be that they acquired searching skills on their

own, without any formal training, and as a result, they used the simplest and most common techniques for retrieving information (Malliari et al., 2014:277).

3.7 Barriers to Internet information behaviour among high school learners

The medium of the Internet assists and supports "knowledge work activities with fast retrieval" of information for evidence-based practice and education and the enablers of effective Internet use generally include access to requisite technology, for example, "computers and mobile platforms for Internet access coupled with information literacy skills" (Gilmour et al., 2016:54). The absence of these enablers poses a challenge or barrier to effective Internet use for information retrieval and other purposes.

A number of studies have outlined a number of barriers to Internet information behaviour of learners (Aula, Khan and Guan, 2010; Ngulube, 2010; Goktas et al., 2013; Zhang, Liu and Cole, 2013; Malliari et al., 2014; Leeder and Shah, 2016). Barriers to information sources can be defined generally to include immaterial or physical "obstacles hindering, delaying or preventing access to information" (Swigon, 2011:475). These barriers to information accessibility can result from 'psychological' and 'intellectual' challenges (Dervin, 1973:16). Psychological barriers are faced when the information seeker is unable to perceive his or her "needs as informational in nature", while intellectual barriers are generally encountered when the information seeker "lacks the necessary training or expertise to obtain necessary information" (Savolainen, 2015:615).

3.7.1 Lack of accessibility as a barrier

It has been found that psychological and intellectual barrier to information accessibility could be seen in two forms – outcome overload and textual overload. Outcome overload is used to represent users' "inability to process large hit lists in order to establish what is potentially relevant" and textual overload "refers to an inability to read information that one has identified as potentially relevant" (Mansourian and Ford, 2007:686). Both outcome and textual overload can lead to limited or less systematic strategies to information searching which may compel the information seeker to become disillusioned with Internet searching, "which might involve individual scrutiny of many different sites, most of which would prove unhelpful", thus, inability to deal with information

overload can result in the information seeker ignoring "relevant information or becoming too superficial in information seeking" (Savolainen, 2015:619). Shenton's (2008:281) study found that, outcome overload was generally common among learners especially when they were not able to define their search limits during the searching process for information on the Internet.

Barriers to information accessibility and retrieval from the Internet "can also be external or internal to information seekers". While most of the external barriers originate outside of the individual information seeker and are thus imposed on him/her - for example, spatial challenges such as long distance to an Internet source for Internet access, Internet access restrictions, temporal challenges like "an absolute deadline limiting the time available for information seeking" and socio-cultural challenges such as "bureaucratic inertia" contribute to external barriers to information accessibility - internal barriers on the other hand originate from inside of the individual information seeker (Savolainen, 2015:613). These internal barriers can be divided into affective and cognitive barriers with affective barriers stemming generally from "negative emotions such as fear of facing unpleasant facts while seeking" information and cognitive barriers including "unawareness of relevant information sources and poor search skills" (Savolainen, 2015:613). Clearly, barriers are "found to be an ingredient part of information seeking" (Ogba, 2015:6).

3.7.1.1 External barriers

External barriers that are common to learners Internet information-seeking include slow or poor Internet connections, Internet filtering and censoring, access restrictions, and inadequate facilities (computers and computer laboratories) (Gilmour et al., 2016:58; Nkomo, 2009:98). Particularly, external barriers such as lack of Internet and other ICTs infrastructure and accessibility may not pose much of a challenge in the advanced countries. For example, in Italy, Borca et al. (2015:49) found that 95% of high school learners have personal computers at home and 66% of them surf the Internet every day; in Greece, almost every learner (95.9%) have access to a personal computer at home with more than 86% having access to the Internet (Malliari, 2014:273); every high school learner in USA since 2003 has access to internet in school (NCES, 2004).

However, in Africa, studies have shown that, ICT infrastructure and Internet accessibility are common challenges that hinder learners quest to seek online information (Ajiboye and Tella 2007;

King, 2007; Osei, Larbi and Osei-Boadi, 2014). According to Atuahene and Owusu-Ansah (2013), there exist limited ICT infrastructure in high schools in Ghana and this affirms Ghana Education Service's e-Readiness Report (2009) which revealed that more than 80% of high schools in Ghana had no access to the Internet. Studies in Ghana have further shown that, majority of high school learners do not have access to the Internet (Agyei and Voogt, 2011; Amenyedzi, Lartey and Dzomeku, 2011; Quarshie and Ami-Narh, 2012; Atuahene and Owusu-Ansah, 2013; Osei, Larbi and Osei-Boadi, 2014) and this situation is a challenge towards their online information seeking.

3.7.1.2 Internal barriers

On the other hand, internal barriers have been seen in work-related and non-work related contexts among high school learners. Internal barriers such as “unawareness of relevant information sources” and “poor search skills” have been revealed in “studies focusing on information seeking among younger people” like high school learners, with poor search skills being rampant on searches conducted using networked services such as the Internet (Savolainen, 2015:617-618). The scope and volume of information on the Internet requires good search skills such as the ability to formulate relevant keywords to find the information one is looking for. However, studies have found that learners lack the skills and experience necessary to construct efficient and sophisticated search strategies, as well as to evaluate the retrieved resources and these limitations constitute internal barriers (Kuiper et al., 2008; Aula, Khan and Guan, 2010; Nkomo et al., 2011; Leeder and Shah, 2016). For example, a study by Nkomo (2009:98) revealed that learners were unable to evaluate online information sources effectively, lacked searching skills, unable to reference Internet sources, and faced with information overload. These depict that learners are faced with internal barriers when accessing the Internet for online information.

Although an information seeker may be able to access and select potentially relevant information sources from the Internet, his/her “inability to differentiate pertinent information from large masses of documents may become a barrier” hence barriers manifesting themselves in poor search skills can be attributed to lack of “procedural knowledge about how to identify and access information sources” (Savolainen, 2015:619). In a study conducted by Leeder and Shah (2016:5) among high school learners in USA, more than 60% of the learners' searches were unsuccessful because of lack of retrieval skills.

Results from a study conducted by Malliari et al. (2014) in Greece also indicates that, high school learners are not frequent evaluators of the information they use. More than half of the learners were not applying any of the criteria usually used for the evaluation of information sources. Comparatively, learners from USA and Greece are expected to be more technologically driven than learners in Ghana due to a gap in technological infrastructure. Hence, the possibility of such barrier affecting high school learners in Ghana could not be rare, since lack of skills to use, access, and evaluate Internet information sources have been noted as a potential information seeking barrier among learners (Leeder and Shah, 2016; Osei, Larbi and Osei-Bonsu, 2014; Aula, Khan and Guan, 2010; Lorenzen, 2001).

Understanding the barriers to information seeking of high school learners is a big step towards understanding the information seeking behaviour of students (Ogba, 2015:2). The selection of information sources can also be inhibited when the information seeker lacks sufficient knowledge of relevant sources of information with low self-efficacy hampering information seeking "if the individual develops scenarios about the failure in selecting and accessing information sources" (Savolainen, 2015:619). There appear to be inability and uncertainty about how to evaluate the quality of information from the Internet (Sin, 2015:472) among high school learners and this poses a barrier to online information accessibility.

3.7.2 Lack of support from teachers as a barrier

There are a number of efforts and investments worldwide to integrate ICT into education (Goktas et al., 2013) and teachers are among the key people to ensure its effective implementation. Many teachers especially in the advanced countries have incorporated ICT in their delivery (Prestridge, 2012; Kopcha, 2012; Goktas et al., 2013; Al-Mulhim, 2014) which helps improve the ICT skills of learners. However, studies conducted in the United Arab Emirates, Spain and Iran indicate that a number of teachers were not using computers in class and a reason assigned by teachers was lack of time (Ismail, Almekhlafi, and Al-Mekhlafy, 2010; Sa ´nchez et al., 2012; Salehi and Salehi, 2012; Kafyulilo et al., 2015). This finding is not different from studies conducted in Ghana (Agyei and Voogt, 2011; Osei, Larbi and Osei-Bonsu, 2014) although, the teachers in Ghana assigned infrastructural challenges and lack of skills as reasons.

A number of teachers in Ghana have been found not to possess ICT skills (Agyei and Voogt, 2011; Quarshie and Ami-Narh, 2012; Atuahene, 2013; Osei, Larbi and Osei-Bonsu, 2014); hence were not able to support and guide their learners to seek online information effectively. A study conducted by Amenyedzi, Lartey and Dzomeku (2011) revealed that, more than 70% of teachers in high schools in Ghana were not organising computer-based lessons neither were they offering Internet-based assignments to learners and these posed challenges to learners' information accessibility and retrieval from the Internet.

It has been found that, a number of teachers were not supporting learners to access online information from the Internet since they lacked the skills in accessing the Internet themselves (Al-Mulhim, 2014; Larbi and Osei-Bonsu, 2014). Integrating the use of the Internet into teaching and learning in schools is a major step in developing the skills and strategies of learners in accessing and retrieving online information (IFLA, 2010; Goktas et al., 2013). It is however, important to note that, educational delivery is greatly spearheaded by teachers, thus teachers' inability to access the Internet due to lack of skills makes it difficult to embrace the use of the Internet in teaching and learning (Salehi and Salehi, 2012; Kafyulilo et al., 2015). Clearly such teachers lack the capacity to support their learners to access the Internet for online information.

3.7.3 Internet use policy as a barrier

The rules and policies for Internet access among high school learners in their schools could also pose a challenge to online information accessibility. A study conducted by Viseu (2005:64) among high school learners in Portugal revealed that learners were frustrated in accessing Internet at school because they were allowed to use the Internet for only 30 minutes which was not enough for them to effectively search, read and select information from the Internet.

Lack of adequate Internet infrastructure at school has been found as a factor that compels school authorities to restrict learners' access to the Internet. School authorities in their quest to ensure all learners have access to the limited Internet facilities available in school resort to drawing up policies that end up restricting learners access to the Internet (Amenyedzi, Lartey and Dzomeku, 2011; Ito et al., 2010; Jenkins, 2006). School rules and policies therefore have the potential of

hindering the teaching of effective Internet research since most instructors are not able to incorporate Internet searching and literacy skills effectively in their instructions, due to Internet filters and other use policies in their schools; thereby posing a challenge to learners Internet information seeking (Purcell et al., 2012:56).

Studies have shown that majority of high school learners access Internet through their mobile phones (Atwood, 2016; Madden et al., 2013; Combes, 2009). This attests to the fact that school policies that restrict learners access to the use of mobile phones at school hinders their access to the Internet. For example, the Ghana Education service has banned the use of mobile phones by learners at high schools. Grimus and Ebner's (2015) study in Ghana found that the restriction in learners' access to mobile phones at school limits their access to the Internet. They further recommended the need for learners to be allowed to use mobile phones since this could complement the limited Internet facilities available at high schools.

3.8 Studies related to the information behaviour of high school learners

Information behaviour is one of the heavily researched topics in LIS and its literature is widely scattered widely across various disciplines especially in the worldwide context. Literature on information behaviour of learners generally focus on their information needs, information seeking activities and problems they encounter when looking for information. This section outlines some of the related studies conducted on the information behaviour of learners overseas, Africa and Ghana.

3.8.1 Studies done overseas

In Europe, Eynon and Malmberg (2012:526) conducted a study on high school learners in UK on the topic "understanding the online information-seeking behaviours of young people: the role of networks of support" and their study concluded that, the use of the Internet for information seeking has provided an additional layer of possibilities for learners in the information sources available to them. They however noted that, the challenges associated in retrieving information from the Internet require schools, teachers, parents and friends to support learners for effective information

retrieval from the Internet. It has also been found in UK, that the information needs of high school learners encompasses both academic and personal needs (Seaman, 2012).

Lack of teachers support on learners' online information access had also been revealed in a study by Quintana, Pujol, and Romaní (2012) among high school learners in Arteixo, Galicia in Spain. Their study concluded that, although learners were not formally taught on how to retrieve information from the Internet, most learners had better knowledge and control of the computer as well as better Internet literacy skills. Malliari et al. (2014) also investigated the Information Literacy skills among high school learners in Greece. Learners' inability to retrieve and evaluate information from online sources was found in the study. A study by Borca et al. (2015) among 127 high school learners in Turin (northeast of Italy) concluded that parents and educators have to be involved in teaching youth conscientious Internet use in order to maintain a respectful presence online for effective information use.

Moreover, Tzavela et al.'s (2015) study among adolescents employed some semi-structured individual interviews in seven European countries (Greece, Spain, Poland, Germany, Romania, Netherlands and Iceland) and their study revealed a considerable variability in the way adolescents satisfied their personal information needs through the use of the Internet. Shenton (2008) investigated the "information-seeking problems of English high schoolers responding to academic information need" among high school learners in UK. He opined that the blocking of some Web sites by school authorities due to Internet use policies do not only deny learners access to potentially useful information sources but also slows the speed with which learners ultimately access relevant information for their academic work.

Braasch et al. (2013) conducted a study among 130 Norwegian high school learners with the aim of promoting high school learners' evaluation of source features of multiple documents and their findings demonstrated that learners who previously took part in the intervention activities included more scientific concepts from useful documents when producing essay responses from memory; these learners again displayed better rankings of the usefulness of the set of multiple documents, and offered principled justifications based on evaluations of source features' trustworthiness compared to learners who instead received typical classroom instruction on source evaluations.

In North America, learners also exhibited lack of retrieval skills and this was confirmed by a study conducted by Leeder and Shah (2016) among high school learners in USA. Their study revealed that most learners had limited retrieval skills. A study by Julien and Barker (2009) also investigated the IL skills of high school learners in Canada and the study revealed gaps in learners' information literacy skills. They asserted that, these gaps represented a significant indicator that schools needed to assume a larger responsibility for information literacy instruction. Similarly, Mills and Angnakoon (2015) conducted a study among high school learners in USA and their study concluded that high school learners tend to be positive in their perceptions of classroom learning and ICT-mediated information seeking and sharing.

A study conducted by Purcell et al. (2012) among high school learners in the USA investigated "how teens do research in the digital world" and the study revealed that teachers were concerned about learners' overdependence on search engines as well as the increasing difficulties many of these learners faced when judging the quality of Internet information sources. Moreover, a study by Grefins (2011) on the information needs of high school learners in California, USA, found that high school learners access the Internet to satisfy both their personal and academic information needs. A study conducted by Madden et al. (2013) in USA concludes that smartphone adoption among teenagers has substantially increased with mobile phone access to the Internet being pervasive. The study further revealed that majority of learners were "cell mostly" Internet users thus were mostly accessing the Internet through the use of cell or smartphones.

In Asia, Khadli and Kumar (2011) conducted a study among high school learners in India. The results of their study indicated that, learners' information needs were one of the cognitive needs of childhood which helped learners to appreciate things such as the family, school, as well as society. A study by Sugihartati, and Harisanty (2014) on the topic "Information Seeking Behaviour Model of Senior High School Students" among high school learners in Surabaya, East Java, Indonesia revealed that psychological, demographic, role-related, and environmental factors and the characteristics of the information sources influence high school learners' information seeking. Lo and Ahmadian (2014) also conducted a study among high school learners in Banda Aceh city, Indonesia and their study concluded that, learners' place for accessing the Internet for information,

the frequency of accessing the Internet and amount of time spent on the Internet were significantly influenced by their method of learning the Internet.

Tsai et al. (2012) also investigated "high school learners' online science information searching performance: the role of implicit and explicit strategies" among 103 Grade 10 learners in Taiwan and their study highlighted that, learners' explicit strategies, especially the time attributes of learners that were proposed in their study, were more successful as compared to implicit strategies in predicting learners' outcomes of searching online information. Damico and Baildon's (2015) study among high school learners in Singapore had the results of their study depicting that, learners were aware of certain factors used to measure reliability of information sources. However, they seemed unsure about how these factors could be weighed and used to ascertain the reliability of information sources especially those obtained from the Internet.

Similarly, Kim and Yang (2016) conducted a study among 238 Korean high school learners and their study concludes that Internet literacy had two separate dimensions: Internet skill literacy and Internet information literacy. The findings of their study also highlighted that, learners who were able to critically understand and effectively evaluate information sources from the Internet were more likely to become active civic participants as compared to those that lacked such skills.

3.8.2 Studies done in Africa

Otoide (2015) investigated the information needs of 114 high school learners in selected schools in Abaraka Community, Nigeria. Her study showed that, most learners had limited Internet access and information literacy skills hence inadequate information resources and poor information literacy skills negatively affected their access and retrieval of online information. Similarly, Adebamowo (2011) conducted a study among 200 high school learners in selected high schools in Ijebu North Local Government Area of Ogun State, Nigeria and the study revealed that most high schools in Nigeria had unqualified library personnel and limited library resources and these served as barriers and factors that negatively impacted learners' information behaviour.

Onuoha, Joye and Uwannah (2013) conducted a study among 200 Nigerian high school learners on awareness and use of career information sources among Selected Schools in Ikenne Local

Government Area of Ogun State, Nigeria and the study revealed that, learners faced challenges such as delays, inaccurate information and ignorance of information sources during learners' process of career information seeking. Udofia's (2012) study also investigated the information needs of rural high school learners in six of the Eastern states of Nigeria. Their study found that, the highest information need of learners were related to job since over 60% of them were seeking job related information. Health information need of learners followed with about (30%) of learners accessing information related to their health. The study also highlighted learners' interests in 'social services' as well with nearly 9% of learners indicating their information need in this area.

Ybarra et al. (2008) investigated information seeking behaviour among learners in five high schools in Mbarara municipality, Uganda. Their study showed that, four in five learners (81%) turned to parents, teachers, and other adults while more than half consulted a book/went to the library when in need of information. The study further revealed that more than one in three learners (38%) used the computer and the Internet to search for information. Crow (2015) also conducted a study on the information-seeking behaviour of intrinsically motivated elementary School learners of a collectivist culture in Kampala, Uganda and the study noted that about 60% of learners preferred information-seeking episodes that emanated from their own questions, while about 49% preferred episodes related to school assignments. Similarly, a study by Norton, Jones and Ahimbisibwe (2013) among learners in Uganda maintained that, the use of the Internet by learners to access information about people and places with whom they had personal connection greatly interested them since it seemed to bridge the virtual and the real world by linking their identities with the outside world on the Internet.

A study conducted by Benard and Dulle (2014) among high school learners in Morogoro Municipality, Tanzania concluded that, provision of current and adequate information sources and Internet connectivity in school libraries and recruitment of qualified librarians were crucial for effective use of school libraries by the high school learners for information accessibility. In South Africa, Mojapelo and Dube (2014) investigated high school learners' access to information in school libraries in Limpopo province and the study highlighted that, learners had difficulties in accessing information due to limited information sources and lack of Internet connectivity in their school libraries since active, vibrant, and functional school libraries were limited. In Namibia,

Shiweda (2013) investigated the Web-based information behaviour of high school learners in Oshana region and her study found that the Web-searching skills of learners were inadequate; hence recommended the need for high schools to strengthen the offering of information literacy instruction to learners.

3.8.3 Studies done in Ghana

Although, literature available to the researcher depicts a lack of study on "Internet-based information behaviour of high school learners in Ghana", there are related studies in Ghana that focus on learners' Internet use, Internet accessibility and general information seeking behaviour of young people. For example, Borzekowski, Fobil and Asante (2006) investigated how adolescents in Accra, Ghana accessed the Internet. Their study revealed that two-thirds (66%) of the in-school youth (high school learners) and approximately half (54%) of the out-of-school youth (school dropouts) had previously used the Internet for information seeking. Of all these Internet users, more than half of them had sought Internet health information, and this percentage did not differ significantly by gender, age, ethnicity, or even school status. Learners, according to the study showed great interest, high levels of efficacy, and positive perceptions of online information; thus high levels of interest and confidence in finding information on the Internet were observed among learners who used the Internet in Accra, Ghana.

Markwei and Rasmussen (2015) investigated the everyday life information-seeking behaviour of marginalised youth among adolescents in Accra, Ghana through a qualitative study. The findings of their study revealed that the information needs of the homeless youth were mostly in relation to their basic needs following Maslow's hierarchy of needs with their preferred information sources been mostly interpersonal and limited in range comparatively. The study further revealed that, the most important information-seeking behaviour of these marginalised youth was characterised by free sharing of information among their social network of friends.

Grimus (2015) and Grimus and Ebner (2016) conducted a study among high school learners in Keta Senior High Technical School, Keta - Ghana on how learners could access and incorporate the use of mobile devices into their learning. Learners, according to these studies perceived the use of mobile devices with Internet connectivity for learning as an additional value for cooperation

in experiments and documentation of their study outcomes. The study further noted that, developing guidelines for appropriate usage of mobile device was important for implementation of mobile learning. Thus, developing guidelines with teachers and learners together would lead to better understanding of the relevant issues. These studies also observed that ownership of mobile devices had reached a sufficient range for integration in educational activities, since one third of learners owned a laptop with more than half of the learners having a mobile phone, most of them with media-enriched items.

A study conducted by Buabeng-Andoh and Issifu (2015) among learners from both public and private schools from four regions in Ghana showed that majority of learners (64%) used the Internet and other ICTs to communicate with peers more than other activities. It was found also that learners' pedagogical use of the Internet and other ICTs was low. Learners' low competence level in ICT usage was observed as a possible reason why learners rarely used the Internet and other ICTs to support their learning. Analysis of the study also showed that learners in public schools pedagogically used ICT more than learners in private schools with urban learners pedagogically using the Internet and other ICTs more than semi-urban and rural school learners.

Quaye (2013) investigated the sexual and reproductive health information seeking behaviour of 197 learners of the Labone senior high school in Accra, Ghana. The study showed that almost 63% of learners had families serving as their dominant sources of information. For example, parents, especially mothers were the most information preferred sources (31 percent) for learners on their sexual and reproductive health informational needs. This was followed by the Internet (28%). The study further revealed that the informative nature and privacy of information sources were reasons that compelled learners to access a medium of information.

Similarly, a study conducted by Buami (2013) among 255 learners in Nima, Accra showed that almost half (49.8%) of learners accessed information from the Internet for their assignments, 35.7% used the Internet for communication and 5.9% retrieved news stories from the Internet. This attests to the fact that majority of learners were using the Internet for academic purposes.

3.9 Summary of the chapter

Chapter Three looked at empirical and theoretical literature which was mostly derived from academic studies in both developed and developing countries. The themes discussed in this chapter also reflect the research questions and the problem under investigation. The literature was therefore arranged systematically based on the research objectives and key research questions underpinning this study.

Key studies relating to the information behaviour of high school learners were reviewed and the literature reviewed showed that the Internet and other ICTs have become an integral part in education and serve as effective tools in providing access to information for both learners and instructors. It was observed that, for learners to use the Internet effectively for information seeking, they need skills, and librarians and teachers must be interested in developing learners Internet retrieval skills and competencies for them to use the Internet for information seeking activities effectively. Several findings from the literature also reported factors that hinder learners' Internet-based information behaviour; among these are lack of Internet access, limited skill to use computers and the Internet, lack of qualified librarians, limited information literacy instructions and others.

The literature review also shows that only a few studies have been conducted on information behaviour of learners in Africa especially Ghana. A study on Internet-based information behaviour of high school learners in Ghana is therefore important since the findings of the study serve as additions to the body of knowledge on the topic. Discussions on the research methodology used to investigate the research problem of this study follows in Chapter Four.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 Introduction

This chapter presents the research methodology and methods used to investigate the Internet-based information behaviour of high school learners. The chapter outlines the research paradigm, research approaches, and design of the study, as well as the population, sampling techniques, data collection methods, and instruments used for data analysis. The research instruments adopted for data collection were that of a questionnaire and interview due to the nature of the problem investigated. Validity and reliability of research methods were also considered and discussed. The analysis of quantitative data was done using SPSS and qualitative data analysis through thematic content analysis. How data for the current study were analysed as well as ethical considerations are also discussed in this chapter.

4.2 Research methodology

Methodology is a term that is used in reference to how we seek answers or solutions to a problem and it is regarded in the field of social sciences as how research is conducted (Taylor and DeVault, 2016:4). In this regard, research methodology includes "the methods, techniques, and procedures" that are used in the "process of implementing the research design or research plan, as well as the underlying principles and assumptions that underline their use" (Babbie and Mouton, 1998:647). Research methodology can therefore be explained as the general approach a researcher employs when conducting a research project (Leedy and Omrod, 2005:12). According to Hjørland (2005:154), a good research method for a study should be established through a combination of philosophical positions of the study vis-à-vis the objectives of the study, the nature of the problem to be investigated, "its novelty in research and the time and resources available to carry out the work".

This study agrees with Bryman's (2015:3) position that "research and its associated methods do not take place in a vacuum". This attests to the fact that, research methodologies are based on the preferred approaches for data collection and analysis (Blaikie, 2010:8). To corroborate, Taylor and DeVault (2016:4) opined that "research methodology includes activities to collect descriptive data,

people's own words and records of people's behaviour". Research methodology can therefore generally be referred to data collection tools or techniques (Silverman, 2013:124).

4.3 Research paradigms

According to Göktürk (2004:2-4), etymological analysis depicts that the word 'paradigm' "comes from the Latin word 'paradigma', and appears in Greek as 'paradeigma'". He further argues that "Michel Foucault and Thomas Kuhn appear to be the two prominent figures in the 20th century that caused an ever-since increasing attention to the word 'paradigm'". Dash (2005) also opined that Thomas Kuhn is known for the term 'paradigm'. To corroborate, Schensul (2012:76) maintained that the term 'paradigm' was first used by Thomas Khun when analysing the structure of scientific revolutions in his study in 1962. The idea of a paradigm as a "framework which put in order our entire approach to being in the globe has become usual since Kuhn published *The Structure of Scientific Revolutions* in 1962" (Aliyu et al., 2014:79). Kuhn (1962) asserted that a paradigm is an integrated cluster of concepts, variables, and problems substantively attached with corresponding methodological approaches and tools. Nevertheless, Babbie (2014:31) is of the view that "paradigms don't explain anything, but they provide logical frameworks within which theories are created".

The use of the word 'paradigm' by Kuhn, and the definitions of the word by several other authors to some extent determined its current meaning (Göktürk, 2004:4). Khun (1962) maintained that 'paradigm' relates closely to science and he thus chose the term to suggest some accepted examples of actual scientific practice. Babbie's (2014:33) assertion that paradigms play a fundamental role in science, just as they do in daily life clearly supports Jackson's (2003: 37) definition of paradigm as a "set of ideas, assumptions and beliefs that shaped and guided the activity of a particular scientific community". These arguments imply that, research paradigm is a set of assumptions, concepts, practices and values that constitutes a way of viewing reality for the community that shares them (McGregor and Murnane, 2010:419).

Theories are employed to offer explanations and paradigms on the other hand, provides ways of looking for explanations (Babbie, 2014:31). Research paradigms represent the "mental window through which the researcher views the world" (Bailey, 1982:24). Babbie (2011:32) particularly

upheld that “social scientists have developed several paradigms for understanding social behaviour”. To make matters clearer for the current study, Babbie and Mouton’s (1998:645) definition of research paradigms as “models or frameworks for observation and understanding, which shape both what we see and how we understand it” was advanced for this study. This definition shows that, a research paradigm can therefore be said to be a comprehensive belief system, world view, or framework that guides research and practice in a field (Willis, 2007:8).

Babbie (2014:32) is of the view that “paradigms are often difficult to recognise as such because they are so implicit, assumed, taken for granted”. Blaikie (2010:20), in an attempt to outline the history of paradigms maintained that research paradigms were refered to as traditions or assumptions to some extent during the early 1990s. These philosophical assumptions, as opined by Creswell (2007:16-17) “consist of a stance towards the nature of reality (ontology), how the researcher knows what he or she knows (epistemology) and the methods used in the process (methodology)”. Research paradigms are therefore, philosophical beliefs which are used to study and interpret knowledge (Mertens, 2005) in three perspectives: namely epistemology, ontology, and methodology (Taylor and Medina, 2013). It is worth noting that, a paradigm serves as a fundamental model which mirrors in-depth knowledge of what researchers see and the way they comprehend the model of a study (Babbie, 2011:32).

This study was mindful of the fact that there exist conflict and interactionist paradigm, while “the conflict paradigm causes us to see social behaviour one way, the interactionist paradigm causes us to see it differently” (Babbie, 2014:31). According to Creswell and Plano Clark (2011:40-41), the four main paradigms that researchers apply for social science research are post-positivism, social constructivism, participatory and pragmatism. Kuhn (1970:23) explained that paradigms are interchangeable with what they exemplify. The current study adopted the post-positivism paradigm because it allows the combination of methodologies and thus enables methodologies to complement individual limitations and exploits respective benefits (Shenton, 2004). The four most widely used paradigms in research - pragmatism, interpretivism, positivism, and post-positivism (Crossan, 2003; Kim, 2003) – are discussed below.

4.3.1 Pragmatism

According to Scott (2016:255), pragmatism is "a philosophical school of thought that developed in America during the late nineteenth and early twentieth centuries". Thinkers of this paradigm as indicated by Saunders, Lewis and Thornhill (2012), note that research question(s) is the most important determinant of the epistemology, ontology and axiology that one adopts for a study. Pragmatism places its emphasis on shared meanings and joint actions (Morgan, 2007:67). It therefore relies upon the belief that "theories can be both contextual and generalise by analysing their transferability to another situation" (Creswell, 2009:4). Tran (2016:10) opined that pragmatism has the ability to "convert observations into theories and then assess those theories through action".

Pragmatism is much about meaning and it is based on the belief that "the meaning of ideas lies in their consequences rather than in the ideas themselves" (Scott, 2016:255). This reflects Morgan's (2007:71) position that this paradigm relies "on a version of abductive reasoning that move back and forth between induction and deduction" to connect theory and data. This shows that, pragmatism to some extent "allows the potential and possibility to work back and forth between qualitative data and quantitative data" (Tran, 2016:10), which are often viewed as incompatible.

To advance this argument, Guthrie (2010:45) concluded that, pragmatic paradigm enables researchers to "combine methodologies even within the same project as it enables us to use those research techniques which suit the research problem at hand". It is therefore "not faithful to any one system of philosophy or reality" since included in its approach is "willingness to change and a readiness to respond to particular circumstances in which human beings are inevitably placed" (Scott, 2016:255). Pragmatism therefore "offers researches the opportunity to search for useful points of connection between" qualitative and quantitative data (Tran, 2016:10).

Johnson and Onwuegbuzie (2004:16) advocated consideration on the "pragmatic method of the classical pragmatists…as a way for researchers to think about the traditional dualisms that have been debated by the purists". Pragmatists argue that "there is impossibility of 'complete objectivity' or 'complete subjectivity' in conducting research" (Tran, 2016:10). According to Scott (2016:255), "pragmatists attempt to emphasise the importance of trying different methods and then

evaluating" them about their effectiveness. Particularly, pragmatism "focuses on knowledge as the fallible and constantly revised product of experience." (Biddle and Schafft, 2015:323).

The current study did not employ pragmatism because it is mostly concerned with using anything that works best in any situation and it falls short of the basic beliefs of mixed method research (Ngulube, Mokwatlo, and Ndwandwe, 2009). Moreover, as the name suggests, pragmatism focuses "on those ideas that apply practically, refusing philosophy's reputation of being excessively idealistic and abstract" (Scott, 2016:255).

4.3.2 Interpretivism

Mertens (2005:12) opined that the interpretivist research paradigm emerged from the philosophy of Edmund Husser's phenomenology as well as Wilhelm Dilthey's and other German philosopher's study of interpretive understanding called 'hermeneutics'. 'Interpretivism' according to Aliyu et al. (2014:84), "is a word that is quite new, however, simultaneously everywhere in the midst of non-positivist researchers and scholars". Bryman (2008:13) defines interpretivism research paradigm as "an epistemological position that requires the social scientist to grasp the subjective meaning of social action".

Interpretivist investigators argue that there is no worldwide and universal truth. They therefore comprehend, interpret, and understand from their own orientation reference and outline, since they hold "the view that uncommitted and indifferent impartiality is impracticable, and realism or practicality of framework and background is imperative" (Aliyu et al, 2014:82).

Cohen and Manion (1994:36) maintained that to understand the world of human experience is the main role of the interpretivist paradigm in research. This position points to the fact that, interpretivism is perhaps the most significant substitute to positivism (Aliyu et al., 2014:84) since it deals with social truth or reality (Creswell, 2002). The underlying philosophical assumptions underpinning the interpretivist research paradigm as opined by Cohen and Crabtree (2006) is that reality or truth is socially constructed and fluid. According to Conje (2011:3), "interpretivists believe that the human experience of the world is subjective, and they have a concern to understand it as it is"; hence their purpose is to explain situations.

The spirit of the interpretivists viewpoint to advance their position as a paradigm lies in the fact that, interpretivism is an "ontological point of view which looks at reality or truth as a social formation or construct of the mind's inner feeling" (Aliyu et al., 2014:84). The interpretivist researchers therefore, generally rely heavily on the views of participants of the subject being studied (Creswell, 2003:8). The current study did not employ interpretivism because it heavily relies upon methods such as interview and observation and as noted by Bryman (2004:266), qualitative research has strong links with interpretivism, since it is "concerned with words rather than numbers". The research approach of the current study was mixed-methods.

4.3.3 Positivism

According to Kaboub (2004), the idea of positivism came into being as a truth-seeking paradigm in the later part of the 19th century through Auguste Comte's denunciation of metaphysics. To corroborate, Babbie (2014:34) opined, "Comte's view came to form the foundation for subsequent development of the social sciences" by coining the term 'positivism' to describe this scientific approach. In an attempt to provide a historical background of this paradigm, Aliyu et al. (2014:81) opined that positivism was recognised as "the leading scientific and technical approach in the beginning of the 20th century by constituents of the Vienna Circle, with Karl Menger et al". However, the term 'positivism' is argued to have been coined over two centuries ago (McGregor and Murnane, 2010:423).

Positivism can be defined as "self-governing, independent and objective existence of truth", since it is a research paradigm that is established "on the ontological principle and doctrine that truth and reality is free and independent of the viewer and observer" (Aliyu et al., 2014:81). Patton (2002:93) maintained that positivists hold the view that knowledge is not absolute but relative. Legal positivists argue that the validity of a law rests upon its generation through "legally stipulated procedures" (Habermas, 1996:202). Within the positivistic research paradigm, "it is assumed that the only way people can be positive that the knowledge is true is if it was created using the scientific method" (McGregor and Murnane, 2010:423).

These arguments indicate that positivism is rooted in the belief that statements whose status of truth cannot be assessed through reference to sense data are 'meaningless' (Ayer, 1946:9). According to Aliyu et al. (2014:81-82), a positivist investigator has an idea or notion:

- that the universe or world conforms to permanent and unchanging laws and rules of causation and happenings;
- that there exist an intricacy and complexity that could be overcome by reductionism;
- with the intention of asserting an importance and emphasis on impartiality, measurement, objectivity and repeatability.

The idea of positivism paradigm generally involves the process of collecting data, observing regularities, and extracting laws (Turner, 1992:157). Aliyu et al. further (2014:82) asserted that the methodologies frequently employed by positivist researchers include:

- confirmatory analysis,
- nomothetic experiments,
- quantitative analysis,
- laboratory experiments, and
- deduction.

Positivists also argue that "all phenomena can be reduced to empirical indicators which represent the truth" (Sale and Brazil, 2004:353). Particularly, this study recognised the fact that, positivists believe that "scientific truths could be positively verified through empirical observations, and the logical analysis of what was observed" (Babbie, 2014:34). The positivist paradigm therefore emphasises that factual, genuine and real happenings can be observed and studied "scientifically and empirically and could as well be elucidated by way of lucid and rational investigation and analysis" (Aliyu, et al., 2014:83).

It is important to note that, at some point, positivist researchers typically tend to determine predictions of human behaviour in order to gain the truth (Grix and Watkins, 2010:146). Positivism can therefore be described in the field of social science as "the view that the natural sciences should provide the model for proper research" (Ryan, 2015:418).

The current study did not employ positivism because "the idea of positivism has come under serious challenge" in recent decades (Babbie, 2014:34). For example, Morçöl (2002:69) challenges positivists' belief that facts are 'immediately observable'. Moreover, a limitation of positivism is that it "fails to recognise that an erroneous theory can generate correct predictions" (Hawkesworth, 1992:320).

4.3.4 Post-positivism

The history of the post-positivistic research paradigm points to the fact that it is "a term coined in the mid-1960s" (McGregor and Murnane, 2010:423). This is corroborated by Scotland (2012:10), who opined that "post-positivism emerged from positivism" during the twentieth century. Post-positivism is believed to provide an alternative to the traditional positivism approach for conducting disciplined research (Wang, Duffy and Haffey, 2007:2). Post-positivism research paradigm is therefore a "revised form of positivism that addresses several of the more widely known criticisms of quantitative orientation and, yet maintains an emphasis on quantitative methods". This implies that, post-positivism is an alternative paradigm that moves "positivism from a narrow perspective into a more encompassing way to examine real world problems" (Henderson, 2011:342). It has been argued that "the birth of post-positivism began with the rejection of and dissatisfaction with positivist epistemological and methodological assumptions" (Eun, 2016:7).

According to Scotland (2012:10), "post-positivism has similar ontological and epistemological beliefs as positivism; however, it differs in several ways". The ideas of positivism remain the gold standard of modernism and post-positivism does not negate these ideas but rather, "suggests that knowledge is not neutral and that all knowledge is socially constructed" (Henderson, 2011:342). This study was mindful of the fact that, post-positivism does not suggest that positivism is no longer valid or irrelevant "but rather offers that something exists subsequent to positivism that also is worth considering" (Henderson, 2011:342).

Post-positivism seems to fit the definition of pragmatism that "an ideology or approach is true if it works" (Henderson, 2011:342). This implies that, the post-positivism paradigm is a suitable approach specially to investigate the behaviour of individuals (Creswell, 2009:7). To advance the

position of post-positivism, post-positivists argue that truth is constructed through a dialogue, thus knowledge claims that are valid "emerge as conflicting interpretations and action possibilities are discussed and negotiated" among members of a given community (Wolcott, 1990:19). This framework of post-positivists describes reality as "multiple, subjective, and mentally constructed by individuals" (Crossan, 2003:54).

Post-positivists therefore assume that, "there are many ways of knowing aside from using the scientific method (McGregor and Murnane, 2010:423). In this regard, post-positivism research paradigm therefore provides another research framework that reflects much of the research undertaken in social science disciplines "regardless of whether quantitative or qualitative data, or a mix of the two, are used" (Henderson, 2011:342). According to Guthrie (2010:43), the advantages of post-positivism as a research paradigm are that it:

- regards knowledge as subjective and value-laden;
- views data on the relationship between the knower and the known;
- favours naturalistic, non-experimental research where the researcher does not manipulate the research setting or subjects or put data in predefined categories; and
- view knowledge as subjective, holistic and not based on cause and effect, and considers that scientific methods are social constructs.

Post-positivists are also of the view that "all observation is fallible and has error, and all theory is revisable" (Wang, Duffy and Haffey, 2007:2). This makes post-positivism paradigm broad and brings together theory and practice which allows, acknowledges, and encourages the researchers' motivations and commitment to the topic (Ryan, 2006). Creswell (2009:7) noted that the two main advantages post-positivism paradigm provides to research are that it appropriately allows data collection to be completed in a short time and helps statistical analysis to be accurately applied. According to Fischer (1998:136-137), the post-positivism paradigm is a useful approach that facilitates accurate interpretation and in-depth analysis of empirical research and this was considered important for the purpose of the current study.

Post-positivists again "view human beings as being unable to know true reality with certainty" and for them, research is 'soft' and should generally employ small samples "for more in-depth

investigations" (Wang, Duffy and Haffey, 2007:2). The post-positivistic paradigm therefore "assumes that research should not be value-free and unbiased but be value-laden, subjective and inter-subjective, even value-driven within the critical paradigm" (McGregor and Murnane, 2010:424). Henderson (2011:342-343) asserted that post-positivism paradigm:

- emphasises meanings and seeks to explicate social concerns,
- acknowledges that fixing meaning(s) is not a neutral act, and
- acknowledges that the questions raised reflect particular interests.

Moreover, post-positivism research paradigm allows the application of many correct techniques to data collection and analysis (Ryan, 2006). Although McGregor and Murnane (2010:424) equate qualitative with post-positivism, many scholars equate it with mixed-method (Ryan, 2006; Creswell, 2009; Nieuwenhuis, 2010; Henderson, 2011; Eun, 2016). The current study employed mixed-method approach and as indicated by Nieuwenhuis (2010:65), post-positivism paradigm allows the combinations of both quantitative and qualitative approaches for a study. The current study therefore adopted post-positivism paradigm because it "legitimises the potential for using mixed methods" and allowing for this reflexive methodology also "enables the possibilities for examining data in more expansive ways" (Henderson, 2011:343).

Post-positivism paradigm serves as a clearer way to "acknowledge the problems with the traditional scientific method" and as an epistemology, it provides "another way of thinking and knowing" (Henderson, 2011:345). Post-positivism claims that "post-positivistic knowledge is more certain and objective than knowledge which originated from other paradigms" (Scotland, 2012:10) and this research paradigm strives for trustworthiness criteria instead of unbiased criteria (McGregor and Murnane, 2010:424).

Some criticise post-positivism as a research paradigm. For example, Kurki and Wight (2013:23) indicted that frequent criticism of post-positivism is that, "although alternatives to positivism are commonly grouped together under the heading of post-positivism, in many respects, all they have in common is 'a rejection of positivism". Although, Eun (2016:8) posited that, "post-positivist scholarship has failed to establish a 'coherent' epistemological ground", he further, however,

maintained that “post-positivist research, despite its shortcomings, needs to be accepted as a ‘normal’ and a different kind of ‘scientific’ approach”.

4.4 Research approach

McGregor and Murnane (2010:420) opined that research approaches are methods used to gather and analyse data and present results. There are three main research approaches and these approaches are qualitative, quantitative and mixed approaches (Hughes, 1980:39). To corroborate, Eyisi (2016:92) asserts that research approaches are “either classified as qualitative, quantitative research or mixed method”. These three approaches are discussed below.

4.4.1 Qualitative approach

Qualitative research involves the study of “things in their natural settings, attempting to make sense of, or interpret phenomenon in terms of the meanings people bring to them” (Denzin and Lincoln, 2000:3). Patton (2002: 253) noted that “the extent to which a qualitative approach is inductive or deductive varies along a continuum”. Qualitative research is most often confined to small groups or individual studies that are in-depth and the data collection methods for this approach include focus group interviews, unstructured in-depth interviews, and observation (Ngulube, 2005:130). Qualitatively “driven strategies” include case studies, bibliographical and historical methods, ethnography, grounded theory, symbolic interactionism or semiotics, phenomenology and other interpretive practices, hermeneutics and discourse analysis (Powell, 1999:96-98).

Qualitative research enables researchers “to conduct in-depth studies about a broad array of topics” (Yin, 2011:6). In qualitative studies, “certain elements of symbolism, meaning, or understanding usually require a consideration of the individual’s own perceptions and subjective apprehension” (Berg and Lune, 2012:15). Qualitative research therefore “contains all necessary instruments that can evoke recall which aids problem-solving” (Eyisi, 2016:92). Denzin and Lincoln (2005:3) opined that the use of qualitative research approach enables researchers to understand the world surrounding them. This implies that, the primary focus of qualitative research is to understand “value, beliefs, and experience of people” and this sometimes makes it become more flexible during the research process (Kumar, 2011:104). Qualitative research approach can therefore

remain flexible for relevant changes and this serves as an advantage to this approach (Lapan, Quartaroli, and Riemer, 2012:1).

Denzin and Lincoln (2000:5) are of the view that qualitative research approach is a more appropriate approach when the nature of the research problem's features is complex. Moreover, qualitative research approach "offers greater latitude in selecting topics of interest" and these have made it an acceptable "form of research in many different academic and professional fields" (Yin, 2011:6). Particularly, the qualitative research approach is noted to provide more explanations as compared to the quantitative research approach (Barbour, 2008:15).

The purpose of using a qualitative approach for a study is to contextualise and interpret results by applying induction to derive possible explanations on observed phenomena (Lapan, Quartaroli, and Riemer, 2012:12). Yin (2011:7-8) outlines five features of qualitative research approach:

- Studying the meaning of people's lives, under real-world conditions;
- Representing the views and perspectives of the people;
- Covering the contextual conditions within which people live;
- Contributing insights into existing or emerging concepts that may help to explain human social behaviour; and
- Striving to use multiple sources of evidence rather than relying on a single source alone.

In qualitative research, data collection instruments such as "observation, open-ended questions, in-depth interview, and field notes are used to collect data from participants in their natural settings" (Eyisi, 2016:92). Kerlinger (1986:348) maintained that the weaknesses of qualitative research approach are:

- the inability to manipulate independent variables;
- the risk of improper interpretation; and
- the lack of power to randomise.

Eyisi (2016:93) on the other hand asserted that qualitative research approach has these advantages:

- Qualitative approach provides abundant data about real life of people and situations.

- The system through which data are retrieved in qualitative research approach is regarded as being unique.
- In qualitative research approach, theory emerges from data.
- Qualitative research approach views human thought and behaviour in a social context and covers a wide range of phenomena in order to understand and appreciate them thoroughly.

4.4.2 Quantitative approach

Quantitative methods have a long history dating to at least the 1930's and its definition is complicated by the fact that it is often used to identify the research approach that reflects the "arrangement of independent and dependent variables associated with data collection" (Harwell, 2011:150). Bryman (2001:20) maintained that quantitative research approach places emphasis on numbers and figures in the analysis and collection of data. Payne (2011:13), however, believes that research quantification occurs in a wide range of study and analysis.

The use of quantitative method in a research helps in maximising the objectivity, replicability, as well as the generalisability of research findings, and they are typically used to predict the study outcome (Harwell, 2011:149). Quantitative research approaches are said to be "specific, well structured, have been tested for their validity and reliability, and can be explicitly defined and recognised" (Kumar, 2011:103). This study agreed that quantitative approach is structured with predetermined variables, hypotheses and design (Bryman, 2012:408). Johnson and Christensen (2012:39) explained that "a quantitative variable is a variable that varies in degree or amount. It usually involves numbers".

It is worth noting that, quantitative approach has a more "positivist worldview, experimental strategy of enquiry, and pre-test measures of attitudes" (Creswell, 2009:17). Integral to this approach is the expectation that a researcher applying this approach for a study will set aside his/her "experiences, perceptions, and biases to ensure objectivity in the conduct of the study and the conclusions that are drawn" (Harwell, 2011:149). This approach is therefore best used for testing a theory or explanation (Creswell, 2003:22).

According to Kothari (2004:5), quantitative research approach can be "sub-classified into inferential, experimental and simulation approach". Harwell (2011:149) argued that quantitative approaches are deductive in nature, "in the sense that inferences from tests of statistical hypotheses lead to general inferences about characteristics of a population". DePoy and Gitlin (2011:8) explained the deductive reasoning to include "moving from a general principle to understanding a specific case".

Key features of many quantitative studies are the use of instruments like surveys and tests to collect data, as well as "reliance on probability theory to test statistical hypotheses that correspond to research questions of interest" (Harwell, 2011:149). Eyisi (2016:94) outlined five advantages of quantitative research approach:

- Quantitative research approach uses statistical data as a tool for saving time and resources.
- The use of scientific methods for data collection and analysis in this approach makes generalisation possible with this type of approach.
- Replicability is another benefit derivable from the use of this research approach since the research approach relies on hypotheses testing.
- Quantitative research approach gives room for the use of control and study groups.
- Researcher detachment feature of quantitative approach helps eliminate research biases.

4.4.3 Mixed-methods approach

The mixed methods research approach originated from the multi-trait, multi-method approach of Campbell and Fiske's work in 1959 (Teddlie and Tashakkori, 2009:31). Mixed methods research approach has gained acceptability and popularity with a "significant number of studies arguing its virtues in terms of greater understanding and/or validation of results" (Bazeley, 2004:1410). Harwell (2011:151) argued that the qualitative and quantitative debate has coincided with the rapid development of mixed methods, which combine qualitative and quantitative research approaches "in ways that ostensibly bridge their differences in the service of addressing a research question". Caruth (2013:112) agrees to this and further asserted that "mixed-methods research evolved in response to the observed limitations of both quantitative and qualitative designs". The current study was mindful of the fact that, the growth of mixed methods research approach has been

accompanied by a “debate over the rationale for combining what has previously been regarded as incompatible methodologies” (Hall, 2013:71).

Mixed methods research can be defined as “the combination of qualitative and quantitative approaches to research” (Bazeley, 2004:14). Mixed methods research approach therefore “combines quantitative and qualitative research techniques, methods, approaches, concepts, or language into a single study” (Johnson and Onwuegbuzie, 2004:17). Hall (2013:71) maintained that the term ‘mixed methods’ is used to “refer to the use of two or more methods in a research project yielding both qualitative and quantitative data”. These definitions imply that it is a “method of both quantitative and qualitative designs in the same research study” (Caruth, 2013:113).

This approach has been recognised as the number three methodological movement over the last twenty years (Hall, 2013:71). Venkatesh, Brown, and Bala (2013:22) therefore refer to it as the "third methodological movement". Although, mixed methods approach is a more complex research approach, “it has the potential to offer more robust research” (Caruth, 2013:112). According to Harwell (2011:151), mixed methods research approach, “combines qualitative and quantitative methods in ways that draw on the strengths of both traditions of inquiry”. Creswell (2006:5) also maintained that mixed methods approach is a research design that has philosophical assumptions and method of inquiry, with the philosophical assumptions guiding the direction of the collection and analysis of data.

Although “both qualitative and quantitative methods are useful and legitimate in social research” (Babbie, 2011:25), Greene (2007:xiii) maintained that combining both approaches provides the “opportunity to compensate for inherent method weaknesses, capitalise on inherent method strengths, and offset inevitable method biases”. The rational for combining qualitative and quantitative research approaches “is to maintain the strengths and ameliorate the weaknesses in both designs” (Caruth, 2013:113). Mixed methods approach is therefore a clear step away from the boundaries and practices of qualitative and quantitative traditions and it seems firmly rooted in research (Harwell, 2011:152).

Combining qualitative and quantitative approaches is gaining acceptance among the research community and it is thought that mixed methods approach "presents a more enhanced insight into the research problem(s) and question(s) than using one of the methods independently" (Caruth, 2013:113). Creswell (2006:5) noted that mixed methods approach "focuses on collecting, analysing, and mixing both quantitative and qualitative data in a single study". The current study adopted mixed methods approach since it provides "flexibility, creativity, and resourcefulness" (Greene, Kreider, and Mayer, 2004:277) for a study. The mixed methods approach, through triangulation also helped the study to examine "the consistency of findings, such as those obtained through different instruments, and which might include interviews and surveys" (Harwell, 2011:152).

The central premise of the combination of quantitative and qualitative approaches is that it provides a better understanding of the research problems (Creswell, 2006:5). Caruth (2013:114-115) argued that mixed methods approach can be characterised from other designs according to the following:

- they offer a rationale for using both qualitative and quantitative approaches;
- they include gathering quantitative and qualitative data;
- they consider priority by indicating which method design data carries more emphasis;
- they consider sequence of data gathering;
- they match the data analysis to a specific design type; and
- they diagram the procedures used in the study.

In the current study, the quantitative approach was dominant and the qualitative was complementary. Combining both qualitative and quantitative data yielded a more complete data analysis for the current study (Nieuwenhuis, 2010:66). As opined by Caruth (2013:113), combining the methods "can complement each other, offer richer insights, and result in more questions of interest for future studies". The use of the mixed method approach triangulated both qualitative and quantitative approaches for the current study and this helped in verifying the reliability of the research tools as well as the validity of the data collected (McNeill and Chapman, 2005:23).

4.5 Research design

Identifying a study's research design is important since "it communicates information about key features of the study" (Harwell, 2011:148). Parahoo (1997:142) defines a research design as "a plan that describes how, when and where data are to be collected and analysed". Mouton (2001:55) opined that a research design is a plan or blueprint of how one intends to conduct a research. To corroborate, Burns and Grove (2003:195) asserted that a research design is "a blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings". This implies that a research design consists of the structure of a study (De Vaus, 2002:16).

Polit, Beck and Hungler (2001:167) are of the view that, a research design is the researcher's overall plan "for answering the research question or testing the research hypothesis". Research design helps a researcher to answer the research questions identified for a study objectively. Selecting a research design of a multiple methods research depends on the "objectives of the study and the questions of the research" (Salehi and Golafshani, 2010:188). The two most commonly used designs are case study and survey. The current study applied the survey design which was suitable for this study. Both research designs are however, explained below.

4.5.1 Case study

Yin (1984:23) opined that, case study investigates a contemporary phenomenon within its real-life context through an empirical inquiry "when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used". Case study research allows the exploration and understanding of complex issues and it can be regarded as a "robust research method particularly when a holistic, in-depth investigation is required" (Zainal, 2007:1).

Through case study methods, a researcher can go "beyond the quantitative statistical results and understand the behavioural conditions through the actor's perspective" (Zainal, 2007:1). Case study method has been applied in many areas and disciplines since it enables researchers to examine data closely within a specific context and in most cases, the design employs a small area or a limited number of people as the subjects of a study. Case study as a research design is therefore

"used in many situations, to contribute to our knowledge of individual, group, organisational, social, political, and related phenomena" (Yin, 2009:4).

The use of case studies for research purposes is "one of the most challenging of all social science endeavours" (Yin, 2009:3). The current study did not use case study design because research "methodologists do not have a full consensus on the design and implementation of case study, which hampers its full evolution" (Yazan, 2015:134) making it a contested terrain despite being one of the most used research methodologies. Moreover, the current study was on a large geographical area but the use of case study design "is meant that only a very small geographical area or number of subjects of interest are examined in detail" (Zainal, 2007:2).

Yin (2009:14) argued that case studies lack rigor and "have been viewed as a less desirable form of inquiry than either experiments or surveys". He further opined that case study investigator is sloppy, "has not followed systematic procedures, or has allowed equivocal evidence or biased views to influence the direction of the findings and conclusions". Zainal (2007:2) noted criticism of case study design in relation to "its lack of robustness as a research tool" as well as "its inability to provide a generalising conclusion, in particular when the events are rare".

Case studies are mostly used in "an in-depth longitudinal examination of a single case or event (Zainal, 2007:2). Yin (2009:15) asserted that a "common concern about case studies is that they provide little basis for scientific generalisation". Yazan (2015:150) noted that case study design has "multiplicity of approaches and a contested terrain marked by variety of perspectives". Although the current study did not use case study, in the perspective of holistic case study, Ghana is the case and the embedded units are the three high schools.

4.5.2 Survey

According to Pinsonneault and Kraemer (1993:77), a survey is a "means for gathering information about the characteristics, actions, or opinions of a large group of people". McMillan and Schumacher (2001:602) define survey research as "the assessment of the current status, opinions, beliefs, and attitudes by questionnaires or interviews from a known population". The current study adopted survey research design and the definition of survey design by McMillan and Schumacher

suits this study, since the study investigates the Internet-based information behaviour of high school learners and the tools used were questionnaires and interviews. Isaac and Michael (1997:136) asserted that survey research design is used

> to answer questions that have been raised, to solve problems that have been posed or observed, to assess needs and set goals, to determine whether or not specific objectives have been met, to establish baselines against which future comparisons can be made, to analyse trends across time, and generally, to describe what exists, in what amount, and in what context.

De Leeuw, Hox and Dillman (2008:1) argued that "the idea of conducting a survey is deceptively simple" since it involves identifying a specific group of "people and collecting information from some of them in order to gain insight into what the entire group does or thinks". The identified group of the current study were high school learners and some of them were selected to gain insight into the entire group's Internet-based information behaviour. Survey research design is a frequently used mode of observation in the social sciences and in a typical survey research, "the researcher selects a sample of respondents and administers a standarsised questionnaire to each person in the sample" (Babbie, 2014:261).

The application of a survey design is helpful in "obtaining information from large samples of the population" (Glasow, 2005:1). A survey research design "can be seen as a research strategy in which information is systematically collected from a relatively large sample taken from a population" (De Leeuw, Hox and Dillman, 2008:2). To corroborate, Babbie (2014:261) opined that "survey research is probably the best method available to the social researcher who is interested in collecting original data for describing a population too large to observe directly". This attests to the fact that, "for generalization about the attitudes of a population, collection of quantitative opinions using quantitative surveys is appropriate" (Guthrie, 2010:46).

Survey research design "is a relatively fast and cost effective method of collecting data to answer both qualitative and quantitative research questions" and this provides the researcher multiple options for data collection (Siedlecki, Butler and Burchill, 2015:1-2). Survey research design is therefore a research mechanism that applies both quantitative and qualitative research

methodologies (Best and Kahn, 2006:271). The current study used both qualitative and quantitative approaches for data collection through the use of survey research design.

In order to avoid major pitfalls associated with research studies that use survey research design, Siedlecki, Butler and Burchill (2015:8) cautioned researchers who employ survey research design to:

- begin with a well-developed research question,
- define all terms (variables),
- select valid and reliable measures appropriate to each variable,
- determine the sampling technique and sample size needed, and
- take measures to ensure an adequate response rate.

The application of survey research design requires the use of independent and dependent variables in defining the scope of study; however, the researcher has no explicit control over any of these variables (Glasow, 2005:1). It is worth noting that "surveys are the most widely used data-gathering techniques in the social sciences and other fields" (Neuman, 2009:144). In the past, "most surveys were paper-and-pencil questionnaires distributed on-site, sent by mail, or administered during a telephone interview" (Siedlecki, Butler and Burchill, 2015:7). Surveys are therefore relatively flexible since "they allow you to ask many questions on a given topic, giving you considerable flexibility in your analyses" (Babbie, 2014:294).

Studies that apply survey research designs are mostly "descriptive, correlation, or comparison studies" and when designing a survey for a study, "the most important criterion is to determine what data need to be collected" (Siedlecki, Butler and Burchill, 2015:1). Edmonds and Kennedy (2013:107) noted that survey research commonly reflects the descriptive approach. To corroborate, Babbie (2014:299), asserted that "survey research is especially appropriate for making descriptive studies of large populations" and the current study is a descriptive study since it investigates the Internet-based information behaviour of high school learners which looks into their online information needs, Internet access and retrieval skills, challenges, etc. According to Walliman (2011:10), a descriptive study involves the use of questionnaires and interviews, and both techniques were used in the current study.

In a survey design, a sampling plan must be firstly developed. A sampling plan could be defined as the methodology "used to select the sample from the population" (Levy and Lemeshow, 1999:6). However, De Leeuw, Hox and Dillman (2008:4) maintained that "the first step in the survey process is to determine the research objectives" and translate them into a set of key research questions. Babbie (2011:277) opined that survey research design generally involves three main steps: questionnaire construction, sample selection, and data collection. The current study followed all three steps and also used both interviewing and self-administered questionnaires as data collection tools. The current study employed survey research design to elicit information about high school learners Internet-based information behaviour that are otherwise difficult to measure using observational techniques (McIntyre, 1999:75).

De Leeuw, Hox and Dillman (2008:5) asserted that, "when thinking about the process that leads from theoretical constructs" to research questions in a survey design, it is useful to distinguish between conceptualisation and operationalisation". They further explained that researchers must decide which concepts they wish to measure before questions can be formulated and "the subsequent process of operationalisation involves choosing empirical indicators for each concept or each subdomain". This implies that, researchers who conduct a survey are advised to "provide additional input regarding resource requirements and offer alternative sampling procedures that they deem feasible and appropriate to the task" (Glasow, 2005:3). Surveys are therefore "particularly useful in describing the characteristics of a large population" and they are mostly applied in studies that have individual people as the units of analysis; however, researchers are cautioned that "survey research is generally weak on validity" but strong on reliability (Babbie, 2014:295).

4.6 Sites of research (Host schools)

Researchers are advised to conduct studies at feasible research settings that suit the purpose of their study (Maree and van der Westhuizen, 2010:34). The current study was conducted at three public high schools in the Ashanti region of Ghana: St. Louis SHS, Effiduasi SHS, and Simms SHS.

According to the St. Louis Senior High School's website (2017), the school was established by the Catholic Church through the efforts of the Most Rev. Hubert Paulissen in the year 1952. The school started with an initial population of 12 learners. Imparting values, skills, Christian principles, and knowledge to empower learners to be relevant in society is the mission of the school. The school is situated in Oduom, a suburb of Kumasi, the capital city of the Ashanti region. As a public institution as well as a religious institution, St. Louis SHS enjoys direct support from both the Government of Ghana through the Ministry of Education and the Ghana Education Service as well as the Catholic Church. The Ghana Senior High Schools Digest (GSHSD, 2016) posits that the school provides boarding facilities for learners and most of the teachers are housed in the teachers' bungalows at the school premises. General Science, General Arts, Business, Visual Art, Core Subject, and Home Economics are the programmes offered for learners at the school. The school is noted for its academic excellence and discipline. St. Louis SHS has won several academic laurels and notable among them is having two students being adjudged the overall international and national best candidates in the 2008 West African Senior High School Certificate Examination (WASSCE). Priscilla Asafo-Agyei and Josephine Tsorgali of St. Louis SHS won the first and second place positions of 2008 WASSCE International Excellence Awards respectively. The International Excellence Awards are awarded to the best three candidates among all the best candidates who write WASSCE from Ghana, Nigeria, Sierra Leone, and the Gambia.

Effiduasi Senior High School was established by Mr. E. R. Addow, alias Kwaku Mosi in 1943. The school is located in Effiduasi, the capital town of the Sekyere East district of the Ashanti Region of Ghana. The school provides secondary education to learners and also has boarding facilities and housing facilities for both learners and teachers at the school. The school started as a commercial school specialising in Business programmes until 2009 when the school's focus was changed into a science-based school (GSHSD, 2016). The school offers General Science, General Arts, Business, Visual Art, Home Economics, and Agriculture Science programmes to learners. The mission of the school is to provide secondary Education to learners irrespective of their ethnic background and capability. The school has been adjudged the best secondary school in the Sekyere East district of Ashanti on several occasions in the WASSCE.

Simms Senior High School was founded in the year 1977 as a private institution by Mr. Simms Kofi Mensah with the purpose of providing secondary education to the people of Kwabre. Simms Senior High School is located at Fawoade, a town in the Kwabre District of Ashanti Region. The school started as a commercial school specialising in business programmes without boarding facilities until it was absorbed into the public educational system by the Government of Ghana in 1982. The mission of the school is to provide quality secondary education to learners to help them enter into tertiary institution and acquire jobs after their course. The school therefore aims at providing quality secondary education to its learners. The school offers General Science, General Arts, Business, Visual Art, Home Economics, and Agriculture Science programmes for learners (GSHSD, 2016). The academic performance of the school has always been rising over the years with its Business Department excelling the most. The School achieved 100% pass in the WASSCE in 2009, 2011, 2012 and 2013.

4.7 Population

According to Busha and Harter (1980:57), research population is "any group of persons, objects, or institutions that have at least one characteristic in common". A population includes all people in a definable group. The population therefore is the entire group of people, objects, or events in a category or a set of all cases of interest (Bordens and Abbott, 2002). Biemer and Lyberg (2003:29) define population for a research as "a group of persons or other units for whom the study results will apply". Babbie (2014:119) also opined that the population for a study is the group of people, "about whom we want to draw conclusions". A research population can therefore be referred to as the "theoretically specified aggregation of study elements" (Babbie and Mouton, 2003:173).

A research population is seen as "a homogenous group of individual units" (Leedy and Ormrod, 2005:184) and "any type of individual can be the unit of analysis for social research" (Babbie, 2011:74). The units of analysis are "those elements we examine in order to create a summary description of all such units and explain differences among them" (Welman, Kruger and Mitchel, 2005:25). Nsibirwa (2012:146) stated, "The size of the population depends on the style of research, which in a descriptive study could involve an individual, group of people or an institution".

These definitions attest to the fact that a research population is the targeted group of interest or unit(s) which the researcher intends to generalise the research findings on. The population of the current study was drawn from three high schools in Ashanti region of Ghana: St. Louis SHS, Effiduasi SHS, and Simms SHS. These three high schools represent the diversity of Ashanti region, including geographic, cultural, and socioeconomic groups. Hence one city school, one school from a major town, and one school from a small town composed the population. Four different units of analysis were selected for the study and they were Grade 12 learners, heads of the ICT departments, teachers of the ICT departments and librarians at the three high schools. Table 4.1 shows the distribution of the population.

Table 4. 1: Population for the study

High School	**Total number of Grade 12 learners**	**Heads of ICT department**	**ICT teachers**	**Librarians**
St. Louis SHS	748	1	7	1
Effiduasi SHS	920	1	9	1
Simms SHS	907	1	6	1
Total	2575	3	22	3

Source: Field data (2017)

4.8 Sampling and sampling technique

According to Gravetter and Forzano (2009:144) sampling is "the process of selecting individuals to participate in a research study". To corroborate, Babbie (2014:197) argued that sampling is the process of selecting observations. There are two types of sampling, namely probability or non-probability sampling (Maree and Pietersen, 2010:172). The current study adopted probability sampling.

Probability sampling is the key to generalising a sample to a larger population through the use of random selection. Probability sampling is used as a general term to refer to samples that are selected based on probability theory that typically involves some element of random-selection mechanism. A key element of probability sampling therefore is random selection and it is a method

that provides each element of the study an equal chance of selection. This equal chance of selection is not dependent of any other event in the selection process. Probability sampling is noted to be the most effective method for the selection of research elements since it "avoids researchers' conscious or subconscious biases in element selection" and "permits estimates of sampling error" (Babbie, 2014:197-233).

The stratified and simple random sampling techniques were used in selecting samples for the current study. According to Durrheim and Painter (2006:136), "stratified sampling is used to establish a greater degree of representativeness in situations where populations consist of subgroups or strata". Babbie (2014:223) explained that stratified sampling or stratification is the grouping of the units composing a population into homogeneous groups (or strata) before sampling. The strata for the current study were Grade 12 learners, heads of ICT department, ICT teachers, and librarians. All heads of ICT department, ICT teachers, and librarians were all included in the study due to their small number hence no need for selection.

The simple random sampling was therefore used in selecting samples from the Grade 12 learners. Simple random sampling is a type of probability sampling in which the units that compose a population are assigned numbers. A set of numbers are then generated randomly from the assigned numbers, and the units that have the generated numbers are used as the sample. The application of stratified sampling in conjunction with simple random sampling, "improves the representativeness of a sample, at least in terms of the variables used for stratification" (Babbie, 2014:220-223).

A method of determining the necessary number or sample size for a survey research is generally based on the error the researcher is willing to accept (Shih et al., 2011:5060). Saunders, Lewis and Thornhill (2012) have developed a table for selecting sample sizes for different sizes of population at a 95% level of certainty (Table 4.2) and this was adopted for the determination of sample size of the Grade 12 learners.

Table 4. 2: Sample sizes for different sizes of population at a 95% level of certainty

	Margin of error			
Population	**5%**	**3%**	**2%**	**1%**
50	44	48	49	50
100	79	91	96	99
150	108	132	141	148
200	132	168	185	196
250	151	203	226	244
300	168	234	267	291
400	196	291	334	384
500	217	340	414	475
750	245	440	571	696
1 000	278	516	706	906
2 000	**322**	696	1091	1655
5 000	357	879	1622	2388
10 000	370	964	1936	4899
100 000	383	1056	2345	8732
1 000 000	384	1066	2395	9513
10 000 000	385	1067	2400	9595

***(*Source: Saunders, Lewis and Thornhill, 2012)**

A sample size of 322 was selected from an overall target population of 2575 Grade 12 high school learners based on Saunders, Lewis and Thornhill's (2012) model at 5% error as shown in Table 4.2. This size was selected because the population figure lies closer to 2,000 than it is to 5,000. The formula for selecting the sample size for learners from each school was:

$$\text{Sample size } = \frac{No.\ of\ Grade\ 12\ learners}{Total\ Grade\ 12\ population}\ X\ 322$$

Tables 4.3 and 4.4 therefore depict the sample (s) used for the study:

Table 4. 3: Sample size of the learners (Grade 12 learners)

N=322

High School	**Total number of Grade 12 learners**	**Sample size at an error of 5%**
St. Louis High School	748	94
Effiduasi Senior High School	920	115
Simms Senior High School	907	113
Total	2575	322

Source: Field data (2017)

Table 4. 4: Total sample size of the study

N=350

Sample unit	**Sample size**
Grade 12 learners	322
Heads of ICT departments	3
ICT teachers	22
Librarians	3
Total	**350**

Source: Field data (2017)

4.9 Data Collection

Data collection follows certain procedures or techniques towards the gathering of data for a research. Tools are also employed for data collection and the most commonly used tools for survey research data gathering includes self-administered questionnaires and personal interviews. This section discusses the data collection methods, instruments and procedures used for the current study.

4.9.1 Data collection methods

Triangulation of methods for data collection was applied in the current study. Greene (2007:20) argues that triangulation combines multiple approaches and this provides several means of

understanding circumstances. Triangulation is therefore “a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study” (Creswell and Miller, 2000:126). Collecting qualitative and quantitative data within a single social research multiplies the strengths of the study (Thompson, 2004:237-239). According to Sarantakos (1998:168), applying triangulation in a study helps:

- in obtaining variety of information on the same issues;
- in using the strengths of each method to overcome the deficiencies of the other;
- to achieve more validity and reliability.

4.9.2 Data collection instruments

Werner (2004:37) noted that “the best strategy is to rely on the primary data as much as possible”. Two instruments were used in this study: survey questionnaire and semi-structured interview. The study collected primary data through the use of interview schedules (see appendix 7 and 8) and questionnaires (see appendix 5 and 6). The questionnaires were used for the collection of quantitative data and the interview schedule was used for qualitative data (Quinlan, 2011:286). Questionnaires were used for the collection of data from Grade 12 learners and ICT teachers, while the interview schedule was used on heads of ICT departments and librarians. The study combined a questionnaire with interview in order to bring high levels of confidence in the findings of the study (Gillham, 2007:2).

4.9.2.1 Survey questionnaire

Babbie (2014:262) defines a questionnaire as “a document containing questions and other types of items designed to solicit information appropriate for analysis”. He further argued that questionnaires are primarily used in survey research and applied in connection with many modes of observation in social research. De Leeuw (2008:316) upheld that a questionnaire is more than a collection of questions since “it contains instructions and texts to keep the flow of information going and to keep the respondents motivated”.

Kumar (2011:145) argued that a questionnaire should be constructed in a particular sequence that will make it easy to follow, read, understand, and make it look attractive in order to encourage

more respondents to answer. According to Babbie (2014:299), to ensure a good questionnaire construction, items in a questionnaire should observe these guidelines:

- the items must be clear and precise;
- the items should ask only about one thing (double-barrelled questions should be avoided);
- respondents must be competent to answer the item;
- respondents must be willing to answer the item;
- questions should be relevant to the respondent;
- items should ordinarily be short;
- negative items should be avoided so as not to confuse respondents; and
- the items should be worded to avoid biasing responses.

A questionnaire is "an instrument designated to elicit information that will be useful for analysis" (Babbie, 2011:243). Using questions suggested by prior research, theory, experience, or experts who are knowledgeable about the setting under investigation ensures the possibility of asking relevant questions (Schutt, 2006:253). It is worth noting that, each data element of a study should "correspond to a single response to a question on the questionnaire" (Biemer and Lyberg, 2003:30-31).

Questionnaires have the options of open-ended and closed-ended questions. Babbie (2014:263) defines open-ended questions as "questions for which the respondent is asked to provide his or her own answers" and closed-ended questions as survey questions in which the respondent is asked to select an answer from among a list provided by the researcher. He further maintained that "in-depth, qualitative interviewing relies almost exclusively on open-ended questions" and closed-ended questions are popular in survey research, since "they provide a greater uniformity of responses and are more easily processed than open-ended questions". Dawson (2002:86) advised that, "if you're sure that a questionnaire is the most appropriate method for your research, you need to decide whether you intend to construct a closed-ended, open-ended or combination questionnaire". The questionnaire used for the current study contained both open-ended and closed-ended questions, however, majority of the questions were closed-ended questions (90%).

The questionnaire for the current study was divided into seven main sections in order to collect the different categories of information. These were:

- Demographic data
- Internet accessibility
- Purpose(s) of accessing the Internet
- Selection and gathering of information from the Internet
- Internet searching skills
- Evaluation of Internet information sources
- Barriers to Internet information seeking

Questionnaires are popular among LIS researchers in collecting data for information behaviour research (Loose and Worley, 1994:144) and as noted by Cockburn and Mackenzie (2000:2), "the main attraction of questionnaires is the relative ease of gathering a large set of responses". They further upheld that, the primary challenges of questionnaires include, "their narrow scope and their separation from the user's task" since questionnaires report on the "user's perceived, rather than actual, interaction".

Advantages of using a questionnaire for a study as opined by Gillham (2007:5-8) are:

- it is low in cost of money and time;
- it gives respondents flexibility to complete the questionnaire when it suits them;
- it is easy and quick to use in obtaining information from many people;
- analysis of answers to closed questions are straightforward;
- it provides less pressure for an immediate response;
- it ensures respondents' anonymity; and
- it eliminates interviewer bias.

Gillham (2007:8-13) further noted that research should look out for and possibly avoid the following disadvantages of questionnaire:

- problems of data quality in relation to completeness and accuracy;
- problems of motivating respondents;

- the need for brevity and simple questions;
- poor development of questionnaire;
- seeking information by just asking questions;
- assuming respondents have answers available in an organised fashion;
- inability to control order and context of answering questions;
- problem of question wording; and
- literacy problems of respondents.

The study avoided these challenges by following Babbie's (2014) guidelines on constructing questionnaire and through the use and combination of the interview technique.

4.9.2.2 Interview

According to Englander (2012:13), the use of interview for data collection has become the main procedure in qualitative human scientific research. Interviews are "believed to provide a 'deeper' understanding of social phenomena than would be obtained from purely quantitative methods, such as questionnaires" (Gill et al., 2008:292). Kvale (1996:174) defines an interview as "a conversation, whose purpose is to gather descriptions of the 'life-world' of the interviewee". Interview is therefore a "data-collection encounter in which one person (an interviewer) asks questions of another (a respondent). Interviews may be conducted face-to-face or by telephone" (Babbie, 2014:281).

An "interview is an alternative method of collecting survey data" (Babbie, 2011:263). There are three fundamental types of research interviews - structured, semi-structured and unstructured. The purpose of the research interview "is to explore the views, experiences, beliefs, and/or motivations of individuals on specific matters" (Gill et al., 2008:291-292). Rather than "asking respondents to read questionnaires and enter their own answers, researchers send interviewers to ask the questions orally and to record respondents' answers" (Babbie, 2014:281).

Ho (2006:4) argued that interview is an extendable conversation between partners and the aim is to have 'in-depth information' about a certain subject or topic in order to interpret a phenomenon.

Interviews are therefore; “most appropriate where little is already known about the study phenomenon or where detailed insights are required from individual participants” (Gill et al., 2008:292).

The tool for conducting interview is called interview schedule. When designing an interview schedule, it is important to “ask questions that are likely to yield as much information about the study phenomenon as possible and also be able to address the aims and objectives of the research” (Gill et al., 2008:292). Interviews afford researchers the opportunity to “observe respondents as well as ask questions” (Babbie, 2014:282). Mason (2002:1) noted that interviews help us to explore:

- the texture and weave of everyday life;
- the understandings, experiences and imaginings of research participants;
- how social processes, institutions, discourses or relationships work;
- the significance of the meanings that they generate.

Designing an interview is argued to be “flexible, interactive, and continuous, rather than prepared in advance and locked in stone” (Rubin and Rubin, 1995:43). Gill et al. (2008:293) maintained that “all interviews should be tape recorded and transcribed verbatim afterwards, as this protects against bias and provides a permanent record of what was and was not said”. In the course of the interview, interviewers need to maintain their “interviewee’s motivation by keeping boredom at bay” (Berg, 2007:210).

4.10 Pre-testing research instruments

Kumar (2005:126) noted that “it is important that questions are clear and easy to understand” in the case of research. Pre-testing include “review of the questions by survey experts and cognitive interviewing” (Dillman, 2000:140). Pre-testing is the administration of the research instruments to similar respondents to assist in identifying weaknesses with the instruments prior to the actual data collection and it is also a way of soliciting the opinions of other researchers before finalising the research instrument (Schutt, 2006:250).

Pre-testing a research instrument provides feedback to the researcher on item(s) that requires some changes and adjustments (Czaja and Blair, 2005:22). Collins (2003:231) opined that pre-testing of research instruments helps researchers to establish whether:

- respondents can understand the question, concept or task;
- they can understand them in a consistent way; and
- in a manner, the researcher intended.

The instruments for the study were pre-tested at Adanwonmase SHS. Content validation and pre-testing of instruments on high school learners, ICT head, ICT teacher, and a librarian was conducted at this school to ensure that instruments' items reflected the key research questions. This school is located in the Ashanti region of Ghana and it has all the facilities and resources required for this study as well as the characteristics of the selected schools. Adanwomase SHS was not part of the selected schools for the study because the school recently got Internet connectivity for learners and only the Grade 12 learners were having constant access to the Internet due to space and inadequate computers. Seven Grade 12 learners, an ICT head, an ICT teacher, and a librarian from the school participated in the pre-testing.

The ICT head, teacher, and librarian understood all the questions in the instruments and answered them as required of them. On the part of the learners, they also understood the questionnaire and answered them as required. However, they had difficulties with two words in the questionnaire – curriculum and navigation – and these words were replaced with 'syllabus' and 'browsing' to their understanding.

4.11 Validity and Reliability of Instruments

Ngulube (2005:135) opines that if a "piece of research lacks validity then it does not add value to society's knowledge base". According to Boudah (2011:64), "reliability is integral to both validity and trustworthiness". Babbie (2014:152) defines reliability as the "quality of measurement methods that suggests that the same data would have been collected each time in repeated observations of the same phenomenon" and validity as a term that describes "a measure that accurately reflects the concept it is intended to measure". Remedial action needs to be taken

quickly before resources are used on collection of data whose reliability and validity would later be questioned when a researcher detects potential errors (Fraenkel, 2000:169).

4.11.1 Reliability

Henerson, Morris, and Fitz-Gibbon (1987:134) refer to reliability as consistency, although consistency may not guarantee truthfulness. Wiersma (2000:8) asserted that "reliability refers to the consistency of the research and the extent to which studies can be replicated". Nsibirwa, (2012:155) indicates that reliability in relation to research instrument, "measures consistency and stability of the instrument". Reliability is a "concern every time a single observer is the source of data, because we have no certain guard against the impact of that observer's subjectivity" (Babbie, 2014:153).

According to Fink (2010:114) "a reliable data collection method is one that is relatively free from measurement error". This attests to the fact that, reliability is a matter of whether a particular technique, applied repeatedly to the same object, yields the same result each time" (Babbie, 2014:152). The researcher ensured proper documentation of the methodology and this increased and ensured the reliability of the tests for this study. The researcher in ensuring reliability adopted the strategy of directing questions and guiding participants (learners) during data collection period. The researcher, however, did not guide and direct the responses of participants in order to avoid bias. Again, the study maintained the same meaning of every research question and research questions were framed in an easily understandable manner (Fowler, 2002). The research instruments used in this study were given to a senior researcher and professionals for proofreading to ensure these reliability strategies.

4.11.2 Validity

Validity is defined as the "extent to which an empirical measure adequately reflects the real meaning of the concept under consideration" (Babbie, 2014:154). Ndanu and Syombua (2015:47) upheld that validity in a research relates to whether the findings of your study are true and certain. 'True' in this context means accurately reflecting the real situation and 'certain' meaning findings that are backed by evidence, hence the results cannot be doubted.

Evaluation of validity ensures "whether the research truly measures that which it was intended to measure or how truthful the research results are" (Golafshani, 2003:598). Research validity can be achieved through using multiple data sources (Mertens, 2012:29). Triangulation is therefore done in research "to increase the credibility and validity of the results" (Ndanu and Syombua, 2015:48). Integrating both qualitative and quantitative approaches within a research study, increases validity (Onwuegbuzie and Leech, 2005:377); hence, the triangulation of methods used for the current study ensured validity.

Validity is the extent to which an instrument measures what it is intended to measure including whether it is an appropriate instrument (Schutt, 2006:117). Validity in research therefore, "means that we are actually measuring what we say we are measuring" (Babbie, 2014:155). In relation to content validation, the study ensured that the instruments' items reflected the key research questions. Instruments for the study were pretested before the actual surveys and interviews. Pretesting of research instruments was an important tool used for content validation in the current study (Ngulube, 2005).

4.12 Data collection procedures

The questionnaires for the study were distributed to Grade 12 learners and ICT teachers in the three selected schools. All the ICT teachers were included in the study and the Assistant headmasters/mistress (Academic) provided the list and contacts of the teachers to the researcher who then contacted them directly in their offices and 'staff common rooms' of the schools. The questionnaires were therefore hand delivered to the ICT teachers. Most of the ICT teachers were very cooperative and they agreed to complete and submit the questionnaire on the same day and where this was not possible, arrangements were made to collect the completed questionnaires on a later day. The distribution of questionnaires to ICT teachers at St. Louis SHS took place between 11th and 17th January, 2017 and the last completed questionnaire was received on 10th February, 2017; same took place at Simms SHS from 16th to 20th January, 2017 and the last completed questionnaire was received on 27th January, 2017; distribution of the same questionnaire at Effiduasi SHS was from 25th to 30th January, 2017 and the last completed questionnaire was received on 15th February, 2017.

At St. Louis SHS, the Assistant Headmistress provided the list of all Grade 12 learners to the researcher for the random selection of the sample for the study on 10th January 2017. The researcher randomly selected the students from the list by ticking on an interval of eight. A copy of the list was given to the Assistant Headmistress who then arranged for the study to be conducted on 18th January 2017 where the sampled learners were prepared. On the said date, the sampled students were assembled in three classrooms for them to respond to the questionnaire and a teacher from the school was assigned to the researcher to assist in the exercise. All the questionnaires were distributed and collected by the researcher himself with the assistance of the teacher assigned to him and time was taken by the researcher to explain every instruction to the respondents before they completed the questionnaire. The researcher was also available to respond directly to queries from respondents.

At Simms SHS and Effiduasi SHS, all Grade 12 learners with the permission and support of school authorities were gathered in the assembly hall of each school on 23rd January 2017 and 27th January 2017 respectively. Through the use of simple random sampling method, each Grade 12 learner had the chance of participating in the study. At each of the selected schools, all learners while seated calmly in the assembly hall were asked to pick a piece of paper from a bowl. Each paper had ‘Yes’ or ‘No’ written on them and the number of papers with ‘Yes’ written on them equalled the sample size of each school. Learners who picked papers with 'Yes' written on them were asked to remain in the hall, while those who picked papers with 'No' written on them were appreciated for their willingness to partake in the study and asked to leave the hall. The questionnaires for the study were then distributed to learners remaining in the assembly hall of each school. All the questionnaires were distributed and collected by the researcher himself with assistance of teachers assigned to him and time was taken by the researcher to explain every instruction to the respondents before they completed the questionnaire. The researcher was also available to respond directly to queries from respondents.

The interviews were conducted in a face-to-face setting with the heads of ICT departments and librarians of each selected school. The authorities provided contacts for each ICT head and librarian, and the researcher was led to the offices of the heads of the ICT departments and

librarians. The ICT heads and librarians were contacted in person by the researcher in advance for the arrangement of suitable time, dates, and places for the interviews (Seidman, 2013:50). The interviews with the HICTDs of St. Louis SHS, Simms SHS and Effiduasi SHS took place on 18th, 24th and 26th January 2017 respectively. On the other hand, the interviews with the librarians of St. Louis SHS, Simms SHS, and Effiduasi SHS took place on 20th, 23rd, and 26th January 2017 respectively. The researcher provided supplementary explanations on the purpose of the study to the heads of ICT department and librarians - although this was initially explained in the covering letter submitted - while informed consent was sought (Corbin and Morse, 2003:341).

4.13 Data analysis

According to Edwards and Talbot (1994:98), data carries little information until it is compiled, analysed, and interpreted. Merriam (2009:175) opined that "data analysis is the process of making sense out of the data". Saunders, Lewis, and Thornhill (2012:415) also define data analysis as the process of obtaining meaning from raw data and of discovering their implications. Analysis of research data enables a researcher to "arrive at a better understanding of the operation of social processes" (Ngulube, 2005:138); and the methods used for analysing research data depend on whether the research approach is qualitative or quantitative (Dawson, 2002:110).

Creswell and Plano (2007:128) noted that "data analysis in mixed methods research consists of analysing the quantitative data using quantitative methods and the qualitative data using qualitative methods". All the data collected for the study were first coded before being analysed systematically. Terre Blanche, Durrheim, and Kelly (2006:324) define coding as "breaking up the data in analytically relevant ways". Coding is done in order to render the data in a form that will make them easily analysed and presented (Bryman and Bell, 2011:249). The recorded interviews data were transcribed on the following day of each interview session (18th, 20th, 23rd, 24th, and 26th January 2017) and these were done in the original language (English) used for the data collection.

4.13.1 Analysis of qualitative data

The qualitative data for the current study were analysed through content analysis. Courtney (2005:51) defines content analysis as a "systematic, replicable technique for compressing many

words for text into fewer content categories based on explicit rules of coding". The main goal of content analysis is "to systematically classify words, phrases, and other units of text into a series of meaningful categories" (Kalof, Dan, and Dietz, 2008:105). Adopting this approach, the researcher was able to identify major themes in the responses. Berg and Lune (2012:355) asserted that "qualitative data analysis shows how researchers can examine ideological mind sets, themes, topic, symbols, and similar phenomena, while grounding such examinations in the data".

Results from the interviews were therefore transcribed, coded, grouped into categories, and interpreted in terms of common themes based on the objectives of the study. Nieuwenhuis (2010:101) refers to qualitative analysis based on theme as thematic content analysis. Audio-taped interviews were transcribed verbatim and the data cleaned and captured. The content categories were moulded from the specific research questions and questions in the data collection instruments. Qualitative content analysis involves the creation of "themes and recurring patterns of meanings" (Merriam, 2009:205). The analysis of the qualitative data was effectively accomplished because the themes were identified comprehensively.

4.13.2 Analysis of quantitative data

Quantitative data is essentially analysed through the use of statistical methods and results can be displayed using tables, charts, histograms, and graphs (Muhambe, 2012:42). The Statistical Package for Social Sciences (SPSS) v.21 was used for the systematic capturing and analysis of quantitative research data. Babbie and Mouton (2001:583) maintained that SPSS can be very helpful when it comes to the manipulation of large amounts of quantitative data.

Quantitative data analysis depicts how researchers are able to "create a series of tally sheets to determine specific frequencies of relevant categories" (Berg and Lune, 2012:355). The quantitative data from survey questionnaires were coded, cleaned, standardised, and keyed into SPSS 21 software. Themes were developed in the data view section of SPSS 21 software based on the questions in the research instruments. All questions were assigned numerical codes and this made it possible for the researcher to systematically enter or capture data into the SPSS and consistently analyse the captured data. The use of the SPSS helped the researcher to effectively organise and analyse quantitative data (Durrheim, 2006:191). The SPSS was used for the generation of

descriptive and frequency tables as a form of data presentation for the current study. The current study used both tables and figures for the presentation of findings and this made the research findings more understandable and easier to interpret.

4.14 Ethical consideration

Neuman (1997:443) explained that the ethical issues in social science research "are concerns, dilemmas, and conflicts that arise over the proper way to conduct research". According to Babbie and Mouton (2003:534), research ethics may be ambiguous but important. Winter (1996:16-17) outlines a number of ethical principles that a researcher should address and these principles were followed:

- all participants should be allowed to influence the work;
- the wishes of those who do not wish to participate must be respected;
- the development of the work must remain visible and open to suggestions from others;
- permission must be obtained before making observations or examining documents produced for other purposes;
- description of other's work and point of view must be negotiated with those concerned before being published; and
- the researcher must accept responsibility for maintaining confidentiality.

These principles show that ethics define "what is or is not legitimate to do, or what morally research procedure involves" (Neuman, 1997:443). An important feature of ethics is that, all research work involving individuals operates under a single ethics policy in many countries in the world with strong biomedical emphasis (Louw and Delport, 2006:39). The current study adhered to the policies stipulated by the University of KwaZulu-Natal on research ethics.

The proposal and ethical clearance documents for the study were submitted to the Higher Degrees Committee of the University of KwaZulu-Natal for approval and the Committee approved the proposal and an ethical clearance was granted (appendix 13). Approval to conduct the research study in the identified institutions was sought and permission to conduct research was granted. The research project was therefore ethically cleared by the University (Drake and Heath, 2011:52). The

participants in the study were also informed about the study's objectives and their right to consent or decline participation. They were assured of confidentiality at all times, thus their identities were not disclosed in the study report (Polit and Beck, 2010). The researcher therefore sought informed consent from participants before starting the data collection process (Smith, 2010:41).

The researcher maintained a professional relationship with participants throughout and ethically protected the anonymity of respondents (Mauthner et al., 2012:177). In accordance with UKZN's ethical policy, the completed questionnaires, interview schedules, tape records, signed consent forms, and data outputs from SPSS 21 were handed to the University after the completion and acceptance of the current study for safe keeping for a period of five years. Other authors' work and ideas used in this study were duly acknowledged and the final thesis was tested for plagiarism through the use of 'Turnitin' software.

4.15 Summary of the chapter

Chapter Four discusses the philosophical underpinnings embedded in the chosen methodologies, both qualitative and quantitative involving self-administered questionnaires and interview schedules to collect data. The research methods used to collect data are therefore presented and the research design, methods, and data collection techniques are justified and presented in this chapter. The rationale for the researcher's choice of research paradigm and methodology was discussed. The data analysis procedures, trustworthiness issues and ethical considerations undertaken in the study were discussed in this chapter. Statistical analysis through SPSS was used to organise data and analyse quantitative data collected from the self-administered questionnaires and the analysis on qualitative data was based on content analysis. Reliability and validity of the results were ensured through pre-testing and triangulation of methods. Chapter Four also outlined the steps the researcher took to accomplish the study objectives. Chapter Five is the next chapter and it presents the results of the study, while Chapter Six focuses on the discussion of the findings.

CHAPTER FIVE: PRESENTATION OF RESULTS

5.1 Introduction

This chapter presents the findings from the self-administered questionnaires and the semi-structured interviews. The questionnaires were used on learners and ICT teachers to investigate the Internet-based information behaviour of learners. The results from the questionnaire include:

- Information about learners' Internet access,
- Learners' online information needs,
- Learners online searching skills,
- Learners' online evaluation skills as well as
- Challenges learners faced when accessing online information.

On the other hand, the results from the semi-structured interviews with the heads of ICT departments (HICTDs) and the librarians in addition to the above include:

- Internet infrastructure available at school for learners,
- Internet policy document at school,
- Internet curriculum and training that learners are offered at school as well as
- Internet accessibility for learners and Internet skills of learners.

5.1.1 General background

The purpose of this study was to investigate the "Internet-based information behaviour of high school learners in Ashanti region of Ghana". The study surveyed three public high schools:

- St. Louis SHS,
- Effiduasi SHS and
- Simms SHS.

Chapter Five presents the results or the research data that were collected for the study's purpose. The data were collected with the aim of answering correctly the research questions of the study, namely:

1. Where and when do high school learners access the Internet?

2. What are the specific purposes for which high school learners search information on the Internet?
3. How do high school learners gather and select information from the internet?
4. How do high school learners evaluate and judge their online information sources?
5. What roles do librarians play in facilitating high school learners to acquire Internet information literacy skills?
6. What are the challenges faced by high school learners when searching for information from the Internet?

The two main sources of data for the study were the questionnaire and interview schedule and these research data were distributed based on the data gathering tools. This chapter described findings in writing and presented them graphically so as to further enhance the presentation of the nature of the findings. The surveyed learners who participated in the study were assigned codes based on the returned questionnaires from L1 to L322 and same with the ICT teachers from T1 to T18.

5.1.2 Response rate of respondents

A response rate for a study is "the number of people participating in a survey divided by the number selected in the sample, in the form of a percentage" (Babbie, 2014:278). The response rate for this study for the different instruments is presented in Table 5.1 below:

***Table 5.1: Response rate (*N=350)**

Respondents	**Data collection tools**	**No. of instruments distributed**	**No. of instruments returned**	**Percent**
Learners	Questionnaires	322	322	100
ICT Teachers	Questionnaires	22	18	81.8
ICT Heads	Interviews	3	3	100
Librarians	Interviews	3	3	100

(Source: Field data, 2017)

Table 5.1 above depicts that, all the learners, ICT heads and librarians expected to participate in the study did take part in the study, yielding a response rate of 100%. However, 18 (81.8%) of the ICT teachers out of the expected 22 ICT teachers returned their completed questionnaires. It is worth noting that, two of the ICT teachers were on leave and the other two failed to return their questionnaires. Table 5.1 further reveals that, response rate involving 100% of interview data and 98.8% of survey data were achieved for the study.

5.1.3 Presentation of results

The results of the questionnaires and interviews of the study are presented separately. The results from the learners' questionnaires are first presented followed by the results from the teachers' responses to the questionnaire. The results from the interviews are presented after the results of the questionnaire. In relation to the interviews, responses of the ICT heads are first presented followed by the responses of the librarians. The percentages of the results presented were all rounded off to one decimal point. Rounding off percentages to a decimal point resulted in some of them adding up to below or above 100% at 0.1.

5.2 Learners' questionnaire results

This section presents the surveyed learners' responses based on the data collected from them through the use of a self-administered questionnaire (see appendix 5).

5.2.1 Demographical data of surveyed learners

The demographic data of surveyed learners was elicited from five questions that were asked in section one of the questionnaire. This section provided general information including gender, age, school affiliated to, status of student, and field of study.

5.2.1.1 Gender of respondents

This section shows the gender of the high school learners who participated in the survey. The gender involves both male and female respondents from the three surveyed high schools. Table 5.2 below presents the results.

Table 5.2: Gender

N=322

Gender	Count	Percent
Male	154	47.8
Female	168	52.2
Total	**322**	**100**

(Source: Field data, 2017)

Table 5.2 above depicts that, of the 322 respondents who participated in the study, 154 of the learners representing 47.8% were males and 168 of them representing 52.2% were females.

5.2.1.2 Age range of respondents

Table 5.3 below indicates the age categories of respondents from the three high schools. The youngest age was I6 years and the oldest age range was 20 years and above.

Table 5.3: Age range

N=322

Age (years)	Count	Percent
16	44	13.7
17	86	26.7
18	89	27.6
19	58	18.0
20	41	12.7
More than 20	4	1.2
Total	**322**	**99.9**

(Source: Field data, 2017)

Table 5.3 above shows that the largest number of learners, 89 (27.6%) respondents, were 18 years old, followed by the learners at age 17 with 86 (26.7%) respondents. This shows that, of the 322 respondents, more than half of the respondents were between 17 and 18 years old. Age 19 was

third in rank having 58 (18.0%) respondents. The next two age groups were almost evenly divided between 16 years old and 20 years old: 44 (13.7%) and 41 (12.7%) of respondents respectively. The oldest age range of 21 years and above was represented by four (1.2%) respondents and this represents the lowest age range of respondents.

5.2.1.3 Host high schools

This section shows the proportion of learners at each high school participating in the survey. Figure 5.1 below shows the distribution of the three host high schools in the Ashanti region of Ghana involved in the study.

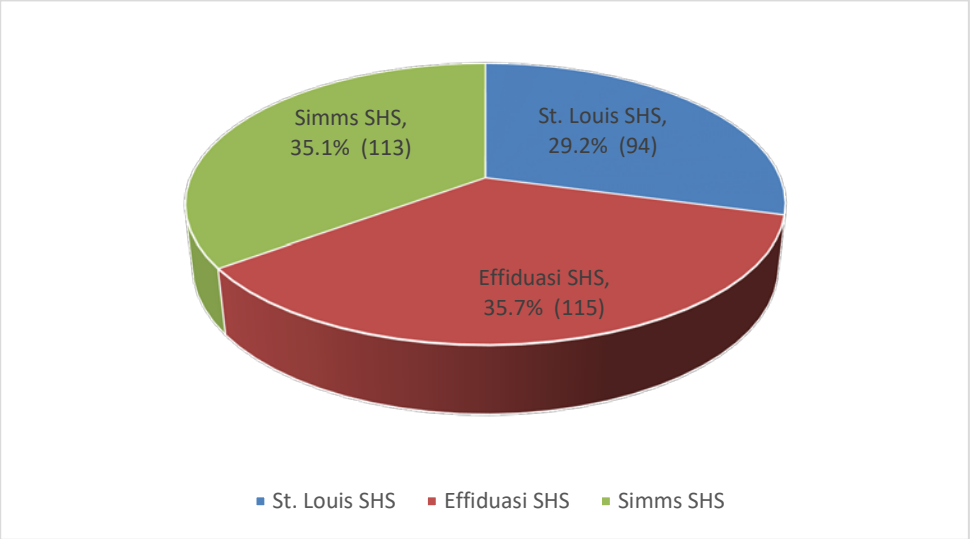

Figure 5.1: Host high schools (N=322)

Source: Field data (2017)

Figure 5.1 above depicts that, 35.7% (115) of the learners were from the Effiduasi SHS, 35.1% (113) of them were from Simms SHS, and the remaining 29.2% (94) of the learners were from St Louis SHS.

5.2.1.4 Residential status of learners

This section indicates learners' residential status. Out of the 322 learners surveyed, 292 of them representing 90.7% were boarders residing on their school campus and 30 of them representing 9.3% were day students. This attests to the fact that, majority of the learners were residing at the

boarding houses of their respective campuses. Table 5.4 shows a comparison of surveyed learners' residential status and host schools of the study. Table 5.4 depicts that St. Louis SHS had no learner residing off the school campus, Effiduasi SHS had 21 (6.5%) day learners, and Simms had nine (2.8%) learners residing outside the school.

Table 5.4: A cross tabulation of host schools and learners' residential status

N=322

School	Learners' residential status				Total	
	Day		Boarding			
	Count	Percent	Count	Percent	Count	Percent
St. Louis SHS	0	0	94	29.2	94	29.2
Simms SHS	9	2.8	104	32.3	113	35.1
Effiduasi SHS	21	6.5	94	29.2	115	35.7
Total	**30**	**9.3**	**292**	**90.7**	**322**	**100**

Source: Field data (2017)

5.2.1.5 Field of study

This section provides information about the academic field of study of the respondents from the three high schools that participated in the study. Table 5.5 below shows that the General Arts department was the largest represented department with 128 (39.8%) respondents. This was followed by learners of the Visual Arts / Home Economics department with 94 (29.2%) respondents. Learners of Business department, 62 (19.3%) and Science department, 38 (11.8%), followed in that order.

Table 5.5: Field of study

N=322

Course	Count	Percent
General arts	128	39.8
Science	38	11.8
Business	62	19.3
Visual arts / home economics	94	29.2
Total	**322**	**100.1**

Source: Field data (2017)

5.3 Internet accessibility for learners

The purpose of this section was to find out from learners where and when (places or locations and times) they were able to access the Internet for online information both at school and outside school.

5.3.1 Internet connectivity at school

This section provides information on Internet connectivity at the three schools. All surveyed learners (100%) indicated in the questionnaire that their schools were connected to the Internet.

5.3.2 Internet access at school

Learners were further asked to indicate whether they were able to access the Internet at school and this section provides information on learners' Internet accessibility at the three schools. The responses to the questionnaire by the surveyed learners indicated that all the respondents, 322 (100%) were able to access the Internet at their schools.

5.3.3 Learners' Internet exposure age

Learners were asked through an open-ended question to indicate the age at which they were exposed to the use of the Internet. The responses from the learners depict that, majority of the learners; 174 (54.0%) were exposed to the Internet at the age of 15 years; 67 (20.8%) of the learners were exposed to the Internet at the age of 14 years; 53 (16.5%) of the surveyed learners were exposed to the Internet between the ages of 10 years and 13 years; and 28 (8.7%) of the surveyed learners were exposed to the Internet between the ages of 16 years and 18 years. It is important to note that, none of the respondents was exposed to the use of the Internet before the age of 10 years. These responses attest to the fact that, most learners were exposed to the Internet when they got to their current schools (high school).

5.3.4 Computer access at home

This section verified from the learners whether they were having access to a computer at their homes. Responses from the learners have been distributed on Table 5.6.

Table 5.6: Computer access at home

N=322

Computer access (home)	**Count**	**Percent**
Yes	202	62.7
No	120	37.3
Total	**322**	**100**

Source: Field data (2017)

Table 5.6 above shows the distribution of participants in terms of access to a computer at home. Accordingly, 202 of the respondents, representing 62.7% indicated they were having access to a computer at home and the remaining 120 (37.3%) of the learners were not having access to a computer at home during the time of data collection.

5.3.5 Internet access on home computers

This section verified from the learners who had access to computers at home whether their home computers were connected to the Internet. Reading from Table 5.7 shows that, out of the 202 learners who indicated that they had access to a computer at home, 121 of them representing 59.9% indicated their computers at home were connected to the Internet and the remaining 81 (40.1%) had their home computers not connected to the Internet. Table 5.7 presents a comparison between learners' access to computer or Internet at home and learners' Internet exposure age. The results from Table 5.7 depicts that out of the 41 (12.7%) respondents who were exposed to the Internet between the ages of 10 and 12 years, 31 (9.6%) of them had a computer with Internet access at home. Furthermore, 102 (31.7%) of the learners who were exposed to the Internet between 16 and 17 years had neither computer nor Internet access at home. Table 5.7 clearly depicts that learners who had Internet access at home were exposed to the Internet earlier than those that had no Internet access at home.

Table 5.7: A cross tabulation of learners' access to computer or computer with Internet at home and learners' Internet exposure age

N=322

Learners access to computer and Internet at home	**Internet exposure age**								**Total**	
	10-12years		**13-14years**		**15-16years**		**17-18years**			
	Count	%	Count	%	Count	%	Count	%	Count	%
Computer with Internet access at home	31	9.6	68	21.1	17	5.3	5	1.6	121	37.6
Only computer access at home	8	2.5	7	2.2	62	19.3	4	1.2	81	25.2
No computer access at home	2	0.6	4	1.2	102	31.7	12	3.7	120	37.2
Total	**41**	**12.7**	**79**	**24.5**	**181**	**56.3**	**21**	**6.5**	**322**	**100**

Source: Field data (2017)

5.3.6 Possession of Internet gadgets

Whilst accessibility of Internet is important, accessibility becomes easier when one possesses an Internet gadget. For the purpose of this study, Internet gadget was defined as any electronic (mobile phone, computer, router, etc.) equipment that could be used to access the Internet. Table 5.8 shows the distribution of respondents in terms of possession of gadgets that were connected to the Internet.

Table 5.8: Possession of Internet gadgets

N=322

Internet gadgets	Count	Percent
Laptop	88	27.3
Notepad / tablet	73	22.6
Mobile / smart phone	279	86.6
Desktop computer	46	14.3

***Multiple responses received**

Source: Field data (2017)

In this section, respondents were able to select all applicable options for the question, hence, the total frequency is more than 322 and total percentage is above 100. Table 5.8 shows the distribution of participants in terms of possession of Internet gadgets. Accordingly, 279 of the respondents, representing 86.6% of the learners mentioned that they owned mobile / smart phones; 88 of the learners, representing 27.3% indicated they were in possession of laptops. Additionally, 73 of them representing 22.6% owned a laptop / tablet, and 46 of the learners representing 14.3% mentioned that they owned desktop computer / PC connected to the Internet.

5.3.7 Internet access place at school

In most Sub-Saharan African countries, access to Internet services is most often difficult. In most schools, Internet connectivity is restricted to designated offices and departments. As a result, learners have access to the Internet when they visit such departments and offices. Among the departments in the schools that have Internet connectivity are computer laboratories and libraries. In addition, aside these departments, the only means learners could access the Internet are through

their cell / mobile phones. Table 5.9 shows the distribution of participants in terms of Internet access place at school.

Table 5.9: Internet access place at school

N=322

Internet access at school	Count	Percent
Library	0	0
Computer laboratory	321	99.7
Science laboratory	0	0
Classroom	0	0
Cell / mobile phone	1	0.3
Total	**322**	**100**

Source: Field data (2017)

From Table 5.9 above, almost all of the learners that participated in the study were accessing Internet from their school's computer laboratory. Accordingly, 321 of the respondents representing 99.7% indicated that they were accessing Internet from their schools' computer laboratories. Besides, the remaining one participant representing 0.3% was accessing the Internet at school from the cell / mobile phone.

5.3.8 Internet access place outside school

This section presents a statistical data on where learners accessed Internet outside their school. Table 5.10 below shows a cross tabulation of responses in terms of learners' Internet access place outside host schools.

Table 5.10: A cross tabulation of host schools and learners' Internet access place outside school

N=322

Host school	Internet access place (outside school)							
	Home		Relative/ friend's place		Public library		Internet café	
	Count	%	Count	%	Count	%	Count	%
St. Louis SHS	61	18.9	35	10.9	8	2.5	83	25.8
Simms SHS	82	25.5	8	2.5	4	1.2	74	23.0
Effiduasi SHS	54	16.8	9	2.8	0	0	91	28.3
Total	**197**	**61.2**	**52**	**16.2**	**12**	**3.7**	**248**	**77.1**

***Multiple responses received**

Source: Field data (2017)

In this section, respondents were able to select all applicable options for the question; hence, the total frequency is more than 322 and total percentage is above 100. Table 5.10 indicates majority of the learners, 248 (77.1%) were accessing the Internet outside their school at an Internet café. Accordingly, 197 of the respondents, representing 61.2% were accessing Internet from home; 52 of them representing 16.1% were accessing the Internet outside their schools from relatives or friend's place; and 12 of the learners representing 3.7% were accessing the Internet from the public library. The cross tabulation from Table 5.10 clearly depicts that out of the 197 (61.2%) of the respondents who were able to access the Internet at home, 82 (25.5%) of them were schooling at Simms SHS. In addition, none of the learners from Effiduasi SHS was able to access the Internet at a public library. It is important to note that, this section was not limited to Internet on desktop computers as depicted in section 5.3.5.

5.3.9 Internet access periods

Internet has become one of the means by which many people access information. This section therefore sought from the learners the periods or time they were able to access the Internet.

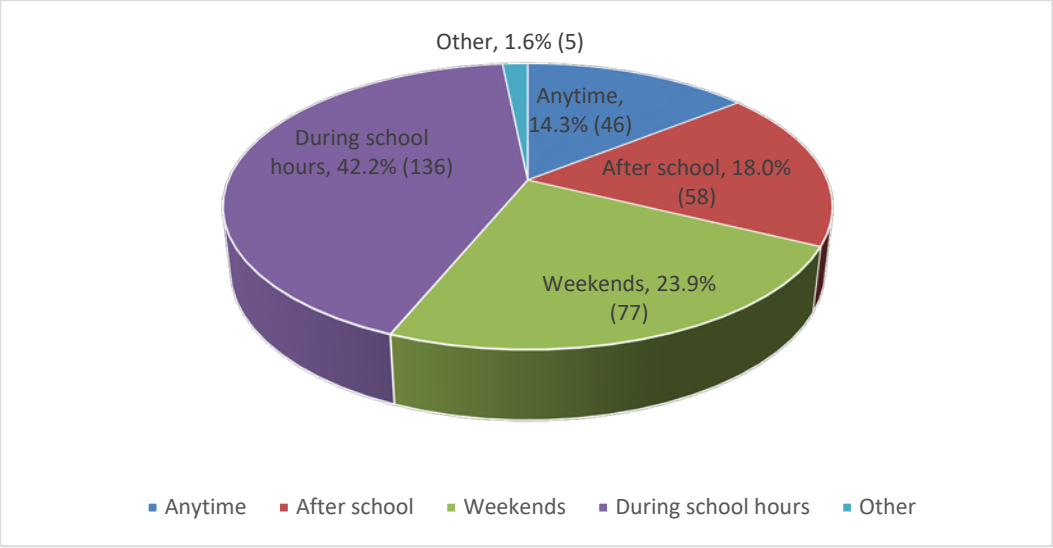

Figure 5.2: Internet access time (N=322)
Source: Field data (2017)

Figure 5.2 above shows the distribution of responses in terms of time of Internet access. As shown above, 42.2% (136) of the surveyed learners indicated they were able to access the Internet during school hours, 23.9% (77) of the respondents were able to access the Internet on weekends, 18% (58) of the respondents were accessing the Internet after school hours, 14.3% (46) of them were able to access the Internet all the time and 1.6% (5) of the surveyed learners indicated they were accessing the Internet on other times. The other times as indicated by learners included during sports competitions as well as getting the chance to use a mobile phone. A surveyed learner highlighted the use of the mobile phone to "access the Internet at night".

5.4 Online information needs of learners

There are a number of purposes for seeking online information. There are essentially two types of online informational needs of learners – one related to academic studies (for example, tests, assignments, research/project, etc.); and the other related to personal issues (health, recreational activities, etc.). The purpose of this section was to find out from learners what important situation(s) they had experienced and the kind of online information they had needed to find, learn, or know in those situations.

5.4.1 Internet information access purposes

The Internet like all other information communication mediums serves a myriad of purposes, including entertaining, educating, general awareness, and others. In this regard, this section sought from the respondents their purpose(s) of accessing the Internet for online information aside academic purposes. Responses from participants have been distributed on Table 5.11 below.

Table 5.11: Internet access purposes
N=322

Internet access purpose	Count	Percent
Entertainment	203	63.0
Communication/ networking	149	46.3
News	76	23.6
General awareness	48	14.9

***Multiple responses received**

Source: Field data (2017)

In this section, respondents were able to select all applicable options for the question; hence, the total frequency is more than 322 and total percentage is above 100. The distribution of responses in terms of purposes of accessing Internet by the learners has been presented on Table 5.11 above. As shown above, 203 of the learners representing 63% accessed online information on the Internet for the purposes of entertainment. Further, 149 (46.3%) of the surveyed learners indicated that their reason for accessing online information was for communication / networking; 76 of the participants representing 23.6% were accessing online information for News purposes; and 48 of the surveyed learners representing 14.9% mentioned that they were accessing online information for the purposes of general awareness.

5.4.2 Accessing online information on the Internet for academic purposes by learners

The Internet has become one of the efficient and reliable mediums for accessing literature and academic related information. As a result, this section sought from the respondents their purposes of accessing online information on Internet for academic work.

Table 5.12: Internet use for academic purposes

N=322

Internet access for academic purpose	Count	Percent
Class assignment	157	48.8
Class test	78	24.2
Examination	86	26.7
Information literacy skills	110	34.2
Research project	85	26.4
Past questions	10	3.1
Laboratory test / practical	21	6.5

***Multiple responses received**

Source: Field data (2017)

In this section, respondents were able to select all applicable options for the question; hence, the total frequency is more than 322 and total percentage is above 100. Table 5.12 above shows the distribution of respondents in terms of Internet use for academic purposes. From the Table 5.12, 157 of the respondents representing 48.8% accessed online information on the Internet for class assignment, while 110 of the participants representing 34.2% used the Internet for Information Literacy Skills; and 86 of the participants, representing 26.7% were accessing online information for examination. Additionally, 85 of them representing 26.4% accessed online information for research project; 78 of the participants representing 24.2% accessed online information for class test; 21 of the participants, representing 6.5% used the Internet for laboratory practical or test; and 10 of the participants representing 3.1% used the Internet to access past examination questions.

5.4.3 Access to subject portal

The Internet is accessible to everyone and most times does not restrict people from sharing information. As a result, some information on the Internet may be less important and misleading. It is based on this that the researcher sought from participants if their schools are having a subject portal. A subject portal is a website which has an entry point to other websites for accessing a collection of high quality, evaluated resources for a particular subject. Figure 5.3 distributes the responses of participants.

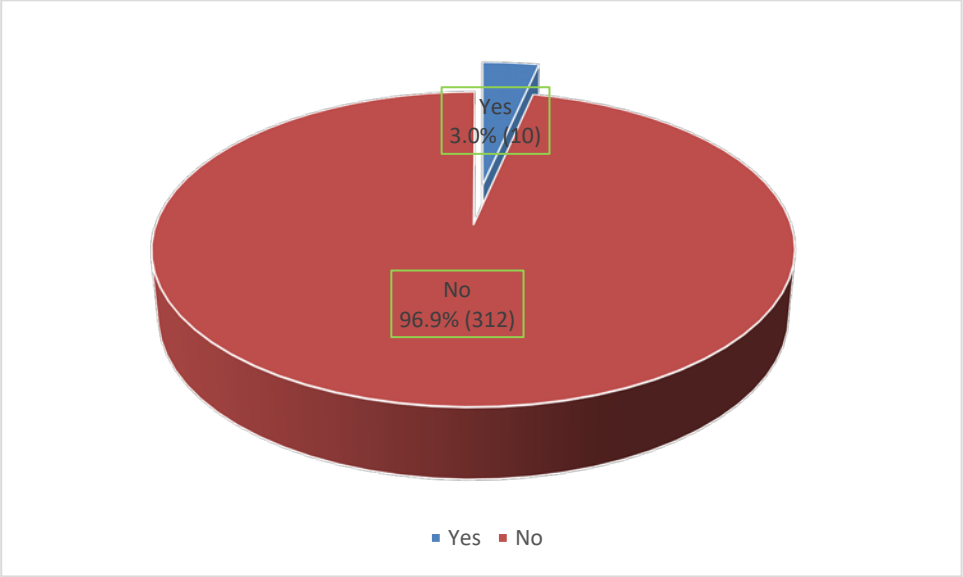

Figure 5 3: Subject Portal (N=322)

Source: Field data (2017)

Figure 5.3 distributes learners' accessibility to subject portal at their respective schools. The results from the learners show that 96.9% (312) of the learners had no access to a subject portal at their school and the remaining 3% (10) indicated they had access to a subject portal at their school.

5.4.4 File transfer

This section sought from the learners if they were required by their tutors to transfer files via email or electronically. Responses from the learners have been shown on Figure 5.4.

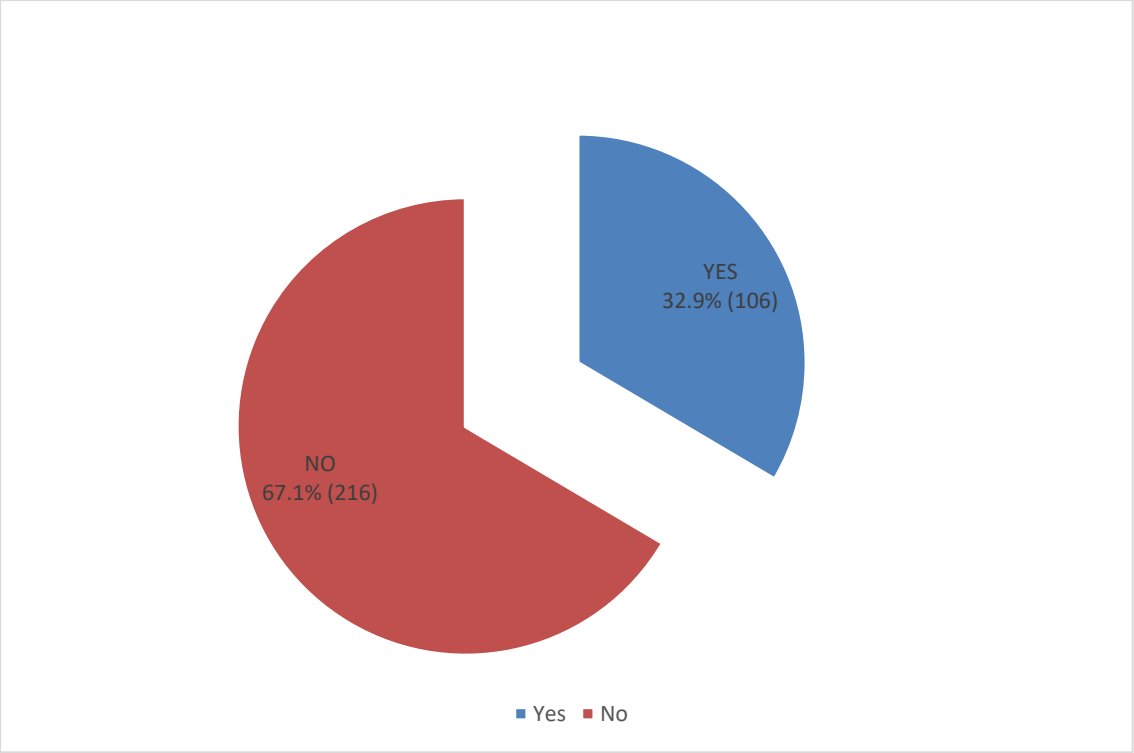

Figure 5.4: File Transfer (N=322)
Source: Field data (2017)

Figure 5.4 above shows a distribution of responses from the learners on whether they were sending files or some of their academic works to their teachers electronically. Reading from the Figure 5.4, 67.1% (216) of the participants indicated they were not required by their teachers to send academic works electronically and the remaining 32.9% (106) had been transferring files or some academic works to their teachers electronically.

5.4.5 Email addresses

An email address helps learners and other individuals to send messages and attach documents or files. Besides, it helps learners to have official and effective online communication with their colleagues and teachers. This section therefore sought from the learners if they had email addresses.

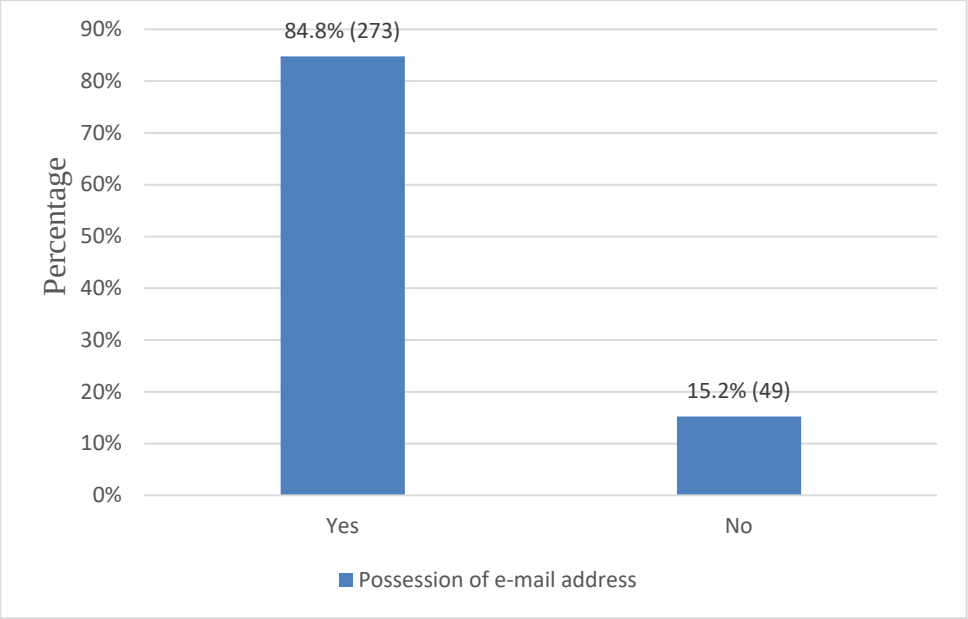

Figure 5.5: Email addresses (N-322)
Source: Field data (2017)

Figure 5.5 above shows the distribution of responses in terms of possession of an email address. As shown above, 84.8% (273) of the learners had email addresses and the remaining 15.2% (49) of the learners indicated they were not having an email address. Most learners who did not have email addresses indicated that they were yet to create an email address; others also indicated that, they seemed not to have many activities to undertake with having an email address.

5.4.6 Email communication with teachers

In this section, respondents who indicated 'Yes' to the previous question regarding possession of email address were asked to indicate whether they were having email communication with their teachers. Figure 5.6 distributes respondent's responses.

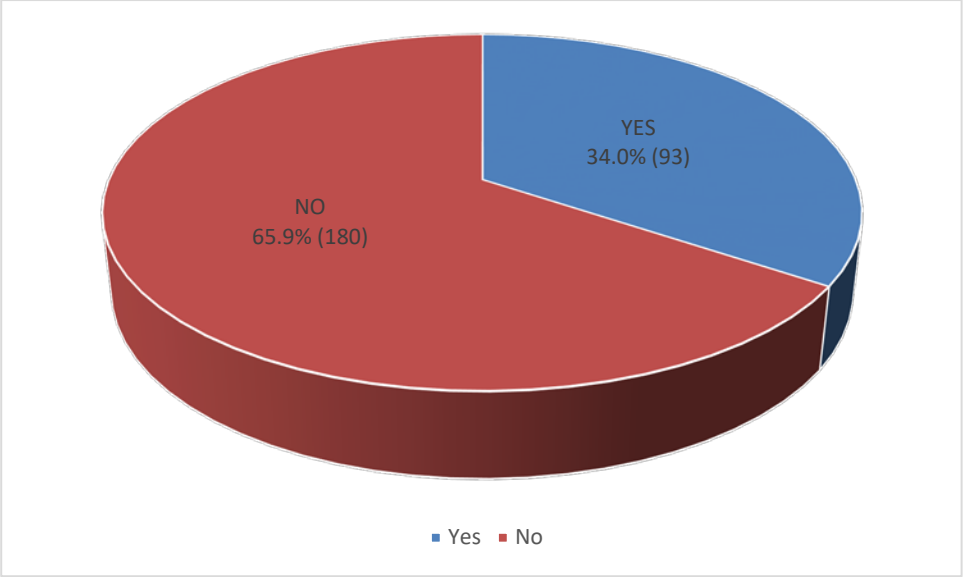

Figure 5.6: Email Communication with Teachers (N=273)
Source: Field data (2017)

From Figure 5.6 above, 65.9% (180) of the 273 respondents who had email addresses indicated 'No' as an answer to whether they were communicating via email with their teachers; and the remaining 34.0% (93) responded 'Yes' to establish that they were communicating with their teachers through email.

5.5 Selecting and gathering online information

This section was to find out from learners how they were selecting and gathering information from the Internet. The section looks into the information sources learners consulted for their online information needs as well as the way and manner they went about in selecting and gathering online information.

5.5.1 How learners seek online information

The use of the Internet to access significant information may be challenging, especially for first time users. Based on this, the researcher sought from the respondents' whether they required the assistance of teachers, librarians, or computer laboratory assistants, or they self-browsed to access information from the Internet. Table 5.13 shows the distribution of the responses.

Table 5.13: A cross tabulation of how learners seek online information and their age

N=322

Ways of seeking online information	Age of respondents										Total	
	16 years		17 years		18 years		19years		20years+			
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Assistance from intermediary	7	2.2	13	4.0	2	0.6	3	0.9	2	0.6	27	8.3
Assistance from friends/colleagues	1	0.3	1	0.3	27	8.4	26	8.1	24	7.5	79	24.6
Self-browsing	35	10.9	72	22.4	60	18.6	29	9.0	19	5.9	215	66.8
Other	1	0.3	0	0	0	0	0	0	0	0	1	0.3
Total	**44**	**13.7**	**86**	**26.7**	**89**	**27.6**	**58**	**18.0**	**45**	**14.0**	**322**	**100**

Source: Field data (2017)

Table 5.13 above shows that, 215 of the learners representing 66.8% accessed the Internet by themselves, 79 of the participants representing 24.5% accessed the Internet with assistance from friends and colleagues, 27 of the participants representing 8.4% accessed Internet through the assistance of intermediaries such as teachers or librarians and the remaining one of the participants representing 0.3% indicated other support. The cross tabulation as depicted in Table 5.13 shows that, 35 (10.9%) of the surveyed learners at age 16 years were accessing the Internet themselves without needing any assistance, while 26 (8.1%) of the surveyed learners at age 20 years and above needed assistance to access the Internet for online information. Clearly, the cross tabulation highlights that learners at lower ages were able to access the Internet themselves as compared to learners of older ages. Moreover, the cross-tabulation highlights that, the learners of younger ages (16-17 years) preferred seeking assistance from intermediaries such as librarians or teachers as compared to learners of older ages (18 and above) who preferred to seek assistance from their friends or colleagues when accessing information on the Internet.

5.5.2 Learners use of search engines

From previous studies, majority of learners have indicated that search engine was the single most used technology they employed to access information on the Internet (Borca et al., 2015; Kadli and Hanchinal, 2015; Asher, Duke and Wilson, 2013). The current study therefore sought from

the surveyed learners how frequent they were accessing online information using search engines on the Internet. Figure 5.7 shows how frequent the learners used search engines.

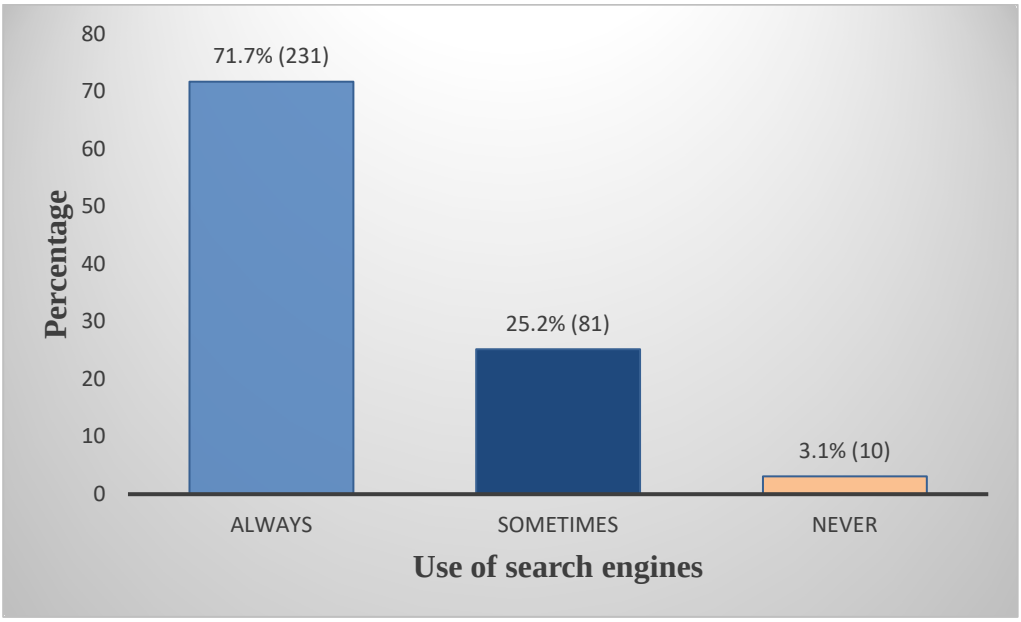

Figure 5.7: Search engine use (N-322)
Source: Field data (2017)

From Figure 5.7 above, majority of the learners, 71.7% (231) indicated they 'Always' used search engines to access information on the Internet. Additionally, 25.2% (81) and 3.1% (10) of the respondents indicated they 'Sometimes' and 'Never' used search engines respectively when searching for online information on the Internet.

5.5.3 Learners use of online catalogues

This section sought from the respondents how often they used online catalogues to access information on the Internet. Table 5.14 shows the distribution of responses.

Table 5.14: Online catalogue use by learners

N=322

Online catalogue use	Count	Percent
Always	2	0.6
Sometimes	11	3.4
Never	309	96.0
Total	**322**	**100**

Source: Field data (2017)

Reading from Table 5.14 above, 309 responses from the surveyed learners representing 96% indicated that they had 'Never' used online catalogue to search for information on the Internet. Besides, 11 of the respondents representing 3.4% 'Sometimes' used the online catalogue to search for information on the Internet and the remaining two of the participants representing 0.6% 'Always' used the online catalogue when searching for information on the Internet.

5.5.4 Learners' use of academic databases

Academic database has been highlighted as one of the convenient and efficient ways individuals search information on the Internet. This section sought from the respondents how frequent they used academic databases to search for online materials. Table 5.15 below distributes the responses of the surveyed learners.

Table 5.15: Academic database use

N=322

Database use	Count	Percent
Always	13	4.0
Sometimes	92	28.6
Never	217	67.4
Total	**322**	**100**

Source: Field data (2017)

From Table 5.15 above, 217 of the participants representing 67.4% had 'Never' used an academic database to access information on the Internet. In addition, 92 of the participants representing 28.6% 'Sometimes' used academic database (s) to search for online information on the Internet and 13 of the participants representing 4% indicated they 'Always' used academic databases to search for online materials.

5.5.5 Learners' use of organisational websites

Some learners prefer using their institution or other organisational websites in search of online information. This section sought from the learners how frequent they used institutional or organisational websites to search for online information. Figure 5.8 distributes the responses of the surveyed learners.

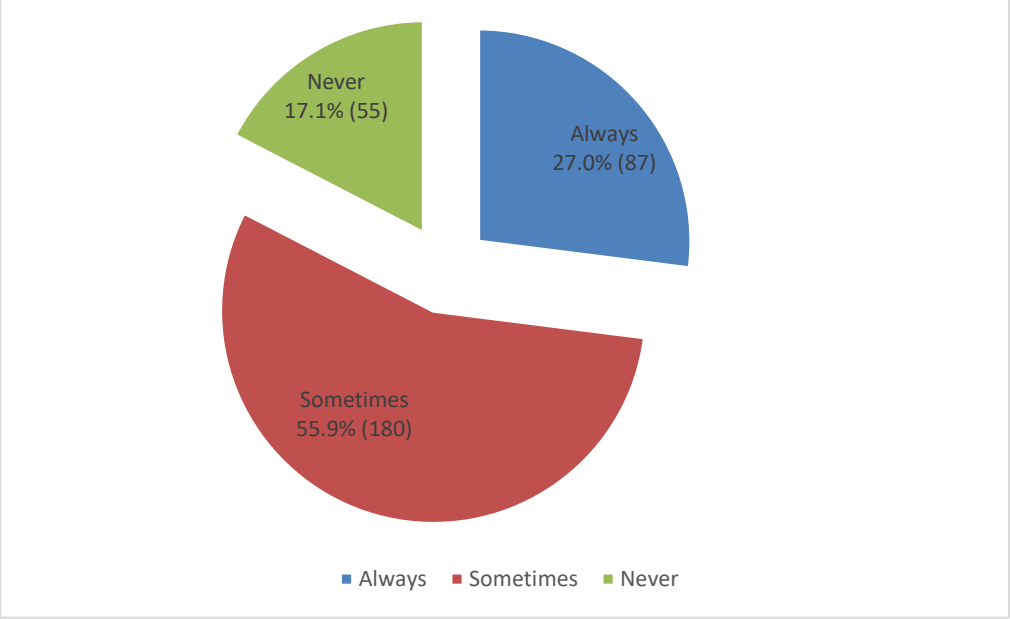

Figure 5.8: Organisational websites use (N=322)

Source: Field data (2017)

From Figure 5.8 above, 55.9% (180) of the respondents indicated that they used organisational websites to search for online information 'Sometimes', 27% (87) of the respondents had 'Always' been using organisational websites to access online information and 17% (55) of the respondents had 'Never' searched online information through organisational websites on the Internet.

5.5.6 Selecting online information based on learners' opinion

The Internet is most often accessed for a specific purpose. In this study, the surveyed learners were asked to indicate how frequent they accessed and selected information that corresponded to their opinion. Accordingly, Table 5.16 distributes responses given by the learners.

Table 5.16: Selecting information based on learners' own opinion

N=322

Selecting information based on opinion	Count	Percent
Always	137	42.5
Often	46	14.3
Sometimes	110	34.2
Rarely	8	2.5
Never	21	6.5
Total	**322**	**100**

Source: Field data (2017)

From Table 5.16 above, 137 of the participants representing 42.5% indicated that they 'Always' searched and selected online information that was based on their own opinions, 110 of the participants, representing 34.2% indicated that they 'Sometimes' accessed online information based on their opinion. In addition, 46 of the participants representing 14.3% indicated that they 'Often' searched and selected online information based on their own opinion, 21 of the participants representing 6.5% and eight of the participants representing 2.5% had 'Never' and 'Rarely' accessed online information based on their own opinion respectively.

5.5.7 Selecting information that brings new thoughts to mind

The Internet is among the mediums where individuals, including learners sought for new thoughts. This section therefore found from the respondents, the frequency at which they accessed and selected online information that brought new thoughts to their minds.

Table 5.17: New thought information

N=322

New thoughts information	Count	Percent
Always	115	35.7
Often	47	14.6
Sometimes	130	40.4
Rarely	9	2.8
Never	19	5.9
*No response	2	0.6
Total	**322**	**100**

Source: Field data (2017)

From Table 5.17 above, 130 of the participants, representing 40.4% indicated that they 'Sometimes' accessed the Internet for online information that brought new thoughts to their minds, 115 of the participants, representing 35.7% were 'Always' accessing the Internet to gain new thoughts, 47 of the participants, representing 14.6% indicated that they 'Often' accessed the Internet to select information that brought new thoughts to their mind, 19 and nine of the surveyed learners representing 5.9% and 2.8% had 'Never' and 'Rarely' accessed the Internet for the selection of information that brought new thoughts to their minds respectively. Two respondents representing 0.6% failed to indicate a response.

5.5.8 Selecting readily accessible information

This section sought from the leaners the frequency at which they just selected readily accessible information on the Internet. Table 5.18 shows the distribution of respondent's responses.

Table 5.18: A cross tabulation of learners that select readily accessible information and gender

N-322

Gender	Selecting readily accessible information										Total	
	Always		Often		Sometimes		Rarely		Never			
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Male	49	15.2	27	8.4	48	14.9	10	3.1	20	6.2	154	47.8
Female	52	16.1	22	6.8	62	19.3	6	1.9	26	8.1	168	52.2
Total	**101**	**31.3**	**49**	**15.2**	**110**	**34.2**	**16**	**5.0**	**46**	**14.3**	**322**	**100**

Source: Field data (2017)

Table 5.18 above shows 110 (34.2%) of the surveyed learners indicated that they were 'Sometimes' selecting readily accessible information on the Internet; 101 (31.3%) of the surveyed learners 'Always' selected readily accessible information on the Internet; 49 (15.2%) of the respondents indicated that they 'Often' selected readily accessible information; 46 (14.3%) of the respondents had 'Never' just selected readily accessible information; and 16 (5%) of the respondents 'Rarely' selected just readily accessible information from the Internet. The cross tabulation presented on Table 5.18 also depicts that more female learners were frequently selecting readily available online information as compared to male learners who were frequently selecting readily available online information.

5.5.9 Selecting online information that is similar to what has been taught

This section sought from the learners the frequency at which they searched and selected online information that were similar to what they had been taught by their teachers or had been outlined in their course syllabus. Figure 5.9 distributes the responses of the learners.

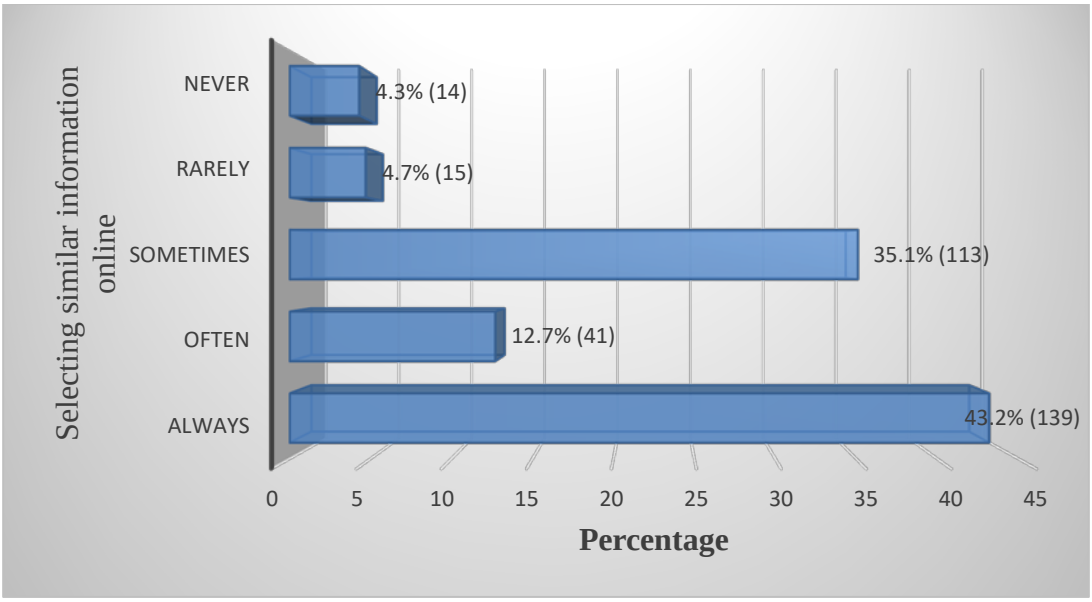

Figure 5.9: Selecting similar information online (N=322)

Source: Field data (2017)

From Figure 5.9 above, 43.2% (139) of the respondents indicated that they 'Always' accessed and selected online information that were similar to what they had been taught by their teachers; 35.1% (113) of the surveyed learners indicated that they 'Sometimes' accessed and selected online information that were similar to what they had been taught at school; 12.7% (41) of the respondents were 'Often' accessing online information that were similar to what they had been taught; while 4.7% (15) and 4.3% (14) of the respondents 'Rarely' and 'Never' accessed online information that were similar to what they had been taught at school respectively.

5.5.10 Ways of gathering information from the Internet

There are countless ways of gathering information from the Internet. Some people gather online information by examining the number of results found on the Internet, while others may want to examine only the results on the first page. Besides, some may proceed to the subsequent pages to examine what information is available there and others may decide to stop search after the information they deemed relevant had been found. This section therefore sought from the learners the different ways they employed to gather and select information from the Internet.

5.5.10.1 Examining all the results produced based on a search query

Having indicated earlier, some people in an attempt to gather information from the internet tend to examine all the number of results found and make meaning out of them before selection. Accordingly, Table 5.19 distributes participants' responses in relation to the frequency at which they examine all the number of results found on the Internet based on their search query - e.g. results produced by a search engine - before they select online information.

Table 5.19: Examining all results Found

N=322

Examining all results found	Count	Percent
Always	116	36.0
Often	35	10.9
Sometimes	118	36.6
Rarely	14	4.3
Never	27	8.4
*No response	12	3.7
Total	**322**	**99.9**

Source: Field data (2017)

From Table 5.19 above that shows the distribution of the frequency of the learners gathering information by examining all the results produced based on a search query, 116 of the respondents representing 36% indicated 'Always', revealing that they always examined the number of results found before they selected information on the Internet. Further, 118 of the surveyed learners, representing 36.6% indicated that they 'Sometimes' examined the number of results found before selecting online information on the Internet, 35 of the participants, representing 10.9% were 'Often' examining the number of results found on the Internet before selecting online information; 27 of the respondents, representing 8.4% had 'Never' examined all the results found on the Internet before selecting online information; and the remaining 14 of the participants representing 4.3% indicated that they 'Rarely' examined the number of results found before selecting information on the Internet. Twelve (3.7%) of the surveyed learners did not indicate a response.

5.5.10.2 Examining search query results available on the first page only

This section presents data on how frequent the surveyed learners were gathering and selecting information after they had examined results found on the first page only. Responses of the learners have been distributed on Figure 5.10 below.

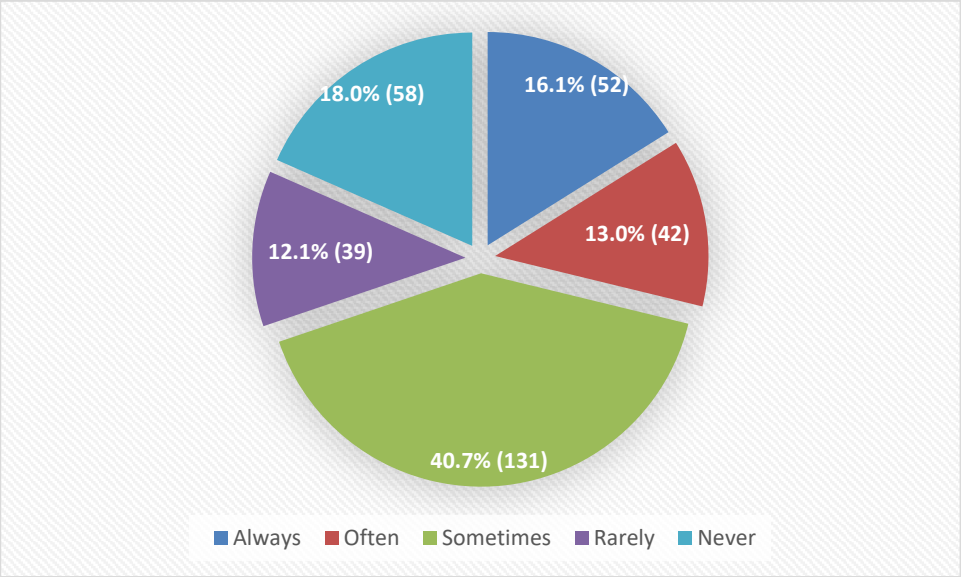

Figure 5.10: Examine results on the first page only (N=322)

Source: Field data (2017)

From Figure 5.10 above, 40.7% (131) of the responses established that most of the learners 'Sometimes' gathered and selected information based on the results from the first page of their search screen only. Additionally, 18% (58) of the surveyed learners indicated that they had 'Never' gathered and selected information based on the results from only the first page, while 16.1% (52) of the respondents were 'Always' gathering information based on the results on only the first page; 13% (42) and 12.1% (39) of the respondents indicated that they 'Often' and 'Rarely' gathered and selected online information by examining only the results on the first page respectively.

Table 5.20: Gathering online information

N=322

Examination of results	Always		Often		Sometimes		Rarely		Never		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%	**Count**	**%**
Examine results on other pages	91	28.3	48	14.9	117	36.3	31	9.6	35	10.9	**322**	**100**
Use of top lists first	102	31.7	40	12.4	121	37.6	22	6.8	37	11.5	**322**	**100**
End search once a result is found	130	40.4	27	8.4	106	32.9	17	5.3	42	13	**322**	**100**

Source: Field data (2017)

5.5.10.3 Gathering information by examining search query results available on other pages

While some people may gather information by examining only the first page, others proceed to the subsequent pages. Table 5.20 distributes the responses of the learners in relation to how often they examined results available on subsequent pages. From Table 5.20 above, 117 of the participants, representing 36.3% indicated that they 'Sometimes' gathered online information by probing further to examine results from other pages on the Internet; 91 of the respondents, representing 28.3% were 'Always' gathering and selecting online information by examining results available on other pages as well; 48 of the respondents, representing 14.9% indicated that they 'Often' proceeded to subsequent pages to verify the results available before selecting online information on the Internet; 35 of the surveyed learners, representing 10.9% indicated that they had 'Never' examined results from other pages; and the remaining 31 of the participants representing 9.6% were 'Rarely' gathering online information after examining results from other pages as well.

5.5.10.4 Learners use of top lists of search query results first to gather online information

The study sought from the learners how frequent they gathered and selected online information by first using the top lists of search query results produced - for example by a search engine. From Table 5.20 above, 121 of the respondents, representing 37.6% indicated that they 'Sometimes' accessed the top lists first when gathering and selecting information on the Internet; 102 of the participants, representing 31.7% were 'Always' accessing the top lists of online search query results first when gathering information on the Internet; 40 of the participants, representing 12.4%

were ‘Often’ gathering results from the top lists first when accessing information on the Internet; while 37 and 22 of the participants representing 11.5% and 6.8% indicated they had ‘Never’ and ‘Rarely’ accessed top lists first when gathering and selecting online information on the Internet.

5.5.10.5 End online search when relevant results are found

This section sought from the learners how often they ended their online search when information or results they deemed relevant were found. Table 5.20 above shows the distribution of the respondents in terms of the frequency at which learners end online search the moment they found results they deemed relevant on the Internet. Table 5.20 shows that 130 (40.4%) of the respondents indicated that they ‘Always’ end online search when relevant results were found on the Internet; 106 (32.9%) of the surveyed learners were of the view that they ‘Sometimes’ end searching the Internet the moment they found relevant results; 42 (13%) of the surveyed learners indicated that they ‘Never’ ended an online search when a relevant result was found; 27 (8.4%) of the respondents ‘Often’ end their online search and the remaining 17 (5.3%) of the surveyed learners ‘Rarely’ end searching the Internet the moment relevant information was found by them.

5.5.11 Frequency at which learners found relevant results

This section presents data on how frequent the surveyed learners found their intended information and materials on the Internet. Table 5.21 shows the distribution of participants’ responses.

Table 5.21: How often learners found relevant results on the Internet

N=322

Relevant results found online	**Count**	**Percent**
Always	82	25.5
Most of the time	142	44.1
Sometimes	90	28
Not very often	8	2.5
Total	**322**	**100.1**

Source: Field data (2017)

From Table 5.21 above, 142 of the participants representing 44.1% indicated that they 'Most of the time' found relevant results from the Internet; 90 of the participants, representing 28% 'Sometimes' found relevant information from their online search on the Internet; 82 of the participants; representing 25.5% indicated that they 'Always' found relevant results from the Internet; and the remaining eight of the participants, representing 2.5% found relevant results 'Not very often' on the Internet.

5.6 Online searching skills

Information users are required to possess certain skills in order to retrieve the desired information from the Internet to satisfy their information needs (Olorunfemi and Mostert, 2012). The purpose of this section was to find out from learners what online searching skills they possessed and how they employed those skills when seeking information on the Internet.

5.6.1 Learners' perception of their Internet searching skills

Searching for information on the Internet could sometimes be very cumbersome; hence requires users to possess certain skills to be able to arrive on the anticipated information or result. This section therefore sought from the learners whether they perceived that they possessed the needed skills to make their online search yield intended results. Table 5.22 shows a cross tabulation of participant's responses in terms of possession of Internet skills and host schools. From Table 5.22, 271 (84.2%) of the respondents indicated that they possessed some peculiar skills needed to search for information on the Internet and 51 (15.8%) of the surveyed learners indicated that they did not possess the needed skills in searching for information on the Internet. The cross tabulation presented on Table 5.22 shows that all the surveyed learners at St. Louis SHS indicated that they possessed the skills needed to access the Internet. However, majority of the surveyed learners who indicated that they did not possess the skills needed to access the Internet were from Simms SHS.

Table 5.22: A cross tabulation of learners' perceived possession of Internet skills and host schools

N=322

Host school	Internet skills				Total	
	Yes		No			
	Count	Percent	Count	Percent	Count	Percent
St. Louis SHS	94	29.2	0	0	94	29.2
Simms SHS	81	25.2	32	9.9	113	35.1
Effiduasi SHS	96	29.8	19	5.9	115	35.7
Total	**271**	**84.2**	**51**	**15.8**	**322**	**100**

Source: Field data (2017)

5.6.2 Internet skills training for learners at school

This section sought from the study participants if they had received formal ICT and Internet training at their institution (school). Responses of participants have been distributed on Table 5.23 below.

Table 5.23: Received formal Internet training

N=322

Formal Internet training	Count	Percent
Yes	301	93.5
No	21	6.5
Total	**322**	**100.**

Source: Field data (2017)

From Table 5.23 above, 301 of the participants, representing 93.5% had received formal Internet training at their school and thus indicated 'Yes' as their response. Conversely, 21 of the learners, representing 6.5% had never had formal Internet training at their school during the time of data collection, hence responded 'No'.

5.6.3 Usefulness of the training

This section was a follow up question to the previous section. Accordingly, respondents who had had formal Internet training at school during data collection were eligible to answer this question. Figure 5.11 shows the distribution of the 301 participants who had formal Internet training.

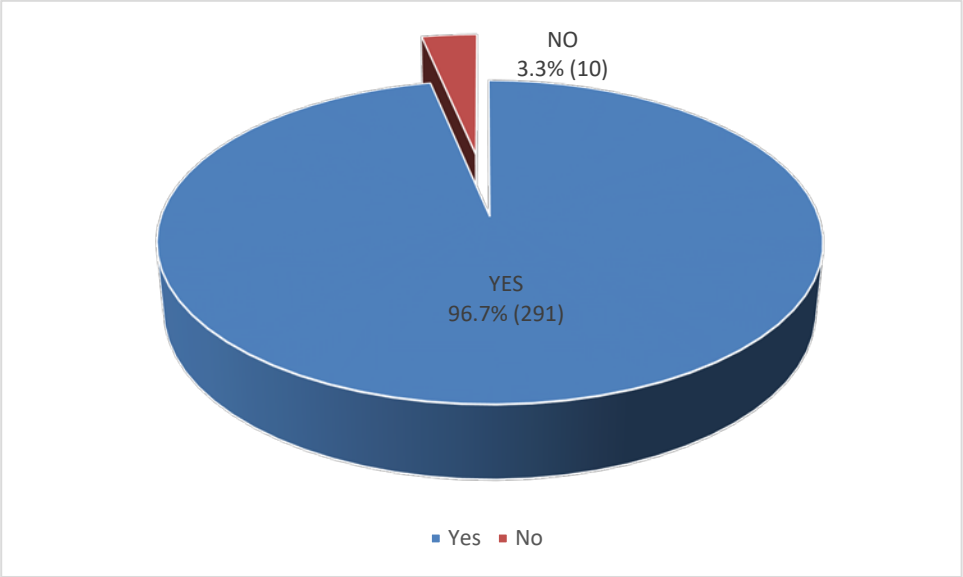

Figure 5.11: Training's usefulness (N=301)

Source: Field data (2017)

Reading from Figure 5.11 above, 96.7% (291) of the respondents had derived benefits from the formal Internet training they had received at their school and the remaining 3.3% (10) had found no usefulness whatsoever from the Internet training they received at school.

5.6.4 Anticipating the usefulness of training

This section sought from the 21 respondents who indicated they had no Internet training from their institutions. All the 21 respondents without formal Internet training at school indicated that having a formal Internet training would be more beneficial for them to retrieve quality online information on the Internet.

5.6.5 Learners Information Literacy skills

This section sought from the respondents of the study their information literacy skills. Specifically, the section covers, respondents' skills in computer use, skills in Internet use, knowledge in database structure, skills in search query formulation, and skills in online navigation techniques. Table 5.24 shows learners' responses in relation to their information literacy skills.

Table 5.24: Learners' information literacy skills

N=322

Information literacy skills	Strongly agree		Agree		Neutral		Disagree		Strongly disagree		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%	**Count**	**%**
Skilled in computer use	104	32.3	133	41.3	59	18.3	23	7.1	3	0.9	**322**	**100**
Skilled in Internet use	105	32.6	142	44.1	51	15.8	18	5.6	6	1.9	**322**	**100**
Skilled in database structure	25	7.8	67	20.8	104	32.3	97	30.1	29	9	**322**	**100**

Source: Field data (2017)

5.6.5.1 Computer use

In the quest of the study to ascertain whether or not learners believed they were computer literate compelled the study to ask them same. Table 5.24 shows the distribution of the respondent's in terms of how skilled they were in the use of computer. At this juncture, the researcher asked the respondents to agree or disagree on the assertion that "I am skilled in the use of the computer". From the above, 133 of the respondents representing 41.3% and 104 of the respondents representing 32.3% indicated they 'Agreed' and 'Strongly agreed' that they were skilled in computer use. Further, 59 of the respondents, representing 18.3% remained 'Neutral' and thus, neither agreed nor disagreed to the assertion. Besides, 23 and 3 of the participants, representing 7.1% and 0.9% 'Disagreed' and 'Strongly disagreed' to the assertion respectively.

5.6.5.2 Skilled in Internet use

This section sought from the respondents their agreement or disagreement on the statement that "I am skilled in the use of the Internet". From Table 5.24 above, 142 (44.1%) and 105 (32.6%) of the

respondents ‘Agreed’ and ‘Strongly agreed’ that they are in the use of the Internet; 51 (15.8%) of the respondents were ‘Neutral’, 18 (5.6%) and 6 (1.9%) of the surveyed learners ‘Disagreed’ and ‘Strongly disagreed’ respectively with the statement.

5.6.5.3 Skilled in the knowledge of database structures

This section sought from the respondents their skills in the knowledge of database structures. Participants were asked to agree or disagree with the statement that ‘I am skilled in the knowledge of database structures’. Table 5.24 above shows 104 (32.3%) of the respondents remained ‘Neutral’, as they neither agreed nor disagreed with the statement. Besides, 97 (30.1%) and 29 (9%) of the surveyed learners ‘Disagreed’ and ‘Strongly disagreed’ that they were skilled in the knowledge of database structures; 67 (20.8%) and 25 (7.8%) of the respondents ‘Agreed’ and ‘Strongly agreed’ with the statement.

5.6.5.4 Skilled in search query formulation

This section sought from the learners if they were skilled in search query formulation. As a result, the respondents were asked to agree or disagree with the assertion that ‘I am skilled in formulating search queries”. Table 5.25 shows the distribution of the responses.

Table 5.25: Skilled in search query formulation

N=322

Skilled in search query formulation	**Count**	**Percent**
Strongly agree	128	39.8
Agree	112	34.8
Neutral	40	12.4
Disagree	28	8.7
Strongly disagree	11	3.4
*No response	3	0.9
Total	**322**	**100.1**

Source: Field data (2017)

Table 5.25 shows the distribution of responses in terms of learners' agreement or disagreement on the assertion that "I am skilled in formulating search queries". As shown above, 128 of the participants, representing 39.8% and 112 of the participants, representing 34.8% indicated that they 'Strongly agreed' and 'Agreed' respectively with the assertion; 40 of the participants, representing 12.4% remained 'Neutral' to the assertion; and 28 of the participants representing 8.7% and 11 of the participants, representing 3.4% indicated that they 'Disagreed' and 'Strongly disagreed' to the assertion respectively. Three (0.9%) of the surveyed learners did not indicate a response.

5.6.5.5 Skilled in online navigation techniques

This section sought from the respondents if they were skilled in online navigation techniques. The assertion that 'I am skilled in online browsing techniques' was put forward to seek respondents' agreement or disagreement. The distribution of responses has been presented in Figure 5.12 below.

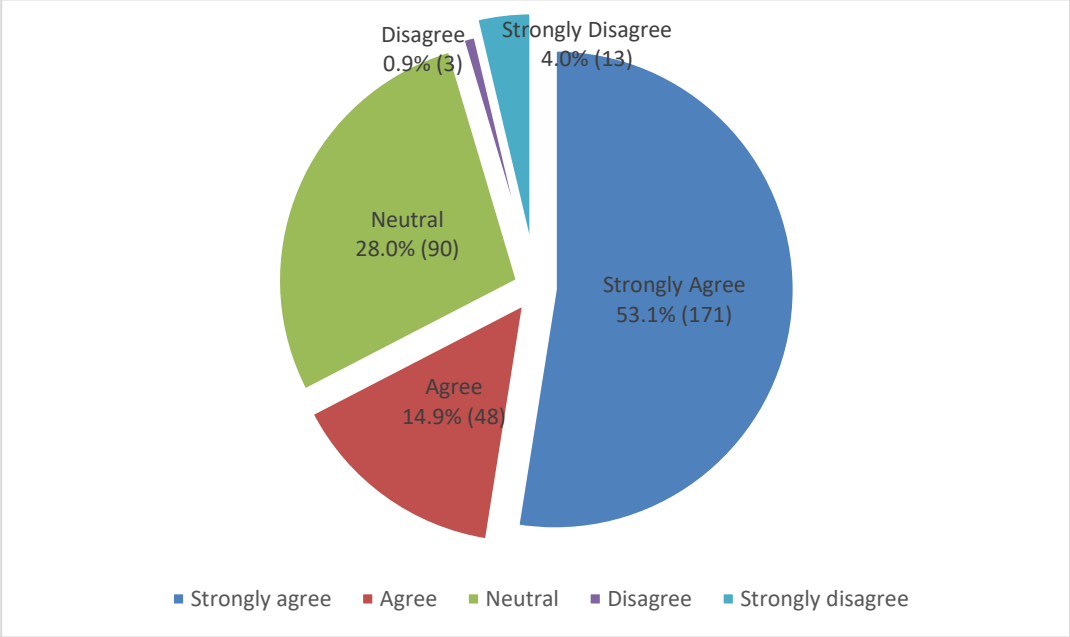

Figure 5.12: Skilled in online navigation techniques (N=322)

Source: Field data (2017)

From Figure 5.12 above, 53.1% (171) and 14.9% (48) of the respondents indicated that they 'Strongly agree' and 'Agree' respectively with the assertion that they were skilled in online navigating techniques. However, 28% (90) of the respondents indicated that they were 'Neutral' to the assertion; 0.9% (3) and 4% (12) of the surveyed learners indicated that they 'Disagreed' and 'Strongly disagreed' respectively with the assertion.

5.6.6 Searching steps

This section sought from respondents the search steps they had been using to search for online information on the Internet. In searching for online information, some people prefer using words from their problem as search terms; others start by typing words straight away into search engines, while others may want to make a list of search terms before starting an online search. Table 5.26 below presents the results on the searching steps employed by learners when searching for online information on the Internet.

Table 5.26: Learners' online searching steps

N=322

Searching steps	Always		Often		Sometimes		Rarely		Never		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%	**Count**	**%**
I use words from my questions as search terms	165	51.2	44	13.7	71	22	8	2.5	34	10.6	**322**	**100**
I start by typing words in search engine	89	27.6	33	10.2	113	35.1	30	9.3	57	17.7	**322**	**100**
I make a list of search terms before I start	92	28.6	58	18	104	32.3	29	9.0	39	12.1	**322**	**100**

Source: Field data (2017)

5.6.6.1 Using questions' word/term as search terms

Participants were asked to indicate how frequent they used words from questions as search terms. From Table 5.26 above, 165 of the respondents, representing 51.2% indicated that they 'Always' used words from their questions as search terms, 71 of the participants, representing 22.0% indicated that they 'Sometimes' do so, 44 of the surveyed learners, representing 13.7% were of the view that they 'Often' used words from their questions as search terms, 34 of the respondents,

representing 10.6% had 'Never' used words from their questions as search terms and the remaining eight of the respondents, representing 2.5% indicated that they 'Rarely' used words from their questions as search terms.

5.6.6.2 Start by typing keywords in search engine

At this point the researcher sought from the respondents how frequent they were starting online search by typing words straight into search engines. Reading from Table 5.26 above, 113 (35.1%) of the respondents indicated that they 'Sometimes' start online search by typing words straight into search engines; 89 (27.6%) of the surveyed learners were 'Always' starting online search by typing words into search engines; 57 (17.7%) of the respondents indicated that they had 'Never' started an online search by typing words straight into search engines, and 33 (10.2%) and 30 (9.3%) of the surveyed learners indicated that they 'Often' and 'Rarely' start online search by typing words into search engines respectively.

5.6.6.3 Making a list of search terms before searching on the Internet

While some do online search by typing words straight into search engines, others list down their search terms first. This section presents a table distributing responses on how frequent the surveyed learners were listing down their search terms before accessing the Internet for online information. According to Table 5.26, 104 of the respondents, representing 32.3% indicated that they 'Sometimes' list search terms first before searching for online information on the Internet. Additionally, 92 of the respondents, representing 28.6% were 'Always' listing their search terms first before accessing the Internet for online information; 58 of the respondents, representing 18% indicated that they 'Often' list search terms first before searching for information on the Internet; 39 and 29 of the respondents, representing 12.1% and 9% respectively had 'Never' and 'Rarely' listed down search terms before searching for online information on the Internet.

5.6.6.4 Formulation of sub questions by learners

This section sought from the respondents how frequently they searched online information by formulating sub questions. Responses from the learners have been distributed on Table 5.27.

Table 5.27: A cross tabulation of gender and learners that formulate sub-questions for online search

N=322

Gender	Formulate sub-questions for online search										Total	
	Always		Often		Sometimes		Rarely		Never			
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Male	37	11.5	63	19.6	31	9.6	20	6.2	3	0.9	154	47.8
Female	76	23.6	47	14.6	26	8.1	14	4.3	5	1.6	168	52.2
Total	**113**	**35.1**	**110**	**34.2**	**57**	**17.7**	**34**	**10.5**	**8**	**2.5**	**322**	**100**

Source: Field data (2017)

Table 5.27 above shows that 113 (35.1%) and 110 (34.2%) of the respondents indicated that they 'Always' and 'Often' formulated sub questions when searching for information on the Internet; 57 (17.7%) of the respondents were 'Sometimes' formulating sub questions when accessing online information on the Internet; 34 (10.5%) of the surveyed learners indicated that they 'Rarely' formulated sub questions when searching for online information on the Internet; and eight (2.5%) of the surveyed learners indicated that they had 'Never' formulated sub questions when conducting online search. The cross tabulation presented on Table 5.27 clearly depicts that female learners frequently formulated sub questions when searching for online information on the Internet more than their male counterparts.

5.6.6.5 Learners' use of advanced search option

Advanced search has been highlighted as effective, when trying to filter online search. This section sought from the respondents how often they used advanced search to search for information on the Internet. Table 5.28 distributes responses of the learners.

Table 5.28: A cross tabulation of learners' school and use of advanced search option

N=322

School	Use of advanced search option										Total	
	Always		Often		Sometimes		Rarely		Never			
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
St. Louis SHS	9	2.8	5	1.6	12	3.7	23	7.1	45	14.0	94	29.2
Simms SHS	15	4.7	7	2.2	16	5.0	14	4.3	61	18.9	113	35.1
Effiduasi SHS	20	6.2	11	3.4	27	8.4	19	5.9	38	11.8	115	35.7
Total	**44**	**13.7**	**23**	**7.2**	**55**	**17.1**	**56**	**17.3**	**144**	**44.7**	**322**	**100**

Source: Field data (2017)

Table 5.28 shows that 144 (44.7%) of the respondents had 'Never' used an advanced search option when accessing online information on the Internet; 56 (17.3%) of the surveyed learners indicated that they 'Rarely' used advanced search options to access online information on the Internet; 55 (17.1%) of the respondents were 'Sometimes' using advanced search options for online information search; 44 (13.7%) of the surveyed learners indicated that they 'Always' used advanced search options for online information retrieval; and 23 (7.2%) of the respondents were of the view that they 'Often' used advanced search options to access online information when searching for information on the Internet. As depicted on the cross tabulation, learners from Effiduasi SHS were frequently applying the advanced search option as compared to learners of Simms SHS and St. Louis SHS.

5.6.7 Searching skills of learners

This section sought from the learners how frequent they used certain skills such as keyword, searching within results, more than one keyword search, and others to search for information on the Internet. The results are presented in Table 5.29.

Table 5.29: Learners' online searching skills

N=322

Searching steps	Always		Often		Sometimes		Rarely		Never		*No response		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	**Count**	**%**
Keyword search	161	50.0	33	10.2	73	22.7	8	2.5	41	12.7	6	1.9	**322**	**100**
More than one keyword search	122	37.9	52	16.1	101	31.4	12	3.7	32	9.9	3	0.9	**322**	**100**
Phrasal search	43	13.4	39	12.1	94	29.2	49	15.2	85	26.4	12	3.7	**322**	**100**

Source: Field data (2017)

5.6.7.1 Learners use of keyword search

This section sought from the learners how frequent they used keyword search for information retrieval on the Internet. From Table 5.29 above, 161 of the respondents, representing 50% indicated that they 'Always' applied keyword search when retrieving information from the Internet; 73 of the respondents, representing 22.7% were 'Sometimes' using keyword search for online information retrieval; 41 of the participants, representing 12.7% indicated that they had 'Never' applied keyword search for online information retrieval; 33 of the respondents, representing 10.2% were of the view that they 'Often' used keyword search when retrieving online information on the Internet; and eight of the surveyed learners, representing 2.5% indicated that they 'Rarely' used keyword search when searching for information on the internet. Six (1.9%) of the respondents did not indicate a response.

5.6.7.2 More than one keyword search by learners

From Table 5.29 above, respondents indicated how often they used more than one keyword search when retrieving online information. As shown above, 122 of the respondents, representing 37.9% indicated that they 'Always' applied more than one keyword search for online information retrieval; 101 of the respondents, representing 31.4% indicated that they 'Sometimes' applied more than one keyword search when searching for online information on the Internet; 52 of the respondents, representing 16.1% were of the view that they 'Often' applied more than one keyword search for online information retrieval; 32 of the respondents, representing 9.9% indicated that

they had ‘Never’ applied more than one keyword search for online information retrieval; and 12 of the surveyed learners, representing 3.7% indicated they were ‘Rarely’ applying more than one keyword search when retrieving information from the Internet. Three (0.9%) of the respondents did not indicate a response.

5.6.7.3 Learners’ use of phrasal search

This section presents data on the frequency at which respondents used phrasal search or quotations to search for information on the Internet. Reading from Table 5.29 above, 94 (29.2%) of the respondents indicated that they ‘Sometimes’ applied phrasal search when retrieving information from the Internet; 85 (26.4%) of the surveyed learners were of the view that they had ‘Never’ applied phrasal search for online information retrieval; 43 (13.4%) of the respondents indicated that they ‘Always’ used phrasal search to retrieve online information on the Internet; 49 (15.2%) of the respondents were ‘Rarely’ using phrasal search for online information retrieval; and 39 (12.1%) of the surveyed learners indicated that they ‘Often’ used phrasal search when searching for online information on the Internet. Twelve (3.7%) of the learners did not indicate a response.

5.6.7.4 Searching within Internet results by learners

This section sought from respondents, how frequent they applied the searching within results technique when accessing online information on the Internet. Responses of the learners have been presented in Figure 5.13.

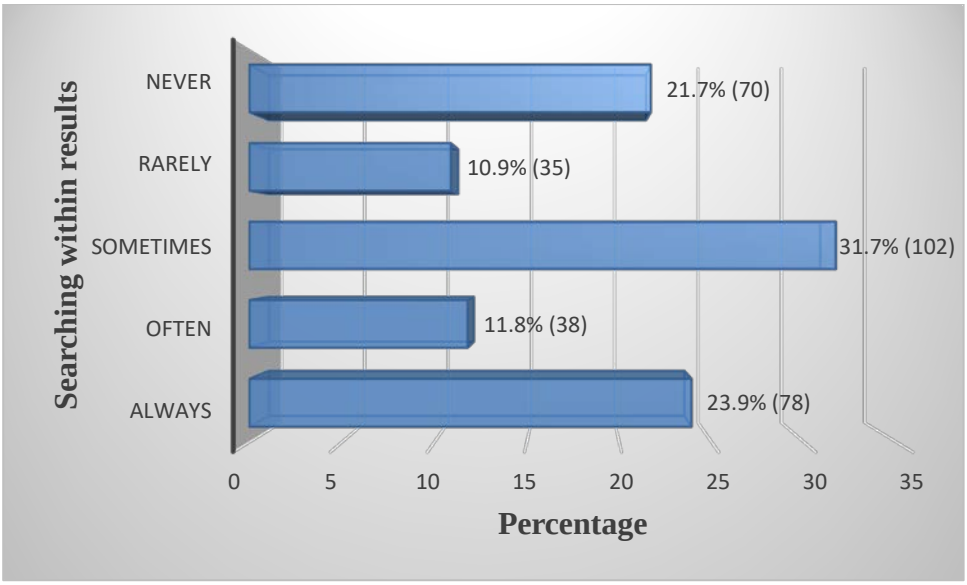

Figure 5. 13: Searching within Internet results (N=322)

Source: Field data (2017)

From Figure 5.13 above, 31.7% (102) of the surveyed learners indicated that they 'Sometimes' applied the searching within results technique when accessing online information on the Internet; 23.9% (78) of the respondents indicated that they 'Always' searched within results when retrieving online information on the Internet; 21.7% (70) of the respondents were of the view that they had 'Never' applied the searching within results technique for online information retrieval; 11.8% (38) of the respondents indicated that they 'Often' searched within results when accessing online information; and 10.9% (35) of the surveyed learners indicated that they 'Rarely' applied the searching within results technique when retrieving online information on the Internet.

5.6.7.5 Searching for similar Internet results

This section presents data on how frequent the learners were applying searching for similar results technique when accessing online information on the Internet. Table 5.30 shows the distribution of responses.

Table 5.30: Searching for similar Internet results

N=322

Searching for similar results	Count	Percent
Always	83	25.8
Often	61	18.9
Sometimes	98	30.4
Rarely	26	8.1
Never	48	14.9
*No response	6	1.9
Total	**322**	**100**

Source: Field data (2017)

From Table 5.30 above, 98 of the respondents, representing 30.4% indicated that they 'Sometimes' applied the searching for similar results technique when accessing online information on the Internet; 83 of the respondents, representing 25.8% indicated that they 'Always' searched for similar results when retrieving online information on the Internet; 61 of the respondents, representing 18.9% were of the view that they 'Often' searched for similar results when retrieving online information; 48 of the respondents, representing 14.9% indicated that they had 'Never' searched for similar results when accessing online information on the Internet; and 26 of the surveyed learners, representing 8.1% indicated that they 'Rarely' searched for similar results when accessing online information on the Internet. Six (1.9%) of the respondents did not indicate a response.

5.6.7.6 Searching within specific time range

This section sought from the respondents how frequent they searched online information within specific time range. Responses have been distributed in Figure 5.14 .

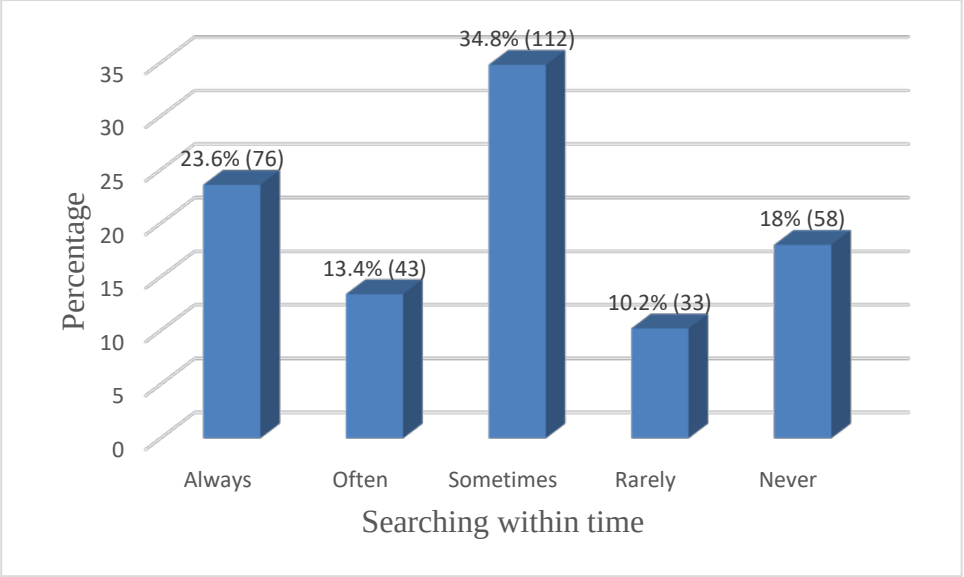

Figure 5.14: Searching within specific time range (N=322)

Source: Field data (2017)

From Figure 5.14 above, 34.8% (112) of the respondents indicated that they 'Sometimes' searched within specific time range when retrieving online information from the Internet; 23.6% (76) of the surveyed learners indicated that they 'Always' searched within specific time range when searching for online information on the Internet; 18% (58) of the respondents indicated that they had 'Never' searched within specific time range for online information; 13.4% (43) of the respondents were of the view that they 'Often' searched within specific time range when searching for online information on the Internet; and the remaining 10.2% (33) of the surveyed learners indicated that they 'Rarely' searched within specific time range for online information on the Internet.

5.6.8 Online information sources taught at school

Online information sources include search engines, databases, and directories, among others. These information sources help individuals to search for Internet information needed to satisfy their information need or perform a particular task.

5.6.8.1 Training on search engines

Respondents were asked to indicate whether they had been taught how to use Internet search engines at their schools. Table 5.31 shows the distribution of respondents in terms of them being taught how to use search engines.

Table 5.31: Search engines training

N=322

Search engines	Count	Percent
Yes	265	82.3
No	57	17.7
Total	**322**	**100**

Source: Field data (2017)

From Table 5.31 above, 265 of the respondents, representing 82.3% have been taught how to use search engines to find information on the Internet at school. Conversely, 57 of the respondents representing 17.1% had never been taught the techniques of using search engines.

5.6.8.2 Training on Meta search engine

At this section, respondents were asked whether they had been taught how to use meta-search engines at school. Responses have been distributed on Figure 5.15 below.

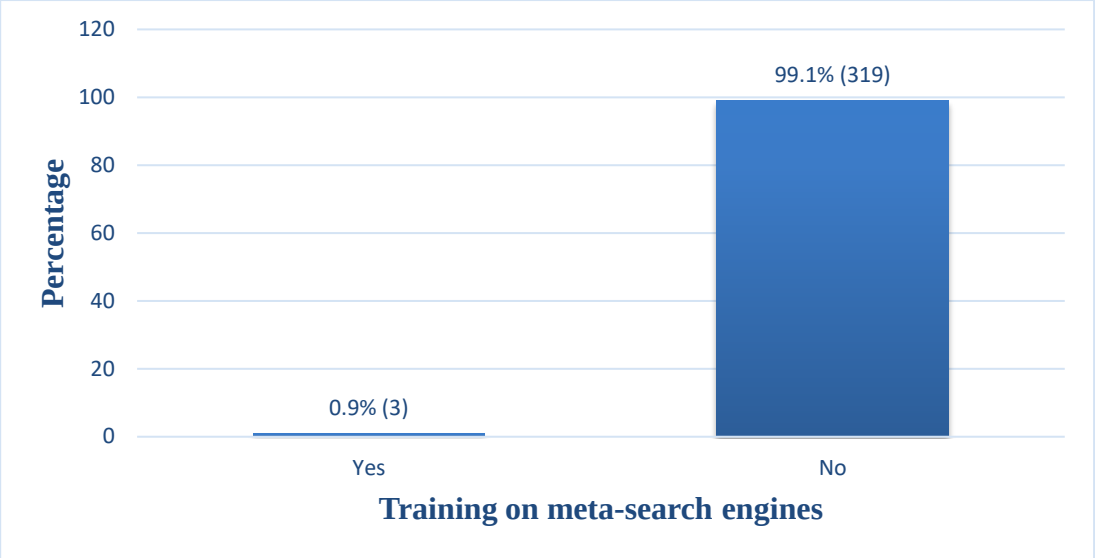

Figure 5.15: Meta search engine training (N=322)

Source: Field data (2017)

From Figure 5.15 above, 99.1% (319) of the respondents indicated that they had not been taught how to use meta-search engines to search for online information on the Internet at school; and 0.9% (3) of the respondents indicated that they had been taught how to use meta-search engines to search for online information on the Internet.

5.6.8.3 Training on directories

Table 5.32 shows the distribution of respondents who had been taught how to use directories to search for online information on the Internet.

Table 5.32: Training on directories

N=322

Directories	**Count**	**Percent**
Yes	1	0.3
No	321	99.7
Total	**322**	**100**

Source: Field data (2017)

From Table 5.32 above, 321 of the respondents, representing 99.7% had not been taught how to use directories to search for online information on the Internet; and one (0.3%) of the surveyed learners had been taught how to use directories to search for information on the Internet at school.

5.6.8.4 Academic databases training

Figure 5.16 shows the distribution of responses on whether or not learners had been taught how to use academic databases to search for online information on the Internet.

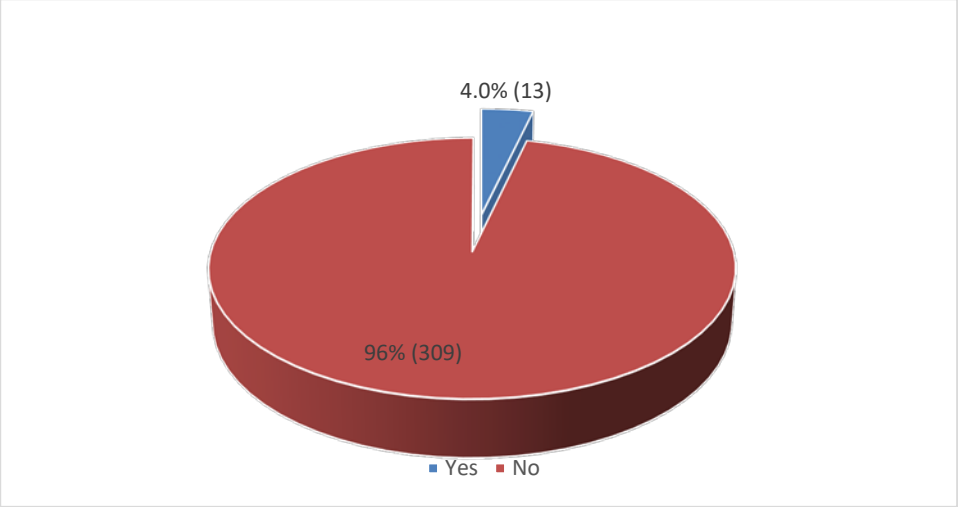

Figure 5.16: Academic databases training (N=322)

Source: Field data (2017)

From Figure 5.16 above, 96% (309) of the respondents indicated that they had not been taught how to use academic databases to search for online information; and the remaining 4% (13) indicated that they had been taught how to use databases to search for information on the Internet.

5.7 Evaluation of online information sources

There is plenty of everything on the Internet but not all of it is of a high quality (Quintana, Pujol and Romaní, 2012); hence the need to evaluate online information sources to ascertain relevance and reliability of information. The purpose of this section was to determine from learners how they were evaluating and judging information from the Internet before they used them.

5.7.1 Evaluating online information

This section sought from the respondents whether they evaluated online information sources. Table 5.33 shows the distribution of responses on evaluation of online sources.

Table 5.33: A cross tabulation of learners' gender and evaluation of online sources

N=322

Gender	Evaluation of online information sources				Total	
	Yes		No			
	Count	Percent	Count	Percent	Count	Percent
Male	96	29.8	58	18.0	154	47.8
Female	128	39.8	40	12.4	168	52.2
Total	**224**	**69.6**	**98**	**30.4**	**322**	**100**

Source: Field data (2017)

From Table 5.33 above, 224 of the respondents, representing 69.6% indicated that they evaluated online information sources before they made a decision on them; the remaining 98 of the respondents, representing 30.4% indicated that they were not evaluating online information sources when accessing and selecting online information on the Internet. The cross tabulation clearly shows that more female learners were evaluating online information sources than male learners.

5.7.2 Criteria for evaluation of online information sources

Evaluation of Internet sources follows certain criteria such as verifying the authority, quality, currency, objectivity, among others, of the information. This section sought from the surveyed learners whether they were applying any of the evaluation criteria recommended by Alexander and Tate (1999) when accessing online information on the Internet. It is important to note that this section was not limited to only learners who indicated they were evaluating online sources in the previous question. Thus, all respondents were required to indicate if they were applying any of the criteria.

5.7.2.1 Verification of authority by learners

This section sought from the respondents if they verified the authority of the information (e.g. author's credentials) before they retrieved online information on the Internet. Figure 5.17 distributes responses given by the learners.

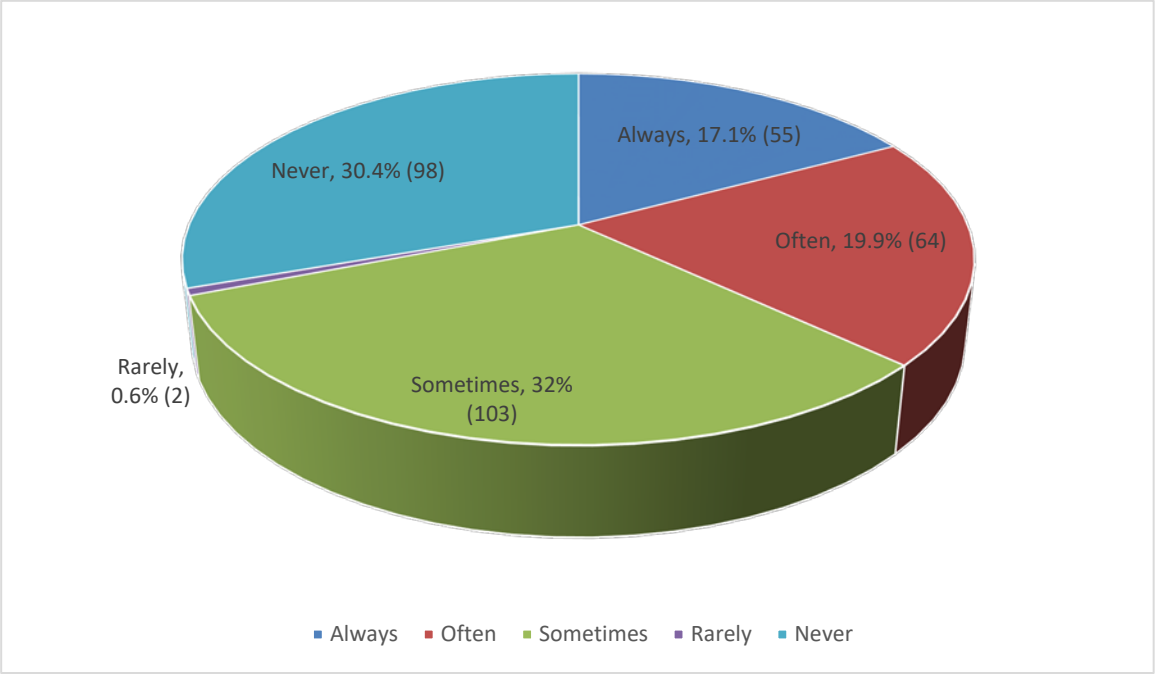

Figure 5.17: Verification of authority (N=322)

Source: Field data (2017)

From Figure 5.17 above, 32% (103) of the respondents indicated that they 'Sometimes' verified the authority of online information source before they retrieved the information on the Internet; 30.4% (98) of the surveyed learners indicated that they 'Never' verified the authority of online information source when accessing information on the Internet; 17.1% (55) of the respondents were of the view that they 'Always' verified the authority of online information source when retrieving information on the Internet; 19.9% (64) of the surveyed learners indicated that they 'Often' verified the authority of online information sources before retrieving online information on the Internet; and the remaining 0.6% (2) of the respondents indicated that they 'Rarely' verified the authority of online sources before retrieving online information on the Internet.

5.7.2.2 Verifying the accuracy or quality of online information by learners

This section sought from respondents whether they verified the accuracy or quality of online information sources before retrieving online information on the Internet. Responses have been presented in Figure 5.18 below.

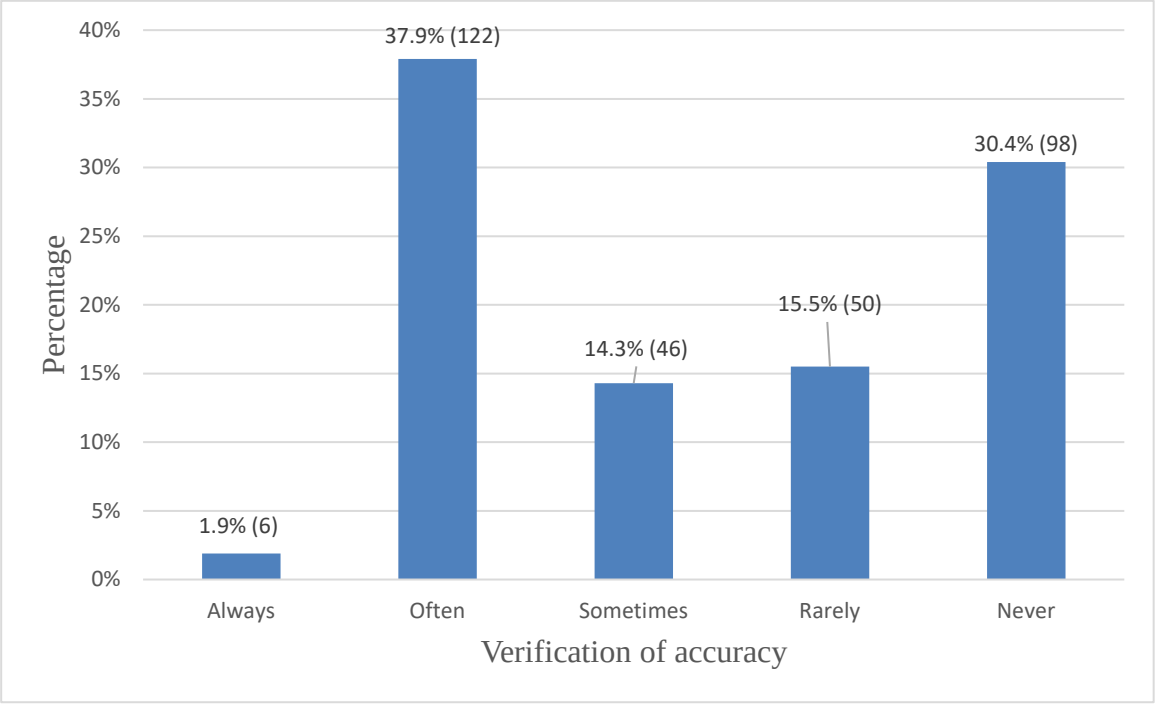

Figure 5.18: Verifying accuracy or quality of online information (N=322)

Source: Field data (2017)

From Figure 5.18 above, 37.9% (122) of the respondents indicated that they 'Often' verified the accuracy or the quality of the information on the Internet before retrieving or using it; 30.4% (98) of the surveyed learners indicated that they had 'Never' verified the accuracy or quality of online information sources on the Internet; 15.5% (50) of the respondents were of the view that they 'Rarely' verified the quality or accuracy of online information sources on the Internet; 14.3% (46) of the respondents indicated that they 'Sometimes' verified accuracy of online information sources; and the remaining 1.9% (6) of the surveyed learners indicated that they 'Always' verified accuracy or quality of the information they retrieved from the Internet.

5.7.2.3 Verifying the objectivity of online information by learners

This section sought from the respondents how often they verified the objectivity of information before retrieving online information on the Internet. Table 5.34 distributes the responses of the learners.

Table 5.34: Verifying objectivity of online information

N=322

Verify objectivity	Count	Percent
Always	2	0.6
Often	68	21.1
Sometimes	114	35.4
Rarely	0	0
Never	136	42.2
*No response	2	0.6
Total	**322**	**99.9**

Source: Field data (2017)

From Table 5.34, 136 of the respondents, representing 42.2% indicated that they had 'Never' verified the objectivity of online information sources when accessing information on the Internet; 114 of the respondents, representing 35.4% indicated that they 'Sometimes' verified the objectivity of online information sources; 68 of the respondents, representing 21.1% indicated that they 'Often' verified the objectivity of online information sources when accessing information on the Internet; and two of the respondents, representing 0.6% were of the view that they 'Always' verified the objectivity of online information before they retrieved them on the Internet. Two (0.6%) of the surveyed learners did not give a response.

5.7.2.4 Verification of the currency of online information by learners

This section sought from the respondents how frequent they verified the currency of online information sources when retrieving online information on the Internet. Figure 5.19 shows the distribution of responses.

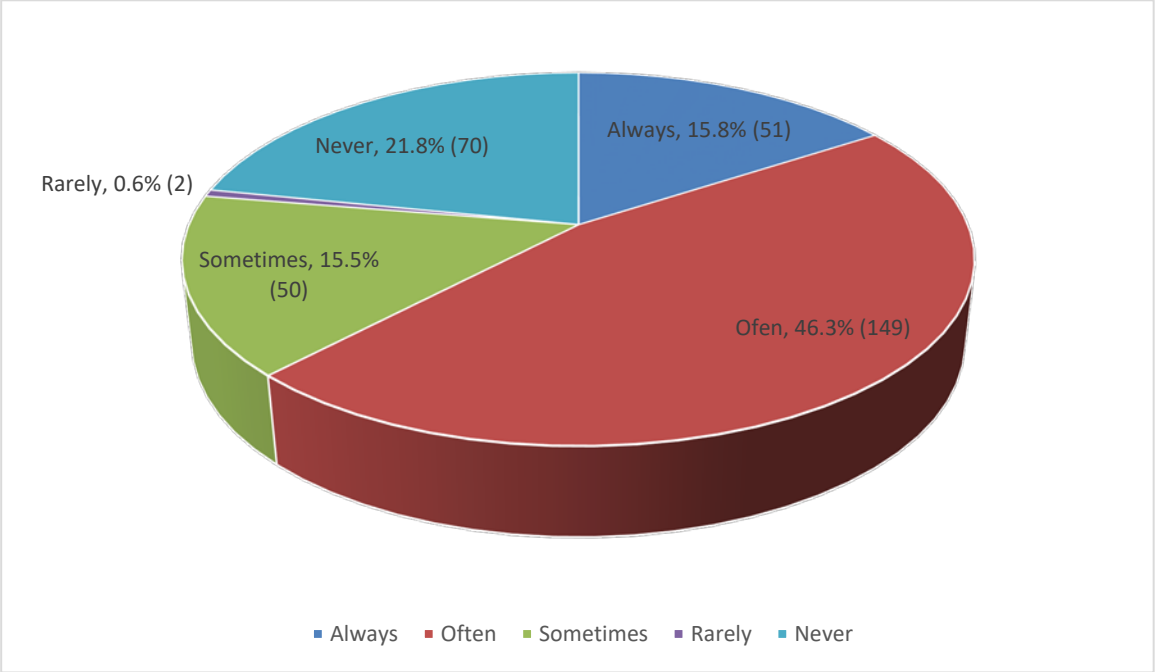

Figure 5.19: Verifying the currency of online information (N=322)

Source: Field data (2017)

From Figure 5.19 above, 46.3% (149) of the respondents indicated that they 'Often' verified the currency of online information on the Internet; 21.8% (70) of the respondents indicated that they had 'Never' verified the currency of online information sources when accessing information on the Internet; 15.8% (51) of the surveyed learners were of the view that they 'Always' verified the currency of online information on the Internet; 15.5% (50) of the learners indicated that they 'Sometimes' verified the currency of online information sources when accessing information on the Internet; and the remaining 0.6% (2) of the respondents indicated that they 'Rarely' verified the currency of online information sources before they retrieved information on the Internet.

5.7.2.5 Verifying the coverage of online information

This section sought from respondents how frequent they verified the coverage of online information sources when accessing information on the Internet. Responses have been distributed on Table 5.35 below.

Table 5.35: Verifying the coverage of online information

N=322

Verify coverage	Count	Percent
Always	2	0.6
Often	74	23
Sometimes	148	46
Rarely	0	0
Never	98	30.4
Total	**322**	**100**

Source: Field data (2017)

From Table 5.35 above, 148 of the respondents, representing 46% indicated that they 'Sometimes' verified the coverage of online information sources on the Internet; 98 of the respondents, representing 30.4% were of the view that they had 'Never' verified the coverage of online information sources when retrieving information on the Internet; 74 of the respondents, representing 23% indicated that they 'Often' verified the coverage of online information sources on the Internet and the remaining two of the respondents; representing 0.6% indicated that they 'Always' verified coverage of online information when accessing information on the Internet.

5.8 Barriers to online information seeking

A number of barriers or challenges have been identified by different studies on the obstacle of online information behaviour (e.g. infrastructural challenges). The purpose of this section was to find out from learners the challenges they faced when seeking information from the Internet.

5.8.1 Internet information seeking **challenges**

When seeking online information from the internet, it is believed that users are faced with a myriad of challenges. This section sought from the respondents the challenges they encountered as they accessed online information. Table 5.36 shows the distribution of responses of the learners.

Table 5.36: Online information seeking challenges

N=322

Challenges	Count	Percent
Slow Internet connection	243	75.5
Internet access restrictions	202	62.7
Lack of support and training	23	7.1
Information overload	16	5
Lack of Internet skills	14	4.3
Other	0	0

***Multiple responses received**

Source: Field data (2017)

In this section, respondents were able to select all applicable options for the question; hence, the total frequency is more than 322 and total percentage is above 100. As presented on Table 5.36 above, 243 of the respondents, representing 75.5% indicated that the major challenge they encountered when accessing the Internet for online information was slow Internet connection; 202 of the respondents representing 62.7% mentioned Internet access restrictions as the challenge they faced when accessing the Internet for online information; 23 of the respondents, representing 7.1% indicated lack of support and training as a challenge for accessing the Internet for online information. Furthermore, 16 of the respondents, representing 5% had faced the challenge of information overload when accessing online information on the Internet; and 14 of the respondents, representing 4.3% were faced with the challenge of lack of Internet skills.

5.8.2 Possible solutions to the online information challenges

Having identified the challenges faced by the learners in accessing the Internet, the researcher further proceeded through an open-ended question by asking the respondents to identify possible solutions to the challenges. Some of the respondents, 111 (34.5%) failed to answer the open-ended question and the responses received were from 211 (65.5%) of the respondents. Multiple responses were received and from the responses provided, 197 of the learners, representing 61.2% were of the view that, provision of more workstations and computer laboratories would be helpful in solving the challenges they faced when accessing the Internet at school; 102 of the learners,

representing 31.7% mentioned an increase in the Internet bandwidth as a solution to their challenges; 48 of the learners, representing 14.9% indicated that the computer laboratories should be opened during weekends and after school hours; and 10 of them, representing 3.1% called for more ICT lessons on their lesson's time table.

5.9 Satisfaction levels on Internet training and Internet access at school

In this section, learners were asked to rate their level of satisfaction in relation to Internet access, training and support at their schools. Results are presented on Table 5.37 below:

Table 5.37: Learners' Internet training and Internet access satisfaction levels at school

N=322

Services	Very satisfied		Satisfied		Neutral		Dissatisfied		Very dissatisfied		*No response		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	**Count**	**%**
Internet training	86	26.7	133	41.3	63	19.6	25	7.7	15	4.7	0	0	**322**	**100**
Internet speed	27	8.4	78	24.2	102	31.7	85	26.4	28	8.7	2	0.6	**322**	**100**
Teachers' support	95	29.5	106	32.9	70	21.7	32	9.9	16	5	3	0.9	**322**	**100**
Internet access	30	9.3	81	25.2	75	23.3	74	23	62	19.3	0	0	**322**	**100**

Source: Field data (2017)

5.9.1 Learners' level of satisfaction on Internet training

Table 5.37 shows the distribution of responses in terms of learners' level of satisfaction on Internet training at their schools. Reading from Table 5.37 above, 133 of the respondents, representing 41.3% and 86 of the respondents, representing 26.7% indicated that they were 'Satisfied' and 'Very satisfied' with the Internet training they were provided with at their schools respectively. Besides, 63 of th respondents, representing 19.6% remained 'Neutral' on their satisfaction on the Internet training provided for them at school. Conversely, 25 and 15 of the respondents representing 7.7% and 4.7% indicated that they were 'Dissatisfied' and 'Very dissatisfied' with the level of Internet training provided for learners at their school.

5.9.2 Learners' Internet speed satisfaction level

This section depicts respondents' level of satisfaction on the Internet speed at their schools. As shown on Table 5.37 above, 102 (31.7%) of the respondents remained 'Neutral' on their level of satisfaction with the speed of the Internet at their school; 85 (26.4%) and 28 (8.7%) of the respondents indicated that they were 'Dissatisfied' and 'Very dissatisfied' with the Internet speed at their school. Conversely, 78 (24.2%) and 27 (8.4%) of the respondents indicated that they were 'Satisfied' and 'Very satisfied' with the level of Internet speed at their school. Two (0.6%) of the surveyed learners did not indicate a response.

5.9.3 Learners' satisfaction level on teachers' support

This section sought from the leaners their level of satisfaction on the support they received from their teachers when accessing the Internet for online information. According to Table 5.37 above, 106 (32.9%) and 95 (29.5%) of the respondents indicated that they were 'Satisfied' and 'Very satisfied' with the level of their teachers support when accessing the Internet for online information; 70 (21.7%) of the respondents remained 'Neutral' on their satisfaction with their teachers support to them when accessing the Internet for online information; and 32 (9.9%) and 16 (5%) of the surveyed learners indicated they were 'Dissatisfied' and 'Very dissatisfied' respectively on the level of their teachers support when accessing the Internet for online information. Three (0.9%) respondents did not indicate their response.

5.9.4 Learners' satisfaction level on Internet access at school

This section sought from respondents their level of satisfaction on Internet accessibility at their school. Responses as presented on Table 5.37 shows that, 81 (25.2%) and 30 (9.3%) of the respondents were 'Satisfied' and 'Very satisfied' with the level of Internet access available to them at school respectively. Besides, 75 (23.3%) of the respondents remained 'Neutral' on their level of satisfaction to their Internet access at school; and 74 (23%) and 62 (19.3%) of the respondents indicated that they were 'Dissatisfied' and 'Very dissatisfied' with their Internet access at school.

5.9.5 Learners' satisfaction level on librarians' support

This section presents data on the level of learners' satisfaction with their librarians' support when accessing the Internet for online information. Responses have been presented on Table 5.38 below.

Table 5.38: A cross tabulation of learners' school and level of satisfaction on librarian's support

N=322

School	Satisfaction level on librarian's support										Total	
	Very satisfied		Satisfied		Neutral		Dissatisfied		Very dissatisfied			
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
St. Louis SHS	4	1.2	9	2.8	10	3.1	26	8.1	45	14	94	29.2
Simms SHS	7	2.2	17	5.3	23	7.1	31	9.6	35	10.9	113	35.1
Effiduasi SHS	11	3.4	32	9.9	29	9.0	24	7.5	19	5.9	115	35.7
Total	**22**	**6.8**	**58**	**18**	**62**	**19.2**	**81**	**25.2**	**99**	**30.8**	**322**	**100**

Source: Field data (2017)

According to Table 5.38 above, 99 (30.8%) and 81 (25.2%) of the surveyed learners indicated that they were 'Very dissatisfied' and 'Dissatisfied' with the level of their librarians' support when accessing the Internet for online information respectively: 62 (19.2%) of the respondents remained 'Neutral' with the satisfaction of the support they received from their librarians when accessing the Internet for online information; 58 (18%) and 22 (6.8%) of the respondents indicated that they were 'Satisfied' and 'Very satisfied' with their librarians' support on Internet accessibility respectively. The cross tabulation depicts that the proportion of learners who were satisfied with their librarians' support at Effiduasi SHS were more than the proportion of learners at Simms SHS and St. Louis SHS who were satisfied with their librarians' support when accessing online information on the Internet.

5.10 The teachers' questionnaire results

This section presents the surveyed teachers' responses based on the data collected from them using a self-administered questionnaire. The questionnaire of the ICT teachers sought from them the Internet infrastructure available to learners at school, the Internet searching skills, and strategies that the teachers were teaching the learners, the teaching of online source evaluation, as well as their perceived Internet skills of their learners. The ICT teachers also through the questionnaire provided data on their level of satisfaction on the Internet training and infrastructure they provided learners at school as well as challenges that learners faced when accessing the Internet at school for online information and possible solutions to these challenges. Particularly, the questionnaire for the learners investigated learners' online information behaviour and the questionnaire of the ICT teachers investigated the support that learners were provided at school towards their online information behaviour. Thus, the questionnaire for the ICT teachers complemented the questionnaire of the learners towards the investigation of learners' Internet-based information behaviour.

5.10.1 Demographical data of surveyed teachers

The demographic data of surveyed teachers was elicited from three questions that were asked in section one of the questionnaire. This section provided general information including gender, school affiliated to, and years of teaching ICT in their respective schools.

5.10.1.1 Gender of respondents

This section shows the gender of the teachers who participated in the survey. The gender involves both male and female respondents from the three surveyed high schools. Responses are distributed on Table 5.39.

Table 5.39: Gender of ICT teachers

N=18

Gender	Count	Percent
Male	15	83.3
Female	3	16.7
Total	**18**	**100**

Source: Field data (2017)

Table 5.39 above shows the distribution of respondents in terms of gender. Table 5.39 shows that 15 of the surveyed teachers representing 83.3% were males and 3 respondents representing 16.7% were females.

5.10.1.2 Teachers' proportion per host high schools

This section shows the proportion of teachers at each high school participating in the survey. The responses are distributed on Table 5.40.

Table 5.40: Proportion of teachers per school

N=18

Schools	Count	Percent
St. Louis SHS	5	27.8
Effiduasi SHS	7	38.9
Simms SHS	6	33.3
Total	18	100

Source: Field data (2017)

From Table 5.40 above, seven of the respondents representing 38.9% were teaching at Effiduasi SHS, six respondents representing 33.3% were teaching at Simms SHS and the remaining five of the respondents representing 27.8% were teaching at St. Louis SHS.

5.10.1.3 Years of service

The ICT teachers were asked in an open-ended question to indicate the number of years they had been teaching ICT in the surveyed schools. Four of the surveyed teachers, representing 22.2% had spent five years teaching ICT at their schools, three of them representing 16.7% had spent three years teaching ICT at the host school; another three of the teachers representing 16.7% had spent eight years teaching ICT at their current school; two of them had spent six years teaching ICT at their current school; another two of the teachers representing 11.1% had spent two years teaching ICT at the host schools. A teacher each had spent nine years, seven years, four years, and one year teaching ICT at their current schools.

5.10.2 Internet access for learners at school

The purpose of this section was to find out from the surveyed teachers where and when (places or locations and times) learners were able to access the Internet at their school for online information.

5.10.2.1 Internet access on campus

This section verified from the teachers whether learners were able to access the Internet at their school. All the teachers (18, representing 100% of the respondents) indicated that, learners were able to access Internet at their school.

5.10.2.2 Internet connection type at school

This section verified from the teachers the type of Internet connection they had at their school. Responses from the teachers have been distributed on Table 5.41 below.

Table 5.41: Internet connection type

N=18

Internet connection type	Count	Percent
Dial-Up / Regulator modem connection	1	5.6
Digital Subscriber Line – DSL	1	5.6
Asymmetric Digital Subscriber Line – ADSL	1	5.6
Cable modem connection	1	5.6
Integrated Services Digital Network – ISDN	1	5.6
Wireless	13	72
Total	**18**	**100**

Source: Field data (2017)

From Table 5.41 above, 13 of the respondents, representing 72% indicated that they were connected to the Internet at their school through wireless Internet connection; one of the respondents, representing 5.6% highlighted that their school was connected to the Internet through Dial-Up / Regulator modem connection; one of the respondents, representing 5.6% was connected to the Internet at their school through a Digital Subscriber Line – DSL; one of the respondents, representing 5.6% had their school connected to the Internet through an Asymmetric Digital Subscriber Line – ADSL; one of the respondents, representing 5.6% also had their school connected to the Internet through Cable modem connection; and the remaining one of the respondents, representing 5.6% indicated their school was connected to the Internet through an Integrated Services Digital Network – ISDN.

5.10.2.3 Internet access duration for learners

This section sought from the teachers whether learners had enough time to access the Internet at their school. Responses from the teachers have been distributed on Table 5.42 below.

Table 5.42: Enough Internet access for learners

N=18

Enough Internet access	Count	Percent
Yes	4	22.2
No	14	77.8
Total	**18**	**100**

Source: Field data (2017)

From Table 5.42 above, 14 of the respondents, representing 77.8% were of the view that learners did not have enough time to access the Internet at their school. The remaining four teachers, representing 22.2% believed that learners had enough time to access the Internet at school.

5.10.2.4 Internet access location on campus for learners

Among the departments in the schools that have internet connectivity are mostly computer laboratories and libraries. In addition, aside these departments, the only means most learners get access to the Internet on campus is through an Internet gadget such as tablet, laptop and others. This section verified from the teachers where learners were able to access the Internet at school. All the teachers (18, representing 100% of the respondents) indicated that the only place learners could access the Internet at their schools was the computer laboratories.

5.10.2.5 Internet access hours or periods for learners

This section verified from the teachers the periods learners were able to access the Internet at their schools. Responses are distributed on Table 5.43.

Table 5.43: Internet access time for learners

N=18

Internet access time	Count	Percent
During school hours	10	55.6
After school hours	1	5.6
Weekends	0	0
Anytime	7	38.8
Total	**18**	**100**

Source: Field data (2017)

Table 5.43 above shows the distribution of responses in terms of the periods that learners were able to access the Internet at school. As shown above, 10 of the respondents representing 55.6% indicated that learners were able to access the Internet during school hours; seven of the participants representing 38.8% indicated that, learners were able to access the Internet anytime at their school; the remaining one participant representing 5.6% indicated that learners could access the Internet after school hours.

5.10.3 Online information needs of learners

The purpose of this section was to verify from the teachers the important situation(s) learners at their schools have experienced and the kind of online information they had needed to find, learn, or know in these situations.

5.10.3.1 Learners' purposes of accessing the Internet for online information

This section sought from the respondents the purpose(s) of learners' accessing the Internet for online information. Responses from the surveyed teachers have been distributed on Table 5.44.

Table 5.44: Internet access purpose

N=18

Internet access purposes	Count	Percent
Academic	18	100
Entertainment	9	50
News	0	0
General awareness	0	0
Communication or networking	5	27.8

***Multiple responses received**

Source: Field data (2017)

In this section, respondents were able to select all applicable options for the question; hence, the total frequency is more than 18 and total percentage is above 100. From Table 5.44 above, all the teachers, 18 (100%) indicated that learners were accessing online information for academic purposes; nine of the surveyed teachers representing 50% indicated that, learners accessed online information for entertainment purposes; and five of the surveyed teachers representing 27.8% indicated that learners were accessing online information on the Internet for communication or networking purposes.

5.10.3.2 Situations or reasons that compel learners to access the Internet for academic use

The Internet as indicated earlier has become one of the efficient and reliable means of accessing literature and academic related information. As a result, this section sought from the respondents their learners' purposes of accessing online information for academic work. Majority of the teachers, 10 (55.6%) indicated that learners accessed online information at their school for Information Literacy training. The remaining eight (44.4%) of the teachers were of the view that the academic purpose that compelled learners to access the Internet for online information was class assignments.

5.10.3.3 Subject portal

This section verified from the teachers if their schools had a subject portal. Table 5.45 distributes the responses of participants.

Table 5.45: Subject portal

N=18

Subject portal	Count	Percent
Yes	1	5.6
No	17	94.4
Total	**18**	**100**

Source: Field data (2017)

Reading from Table 5.45 above, 17 (94.4%) of the surveyed teachers indicated that their schools did not have a subject portal for learners and the remaining one (5.6%) indicated that their school had a subject portal for learners.

5.10.3.4 File transfer

This section sought from the teachers if they required their learners to transfer files electronically to them for academic purposes. Responses from the teachers have been shown on Figure 5.20 below.

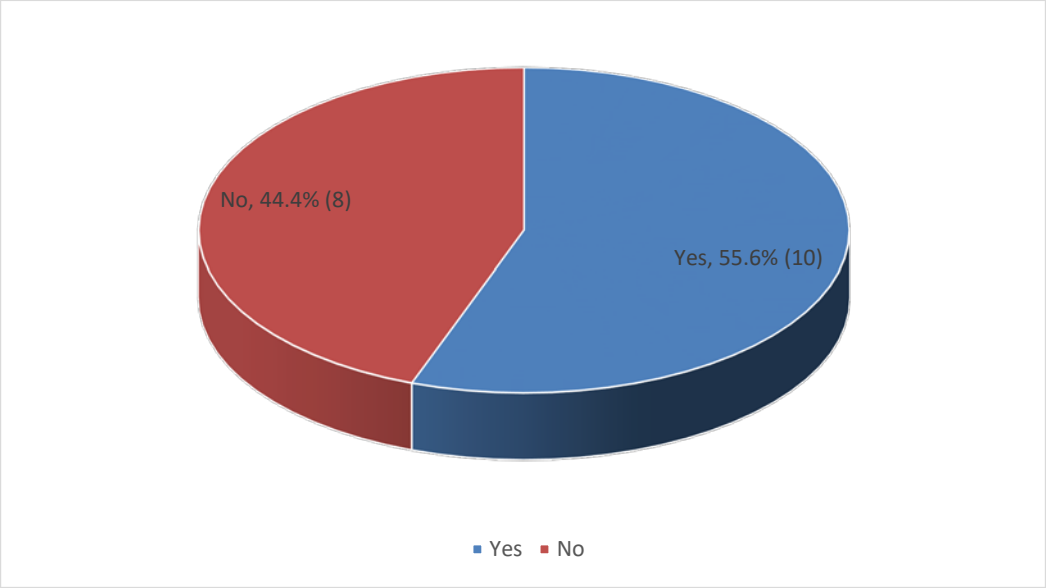

Figure 5.20: File transfer (N=18)

Source: Field data (2017)

Figure 5.20 above shows a distribution of responses from the teachers on whether they required their learners to send files and other assignments to them electronically. The Figure above shows that 55.6% (10) of the surveyed teachers required learners to send them assignments electronically and the remaining 44.4% (8) did not require learners to transfer files to them electronically.

5.10.3.5 Email communication with learners

In this section, respondents were asked to indicate whether they communicate with learners through email. Table 5.46 distributes respondent's responses.

Table 5.46: Email communication with learners

N=18

Email communication	Count	Percent
Yes	7	38.9
No	11	61.1
Total	**18**	**100**

Source: Field data (2017)

From Table 5.46 above, 11 of the teachers representing 61.1% indicated that they were not communicating with their learners via email and the remaining seven, representing 38.9% indicated that they were communicating with their learners through email.

5.10.4 Online searching skills of learners

The purpose of this section was to verify from the surveyed teachers, the online searching skills learners possessed and how they employed those skills when seeking information from the Internet.

5.10.4.1 Internet skills of learners

This section verified from the teachers whether learners possess the needed Internet skills to make their online search yield intended results. Figure 5.21 shows the distribution of participant's responses in terms of learners' possession of Internet skills.

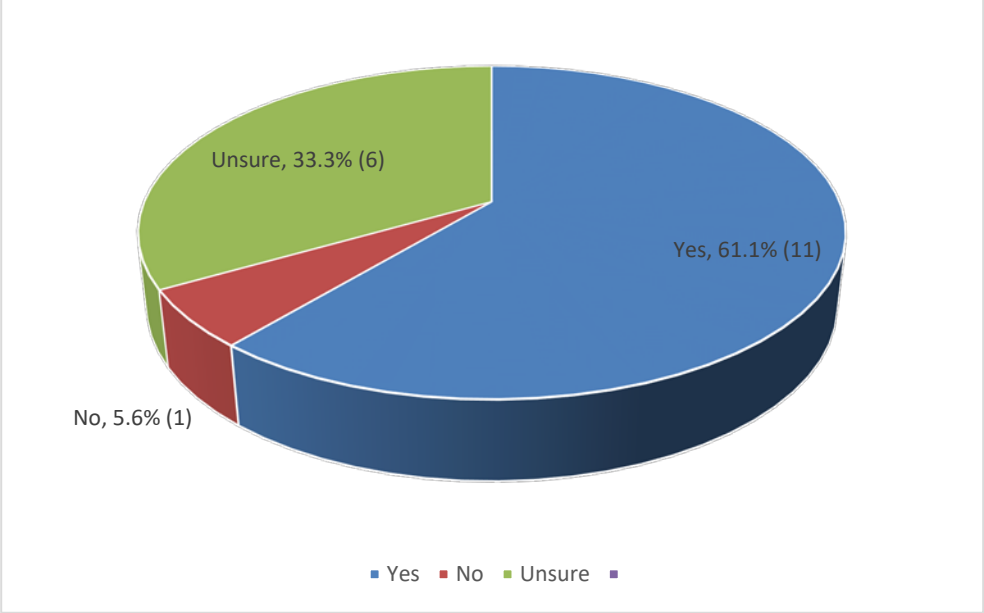

Figure 5.21: Learners' Internet skills (N=18)

Source: Field data (2017)

From Figure 5.21 above, 61.1% (11) of the respondents indicated that learners possessed some peculiar skills needed to search for information on the internet; 33.3% (6) of the respondents were unsure of learners Internet skills and 5.6% (1) of the surveyed teachers indicated that learners did not possess the needed skills in searching for information on the Internet.

5.10.4.2 Formal Internet skills training for learners

This section sought from the teachers if they provided learners with formal ICT and Internet trainings at their institution (school). All the teachers (18 representing 100% of the respondents) indicated that formal Internet and ICT trainings were offered to learners at their schools.

5.10.4.3 Cooperation with librarians on Information Literacy training

This section sought out from the teachers whether they collaborated with the librarian(s) at their school on Internet Information Literacy training. The responses are presented on Table 5.47.

Table 5.47: Collaboration with librarians on Information Literacy training of learners

N=18

Subject portal	Count	Percent
Yes	4	22.2
No	13	72.2
*No response	1	5.6
Total	**18**	**100**

Source: Field data (2017)

Reading from Table 5.47 above, 13 of the surveyed teachers representing 72.2% indicated that they were not collaborating with librarians at their school when it comes to Internet Information Literacy training of learners; and four of the surveyed teachers representing 22.2% indicated that they were cooperating with librarians at their schools on Internet Information Literacy training for learners. One surveyed teacher (5.6%) did not indicate a response.

5.10.4.4 Searching skills that learners are taught at school

Internet users are required to possess certain skills that help them conduct effective online search. This section verified from the surveyed teachers whether they were teaching learners some of these skills at their school. Responses of the surveyed teachers are presented on Table 5.48.

Table 5.48: Searching skills that learners are taught

N-18

Searching skills	**Yes**		**No**		***No response**		**Total**	
	Count	%	Count	%	Count	%	**Count**	**%**
Keyword search	15	83.3	3	16.7	0	0	**18**	**100**
More than one keyword	9	50	9	50	0	0	**18**	**100**
Phrasal search	11	61	6	33.3	1	5.6	**18**	**100**
Searching within results	14	77.8	4	22.2	0	0	**18**	**100**
Searching for similar results	13	72.2	5	27.8	0	0	**18**	**100**
Searching within specific time range	4	22.2	14	77.8	0	0	**18**	**100**

Source: Field data (2017)

5.10.4.4.1 Keyword search

This section verified from the surveyed teachers if they formally introduced learners to 'Keyword' search. Table 5.48 above depicts that, 15 of the surveyed teachers representing 83.3% were teaching learners how to apply 'Keyword' search and the remaining three of the surveyed teachers representing 16.7% were not introducing learners to 'Keyword search'.

5.10.4.4.2 More than one keyword search

This section verified from the teachers if they formally introduced learners to more than one keyword search. According to Table 5.48, half of the respondents (nine teachers representing 50%) were teaching learners how to conduct more than one keyword search and the remaining half, nine (50%) of the surveyed teachers were not introducing learners to more than one keyword search.

4.10.4.4.3 Phrase (quotation) search

This section verified from the teachers if they taught learners how to conduct phrase search. Table 5.48 shows that 11 (61.1%) of the surveyed teachers were teaching learners how to conduct phrase search and six (33.3%) of the surveyed teachers were not introducing learners to phrase search. One teacher (5.6%) did not indicate a response.

5.10.4.4.4 Searching within results

This section verified from the teachers if they were teaching learners how to search within results on the Internet. From Table 5.48 above, 14 of the surveyed teachers representing 77.8% were teaching learners how to search within results on the Internet and the remaining four of them representing 22.2% were not teaching learners how to search within results on the Internet.

5.10.4.4.5 Searching for similar results

This section verified from the teachers if they were teaching learners how to search for similar results on the Internet. Table 5.48 shows that, 13 of the teachers representing 72.2% were teaching learners how to search for similar results on the Internet and the remaining five of them representing 27.8% were not introducing learners to searching for similar results on the Internet.

5.10.4.4.6 Searching within specific time range

This section verified from the teachers if they were teaching learners how to search within specific time range on the Internet. According to Table 5.48, 14 of the teachers representing 77.8% were not teaching learners how to search within specific time range on the Internet; the remaining four representing 22.2% were introducing learners to searching within specific time range on the Internet.

5.10.4.5 Internet information sources that learners are taught

In order to retrieve relevant information and online materials, Internet users are required to consult certain sources of information such as databases, search engine directories, and so on. This section

verified from teachers whether they were introducing learners to some of these online information sources. Table 5.49 below distributes the responses of the surveyed teachers.

Table 5.49: Information sources that learners are taught

N=18

Searching skills	Yes		No		Total	
	Count	%	Count	%	**Count**	**%**
Search engines	15	83.3	3	16.7	**18**	**100**
Meta search engine	6	33.3	12	66.7	**18**	**100**
Directories	5	27.8	13	72.2	**18**	**100**
Academic databases	11	61.1	7	38.9	**18**	**100**

Source: Field data (2017)

5.10.4.5.1 Search engines

This section verified from the teachers if they formally introduced learners to search engines. Responses given by the teachers have been distributed on Table 5.49which shows that 15 (83.3%) of the surveyed teachers were teaching learners how to use search engines to access online information on the Internet; and the remaining three (16.7%) of the surveyed teachers were not introducing learners to the use of search engines to access online information on the Internet.

5.10.4.5.2 Meta-search engines

This section verified from the teachers if they were formally introducing learners to meta-search engines. According to Table 5.49, 12 of the teachers representing 66.7% were not teaching learners how to use meta-search engines for online information retrieval; the remaining six representing 33.3% were introducing learners to the use of meta-search engines for online information retrieval.

5.10.4.5.3 Directories

This section sought from the surveyed teachers whether or not they formally introduced learners to online Directories. Table 5.49 depicts that 13 of the teachers, representing 72.2% were not teaching learners how to use online directories for online information retrieval; the remaining five

representing 27.8% were introducing learners to the use of online directories for information retrieval.

5.10.4.5.4 Academic databases

This section sought from the surveyed teachers if they were teaching learners how to use online academic databases for information retrieval. The data on Table 5.49 above shows that, 11 of the teachers, representing 61.1% were teaching learners how to use online databases to retrieve information on the Internet; the remaining seven representing 38.9% were not introducing learners to the use of online academic databases to retrieve information on the Internet.

5.10.5 Online source evaluation

Evaluating Internet information sources help users to ascertain relevance and reliability of online information. The purpose of this section was to verify from the surveyed ICT teachers whether they were teaching learners how to evaluate and judge online information sources on the Internet before they accessed such information.

5.10.5.1 Teaching learners how to evaluate online sources

This section verified from the respondents if they were teaching learners to evaluate Internet information sources. Responses are presented on Table 5.50 below.

Table 5.50: Teaching source evaluation

N=18

Source evaluation	Count	Percent
Yes	15	83.3
No	3	16.7
Total	**18**	**100**

Source: Field data (2017)

From Table 5.50 above, 15 of the respondents, representing 83.3% indicated that they were teaching learners how to evaluate online information sources and the remaining three surveyed

teachers, representing 16.7% indicated that they did not teach learners how to evaluate information sources on the Internet.

5.10.5.2 Teaching learners the criteria for evaluating online information sources

This section sought from the teachers whether or not they taught learners any of the following online sources evaluation criteria. It is important to note that this section was not limited to the surveyed teachers who indicated they were teaching learners how to evaluate online information sources on the Internet. Thus, all the teachers were required to provide responses. The responses are distributed on Table 5.51 below.

Table 5.51: Information source criteria that learners are taught

N=18

Evaluation criteria	**Yes**		**No**		**Total**	
	Count	%	Count	%	**Count**	**%**
Authority	11	61.1	7	38.9	**18**	**100**
Accuracy or quality	13	72.2	5	27.8	**18**	**100**
Objectivity	12	66.7	6	33.3	**18**	**100**
Currency	13	72.2	5	27.8	**18**	**100**
Coverage	6	33.3	12	66.7	**18**	**100**

Source: Field data (2017)

5.10.5.2.1 Online information sources' authority verification

This section sought from the respondents if they taught learners how to verify the authority of an information source (e.g. author's credentials) before they retrieved such information on the Internet. Table 5.51 shows 11 (61.1%) of the respondents indicated that they were teaching learners how to verify the authority of an online information source on the Internet; and the remaining seven (38.9%) of the surveyed teachers indicated that they were not teaching learners how to evaluate the authority of an online information source on the Internet.

5.10.5.2.2 Evaluation of accuracy or quality of online information

This section sought from the respondents if they were teaching learners how to evaluate the accuracy or quality of information sources before they retrieved online information on the Internet. According to Table 5.51, 13 (72.2%) of the surveyed teachers indicated that they were teaching learners how to evaluate the accuracy or quality of an online information source on the Internet; the remaining five (27.8%) were not teaching learners how to evaluate the quality of online information on the Internet.

5.10.5.2.3 Evaluation of online information sources' objectivity

This section sought from the surveyed teachers whether they taught learners how to evaluate the objectivity of online information on the Internet. Table 5.51 depicts that, 12 of the teachers representing 66.7% were teaching learners how to evaluate the objectivity of online information. The remaining six teachers, representing 33.3% were not teaching learners how to evaluate the objectivity of online information on the Internet.

5.10.5.2.4 Evaluation of currency of online information

This section sought from the teachers if they were teaching learners how to evaluate the currency of an online information source on the Internet. Responses of the teachers have been distributed on Table 5.63 below. Table 5.51 above shows that, 13 of the teachers representing 72.2% were teaching learners how to evaluate the currency of an Internet information source and the remaining five teachers, representing 27.8% were not teaching learners how to evaluate the currency of an online information source on the Internet.

5.10.5.2.5 Evaluation of coverage online information

This section sought from the surveyed teachers if they were teaching learners how to evaluate the coverage of an online information source. According to Table 5.51, 12 of the teachers representing 66.6% were not teaching learners how to evaluate the coverage of an online information source on the Internet. The remaining six teachers, representing 33.3% were teaching learners how to evaluate the coverage of an online information source.

5.10.6 Learners' Internet information seeking challenges

This section verified from the surveyed teachers the challenges learners encountered in their quest to access online information at school. Table 5.52 shows the distribution of responses of the ICT surveyed teachers.

Table 5.52: Learners' online information seeking barriers

N=18

Barriers	Count	Percent
Slow Internet connection	16	88.9
Internet access restrictions	12	66.7
Lack of support and training	0	0
Information overload	2	11.1
Lack of Internet skills	0	0

***Multiple responses received**

Source: Field data (2017)

In this section, respondents were able to select all applicable options for the question; hence, the total frequency is more than 18 and total percentage is above 100. From Table 5.52 above, 16 of the teachers representing 88.9% were of the view that, slow Internet connection was the main challenge learners faced when accessing the Internet for online information; 12 of the teachers, representing 66.7% indicated that Internet access restrictions was the challenge learners faced in their quest to access information on the Internet; and two representing 11.1% mentioned information overload as learners' challenge when accessing online information at school.

5.10.7 Satisfaction level on Internet infrastructure and training for learners

In this section, the surveyed teachers were asked to rate their level of satisfaction in relation to Internet infrastructure and training they rendered learners at their schools. The responses are distributed on Table 5.53 below.

Table 5.53: Satisfaction level on Internet infrastructure and training for learners

N=18

Services	Very satisfied		Satisfied		Neutral		Dissatisfied		Very dissatisfied		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%	**Count**	**%**
Internet training	3	16.7	8	44.4	5	27.8	2	11.1	0	0	**18**	**100**
Internet speed	0	0	4	22.2	6	33.3	7	38.9	1	5.6	**18**	**100**
Number of workstations	1	5.6	0	0	9	50	5	27.8	3	16.7	**18**	**100**
ICT infrastructure management	0	0	4	22.2	6	33.3	7	38.9	1	5.6	**18**	**100**

Source: Field data (2017)

5.10.7.1 Satisfaction level on Internet training for learners

Table 5.53 shows the distribution of responses in terms of teachers' level of satisfaction on Internet training they rendered learners at their schools. From Table 5.53 above, eight of the respondents, representing 44.4% and five of the respondents, representing 27.8% indicated that they were 'Satisfied' and remained 'Neutral' with their level of satisfaction in relation to the Internet training they rendered learners at their schools. Moreover, three of the respondents, representing 16.7% indicated that they were 'Very satisfied' with the Internet training they provided learners at their school. Conversely, two of the teachers representing 11.1% were 'Dissatisfied' with the Internet training they rendered learners at their school.

5.10.7.2 Level of satisfaction on Internet speed

Table 5.53 also shows the distribution of responses in terms of teachers' level of satisfaction on Internet speed at their schools. Accordingly, the Table 5.53 shows that seven (38.9%) of the surveyed teachers were 'Dissatisfied' with their school's Internet speed; six (33.3%) were 'Neutral' with the satisfaction of their school's Internet speed; and four (22.2%) of the surveyed teachers were 'Satisfied' with the speed of their school's Internet. The remaining one (5.6%) of the surveyed teachers was 'Very Dissatisfied' with their school's Internet speed.

5.10.7.3 Satisfaction level on the number of workstations available for learners

Table 5.53 shows the distribution of responses in terms of teachers' level of satisfaction on the number of workstations available for learners to access the Internet at their schools. Nine (50%) of the surveyed teachers remained 'Neutral; with the satisfaction of the number of workstations available for learners to access the Internet at their school; and five (27.8%) of the surveyed teachers were 'Dissatisfied' with the workstations available for learners to access online information on the Internet. Three (16.7%) of the respondents were 'Very dissatisfied' and the remaining one (5.6%) of the teachers was 'Very satisfied' with the number of workstations available for learners to access the Internet at their school.

5.10.7.4 Satisfaction level on ICT infrastructure management

Table 5.53 again depicts the distribution of responses in terms of teachers' level of satisfaction on the maintenance and management of ICT infrastructure at their school. The Table shows that seven of the teachers, representing 38.9% and six of the respondents, representing 33.3% indicated they were 'Dissatisfied' and 'Neutral' with the satisfaction of the maintenance and management of ICT infrastructure at their schools respectively. Besides, four of the respondents, representing 22.2% indicated that they were 'Satisfied' with the management of ICT infrastructure at their schools. Conversely, one of the teachers representing 5.6% was 'Very dissatisfied' with the maintenance and management of ICT infrastructure at school.

5.10.8 Possible solutions to learners' online information seeking challenges

This section used an open-ended question in seeking from the teachers some of the possible solutions to the challenges they had identified in relation to learners' online information seeking. The multiple responses of the teachers are summarised as follows:

a) Majority of the respondents (13 teachers representing 72.2%) mentioned the provision of additional workstations and computer laboratories as solutions to learners' Internet access challenges.
b) Twelve of them representing 66.7% called for an increase in the Internet bandwidth of their school.

c) Six of the teachers representing 33.3% were of the view that, support from their school's Management was key in addressing these challenges.
d) A teacher (T12) proposed that, ICT lessons should be extended to include weekends.

5.11 Results from the interviews with the Heads of ICT departments

All the surveyed high schools for this study had a head for their ICT department. The role of the ICT head includes management of the ICT infrastructure of the school, supervising ICT teachers, planning the timetabling of ICT lessons, and the use of the ICT laboratories among others. The results generated from the interviews with the heads of the ICT departments are presented in the order of how the questions were asked during the interview.

5.11.1 General background information

A semi-structured interview schedule was used to interview the heads of ICT departments of the three surveyed schools and the schedule included 31 questions. Questions 1 to 3 covered background information related to the ICT department heads that took part in the study. Questions 4 to 9 verified information on learners Internet accessibility at their school. Questions 10 to 12 focused on learners' online information needs. Questions 13 to 24 looked into learners Internet searching skills and training. Questions 25 and 26 focused on learners' evaluation of Internet sources. Questions 27 to 29 commented on the challenges of Internet access and training that learners faced at school. Questions 30 and 31 were on Internet / ICT policies at school and other comments. Three Heads of ICT departments participated in the interviews.

5.11.2 Biographical data of respondents

This section presents the gender as well as the length of service of the heads of ICT departments who participated in the survey. For the purposes of anonymity and confidentiality, the three respondents were assigned codes: HICTD1, HICTD2, and HICTD3. Table 5.54 below presents the responses to questions 1 and 3.

Table 5. 54: Gender and length of service

N=3

Interviewee	Gender	Length of service
HICTD1	Male	Three years
HICTD2	Male	Two years
HICTD3	Male	Seven years

Source: Field data (2017)

Table 5.54 shows that all the respondents were males. The HICTD1 and HICTD2 had headed their departments for three years and two years respectively. On the other hand, HICTD3 had been the head of the department for seven years.

5.11.3 Learners access to the Internet at school

This section probed the interviewees on how learners were able to access the Internet at school. HICTD1 indicated that learners were able to access Internet on the Internet infrastructure at their school on "shift basis" due to the limited workstations they had available at their school. HICTD2 asserted that learners were able to access the Internet at their school whenever there was an instructor available to assist learners, since their school had an Internet infrastructure that provides Internet "24/7", thus, all the time. HICTD3 indicated that learners were able to access Internet through the Internet infrastructure at their school.

5.11.4 Internet connection infrastructure

Question 5 asked the interviewees to indicate the type of Internet connection they had at their school. HICTD1 indicated that their school was connected to the Internet through a cable broadband connection. According to HICTD2, their school had a wireless (WiFi) Internet connection. HICTD3 indicated that there was a wireless (WiFi) and LAN Internet connectivity at their school from a "cloud Internet provider". The interviews with the HICTDs also revealed the number of computers available for learners use as pertained in the surveyed schools; these are presented on Table 5.55 below.

Table 5.55: Computers available for learners' use at school

School	Number of computers available		Computers with Internet access	
	Desktops	*Laptops*	*Desktops*	*Laptops*
St. Louis SHS	40	10	27	10
Effiduasi SHS	50	45	13	45
Simms SHS	52	6	33	6

Source: Field data (2017)

Table 5.55 indicates that Effiduasi SHS had the highest number of computers (95 computers) available for learners. Since the school had a WiFi connection, all the laptops available at Effiduasi SHS were able to connect to the Internet through the WiFi features built in the laptops. The interview revealed that only 26% (13 out of 50) of the desktop computers available for learners' use were connected to the Internet. Table 5.55 further reveals that, there were 52 desktop computers and 6 laptop computers available to the learners at Simms SHS. All the laptops were connected to the Internet; however, about 37% (19 out of 52) of the desktop computers available at Simms SHS were not connected to the Internet. Hence, the learners could access the Internet from the remaining 33 desktop computers.

Moreover, Table 5.55 shows that the total number of computers available for learners' use at St. Louis SHS were 50. Again, all the laptops were able to connect to the Internet. However, 32.5% (13 out of 40) of the desktop computers available for learners' use at the school were not connected to the Internet. This attests to the fact that learners could only access Internet from 37 computers at the school.

5.11.5 Learners' Internet access satisfaction

This section verified from the respondents whether in their opinion learners had enough time to access the Internet at school. HICTD1 was of the opinion that, learners did not have enough time to access the Internet at school due to the limited Internet facilities at the school. He further asserted that having only one Internet "lab for 42 classes…is not easy for a class to access the Internet once in a week". HICTD2 asserted that "not all learners" had enough time to access the Internet. He

was of the view that lack of space and workstations hindered learners' access to the Internet. HICTD3 explained that learners did not have enough time to access the Internet at school since learners were allowed to access the computer laboratory for Internet "during school hours…and there are other lessons during school hours" that learners had to undertake.

5.11.6 Learners' Internet access place

Question 8 sought from the respondents where learners were able to access the Internet at school. All the HICTDs indicated that the only place learners were able to access the Internet at school was the schools' computer laboratories. A further probe on why learners were not accessing the Internet through their mobile phones revealed that mobile phones were not permitted to be used by learners at school. For instance, HICTD2 opined that the WiFi radius at his school extended to some of the classrooms and other parts of the school but learners were not allowed to use gadgets such as mobile phones and tablets; hence were not able to access the Internet outside the computer laboratory.

5.11.7 Learners Internet access periods

Question 9 asked the respondents to indicate the periods that learners were able to access the Internet at school. HICTD1 and HICTD3 indicated that learners were able to access the Internet "during class hours…when they have ICT" lessons. Although HICTD2 corroborated that learners accessed the Internet during class hours, he further opined that learners at his school were allowed to access the Internet after school and during weekends provided there was an instructor to supervise them.

5.11.8 Learners' purpose(s) of seeking online information

This section found out from the HICTDs, learners' purpose(s) of seeking Internet information. All the HICTD indicated that learners accessed online information for both academic and personal purposes. HICTD1 and HICTD2 indicated that, they restricted learners' Internet use to academic purposes but learners always had their way to access the Internet for entertainment as well.

On learners' academic purpose(s) for accessing the Internet, HICTD1 and HICTD2 indicated that learners accessed online information for both Information Literacy training and class assignments. In addition to these, HICTD3 indicated that learners also accessed the Internet for examination purposes.

5.11.9 Subject Portal

Question 12 asked the HICTDs whether they had subject portals at their schools. All the respondents indicated that, there was no online subject portal at their schools.

5.11.10 Learners online searching competencies

Question 13 asked respondents to highlight the effectiveness of learners' online information search. HICTD1 was of the view that not all the learners were able to conduct effective online search. He opined that "some of the learners are smart…but in general, no!", thus the smart learners were able to conduct effective online search. To corroborate, HICTD2 and HICTD3 indicated that not all learners were able to conduct effective online search. HICTD2 was of the view that learners "who have interest in Internet…are smart in it" and therefore were able to conduct effective online search. On the Internet skills level of learners, HICTD1 and HICTD3 rated their learners average. HICTD2 on the other hand rated his learners above average.

5.11.11 Locating, gathering and selecting online information by learners

This section verified from the respondents how learners located, gathered, and selected online information. According to the respondents (all the HICTDs), majority of the learners located and gathered online information through the use of Google, thus, learners first point of accessing online information was through Google search engine.

5.11.12 Internet Information Literacy training for learners

Question 17 asked the HICTDs whether they offered formal Internet training to learners. All the respondents indicated that they were offering formal Internet training to all learners at their

schools. They further opined that, the ICT syllabus for high school learners prescribed the teaching of Internet as an academic topic and they followed the syllabus religiously.

On the usefulness of the Internet training, all the respondents indicated that the training had been very useful. For example, HICTD2 asserted that, learners who earlier "could not use the mouse…now browse on the Internet effectively" because of the formal training they offered learners.

5.11.13 Collaboration with librarian on Information Literacy training for learners

This section verified from the HICTDs whether they were collaborating with their librarians in regard to Information Literacy training of learners. HICTD1 and HICTD3 indicated that their departments did not collaborate with their librarians when it comes to Information Literacy training. HICTD2 also revealed that such cooperation did not exist between his department and the librarian and the reason he assigned was that, their library had no Internet connectivity.

5.11.14 Searching skills and tools that learners are taught

This section further probed into the searching skills and tools that learners were taught at school. HICTD1, HICTD2, and HICTD3 indicated that they were teaching learners how to conduct keyword search and more than one keyword search. They indicated that they were not teaching learners advanced search options and the reason assigned was that, they were providing academic instruction to learners so they taught learners based on what the curriculum had prescribed.

5.11.15 Introducing learners to academic databases and directories

Question 24 asked the respondents whether they introduced learners to online academic databases and directories. All the respondents indicated that they introduced learners to online academic databases. However, none of them was teaching learners how to access online academic directories. Their responses also revealed that learners were not introduced to meta-search engines at school.

5.11.16 Evaluation of Internet sources

This section verified from the respondents if they were teaching learners how to re-check and verify Internet sources. HICTD2 and HICTD3 indicated that, they were teaching learners how to evaluate online sources. On the other hand, HICTD1 was of the view that, they were teaching learners how to evaluate online sources; however, they had "not been hammering on it". He further posited that the evaluation criteria they often taught learners were verifications of authority and accuracy.

5.11.17 Learners Internet information seeking challenges

The interviewees were asked to indicate some of the challenges learners faced in their quest to access online information. Responses given by HICTD1 and HICTD3 attested that learners faced challenges of Internet access restrictions due to limited workstations and a challenge of slow Internet speed. HICTD2 also highlighted the challenges of limited workstations and slow Internet access. For example, he opined, "60 classes using 25 working computers is a challenge" in accessing the Internet effectively. He further indicated that learners lacked the skills in formulating search queries and this affected their online information behaviour. On the solutions to these challenges, all the respondents were of the view that, additional computer laboratories with more workstations, and increase in the Internet bandwidth of their schools would help in solving these challenges. HICTD3 further suggested that learners should be provided with personal laptops so they could have enough time to access the Internet.

5.11.18 Level of satisfaction on Internet infrastructure and training for learners

This section verified from the respondents, their level of satisfaction on Internet infrastructure and training at school. HICTDI and HICTD2 indicated that, they were satisfied with the Internet training they offered learners at school but they remained neutral on their level of satisfaction on the Internet infrastructure at their school. HICTD3 was satisfied with both their school's Internet infrastructure and the Internet training they were offering learners.

5.11.19 Internet use policy

This section investigated whether or not the surveyed schools had Internet use policies for learners. Both HICTD2 and HICTD3 indicated they were having Internet use policies at the time of gathering data. HICTD1 indicated that they had an Internet use policy at their school, although, the policy was “not comprehensive”.

5.12 Results from the Interviews with the librarians

Each of the surveyed high schools for this study had a librarian. The role of the librarian includes management of the library facility of the school; cataloguing and classifying library materials; providing reference services to learners, teachers, and staff of the school; provision of budgetary and acquisition services of the library among others. The results generated from the interviews with the librarians are presented in the order of how the questions were asked during the interview.

5.12.1 General background information

A semi-structured interview schedule was used to interview the librarians of the three surveyed schools and the schedule included 27 questions. Questions 1 to 3 covered background information related to the librarians that took part in the study. Questions 4 to 7 verified information on learners Internet accessibility at their school. Questions 8 to 10 focused on learners’ online information needs. Questions 11 to 21 looked into learners Internet searching skills and training. Questions 22 and 23 focused on evaluation of Internet sources. Questions 24 to 27 commented on the challenges of Internet access and training at school. Three librarians participated in the semi-structured interviews.

5.12.2 Biographical data of respondents

This section presents the gender as well as the length of service of the librarians who participated in the survey. For the purposes of anonymity and confidentiality, the three respondents were assigned codes: LIB1, LIB2, and LIB3. Responses to questions 1 and 3 are presented on Table 5.56 below.

Table 5.56: Gender and length of service

N=3

Interviewee	Gender	Length of service (years)
LIB1	Male	4
LIB2	Female	27
LIB3	Male	8

Source: Field data (2017)

Table 5.56 above shows that, both LIB1 and LIB3 were males and LIB2 was a female. LIB1 had served as a librarian for four years at the school, LIB2 had served for 27 years, and LIB3 had served as librarian for eight years at their respective schools.

5.12.3 Learners access to the Internet at the library

All the respondents indicated that, learners were not able to access the Internet at the library since the libraries did not have computers and Internet access. They further indicated that, the only place learners could access the Internet at school was the computer laboratory. None of the respondents could indicate whether learners had enough time in accessing the Internet at school.

5.12.4 Learners' purpose(s) of seeking online information

This section found out from the librarians if learners consulted them on their online information needs and the nature of the online information needs that learners sought from them. LIB1 and LIB3 asserted that learners "sometimes" consulted them on their online information needs and most of these needs were focused on academic purposes. LIB2 indicated that learners were not consulting her on their Internet information needs; however, she believed that learners were accessing the Internet at school for academic purposes. She further explained that, learners were aware that the library had no Internet, thus "the reason learners are not consulting me on their Internet information needs".

5.12.5 Learners' online searching competencies

This section verified from the librarians the skills that learners possessed to help them conduct effective online searches. All the librarians were not able to indicate whether learners possessed the skills to conduct effective online searches. They could neither explain how learners gathered and selected information from the Internet. However, LIB1 and LIB3 asserted that, majority of learners that consulted them on their Internet information needs were not skilled in Internet search so they advised the learners to access Google for their online information needs.

5.12.6 Internet training for learners

Question 14 asked the librarians to indicate whether they offered formal Internet training to learners. All the respondents indicated that they did not offer formal Internet training to learners at their school. They were of the view that, their libraries had no computer or Internet access and the curriculum of their school was not structured for them to offer Internet Information Literacy training to learners.

5.12.7 Cooperation with ICT department on Information Literacy training for learners

This section verified from the librarians whether there existed collaboration between them and the ICT departments in regard to Information Literacy training of learners. All the librarians indicated such cooperation did not exist between them and their schools' ICT departments. They were of the view that lack of Internet connection at the library and the structure of the school's curriculum were some of the reasons such cooperation did not exist. LIB1 further posited that, he "can train students very well on Internet search when the library is connected to the Internet" and given the opportunity.

5.12.8 Learners' Internet information seeking challenges

Respondents were asked to indicate some of the challenges learners faced in their quest to access online information. Respondents were not able to indicate comprehensively the challenges that learners faced when accessing the Internet for online information. However, LIB1 and LIB3 were of the view that Internet access restrictions and slow Internet speed were challenges at their

schools. They highlighted the need to provide additional workstations and Internet bandwidth at their schools to help in solving these challenges. HICTD3 further suggested that learners should be provided with laptops so they could have enough time to access the Internet.

5.12.9 Level of satisfaction on Internet Infrastructure and Training

This section sought from the librarians, their level of satisfaction on Internet infrastructure and training at school. None of the librarians was able to indicate their level of satisfaction on Internet training at their school. They were of the view that the ICT department was better positioned to do that. They were however, neutral on the level of Internet infrastructure at their schools. LIB1 further asserted that, the Internet infrastructure at his school was “on course”.

5.13 Summary of the chapter

Chapter 5 presented the results of the study. The data for the study were collected from two sources: self-administered questionnaires were used on learners as well as ICT teachers and semi-structured interviews with the HICTDs and librarians. A total of 322 learners and 18 ICT teachers completed and returned questionnaires from the three surveyed high schools. Three HICTDs and three librarians were individually interviewed by the researcher. Results from the semi-structured interview supported the findings from the questionnaire and these results have sufficiently answered the key research questions of the study. The next chapter discusses the findings of the study.

CHAPTER SIX: DISCUSSION AND INTERPRETATION OF FINDINGS

6.1 Introduction

The purpose of the study was to investigate the “Internet-based information behaviour of high school learners in Ashanti region of Ghana”. The study surveyed three high schools: St. Louis SHS, Effiduasi SHS, and Simms SHS. These three schools were public schools that had the required infrastructure and structures needed for the current study as described in Chapters One and Four. Chapter Six discusses and interprets the results presented in Chapter Five. The study collected and analysed both quantitative and qualitative data in addressing the objectives and

questions of the study. The study also employed Wilson's (1999) model of information behaviour and Ellis' (1989) behavioural model of information seeking strategies as its theoretical framework.

Questionnaires were used to collect quantitative data from high school learners and ICT teachers. Semi-structured interviews were also used to collect qualitative data from heads of ICT departments and librarians. The SPSS version 21 was used for the quantitative data analysis and the qualitative data were analysed using thematic content analysis. The literature review components of the study are linked with the study results in this chapter and this process was guided by the research questions of the study as well as the two models employed as the theoretical framework of the study. This chapter also reproduces appropriate and relevant data presented in Chapter Five to ensure completeness of the discussion and interpretation of the results. The study had six research questions:

1. Where and when do high school learners access the Internet?
2. What are the specific purposes for which high school learners search information on the Internet?
3. How do high school learners gather and select information from the internet?
4. How do high school learners evaluate and judge their online information sources?
5. What roles do librarians play in facilitating high school learners to acquire Internet information literacy skills?
6. What are the challenges faced by high school learners when searching for information from the Internet?

The discussion as presented in this Chapter begins by addressing the concepts of the study, namely information needs and information seeking within the setting of Internet-based information behaviour. Chapter Six also discusses the results of the study that were presented as themes and categories in Chapter Five. The discussion of results therefore:

- starts with issues related to learners' Internet accessibility;
- then proceeds to learners' online information needs;
- learners' gathering and selection of online information;
- learners' evaluation of online information;
- learners' online information behaviour barriers; and

- role of librarians towards the development of learners' information literacy.

6.2 Demographic profile of surveyed learners

As already indicated, both Wilson's (1999) model of information behaviour and Ellis' (1989) behavioural model of information seeking strategies were used as theoretical framework for this study. It was important to describe learners (respondents) - the 'information users' in this study - since the first core variable of Wilson's (1999) model (see section 2.3 of Chapter Two) consists of the 'information user'. The learners who participated in the survey were described based on gender, age, school affiliated to, residential status, and field of study.

6.2.1 General information

The study surveyed a total number of 322 learners. The responses from the research data revealed that more than half of the surveyed learners, 168 (52.2%) were females and the remaining 154 (47.8%) were males. In regard to the age of surveyed learners (see section 5.2.1.2 of Chapter Five), more than two-thirds of the 322 respondents, 219 (68%) were between the ages of 16 and 18, compared to 103 (32%) respondents that were 19 years and above.

In terms of learners' residential status, majority of the learners, 292 (90.7%) were boarding students residing at their school's campus and the remaining 30 (9.3%) were residing outside the school (see section 5.2.1.4 of Chapter Five). This attests to the fact that majority of the learners could only accessed the Internet at school since learners in boarding facilities were not permitted to leave the school premises when schools were in session. None of the learners surveyed at St. Louis SHS was residing outside the school's campus and it was revealed that Effiduasi SHS had the highest number of learners, 70% (21 out of 30) residing outside their school's campus.

Out of the 322 surveyed learners, the General Arts programme had the highest number of participants with 128 (39.8%) surveyed learners, followed by the Visual Arts / Home Economics programme with 94 (29.2%) participants; Business programme with 62 (19.2%) surveyed learners and Science programme with 38 (11.8%) participants in that order.

6.3 Where and when do high school learners access the Internet?

The research data on learners' Internet accessibility that were presented in Chapter 5 (see sections 5.3.1 to 5.3.9) are discussed in this section. Sugihartati and Harisanty (2014:25) opined that, most high school learners preferred searching for information on the Internet. In order to collect and interpret the data in relation to Internet accessibility of the surveyed learners, the questionnaire asked respondents to describe where and when they were able to access the Internet. This was complemented by the questionnaires that elicited responses from the ICT teachers on where and when learners were able to access the Internet as well as the interviews with the HICTDs and librarians. Wilson's (1999) model of information behaviour guided the discussion on the findings related to the Internet accessibility of respondents who participated in the study.

6.3.1 Learners Internet access at school

An attribute of Wilson's (1999) model of information behaviour refers to 'demands on information system' by the information user. In this case, learners are the information users and information system is the Internet. A study by Krige (2009) found that most high school learners accessed the Internet through schools. The responses from the learners (see sections 5.3.1 and 5.3.2 of Chapter 5) indicated that, all the surveyed schools had Internet connectivity and all the learners were able to access the Internet at school. The ICT teachers (see section 5.10.2.1 of Chapter 5), HICTDs (see section 5.11.3 of Chapter 5), and librarians (see section 5.12.3 of Chapter 5) corroborated that learners were able to access the Internet at school. This confirms earlier studies that found (Malliari et al., 2015; Borca et al., 2015; Shiweda, 2013) that most high school learners were able to access the Internet at school.

Although learners were able to access Internet at school, the study found that the number of computers with Internet access for learners' use were not adequate.

6.3.1.1 Learners Internet access place at school

Nkomo (2009:5) asserted that the infrastructure for Internet access in educational institutions is primarily located in the institutional libraries, computer laboratories, and offices. The responses from the participants (see section 5.3.7 of Chapter 5) indicated that, the only place the surveyed

learners could access the Internet at school was the computer laboratory. The ICT teachers (see section 5.10.2.4 of Chapter 5), HICTDs (see section 5.11.6 of Chapter 5), and librarians (see section 5.12.3 of Chapter 5) confirmed the responses of the surveyed learners that Internet access for learners was restricted to the schools' computer laboratories. This study therefore confirms Grimus and Ebner's (2016:14-15) study that found that learners' Internet use in Ghana high schools is officially limited to the institutions' computer laboratories.

In contrast, a study by Shiweda (2013) found that, most learners were accessing the Internet from their school libraries. Similarly, Lawrence and Miller (2000:30) had found in their study that the "Internet had become an essential component of every library, allowing it to function as a gateway to vast reserves of dispersed information". However, the findings from this study points to the fact that, learners from the surveyed schools in the Ashanti region of Ghana had no access to the Internet at their school libraries. This was verified from the librarians (see section 5.12.3 of Chapter 5) who indicated in the interviews that none of the libraries in the surveyed schools had Internet connectivity.

The findings of this study therefore contradict Shiweda's (2013) study that found that, a significant number of high school learners were accessing the Internet from their school libraries. The findings of Shiweda's (2013:61) study among high school learners in Namibia revealed that, more than 45% of high school learners were accessing the Internet from their school libraries. It was revealed in this study, however, that none of the surveyed high school learners were able to access the Internet at the surveyed schools' libraries due to lack of Internet connectivity at the libraries.

6.3.1.2 Learners Internet access period at school

Studies have shown that, learners were constantly accessing the Internet for online information and others (Montagni et al., 2016; Madden et al., 2013). It was evident from the responses of the learners that (Figure 5.2), a significant number of the learners (136 learners, representing 42.2%) were able to access the Internet only during school hours. The interviews with the HICTDs corroborated that learners were able to access the Internet at school, only when they had ICT lessons or an available instructor to supervise them at the computer laboratory. HICTD1 and HICTD3 indicated during the interviews that the computer laboratories, which were serving as the

only place learners could access the Internet, were closed after school hours and during weekends. This finding is in sharp contrast with a study by Rice et al. (2015) that found that most high school learners accessed the Internet several times within a day.

A study by Akom, Asante and Adjei-Frimpong (2016:21) concluded that, the interest level of high school learners in Ghana accessing the Internet had increased over time, however, Internet access restrictions as revealed by this study makes it difficult for learners to access the Internet effectively. The findings from this study have revealed that learners were not having enough time to access the Internet at school (see section 5.10.2.3 of Chapter 5). Majority of the ICT teachers (77.8%) and all the HICTDs indicated that learners were not having enough time to access the Internet at school. Studies in the developed countries (Herout, 2016; Atwood, 2016; Rideout, 2015; Malliari et al., 2015; Borca et al., 2015) however, reveal that learners had enough time to access the Internet at school. Nevertheless, learners in Ghana as revealed by this study were having limited time in accessing the Internet at school due to limited Internet infrastructure.

This study therefore could not concur Rideout's (2015:15), Borca et al.'s (2015:52) and Rice et al.'s (2015:756) studies that found that, majority of learners were accessing the Internet several times, at least for three hours in a given day at school.

6.3.2 Learners Internet access place outside school

Aside the school, learners have other places that they could access the Internet. Studies have shown that, learners were able to access the Internet at home, public libraries, community halls, or public places and so on. The responses from the learners (Table 5.10) who took part in this study revealed that, majority of them (248 learners, representing 77%) were able to access the Internet when they were out of school at the Internet cafes. This corroborates a study by Tayo, Thompson, and Thompson (2016) in Nigeria that found that most learners were accessing the Internet through the Internet cafes.

The responses from the learners further revealed that when learners were out of school, 61.2% (197) of the learners were able to access the Internet from their homes; 16.2% (52) were able to access the Internet from relatives or friends' place. It could be deduced from the findings that, over

38% (123) of the learners who were accessing the Internet at home were probably accessing it through their mobile phones since these learners had indicated that they did not have a computer connected to the Internet at their homes. The results further revealed that Simms SHS has the highest number of learners, 72.6% (82 out of the 113 surveyed learners from Simms SHS) who were able to access the Internet at home, followed by St. Louis with 64.9% (61 out of the 94 surveyed learners from St. Louis SHS) learners and Effiduasi SHS with 47% (54 out of the 115 surveyed learners from Effiduasi SHS) learners who could access the Internet from their homes in that order. Clearly, a school in a small town (Simms SHS) had the highest number of learners who were able to access the Internet at their homes compared to a school in the city (St. Louis SHS) and a major town school (Effiduasi SHS). A possible reason for this was that learners in Ghana high schools were not necessarily residents of the areas that their schools were situated. Most learners in Ghana were schooling at schools that were situated far from where they resided due to the boarding systems available in Ghana high schools.

Moreover, the results of the study revealed that over 62% (202) of the learners had computer at home and about 60% (121) of those with computers at home had their computers at home connected to the Internet. In sum, more than 37% (121) of the learners who participated in this study had computers connected to the Internet at home hence these learners were residing in homes that were fully connected to the Internet.

This study concurs with a study by Czerniewicz and Brown (2013) in South Africa that found that, some learners reside in homes that were connected to the Internet and learners whose families could not afford Internet at home, accessed the Internet from relatives / friends' homes and other public places. Similarly, the study confirms Akom, Asante and Adjei-Frimpong's (2016:21) study that found that about 40% of learners in Ghana lived in homes connected to the Internet.

In contrast to more than 37% of learners living in homes connected to the Internet as revealed in this study, Montagni et al.'s (2016:3) study among high school learners revealed that, more than 70% of learners in the developed countries had their homes connected to the Internet. In the USA, studies have shown that homes of high school learners were the highest-rated Internet access point for the learners since most of these homes were connected to the Internet and learners thus had

more time accessing the internet at home without much restrictions (Atwood, 2016; Rideout, 2015; Rice et al., 2015); In Italy, Borca et al.'s (2015:52) study among high school learners found that over 90% of learners had personal computers at home with majority of them accessing the Internet from them every day. In Greece, a study by Malliari et al. (2015:273) revealed that, more than 85% of high school learners had access to the Internet in their homes.

These findings which are mainly from the developed world show that more learners in the advanced countries have enough Internet connectivity and access at their homes as compared to learners from developing countries such as Ghana. A possible reason for this lies in the cost and affordability of the technology as well as limited Internet infrastructure (Akom, Asante and Adjei-Frimpong, 2016) in the developing countries. It had been found that learners from poor homes especially in the developing countries were not able to afford Internet connectivity at home (Czerniewicz and Brown, 2013) and this is a possible reason that majority of the surveyed learners in this study were not having access to the Internet at home.

6.3.3 Learners possession of Internet gadgets

Studies have shown that majority of high school learners have smart phones that they use to access the Internet (Atwood, 2016:93; Coombes, 2009:36). This attests to the fact that mobile phones have increased learners' access to the Internet (Grimus, 2015:113). Although, some learners possessed gadgets such as laptops, personal computers, tablets and so on that were connected to the Internet, Madden et al. (2013:1-2) opined that, smart phone usage and adoption among learners had "increased substantially and mobile access to the internet is pervasive". The findings from this study as indicated by the respondents (Table 5.8) show that, majority of the learners (279 learners, representing 86.6%) owned smart phones that were connected to the Internet and this corroborated an earlier study by Grimus and Ebner (2016) which found that more than 80% of high school learners in Ghana had mobile phones connected to the Internet. Besides, 27.3% (88) of them had laptops, 22.6% (73) owned notepads or tablets connected to the Internet, and 14.3% (46) had personal computers connected to the Internet.

A study by Atwood (2016:93) revealed that, more than half of high school learners use their smart phones as their primary source of Internet and UNISA Bureau of Market Research (2012:7) had

earlier revealed that, about 90% of learners in South Africa had access to the Internet through their mobile phones. Shiweda's (2013:61) study among high school learners also found that, majority of learners accessed the Internet using cell phones. The findings of this study confirm these earlier studies (Atwood, 2016; Malliari et al., 2015; Rideout, 2015, Rice et al., 2015; Borca et al., 2015; Shiweda, 2013; Madden et al., 2013) among high school learners that found that, majority of high school learners owned smart phones that they used to access the Internet.

Although most of the learners who took part in the study indicated they owned smartphones connected to the Internet, responses from the interviews with the HICTDs revealed that, learners in Ghana were not permitted to use their mobile / smart phones at school thus learners leave the gadgets at home whenever they go to school. This confirms a finding by Grimus and Ebner's (2016) study among high school learners in Ghana which indicated that authorities in Ghana high schools did not allow learners to use mobile or smart phones at schools. This result attests to the fact that learners, especially those residing in the boarding schools, could only access the Internet at their schools' computer laboratories since they were not able to access the Internet via their smart phones when schools were in session.

6.3.4 Learners Internet exposure age

A study by Czerniewicz and Brown (2010:367) revealed that, most learners were exposed to the Internet at a very young age. The responses from the learners in this study (section 5.3.3) show that, more than two-thirds of the learners (241 learners, representing 74.8%) were exposed to the Internet at the age of 14 years and 15 years. This shows that majority of the learners started using the Internet when they got to high school. It is important to note that, none of the learners was exposed to the Internet before the age of 10 years. This finding is in contrast with the findings of Herout, (2016) among learners in Czech Republic as well as Malliari et al. (2015) among high school learners in Greece that found that learners were exposed to the Internet at early stages of their lives, mostly at primary school.

A cross tabulation (Table 5.7) of learners' responses on Internet exposure age and learners' access to computer as well as Internet at home showed that majority of the learners, 81.8% (99 out of 121), who had computer with Internet connection at home were exposed to the Internet before age

15 years. It was revealed that learners who did not have access to a computer connected to the Internet at home were not exposed to the Internet early. Clearly, the findings of this study showed that access to Internet at home influences learners' Internet exposure age since learners who reside in homes connected to the Internet were exposed to the Internet earlier than learners who resided in homes that were not connected to the Internet.

6.4 What are the specific purposes for which high school learners search information on the Internet?

This section discusses the research findings on learners' purposes of accessing the Internet for information that were presented in Chapter 5 (see sections 5.4.1, 5.4.2, and 5.4.5). Akar (2015:36-37) opined that, learners were the most frequent and widespread users of the Internet and they used the Internet to access knowledge and information. Learners' responses to the questionnaire were used to interpret the data regarding their purposes of accessing the Internet to satisfy their information needs. This was complemented by the responses from the ICT teachers to the questionnaires as well as the interviews with the HICTDs and librarians. Wilson's (1999) model's second attribute is 'information need' of the information user and this attribute guided the discussion of the research findings related to the online information needs of high school learners. In this context, the information users are the high school learners involved in the current study.

Studies have shown that, learners access online information for academic and personal purposes (Rahardjo et al., 2016; Kotz, 2016). A study by Lo and Ahmadian (2014:53) among high school learners found that, learners were accessing online information mainly for educational purposes. On the contrary, Malliari et al.'s (2014:276) study among high school learners revealed that more than half of learners were accessing online information only for personal reasons. The findings from this study, however, depicts that the surveyed high school learners were accessing online information for different purposes including academic and personal. This study therefore shows that both Lo and Ahmadian's (2014) as well as Malliari et al.'s (2014) findings are valid based on Wilson's (1999) model that was used as a theoretical base for the study. The reason is, the model highlights that users access information for different purposes including both personal and academic purposes.

A study by Akar (2015:48) as well as Rahardjo et al.'s (2016:33-38) study among high school learners found that learners' Internet use for academic purpose was 'low'. However, this study found that accessing online information on the Internet for academic purpose by learners was not 'low'. A possible explanation for increase in learners' access to online information for academic purpose lies in the fact that the surveyed learners were mainly accessing the Internet at school. Particularly, all the surveyed ICT teachers and HICTD indicated that learners' purpose of accessing online information on the Internet was academic. Besides academic purposes, the responses from the learners and corroborated by the ICT teachers (see section 5.10.3.1 of Chapter 5) and HICTDs (see section 5.11.8 of Chapter 5) highlighted that, most learners were also accessing online information for entertainment (63%) purposes. It was also clear that learners were rarely accessing online information for general awareness (14.9%) purposes.

6.4.1 Online information needs for academic purposes

Wilson (1999:251) highlighted that, "information-seeking behaviour arises as a consequence of a need perceived by an information user" and these needs compel the user to make demands on information systems – in this case the Internet – to satisfy his/her need. The use of the Internet to search for information by learners is largely prompted by their academic activities such as assignment, examinations, and research (Soyemi and Mojisola, 2015:81). Learners of today have been found to rely increasingly on online information to get their academic work and assignments done and the availability of search engines to "locate relevant information is thus felt more essential now than ever" by learners (Kadli and Hanchinal, 2015:62).

Learners provided data about their quest to access online information to satisfy their academic needs (see section 5.4.2 of Chapter 5). It was evident from the responses that most learners (164 respondents, representing 50.9%) accessed online information for class test and examination purposes. Almost half of the learners (157 respondents, representing 48.8%) were also accessing online information for the purposes of class assignments. This could be attributed to the fact that, most of the learners as indicated by the surveyed ICT teachers were required by their teachers to access online information for specific class assignments. These findings concur earlier findings that revealed that, the academic activities that compelled learners to seek online information were

assignments and examinations (Buabeng- Andoh and Yidana, 2015; Anyaoku, Nwafor-Orizu and Oguaka, 2015; Soyemi and Mojisola, 2015; Zickuhr, Rainie and Purcell, 2013).

The responses from the learners also revealed that, a number of them (110 respondents, representing 34.2%) were accessing online information for Information Literacy training. To corroborate, the surveyed ICT teachers (see section 5.10.3.2 of Chapter 5) as well as the HICTDs (see section 5.11.8 of Chapter Five) confirmed that, majority of learners searched online information on the Internet for Information Literacy training purpose. The quest for learners to access online information for Information literacy purpose is not highlighted in many studies and literature. The reason many learners as well as ICT teachers and HICTDs who participated in this study indicated Information Literacy training as the purpose of learners accessing online information could be attributed to the fact that, most of the learners were only allowed to access Internet at school during ICT lessons (see Figure 5.2 and section 5.11.7 of Chapter Five).

Results of the study also showed that, about 85% (273) of the learners had email addresses (see section 5.4.5 of Chapter Five), yet, it was evident from their responses that majority of the learners who had email addresses were not communicating with their teachers through email. In sum, 28.9% (93) of the surveyed learners indicated they were communicating with their teachers via email. Interestingly, 33% (106) of the surveyed learners indicated that they were transferring files electronically to their teachers (see section 5.4.4 of Chapter Five). This could be explained that the learners were transferring files not necessarily through their email and this was confirmed by the HICTD1 and HICTD3 during the interviews. Both HICTDs revealed that, they made learners transfer files electronically without using email addresses during ICT lessons. For example, HICTD3 indicated that they had a LAN Messenger on their Internet infrastructure at school and learners were using it to transfer files during ICT lessons.

6.4.2 Frequency of seeking online information for specific information needs

High school learners are constantly accessing information on the Internet due to its advantage of providing faster access and extensive information (Montagni et al., 2016; Sugihartati and Harisanty, 2014). The responses from the learners which were corroborated by the ICT teachers

and HICTDs depict that, academic purposes compelled learners to seek online information on the Internet frequently.

It was evident from the results of this study that the next most frequent situation that compelled learners to access online information was 'Entertainment' with 203 (63%) of learners indicating that they were accessing online information on the Internet for entertainment purposes. An earlier study by Adeyemo (2016) had found that, frequent Internet use purpose among learners was communication and the results from this study showed that learners' interest in accessing online information on the Internet for communication purposes was also high. Particularly, 149 (46.3%) of the surveyed learners indicated that they were accessing online information for communication or networking purposes.

The findings of the study confirm that the surveyed high school learners had online information needs and these needs compelled them to access the Internet to satisfy those needs (Wilson, 1999:251).

6.5 How do high school learners gather and select information from the internet?

Searching for online information includes gathering and selecting desired as well as relevant information on the Internet and different skills are needed for this process for a successful search activity (Koesten, Kacprzak and Tennison, 2016). This section discusses the research findings on how learners were selecting and gathering online information. It is worth noting that selecting and gathering of information is a key element of information behaviour. As explained by 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 gathering and selection process of information on the Internet involves users' ability to know where to go, how to get there in the shortest way and how to interpret the several forms in which information is presented to achieve and construct knowledge (Wu and Tsai, 2005). This section considers how learners were selecting and gathering information on the Internet; the Internet sources they accessed; the tools they employed for online information gathering and the skills as well as strategies learners employed to gather and select online information. Wilson's (1999)

model's 'information seeking behaviour' attribute guided the discussion on learners' gathering and selection of online information since this attribute looks into ways that information users are able to access information.

6.5.1 How learners go about accessing the Internet for online information

Wilson (1999:263) asserted that information-seeking behaviour is "particularly concerned with the variety of methods people employ to discover, and gain access to information resources" such as the Internet to access information. An important requirement for accessing online information is the information users' ability to access the Internet or using an intermediary to access the Internet on his or her behalf for the online information he or she desires. It was on this backdrop that learners were asked to indicate how they were accessing the Internet for online information.

Earliar studies highlighted that majority of learners were accessing the Internet for online information by themselves (Combes, 2009; Atwood, 2016). The results from this study attest to the fact that most of the surveyed high school learners had the needed skills to access the Internet themselves. The surveyed learners were asked through the questionnaire to indicate whether they possessed the needed skills to access the Internet for online information and the responses from the learners (see section 5.6.1 of Chapter 5) indicated that 84% of them believed they had the skills to access the Internet themselves. The ICT teachers (see section 5.10.4.1 of Chapter Five) revealed that, most of the learners were able to access the Internet themselves for online information.

Furthermore, learners were asked to indicate their agreement or otherwise to the statement that they were skilled in Internet use; the responses from the learners (see section 5.6.5.2 of Chapter Five) depicted that over 76% (247) of the surveyed learners agreed that they were skilled in Internet use. These findings concur earlier studies (Akom, Asante and Adjei-Frimpong, 2016; Kwabia, 2015) among high school learners in Ghana that found that most high school learners wereable to access the Internet by themselves.

Furthermore, Montagni et al. (2016) and Malliari et al., (2014) studies had found that more than 80% of learners were accessing the Internet for online information themselves. The current study also confirmed that majority of the surveyed learners (215 learners, representing 67%) were

accessing the Internet themselves for online information. The results of the study through a cross tabulation of learners' age and how they accessed the Internet for online information showed that young learners were more able to access the Internet by themselves as compared to older learners. The study (Table 5.13) found that about 80% (35 out of 44) and 84% (72 out of 86) of the learners who were 16 years and 17 years respectively were able to access the Internet by themselves. However, just 50% (29 out of 58) and 42% (19 out of 45) of learners who were 19 years as well as 20 and above respectively were able to access the Internet themselves. This attests to the fact that age of learners had influence on learners' ability to access the Internet for online information. A possible explanation to this could stem from the fact that the young learners were exposed to the Internet at an earlier age than the older learners as revealed by the study.

Moreover, the study found that learners who needed assistance to access the Internet turned to either their colleagues or intermediaries such as teachers and librarians. Clearly, the results showed that young learners preferred seeking assistance from their teachers than their colleagues when accessing the Internet. In contrast, the findings as presented on Table 5.16 revealed that older learners preferred seeking assistance from their colleagues than their teachers when accessing the Internet for online information.

6.5.2 Learners' online information sources

Wilson (1999) asserted that, information users' in their quest to seek information, may access more than one information source to satisfy their information needs. This shows that accessing information on the Internet may differ among users since information users may either consult only one source or many sources for online information. In order for the learners to satisfy their online information needs, they needed to access sources of information on the Internet. Some of the online information sources are subject portals, academic databases, search engines, directories among others. The surveyed learners indicated through their responses to the questionnaire (see section 5.4.3 of Chapter Five) that they had not been introduced to subject portals at school and their schools had no subject portals; hence lacked the skills to access them. HICTDs (section 5.11.9) and the ICT teachers (5.10.3.3) confirmed the responses of the learners by indicating that, their schools had no subject portal.

Reading from sections 5.11.15 and 5.10.4.5.4 of Chapter Five, all the HICTDs and over 60% of the ICT teachers indicated that, they were teaching learners how to access online information from academic databases. Ironically, 96% (309) of the surveyed learners indicated that they had not been taught how to access online academic databases on the Internet (see section 5.6.8.4 of Chapter Five); hence were not accessing online information from them. It was likewise evident from the responses that learners were not accessing information from online directories. The reason for this could stem from the fact that learners were not taught how to access online directories. This was verified by the ICT teachers, and HICTDs who indicated they were not teaching learners how to access online directories (see sections 5.10.4.5.3 and 5.11.15 of Chapter Five).

To confirm this, learners in their responses indicated that they had not been taught how to use directories and Meta search engines. Almost all the learners, 99.1% (319) of them indicated that, their teachers were not teaching them how to access meta-search engines (see section 5.6.8.2 of Chapter Five). Similarly, 99.7% (321) of the learners again highlighted that; they had not been taught how to use directories in accessing online information at school (see section 5.6.8.3 of Chapter Five). The ICT teachers corroborated the responses of the learners by highlighting that, more than 66% (12) of them were not teaching learners how to use meta-search engines to access online information on the Internet (see section 5.10.4.5.2 of Chapter Five). Similarly, over 72% (13) of the ICT teachers were not teaching learners how to use online directories to access information on the Internet (section 5.10.4.5.2 of Chapter Five).

Most learners have been found to access online information on the Internet through search engines such as Google (Kolowich, 2011). The results from this study highlighted that (see section 5.5.2 of Chapter Five), almost all of the learners, 98.1% (316) of them, ‘Always’ or ‘Sometimes’ used search engines as their main source of online information. The ICT teachers and HICTDs confirmed that the most preferred online information source of learners was Google. Earlier, studies had found that the most used online source by learners was search engine and the most preferred search engine among them was Google (Furi and Balog, 2016; Asher, Duke, and Wilson, 2013; Julien and Barker, 2009) and this study is in agreement with these findings.

Another preferred source of online information highlighted by the learners was organisational websites. It was clear from their responses that most of them accessed organisational websites for online information. The findings from this study therefore depicts that, learners were accessing multiple online information sources that were relevant to them acquiring online information to satisfy their information needs. Clearly, the most frequent accessed online information sources by learners as highlighted by the respondents were search engines and organisational websites.

6.5.3 How learners select information on the Internet

Information users employ variety of methods in order to access information (Wilson, 1999:263). Sales, Pinto and Fernández-Ramos (2016:4) asserted that the search for information on the Internet is a task that has changed a great deal in recent years due to the "huge growth in the Internet which allows the user to retrieve thousands of resources almost instantaneously". The manner in which an information user gathers and selects information from the Internet has a link to the user's online skills. Learners were asked to describe how they were selecting information from the Internet and majority of the learners (180 learners, representing 56%) mentioned that, they frequently ('Always' and 'Often') selected online information that corresponded with their opinion. This confirms Tsai, Hsu and Tsai's (2012:246) study that found that, learners accessed the Internet to seek information of their own interests.

It was also evident from the results that very few of the surveyed learners (29 learners, representing 9%) were selecting and retrieving results (online information) that were different from the subject contents and methodology of what their teachers had taught them at school in relation to the content of the online information. This attests to the fact that learners mostly searched for online information that were similar to what their teachers had taught them at school. It was not out of place for learners to frequently access online information similar to what their teachers had taught them at school because the surveyed learners had indicated earlier that they were accessing online information for academic purposes such as tests, assignments and so on. The need to access online information that corresponds with what they had been taught at school was therefore to prepare them for their tests and assignments. It is also important to highlight that, about 36% (115) of the learners (see section 5.5.7 of Chapter 5) were 'Always' selecting online information that brought new thoughts to their minds.

Moreover, most learners highlighted that they were accessing online information that were readily available (see section 5.5.9 of Chapter 5). This situation seems to support Kotz's (2016:1163) assertion that most learners prefer to access information through the Internet; however, some of them end up selecting 'anything' they find on the Internet. The responses from the learners who were frequently accessing readily available online information depicts that, they rarely conducted an effective online search, thus, were selecting whatever results that were readily available. A cross tabulation (Table 5.18) of the surveyed learners who accessed readily available information on the Internet and gender showed that more female learners were accessing readily available information from the Internet than male learners.

6.5.4 How learners' gather information on the Internet

Gathering information on the Internet requires the use of personal knowledge and skill (Olorunfemi and Janneke, 2012). This process requires the Internet-based information seeker to search through the Internet in order to acquire for selection the relevant information that would satisfy his or her information need (Soyemi and Mojisola, 2015:87). Examination of results found when searching for online information helps information users to gather relevant information on the Internet. It was revealed from the responses that, majority of learners examined the results found when searching for online information. Since learners had indicated earlier that, their most preferred source of online information was search engine - especially Google – it was important to investigate how they examined results that sources such as search engines provided them during the online search process. Savolainen (2015:618) maintained that there seems to be no evidence that high school learners are expert searchers, or that their search skills have improved with time since learners tend to have challenges "in selecting appropriate search terms, and research into internet use has consistently identified similar problems".

It is important to note that search engines currently provide automated query expansion to assist users with their searches, but the suggested queries are often out of context and based on popular searches, rather than on the specific information need of searchers (Leeder and Shah, 2016). Dalal, Kimura and Hofmann (2015:668) had indicated in their study that Google differs from other search engines and discovery tools, however, learners:

> often lack understanding of the differences between Google and a discovery tool, not grasping that underneath the Google-like smoke screen is a complex set of databases, indexes, catalogs, media, and journals where format matters, full text is not guaranteed, and results are returned by relevance instead of popularity.

In the quest of the study to understand how learners gathered online information on the Internet, learners were asked to indicate how often they examined only results found on the first page. Majority of the surveyed learners highlighted that, they only examined results produced on the first page (see section 5.5.10.2 of Chapter Five) during their online search process. Aula, Khan and Guan (2010) had found earlier that learners were overwhelmed by the amount of results provided by web search engines' queries and it was evident from learners' responses that only few of them (91 respondents, representing about 30%) 'Always' examined results produced on other pages during their online search process (see section 5.5.10.3 of Chapter Five) partly as a result of the number of results provided them.

It has been found also that learners concentrate on top listed results when conducting online search although there are a number of results offered to them (Church, et al., 2008). The results of the current study confirmed that most of the surveyed learners were relying on the top listed results. Learners over-reliance on results produced on the first pages during their online search process could be a reason they were frequently examining results from the top list (see section 5.5.10.4 of Chapter Five). These findings confirmed the reason more than half of the learners indicated that they end online searching the moment results they deemed 'relevant' were found (see section 5.5.10.5 of Chapter Five). Clearly, learners lacked the understanding of how search engines such as Google works (Dalal, Kimura and Hofmann, 2015), thus, their only concern was to gather any available results that were produced by search engines from their search queries.

6.5.5 Learners' Internet searching skills

Information users gather and select information using techniques or methods that enable them "discover and gain access to information resources such as the Internet" (Wilson, 1999:263). Learners are required to manipulate the new and extraordinary resources that the Internet and other

ICTs have made available for their work through the acquisition of competence and capacity to seek out information that is based on knowledge, abilities, and skills from the Internet (Sales, Pinto and Fernández-Ramos, 2016:3). Information retrieval as a skill to retrieve information from the Internet resources is as important as the information itself and it has been revealed that each individual is not proficient enough to retrieve the desired piece of information from the Internet or other online resources "as efficiently as others may be" (Singh and Mahapatra, 2016:477). A key to the development of Internet searching skills is Information Literacy training since such programmes train learners in identifying the online information they need, locating and selecting the right information on the Internet as well as using it effectively in solving problems and meeting their information needs (Lanning and Turner, 2010).

In order to ascertain the Internet searching skills of learners, the study sought from the learners whether or not they had received formal training on the use of the Internet at school. The study also verified from the ICT teachers, HICTDs, and librarians whether they were offering formal Information Literacy training to learners. The learners highlighted that, they were receiving formal Internet training at school. It was clear from the responses that about 94% (301) of the learners had received formal Internet training (section 5.6.2). The ICT teachers and HICTDs confirmed that Information Literacy instruction was incorporated in their educational curriculum. This supports IFLA's Guidelines on Information Literacy for Lifelong Learning (2010:27) which prescribes the need for schools to develop an information literacy programme that is part of the curricula. Earlier studies had also found that, many schools had incorporated Information Literacy programmes into their curriculum (Sandercock, 2016; Malliari et al., 2014; Liu and Sun, 2012).

DaCosta (2011:36) argued that "information literacy skills are core to lifelong learning and need to be developed to equip students to manage information in whatever format it is presented". The study again sought from the learners how the Information Literacy training offered at their school had helped them improve their online searching skills. About 97% (291) of the respondents who had received such training indicated that the training had been helpful (see section 5.6.3 of Chapter Five). The teachers and HICTDs were of the view that, most of the learners were able to access the Internet because of the Information Literacy training offered them at school. The revelations of the teachers and HICTDs in relation to the IL training were valid since the Internet exposure

age indicated by the surveyed learners showed that most of the learners started using the Internet when they got to their current schools (see sections 5.3.3 and 6.3.4 of Chapter Five). Clearly, this finding confirms that IL training helps in the development of skills needed for locating and retrieving online information (Sandercock, 2016; Malliari et al., 2014).

6.5.5.1 Basic Information Literacy skills

Some basic IL skills are required for online information retrieval. Some of these skills include the information users' ability to use the computer; ability to access the Internet; ability to formulate search queries, and so on. It is worth noting that, poor IL skills negatively affect learners' online information access and retrieval (Otoide, 2015). The quest for this study to ascertain learner's basic IL skills compelled the study to asked learners to agree or disagree with some statements that point to their IL skills.

From the responses provided by the surveyed learners (see sections 5.6.5.1 to 5.6.5.5 of Chapter Five), it was clear that more than 75% (247) of them perceiced themselves to possess the needed skills in computer and Internet use. Based on these responses, it was not surprising that majority of the learners indicated that they were skilled in online navigation. A cross tabulation (Table 5.22) analysis of learners' Internet competencies and host schools showed that all the surveyed learners at St. Louis SHS perceived themsevelves to be skilled in Internet use, 96 learners out of the total 115 learners surveyed from Effiduasi SHS (representing 83.5%) perceived themselves to be skilled in Internet use and Simms SHS had the least proportion with 81 learners out of the total 113 learners from the Simms SHS (representing 71.7%) perceiving themselves to possess the needed skills to access the Internet.

Although, majority of the learners highlighted that they were skilled in search query formulations, it was however evident from their responses that only few of them perceive themselves to be skilled in the knowledge of database structures.

6.5.5.2 Searching steps employed by learners

The growing trend of exploring scientific knowledge on the Internet has motivated a number of studies to highlight examination of learners' online searching strategies (Tsai, Hsu and Tsai, 2012:246). The study inquired from learners through some statements how they were conducting online search for information on the Internet. It is an established fact that searching online information requires the formulation of search queries (Sales, Pinto and Fernández-Ramos, 2016; Asher, Duke, and Wilson, 2013). Responses from the learners (see sections 5.6.6.1 to 5.6.6.5 of Chapter 5) depicted that, majority of them used words from their questions as search terms. Particularly, search query formulation process entails a lot and one of the safest ways to formulate a search query is to use words from your problem or question as search terms and the results of the study clearly showed that learners were doing so.

Learners had highlighted in their responses that, approximately half of them (165 respondents, representing 51%) 'Always' used words from their questions as search terms. In general, more than 80% (280) of the learners were mostly formulating search queries through the use of words from their problem of investigation or questions. Using words from a topic or question as search terms is not bad; however, a study by Georgas (2014) had found that learners did not examine their topics to identify keywords and related terms when conducting online search, instead relied heavily on the language of their research topics which could affect the results of their searches negatively. This study through the responses from the learners confirms that, learners were heavily relying on the language of their topics or questions as search terms.

It is already established that the most learners preferred to start their online information search by doing a Google search. According to King (2007:26), the reasons for learners starting their information seeking with a Google search "were because they believed Google to be legitimate, of excellent quality, most comfortable to use" as compared to other information sources; thus, Google seemed more credible and "the place to be" so they start their online search by typing words into Google search box.

The responses provided by the learners also showed that, majority of them were starting their online search by typing words into search engines. More than half of the learners indicated that

their online search starts with them typing words straight into search engines. This was not surprising because Asher, Duke, and Wilson (2013:473) had found in their study that, learners treat "almost every search box like a Google search box, using simple keyword searches" in majority of their searches on the Internet. The responses provided by the learners confirmed that they start their online search by typing words into any search box they come across on the Internet, thus treating every search box like a Google search box.

Moreover, majority of the learners (223 respondents, representing about 70%) were regularly ('Always' and 'Often') formulating sub-questions for their online search. It was clear that only about 11% (34) of the learners rarely formulated sub-questions when conducting online searches. The formulation of sub-questions helped learners to gather and select more relevant online information for their information needs. The use of sub-questions by learners regularly was a positive searching strategy and it is advisable for most sub-questions to be listed down in order not to forget any of them when searching for information on the Internet. It is also important to list search terms down since not all search queries or terms could be typed into a search box when searching for online information on the Internet at the same time. The analysis on Table 5.27 showed that more female learners, 73% (123 out of the 168 female participants) frequently ('Always' and 'Often') formulated sub-questions when searching for information on the Internet than male learners with a proportion of 65.5% (100 out of the 154 male participants).

To ensure accuracy of a search and retrieval of relevant materials from the Internet, information users are required to conduct online searches in so many ways – such as changing search terms and replacing them with synonyms and so on – and it is advisable to list them down. However, less than half of the learners (150 respondents, representing 47%) asserted that, they regularly listed down their search terms first whenever they were conducting online search. It was evident from the responses that more than 12% (39) of the learners had never listed down their search terms before conducting an online search. The search strategies employed by the learners as indicated in their responses confirmed they lacked the competence and skills to search and retrieve information on the internet effectively (Borca et al., 2015; Kadli and Hanchinal, 2015).

The use of advanced search options help in conducting effective online search. It helps users to effectively gather and select relevant information from the Internet. A key advantage of the use of advanced search options is that, it defines the limits of the search. According to Sales, Pinto and Fernández-Ramos (2016:4), an effective online information search requires the competence of clarifying and defining the limits of the search profile. It is important to note that advanced search options help in the clarification and definition of search profiles. From the learners' responses, it was established that more than 60% (200) of the learners were not ('Rarely' and 'Never') using advanced search options when conducting online information search. It was alarming to note that, 45% (144) of the learners had 'Never' used the advanced search option.

The HICTDs confirmed during the interviews that, they were not teaching the learners how to use the advanced search option. HICTD2 explained that, the advanced search option was not provided for in the ICT curricula hence the reason they were not introducing learners to it. It could therefore be deduced from the responses of the HICTDs that, majority of the learners did not know the use of the advanced search option. This confirms Malliari et al.'s (2014) study which found that most learners rarely used advanced search options.

The quest of the study to ascertain the host school that had most learners' applying advanced search options when accessing online information compelled the study to analyse the same on a cross tabulation. The results on Table 5.28 showed that Effiduasi SHS had the highest proportion of learners, 27% (31 out of the 115 learners surveyed from Effiduasi SHS) who frequently applied advanced search ('Always' and 'Often') option when searching for information on the Internet, followed by Simms SHS with 19.5% (22 out of the 113 learners surveyed from Simms SHS) participants who were applying advanced search options and St. Louis SHS with 14.9% (14 out of the 94 learners surveyed from St. Louis SHS) participants who were using advanced search options when accessing online information on the Internet in that order.

6.5.5.3 Searching skills and techniques employed by learners

Sales, Pinto and Fernández-Ramos (2016:4) noted that, knowledge and command of information competencies are fundamental for searching effectively since the acquisition of these competences enable searchers to achieve the "skills needed to know, on the one hand, how to define and structure

an information need, by identifying the key concepts and the terms that describe the search profile", This is done in order to determine what kind of information is needed and what for as well as how to manage the "strategies, techniques and tools for formulating the search and selecting suitable resources". This shows that locating and retrieving information on the Internet involves the construction of efficient and sophisticated search strategies and these require the acquisition of relevant skills (Dempsey and Valenti, 2016; Dalal, Kmura and Hofmann, 2015; Malliari et al., 2014).

The most frequent and simplest technique that learners apply when conducting an online search is the use of a "keyword" search (Malliari et al., 2014). Although this search technique seems the most popular searching skill of learners, Dempsey and Valenti (2016:204) found that learners whose keywords were inappropriate often failed to consider synonyms or more formal terms that likely would appear in college-level sources, and rather searched "colloquial or informal terms that are part of their everyday vernacular". The results from the respondents (see section 5.6.7.1 of Chapter Five) highlighted that, half of the learners (161 respondents, representing 50%) 'Always' used a keyword search when searching for information on the Internet. The surveyed learners through their responses clearly highlighted that, the use of a keyword search was very popular among them since those who were not applying a keyword search were less than 16% (49 learners). This confirms Malliari et al.'s (2014) study that found that the use of keyword search is the most frequently used technique among learners.

The use of more than one keyword search is a search technique that combines a number of keywords during an online information search on the Internet for better results. Dempsey and Valenti (2016:204) had found that, despite using specific techniques, learners seemed not to use their keywords as part of an effective search strategy and thus "just keyword-hopped from one term or phrase to the next without trying to combine search terms for better results". The responses from the learners (see section 5.6.7.2 of Chapter Five) confirmed that learners were not frequently combining more keywords for online search as compared to the use of a keyword for online search.

The use of phrasal search is a technique that is used to clarify and define limits of an online search. The most common way of using phrasal search is by applying quotation marks on the search terms.

An earlier study by Dempsey and Valenti (2016) had found that, learners were not applying phrasal search when retrieving information on the Internet. Dalal, Kmura and Hofmann (2015:670) had also found that, learners who engaged in phrasal search exhibited improper use of quotes. Clearly, the responses from the respondents confirmed that, majority of the learners were not applying phrasal search when searching for information on the Internet. It was evident from the responses (see section 5.6.7.3 of Chapter Five) that, less than 30% (82) of the learners were frequently ('Always' and 'Often') applying phrasal search.

'Searching within results' and 'searching for similar results' are advanced search techniques that assist in effective retrieval of relevant information on the Internet. Malliari et al. (2014) had found in their study among high school learners that, learners rarely applied these advanced techniques when conducting online search. The responses from the learners confirmed that, they did not often apply these two advanced techniques when conducting online search. Their responses highlighted (sections 5.6.7.4 and 5.6.7.5) that, less than 36% (116) and less than 45% (144) of the learners were regularly ('Always' and 'Often') applying 'searching within results' and 'searching for similar results' techniques respectively when conducting online information search on the Internet.

Searching within specific time range is a search technique and information users who possess this skill used it to limit their search results to a range of time. An advantage of this technique is that it helps in retrieving results by date specified by the user during the searching process. It is also sometimes applied in a manner to ensure accuracy and currency of results. The responses from the learners showed that less than 30% (91) of them were not applying ('Rarely' and 'Never') this technique when searching for online information. It was therefore evident from the responses that most surveyed learners limited their search by date in order to ensure currency.

Clearly, the results of the study highlighted that most of the learners were not applying the strategies and techniques needed to conduct effective online search on the Internet. Particularly, the surveyed learners have shown through their responses to the questionnaire that they over rely on the use of a keyword search technique at the exclusion of other advanced search techniques. It is evident from the study that the ICT teachers responsible for the Information Literacy instructions at the surveyed high schools were not teaching the learners how to apply these advanced search

techniques. The surveyed ICT teachers and HICTDs confirmed that they were teaching the learners only the basic search techniques such as a keyword search. Evidently, the syllabus for Information Literacy instruction for high school learners in Ghana did not prescribe the teaching of advanced search techniques, thus, the reason cited by the ICT teachers and HICTDs for not introducing learners to these techniques.

These findings on the searching skills of learners through the responses of the participants confirm earlier findings that, learners lacked the skills and experience necessary to construct efficient and sophisticated search strategies (Kuiper et al., 2008; Aula, Khan and Guan, 2010; Nkomo et al., 2011; Dempsey and Valenti, 2016; Leeder and Shah, 2016). The reason for learners lacking the skills and experience needed to construct efficient search strategies stem from the fact that they had not been taught how to construct efficient and sophisticated search strategies. The results of the study evidently showed that most of the learners were relying on their own methods and strategies to retrieve online information on the Internet since they were not being introduced to the advanced search options that were needed for them to acquire the skills necessary to conduct efficient and sophisticated online search on the Internet.

However, the results of the study have confirmed that the surveyed learners consulted many online information sources in their quest to seek online information on the Internet and also employed diversity of methods in order to "discover, and gain access" to the Internet for online information (Wilson, 1999:263). The study further confirms Wilson's (1999:263) assertion that information searching behaviour is a sub-set of information-seeking which pays particular attention on the interactions concerning the information users – in this case the learners - and computer-based information systems, of which the Internet is a type.

6.6 How do high school learners evaluate and judge their online information sources?

Reliable information sources are important to look for when using the Internet. The online information sources we can trust are when it is established that the author, creator, or sponsor of an Internet information source has done due diligence to ensure that the online information presented and the claims made "are accurate, reasonable, and substantiated with quality evidence, we tend to deem the source reliable" (Damico and Panos, 2016:275). Paglieri et al. (2014:176)

opined that, information provided by an Internet source needs to be assessed by users such as learners on “the basis of several criteria: most notably, its content and the trust one has in its source” in order to ensure reliability.

This section considers how learners were evaluating online information sources and the criteria they employed when evaluating online sources. Ellis' (1989) behavioural model of information seeking strategies’ ‘differentiating’ and ‘verifying’ features guided the discussion on learners’ evaluation of online information sources. The ‘differentiating’ feature of Ellis’ (1989) model looks into how information seekers filter the sources of information in relation to the “nature and the quality of the material” accessed on the Internet (Ellis, 1989:179). The “verifying” feature is defined as checking the information and sources found for accuracy and errors (Ellis, Cox and Hall, 1993:364-365).

In order to collect and interpret the data in relation to evaluation of online information sources by the surveyed learners, the questionnaire asked respondents to indicate whether they were evaluating online information sources when accessing online information on the Internet. The questionnaire further sought to find out from the learners if they were applying the evaluation criteria recommended by Alexander and Tate (1999) – author, accuracy, coverage, objectivity, and currency - when accessing online information on the Internet. This was complemented by the questionnaires that elicited responses from the ICT teachers on whether they were teaching learners how to evaluate online sources as well as the interviews with the HICTDs and librarians.

Earlier studies have highlighted the need to evaluate Internet information sources (Georgas, 2014; Malliari et al., 2014; Shiweda, 2013). In order to ascertain whether learners were evaluating online information sources; the surveyed learners were asked to indicate the same. The responses from the learners indicated that, majority of the learners were evaluating online information sources, although, those who were not evaluating online information sources were significant. Responses of the participants clearly showed that, nearly 70% (224) of the learners were checking and verifying online information sources. Moreover, the cross tabulation as depicted on Table 5.33 showed that female learners (168 female respondents, representing 52.2%) were evaluating online information sources more than male learners (154 male respondents, representing 47.8%).

The study further verified from the ICT teachers whether or not they were teaching or introducing learners to evaluation of online sources. It was clear from the ICT teachers' responses that, majority of them were teaching learners how to evaluate online information sources when accessing information on the Internet. Majority of the ICT teachers (83%) highlighted that, they were teaching learners how to evaluate online information sources (section 5.10.5.1).

The HICTDs corroborated from the interviews that, learners were introduced to evaluation of online sources at school. All the HICTDs indicated that, they were teaching learners the need to evaluate online information sources since not all information found on the Internet were deemed accurate and useful. It could be deduced from these findings that, the 30% (98) of learners who were not evaluating online information sources might have found themselves in the classes of the three ICT teachers (about 17%) who were not teaching learners how to evaluate online information sources.

Although, most of the teachers were teaching learners how to evaluate online information sources, it seems from the responses that, much was not being done on the subject of source evaluation. As indicated by HICTD1, they were "not hammering on it". It was clear from the findings of the interviews with the HICTDs that learners were not introduced to any recommended criteria used for the evaluation of information sources. Particularly, learners were asked to make sure that the information they were accessing on the Internet were of good quality by verifying from their lesson notes and syllabus that the information they were retrieving conformed with what they had been taught at school. It was therefore not surprising that many of the learners indicated that they frequently accessed online information that was similar to what they had been taught at school. The study in its quest to verify from the learners whether they were applying any of the recommended criteria further asked the learners to indicate the frequency of which the five criteria recommended by Alexander and Tate (1999) were employed by them when accessing online information on the Internet. The results are discussed in the next sub-sections.

6.6.1 Evaluation of online information sources' authority by learners

Head and Eisenberg (2010:10) advised that, online information seekers should apply traditional evaluation – authority and quality - criteria whenever they were accessing information from the

Internet. They further asserted that evaluation of source authority is a very fundamental and key evaluation criterion that needed not to be overlooked. Mondalios (2013:5), in an attempt to explain how to evaluate source authority advised online information users to investigate who the author is (could be a person/organisation); the credentials of the author; the relevant experience and qualifications of the author in the subject area; the authenticity of the URL of the site of the information and whether the website has links that direct users to other authoritative or useful sources.

Few of the learners highlighted from their responses that, they were frequent evaluators of the authority of online information sources. Clearly, majority (more than 62%) of the learners were not evaluating the authority of online information sources frequently ('Sometimes' and 'Never'). An alarming revelation from the responses was that more than 30% of the learners had never verified the authority of an online information source (see section 5.7.2.1 of Chapter Five). The study verified from the ICT teachers and HICTDs whether they were teaching learners how to evaluate the authority of online information sources. Damico and Baildon (2015:51-52) in an earlier study had indicated that, an important "aspect of teaching students to assess the reliability of information sources is to emphasise source attribution" such as identifying the author of a source, the author's motivations, how the source came into being and the intended audience of the information.

The responses from the ICT teachers pointed to the fact that, nearly 40% of them were not teaching learners how to evaluate the authority of online information sources (see section 5.10.5.2.1 of Chapter Five). The HICTDs had indicated during the interview that, the most source evaluation criteria they taught learners were authority, currency, and accuracy. However, the responses from the teachers and findings from the learners indicated that evaluation of the authority of online information source was not seriously looked at.

6.6.2 Evaluation of online information sources' accuracy/quality by learners

According to Damico and Baildon (2015:61), many Internet sources are having language features as well as knowledge demands of information sources that sometimes make it difficult to verify and assess the accuracy of the sources' content. However, Tajane (2016:19) cautions that many

sources of information on the Internet are “filled with inaccurate, false, redundant data which necessitates the need” for learners to verify the accuracy and reliability of these sources. In the light of this, the study verified from the learners whether they were verifying the accuracy of information sources on the Internet.

The responses from the learners showed that, less than 40% of them were frequently (‘Always’ and ‘Often’) evaluating the accuracy of the online information sources they accessed on the Internet. It was alarming to note that, most (about 46%) of the surveyed learners were not (‘Rarely’ and ‘Never’) evaluating the accuracy of the information sources they were accessing on the Internet. As indicated in a lot of literature, the Internet houses lots of information but not all of it is accurate (Damico and Baildon, 2015; Georgas, 2014; Malliari et al., 2014), thus the need for learners to evaluate the accuracy of online information sources is critical.

The ICT teachers and HICTDs on their part indicated that, evaluation of the accuracy of online information source was an aspect they taught learners at school. More than 72% of the ICT teachers asserted that they were teaching learners how to evaluate the accuracy of online information sources (see section 5.10.5.2.2 of Chapter 5). The responses from the teachers were encouraging since majority of them were teaching learners the need as well as how to conduct evaluation on the accuracy of an online information. However, as the responses from the learners showed, majority of the surveyed learners were not evaluating the accuracy of online information sources. A study by Walraven, Brand-Gruwel, and Boshuizen (2009) had found that most learners had knowledge of evaluation criteria but were not applying the criteria when accessing online information. Hence, it is possible as highlighted by the ICT teachers that learners were taught how to evaluate the accuracy of online information but they failed to apply the criteria when accessing online information on the Internet. This study therefore confirms an earlier study by Taylor (2012) which revealed that young peoples’ evaluation of online sources was poor since they were not concerned with the validity and authority of documents selected from the Internet.

6.6.3 Evaluation of information sources’ objectivity by learners

Evaluation of the objectivity of information is critical in avoiding biased information. Online information users are advised to ascertain the objectivity of Internet sources (Damico and Panos,

2016; Braasch et al., 2013). A key element of the objectivity criterion is to ascertain whether the author provides more than one view point. Respondents were therefore asked to indicate whether or not they were evaluating the objectivity of online information they were accessing on the Internet and the responses from the learners highlighted that, less than 22% (70) of them were frequently ('Always' and Often') evaluating the objectivity of online information sources (Table 5.34). It was alarming to note that, more than 42% (136) of the learners had 'Never' evaluated the objectivity of online information they had accessed on the Internet. Interestingly, majority of the ICT teachers (12 ICT teachers, representing 67%) highlighted that they were teaching the learners the need as well as how to evaluate the objectivity of online information (see section 5.10.5.2.3 of Chapter Five).

Damico and Panos (2016:275) in their study asserted that, the Internet has inundated us with vast information "much of it unvetted, and we know that these streams are imbued with the agendas, purposes, and values of authors, agencies, or sponsors", hence, a need to evaluate the objectivity of online information sources. Although, the ICT teachers might be teaching learners how to evaluate objectivity of online sources, it was clear from the findings of the current study that learners were not applying the objectivity criterion taught to them by their teachers when accessing online information (Walraven, Brand-Gruwel, and Boshuizen, 2009).

6.6.4 Evaluation of online information sources' currency by learners

The currency of information is one of the keys in determining its validity, since information is perishable. According to Head and Eisenberg (2010), the timeliness of information serves as the basis for determining its currency (e.g. the date of publication). The currency criterion of information source evaluation therefore looks into the timeliness of the information. Learners were asked to indicate whether they were evaluating the currency of information they accessed from the Internet. It was refreshing to note that majority (200 respondents, representing more than 60%) of the learners were frequently ('Always' and 'Often') evaluating the timeliness of information they accessed from the Internet. It was clear from the responses that, less than 23% (72) of the surveyed learners were not ('Rarely' and 'Never') evaluating the currency of online information sources.

The current study is mindful of the fact that, information competence for evaluation requires training in a series of skills such as recognising how up-to date the online information sources are (Sales, Pinto and Fernández-Ramos, 2016:5). It was therefore important to ascertain from the ICT teachers and HICTDs whether they were teaching learners how to evaluate the currency of online information sources. The HICTD2 and HICTD3 had indicated during the interviews that, one of the evaluation criterions they were mostly teaching learners was currency. It was therefore not surprising that many of the learners were evaluating the currency of online information sources. Majority (13 respondents, representing 72%) of the ICT teachers corroborated that they were teaching learners the need as well as how to evaluate the currency of online information sources (see section 5.10.5.2.4 of Chapter 5).

6.6.5 Evaluation of online information sources' coverage by learners

In order to process higher quality information from the Internet selectively, learners need to "apply more sophisticated source evaluation strategies" (Braasch et al., 2013:181). Coverage as an evaluation criterion looks into the scope covered by the author or information source. A credible information source needs to cover all the relevant scope of the subject matter, thus, a basic means of evaluating the coverage of online information is ascertaining whether the information source leaves questions unanswered. In the quest of the current study to ascertain from learners if they were evaluating the scope of online information sources, learners were asked to indicate the frequency at which they were evaluating the coverage of information they accessed from the Internet. Clearly, the responses of the participants showed that less than one-fourth (about 24%) of the learners were frequently ('Always' and 'Often') evaluating the coverage of information they accessed from the Internet (section 5.7.2.5).

Majority of the ICT teachers also highlighted that, they were not teaching learners how to evaluate coverage of online information sources. This could be a possible reason most learners were not evaluating coverage of online information sources. It was observed from the responses of the ICT teachers that, 12 (67%) of them were not teaching learners how to evaluate the coverage of online information sources (see section 5.10.5.2.5 of Chapter 5).

Many studies have revealed that, learners do not possess the needed skills for source evaluation and are thus, not frequent evaluators of online information sources (Damico and Panos, 2016; Ogba, 2015; Georgas, 2014; Malliari et al., 2014; Shiweda, 2013). The findings from this study clearly confirm these earlier findings. However, the current study has revealed that there exist a possible lack of training on information source evaluation for the surveyed learners at school and this had greatly contributed to the gap in learners' information source evaluation competencies.

6.7 What are the challenges faced by high school learners when searching for information from the Internet?

Studies have shown that, online information seeking has a number of barriers (Goktas et al. 2013; Zhang, Liu and Cole, 2013; Malliari et al., 2014; Leeder and Shah, 2016). Savolainen (2015:613) asserted that, most researchers "lack a holistic picture of the features" of information accessibility barriers, as well as "their impact on information seeking". In order to collect and interpret data on barriers to online information behaviour of the surveyed learners, the questionnaire asked respondents to indicate the challenges they faced when accessing the Internet for online information. This was complemented by the questionnaires that elicited responses from the ICT teachers and the interviews with the HICTDs on learners' online information seeking challenges. 'Information seeking behaviour' and 'failure' attributes of Wilson's (1999) model of information behaviour guided the discussion of the findings related to the learners' online information behaviour challenges. Wilson (1999) asserted that information users are faced with a number of challenges when accessing information to satisfy their information need.

6.7.1 Slow internet connection

A study by Nkomo (2009:98) found that, slow Internet connection poses a great challenge to information users' quest to access information on the Internet. Slow Internet connection creates undue delays to online information access. The learners were asked to indicate the challenges they faced when accessing online information and majority of the learners highlighted slow Internet connection as a challenge to their online information access. The responses of the learners depicted that; more than 75% (243 respondents) of them were faced with the challenge of slow Internet connection when accessing online information (see section 5.8.1 of Chapter 5).

It was clear from the interviews with the HICTDs that, the teachers and learners alike were not satisfied with their schools' Internet speed. The HICTD2 explained that, "the Internet speed of the school is not the best". He continued that, there had been a number of request and discussions with school Management to increase the bandwidth of their school's Internet connection but to no avail. To corroborate, more than 88% (16 respondents) of the ICT teachers highlighted slow Internet connection as a challenge that learners faced when accessing the Internet for online information (see section 5.10.6 of Chapter Five). It is interesting to note that, the results from this study highlighted that Internet accessibility of learners at school was restricted to their school's computer laboratories and learners were not permitted to access the Internet via their personal gadgets since these gadgets were not permitted to be used by learners at school.

Thus, the bandwidth of their schools' Internet serves only the workstations at the computer laboratories, offices, and possibly gadgets of staff and teachers. Juxtaposing this to the slow Internet connection posing a challenge to learners' quest to access the Internet from their schools' computer laboratories attest to the fact that, Internet connection in schools would have been very slower if learners were allowed to access the Internet from their personal gadgets such as mobile phones through their schools' Internet infrastructure. These findings show that, there existed poor Internet infrastructure at the surveyed schools.

Earlier studies (Quarshie and Ami-Narh, 2012; Atuahene and Owusu-Ansah, 2013; Osei, Larbi and Osei-Boadi, 2014) in Ghana had revealed that, the Internet infrastructure in most schools were not encouraging due to limited workstations and poor Internet connectivity and this study concurs these findings.

6.7.2 Internet access restrictions

A number of reasons such as limited workstations can restrict access to Internet and such restrictions pose challenges to online information users (Kheswa and Hoskins, 2012:136-137). Inadequate Internet facilities coupled with limited workstations (computers) at high schools in Ghana compel school authorities to restrict Internet access of learners. The responses from the learners indicated that, more than 62% (202 respondents) of them were faced with the barrier of

Internet access restrictions in their quest to access online information (see section 5.8.1 of Chapter 5) at school. The HICTDs indicated that, learners Internet access were restricted due to limited workstations available for learners at school. HICTD1 explained that, learners' access to the computer laboratory was determined by learners having ICT lessons. Hence, learners could only use their schools' computer laboratories when they had ICT lessons. He further explained that, the use of the computer laboratories by the learners was scheduled in a manner to afford all classes (learners) at the school the opportunity to access the computer laboratories for Internet access and ICT lessons.

Evidently, all the HICTDs acknowledged Internet access restriction as a barrier that affects learners' access to online information on the Internet. Majority of the ICT teachers (12 respondents, representing 67%) also corroborated that, learners were faced with the challenge of Internet access restriction (section 5.10.6) due to limited Internet facilities available for learners at school. This study confirms Nkomo's (2009:98) study and Gilmour et al.'s (2016:58) study that found that Internet access restrictions pose a challenge to online information seekers' quest to access online information on the Internet.

6.7.3 Lack of support and training

Savolainen (2015:615) asserted that, lack of necessary training or expertise to access the Internet poses a challenge to online information users. Information users who have not received the necessary skills training on Internet use and online retrieval finds it difficult to conduct effective online information search and retrieval (Zhang, Liu and Cole, 2013; Malliari et al., 2014; Leeder and Shah, 2016). It was refreshing to note that, few of the learners (23 respondents, representing 7%) were faced with the challenge of lack of support and training. The HICTDs and ICT teachers indicated that they were providing the necessary support and training to the learners on Internet access and online information retrieval.

This study therefore disagrees with earlier studies in Ghana by Amenyedzi, Lartey and Dzomeku (2011), Agyei and Voogt (2011) and Osei, Larbi and Osei-Bonsu (2014) that found that learners lacked the support and training from their teachers to access the Internet.

6.7.4 Information overload

Mansourian and Ford (2007:686) maintained that psychological and intellectual barrier to information accessibility "may appear in two main forms" – outcome overload and textual overload. They further explained outcome overload to represent users' "inability to process large hit lists in order to establish what is potentially relevant" and textual overload according to them "refers to an inability to read information that one has identified as potentially relevant". Information overload is a common challenge that learners are faced with when accessing the Internet for online information (Shenton, 2008; Savolainen, 2015).

Findings from this study points to the fact that, not many of the learners were faced with the challenge of information overload when accessing the Internet. Only 5% (16) of the learners (see section 5.8.1 of Chapter 5) highlighted information overload as a challenge they faced when accessing the Internet for online information. About 11% (2) of the ICT teachers indicated information overload as a challenge to learners' online information behaviour (section 5.10.6). Clearly, this study cannot agree with Shenton's (2008) study and Savolainen's (2015) study that found that information overload was a common challenge among learners when accessing online information.

6.7.5 Lack of Internet skills

Lack of Internet skills poses a great challenge to information users' quest to access online information. According to Savolainen (2015), studies have shown that lack of Internet skills such as 'poor search skills' are common among young people and thus poses a challenge to their online information behaviour. The findings from the current study reveal that less than 5% (14) of the learners indicated they were faced with the challenge of limited Internet skills.

Although, lack of Internet skills serves as a barrier to learners' online information seeking, the results of the current study depict that the surveyed learners were not perceiving their level of Internet skills as a barrier to accessing online information on the Internet. Although results of the study showed that learners lacked the needed skills to effectively access and retrieve online information, they did not recognise their competency levels as barrier to their online information

behaviour. A possible reason to this was that majority of the learners perceived themselves to possess the needed skills required to access and retrieve online information on the Internet. Similarly, none of the ICT teachers indicated lack of Internet skills as a challenge that learners faced when accessing the Internet for online information.

Clearly, the findings of the study confirm Wilson's model because it showed that, in the effort to access the Internet for online information by the surveyed learners to satisfy their information need, they were met "with barriers of different kinds" (Wilson, 1999:252).

6.8 Possible solutions to challenges faced by learners when accessing online information

In an attempt to find and prescribe solutions for the challenges learners faced when accessing the Internet for online information, the study asked respondents to highlight possible solutions they believed would solve the challenges they were facing in their quest to access the Internet for online information. A number of studies have outlined solutions that help in solving barriers to young peoples' online information behaviour. For example:

- Lavate (2016) and Sandercock (2016) in their studies recommended Information Literacy training as a solution to barriers to online information behaviour;
- Gilmour et al.'s (2016) study prescribed the provision of requisite enablers and technology as a solution to challenges faced by learners in their quest to access the Internet for online information;
- Osei, Larbi and Osei-Boadi (2014) and Atuahene and Owusu-Ansah (2013) also recommended improvement in the Internet infrastructure at schools as a solution to learners' online information behaviour challenges;
- Al-Mulhim, (2014) and Quarshie and Ami-Narh (2012) in their studies recommended the development of teachers' ICT skills and competence so as to provide effective ICT support and training to learners.

Responses from the learners showed that, improvement in the Internet infrastructure at their school would go a long way in solving the challenges they were faced with in their quest to access the Internet for online information. Majority of the learners (197 respondents, representing 61%) highlighted the need to provide more workstations at school as a solution to the limited

workstations that compelled the teachers to restrict their Internet access at school (see section 5.8.2 of Chapter 5). Learners L14 and L183 had indicated “more computers” as solution to the challenges they were faced with when accessing the Internet for online information.

The responses from the ICT teachers and HICTDs also affirmed the calls of learners for more workstations as solution to their challenges. From the responses of the teachers, more than 70% (13 respondents) highlighted provision of additional workstations and computer laboratories as solution to the challenges learners faced when accessing the Internet for online information. All the HICTDs bemoaned the limited workstations serving the number of learners at their school. Their responses were in support of the learners and ICT teachers’ recommendation for additional workstations. HICTD3 appealed that, he would be glad if the researcher “could assist the school in getting more computers for the learners” through philanthropists or state institutions.

Another solution to the challenge of Internet access restriction prescribed by the learners was the opening of the school’s computer laboratories during weekends. Some learners were of the view that opening the computer laboratories during weekends would offer them enough time to access the Internet at school. Response from L74 indicated that, learners were most of the time “free during weekends so they should open the computer lab for us” to access the Internet. To corroborate, T12 also highlighted the need to extend ICT lessons to include weekends in order to afford learners enough opportunity to learn and access the Internet for online information.

Slow Internet connection was a challenge many of the learners, ICT teachers as well as the HICTDs indicated as a barrier to learners’ online information behaviour. It was therefore not surprising when learners and majority of the ICT teachers indicated additional Internet bandwidth as a solution to the barriers of learners’ online information behaviour. Majority of the ICT teachers (12 respondents, representing 66.7%) recommended an increase in the Internet bandwidth of their school as solution to the challenges learners faced when accessing online information. Clearly, this solution was in response to the slow Internet connection faced by learners at school. All the HICTDs and 31.7% (102) of the learners also indicated the need to increase the bandwidth of their school’s Internet as a solution to learners’ challenges.

Management and school authorities play a critical role in the provision of ICT infrastructure. The HICTDs indicated that, they were tasked with the provision of ICT budgets yearly at their schools which they duly executed annually. However, Management were not able to meet their budget due to financial constraints. They were therefore of the view that, provision of funds will greatly solve many of the Internet challenges faced by learners at school. HICTD2 highlighted that "we have some computers that need servicing" but was yet to undertake the servicing due to financial constraints. About one-third of the ICT teachers therefore recommended support of school Management to the ICT department as a solution to the online information barriers learners were faced with.

The responses therefore confirm Osei, Larbi and Osei-Boadi (2014) and Atuahene and Owusu-Ansah's (2013) recommendation for the provision of adequate ICT infrastructure as a key solution to learners' online information barrier. Similarly, the study is in support of Gilmour et al.'s (2016) call for the provision of requisite enablers and technology for learners.

6.9 Satisfaction on Internet training and access at school

This section sought to ascertain learners' satisfaction on their access to the Internet at school as well as the Internet training they received at school. Particularly, learners were asked to rate their level of satisfaction in relation to Information Literacy training, Internet speed, teachers' support, librarians' supports and Internet access at school. The study also verified from the ICT teachers and HICTDs their level of satisfaction on the ICT infrastructure at school and the Internet training they were offering learners.

6.9.1 Satisfaction on Information Literacy training

Information Literacy training is vital in the development of information users' skills in locating, accessing and retrieving online information (Deshmukh and Kulkarni, 2016; Gilmour et al., 2016; Kuhlthau, 2008). It was established from the responses that learners were offered formal Information Literacy training at school. In rating their level of satisfaction on the IL training offered them at school, it was clear that majority (219 respondents, representing 68%) of the surveyed learners were comfortable (Very satisfied' and 'Satisfied') with the IL training they

received at school (see section 5.9.1 of Chapter Five). All the HICTDs and more than 61% (11) of the ICT teachers highlighted their satisfaction on the IL training they rendered learners at school (see section 5.10.7.1 of Chapter Five). These responses attest to the fact that the level of ICT trainings in the surveyed high schools was deemed encouraging by the participants.

6.9.2 Satisfaction on Internet speed

Respondents were asked to rate their level of satisfaction in relation to the speed of the Internet connection at their school. The responses given by the surveyed learners depicted that, they were not satisfied with the speed of the Internet connection at their school. Less than 34% (105) of the surveyed learners were either 'Satisfied' or 'Very satisfied' with the Internet speed at their school (section 5.9.2). Similarly, less than 23% (4) of the ICT teachers were satisfied with the Internet connection speed at their school and all the HICTDs indicated during the interviews their dissatisfaction with the speed of their schools' Internet connections. These responses showed that there existed poor Internet speed at the surveyed schools and this confirms the studies of Osei, Larbi and Osei-Boadi (2014) and Atuahene and Owusu-Ansah's (2013) that found that schools that were connected to the Internet in Ghana were faced with the challenge of poor Internet speed.

6.9.3 Satisfaction on teachers' support

A study by Ybarra, et al. (2008) among high school learners found that, many learners relied on their teachers' supports when accessing the Internet for online information. Teachers' support is therefore very important during learners' online information retrieval process. Teachers are required to support learners' online information retrieval process through formal Information Literacy trainings and other guidance they provide learners to satisfy their online information needs. The surveyed learners for this study were asked to rate their level of satisfaction in relation to the support they received from their teachers when accessing the Internet for online information. It was encouraging from the responses that, majority of the learners (201 respondents, representing 62%) indicated their satisfaction ('Very satisfied' and 'Satisfied') with the support they received from their teachers when accessing the Internet to satisfy their information needs (see section 5.9.3 of Chapter Five). Only 15% (48) of the respondents were dissatisfied with their teachers' support in relation to accessing online information on the Internet.

6.9.4 Satisfaction on Internet accessibility at school

The study has established that the only means almost all learners could access the Internet when schools were in session, was through the Internet facilities of their school, since majority of the learners (292 respondents, representing 91%) were residing on their schools' premises (see section 5.2.4 of Chapter Five). It was therefore important for the current study to assess learners' satisfaction on their Internet accessibility at school. The study asked the learners to rate their level of satisfaction in relation to their access to the Internet at school. The findings from the study showed that, about one-third of the learners were satisfied with their Internet access at school. It was clear from the responses that, most of the learners were not satisfied with their Internet access at school (see section 5.9.4 of Chapter Five).

It is evident from this study that, learners' access to the Internet at school is dependent on the number of workstations available at their schools' computer laboratories since the computer laboratories served as the only places learners could access the Internet at school (see sections 5.3.7 and 5.10.2.4 of Chapter Five). The study verified from the ICT teachers, their level of satisfaction in relation to the number of workstations available for learners' Internet access. The results showed that, less than 6% (one respondent) of the ICT teachers were satisfied with the number of workstations available for learners' Internet access (see section 5.10.7.3 of Chapter Five). The responses from the ICT teachers agree with learners Internet access dissatisfaction.

Moreover, the management of ICT infrastructure is very important for the sustenance of Internet access to learners. The ICT teachers were asked to rate their level of satisfaction in terms of how the ICT infrastructure at their schools were managed. The responses from the ICT teachers showed that less than 23% (4 respondents) of them were 'Satisfied' with the manner in which their schools' ICT infrastructure was managed (see section 5.10.7.4 of Chapter Five). Although about a third of the ICT teachers remained 'Neutral' in relation to their satisfaction on the management of ICT infrastructure at their schools, about 45% (8 respondents) of them were dissatisfied. These responses depict that, the management of ICT infrastructure at the surveyed schools were not the best and this finding concurs a study by Grimus and Ebner (2016:12) that found poor management of ICT infrastructure at high schools in Ghana.

6.9.5 Satisfaction on librarians' support

Benard and Dulle (2014) in their study among high school learners in Tanzania highlighted the role of librarians in providing effective and relevant support to learners on information access and retrieval. IFLA's Guidelines on Information Literacy for Lifelong Learning (2010:27) outlines the need for librarians to participate in the Information Literacy training at schools in order to support learners. The surveyed learners of this study were asked to rate their level of satisfaction in relation to the support they received from their schools' librarians when accessing the Internet for online information. It was clear from the responses of the learners that their school librarians were not offering them adequate support when they were accessing the Internet for online information.

Majority of the learners were not satisfied ('Very dissatisfied' or 'dissatisfied') with the support they received from their school librarians when accessing the Internet for online information (see section 5.9.5 of Chapter Five). Just about a quarter of the learners were pleased with the support they received from their librarians when accessing online information on the Internet. This finding shows that librarians in the surveyed schools were not playing the needed role of supporting learners as prescribed in the IFLA's Guidelines on Information Literacy for Lifelong Learning (2010:27).

A cross tabulation (Table 5.38) on learners' satisfaction on librarian's support and host school revealed that surveyed learners at Effiduasi SHS proportionally had the most learners who were satisfied (43 respondents representing 14%) with their librarian's support on Internet information seeking; followed by Simms SHS with about 8% (24) of the surveyed learners; and St. Louis SHS with 4% (14) of the surveyed learners who were satisfied with the support they received from their school librarians when accessing online information on the Internet in that order.

6.10 What roles do librarians play in facilitating high school learners to acquire Internet information literacy skills?

One of the objectives of this study was to investigate the roles librarians play in facilitating high school learners to acquire Internet Information Literacy skills. This section therefore discusses the

findings of the study in relation to the roles school librarians play towards the development of learners' Information Literacy skills. In order to collect and interpret the data in relation to the role librarians play in facilitating learners Information Literacy skills development, interviews were conducted with the librarians of the three surveyed schools through the use of semi-structured interview schedules. This was complemented by the questionnaires that elicited responses from the learners and ICT teachers on librarians' role towards learners' acquisition of IL skills as well as the interviews with the HICTDs. 'Information seeking behaviour' attribute of Wilson's (1999) model of information behaviour guided the discussion on the findings related to the roles of librarians in facilitating learners' acquisition of Information Literacy skills.

Shiweda (2013) and Nkomo (2009) in their studies found that, institutional Internet facilities were mainly housed in libraries. Findings of this study, however, points to the fact that, none of the surveyed schools had Internet facilities in their library. The librarians confirmed this finding during the Interview that there was no Internet access at their libraries (see section 5.12.3 of Chapter 5). It was clear from the interviews that none of the libraries had installed computers. LIB2 indicated that, the school had assigned the library three computers but they were yet to be installed at the library; however, she could not guarantee whether the computers would be connected to the Internet after the installation. None of the HICTDs during the Interviews was able to guarantee when their school libraries would be connected to the Internet. The responses from them showed that, there were no immediate plans to extend Internet connectivity to the libraries.

A number of studies point to librarians' role in developing the Information Literacy skills of information users (Sandercock, 2016; Whitmore, Agarwal and Xu, 2015; Malliari et al., 2014; DaCosta, 2011). Deshmukh and Kulkarni (2016:107) recommended in their study that, librarians should be empowered to organise Information Literacy programmes at schools. A study by Johnson et al. (2015) asserted that, there existed a mounting case for librarians to play more significant roles in the Information Literacy skills development of information users. IFLA's Guidelines on Information Literacy for Lifelong Learning (2010:27) had also prescribed the need for librarians to spearhead Information Literacy programmes at schools. All the librarians during the interviews indicated that they were neither organising nor taking part in learners' Information Literacy programmes at school (see section 5.12.5 of Chapter Five).

The results from the study revealed that only the teachers of the ICT departments were spearheading the Information Literacy training of learners at the three surveyed schools. Moreover, the librarians during the interviews could not establish the online information needs of learners and were not able to indicate whether learners were able to retrieve online information since they were not engaged with the learners on Internet Information Literacy programmes (see section 5.12.4 of Chapter 5). Particularly, the study found that the surveyed learners were not consulting librarians on their online information needs. LIB2 asserted that learners never consulted her on their online information needs "because they know the library has no Internet".

According to Curzon (2004:44), irrespective of the model or models that are used to teach Internet Information Literacy, librarians and instructors "must partner to teach students information literacy skills". However, results from this study showed that, the ICT teachers were not collaborating with the librarians on learners Internet Information Literacy instructions. All the HICTDs highlighted that, there existed no collaboration between their department and the library department on computer and Internet Information Literacy training for learners (see section 5.11.13 of Chapter Five). Similarly, more than 77% of the ICT teachers were not collaborating with the librarians on learners' Internet Information Literacy training at the surveyed schools (see section 5.10.4.3 of Chapter Five). These findings indicate that, librarians' roles in facilitating learners' Internet Information Literacy skills were not encouraging. It was therefore not surprising when majority of the learners expressed their dissatisfaction on the roles their school librarians were playing towards their online information access and retrieval (see section 5.9.4 of Chapter Five).

According to Sandercock (2016:6), if librarians are made aware of what instructors perceive to be a weakness in their learners in relation to Information Literacy, it would assist them to approach Information Literacy instruction with greater focus and this will serve the learners and the institution as a whole in a greater capacity. However, it is evident from the findings of this study that, librarians were not made aware of learners Internet Information Literacy weaknesses due to the lack of collaboration between them and the ICT teachers. The librarians indicated that, a reason for them not taking part in the computer and Internet Information Literacy training of the learners was that, the curriculum for Information Literacy instruction in Ghana high schools was developed

in the manner that, the ICT teachers were the only assigned instructors to spearhead the training at school.

IFLA's Guidelines on Information Literacy for Lifelong Learning (2010:27-28) highlighted that, librarians are required to possess certain Information Literacy skills in order to be part in the Information Literacy training programmes at school. The guidelines further encouraged librarians to take part in relevant academic courses or qualifications to develop their IL skills for them to be integrated in their school's IL training. Benard and Dulle (2014) also highlighted that, recruitment of qualified librarians with the relevant IL skills was crucial in the development of learners IL skills. However, the responses from the librarians indicated that their Internet Information Literacy skills were not encouraging. Only LIB1 indicated during the interview that, he was prepared to train learners on effective online information retrieval and other IL skills.

It was revealed from the Interview that, LIB1 was a teacher-librarian who teaches English Language at his school. He was therefore serving as an English teacher and a school librarian at the same time. He seemed to have had enough Internet Information Literacy training and thus possessed the relevant skills for IL training compared to LIB2 and LIB3. Although, LIB3 seemed to have a fair idea on Internet Information Literacy, it was clear from the interview that, LIB2's Internet skills were highly limited. This confirms IFLA's (2010) position on the need for librarians to undertake relevant IL courses or qualifications (Internet IL training for the purpose of this study) in order to be integrated in their institution's IL training programmes.

The librarians during the interviews were not able to respond to questions regarding the Internet-based information behaviour of learners at their schools. LIB2 and LIB3 were indicating frequently that, the ICT teachers would be in the position to answer questions on learners Internet skills and accessibility. This study has revealed that librarians in the surveyed schools were not playing the needed role required of them to facilitate the development of learners' Internet Information Literacy skills at school (Sandercock, 2016; Whitmore, Agarwal and Xu, 2015; Malliari et al., 2014; Benard and Dulle, 2014; DaCosta, 2011; IFLA, 2010).

6.11 Internet use policy at school

According to Lemke et al. (2009), several high schools have developed policies on the use of Internet by high school learners and majority of schools use these policies as a way to block access to some internet tools and technologies. The e-Readiness Assessment Report (2009) of the Ministry of Education in Ghana indicates that over 60% of the high schools in Ghana with ICT facilities had developed ICT Acceptable Use Policies for their schools. Media education advocates note that the repercussions of such policy decisions are potentially far-reaching. For example, Jenkins (2006:13) asserted that participation in social media, online networks are vital for youth learning so Internet use polices that block "access to social networking software in schools and public libraries will further widen the participation gap".

The study sought from the HICTDs during the interview, if they had Internet use policy at their schools. The results revealed that all the surveyed schools had developed Internet use policy for learners; however, HICTD1 indicated that their policy was "not comprehensive". This confirms Lemke et al.'s (2009) study that found that several high schools had Internet use policies.

6.12 Summary of the chapter

Chapter Six discussed and interpreted the results of this study. The discussion of the results was done in a comprehensive manner that followed the research findings and literature review so as to align them with the theoretical frameworks that were employed for this study. Wilson's (1999) model of information behaviour and Ellis' (1989) behavioural model of information seeking strategies that were employed as theoretical framework for the study were used to direct the discussion of the study's results. Wilson's (1999) model directed the discussion on learners' Internet accessibility, online information needs, online information retrieval, or seeking behaviour patterns of learners, role of librarians in facilitating learners' Information Literacy skills development and learners' online information behaviour challenges. Ellis' (1989) model also directed the discussion on learners' evaluation of online information sources.

The study highlighted the use of the Internet by learners to retrieve online information to satisfy both their academic and personal information needs. The study found that the surveyed learners

were formally offered Information Literacy training at school and the only place they could access the Internet at school was their schools' computer laboratories. It was revealed that learners lacked some Internet skills that were needed to access relevant online information to satisfy their information needs. For example, learners were not frequently evaluating online information sources since they were not skilled in using the relevant evaluation criteria for evaluation of online information sources. The surveyed learners were faced with the challenges of slow Internet connections and Internet access restrictions and the HICTDs were of the view that limited funding resources was a major contributing factor to these challenges. It was clear from the study that librarians were not playing their required role in developing learners Information Literacy skills. Chapter Seven follows and it gives a summary of major findings, conclusions, recommendations, and suggestions for further studies.

CHAPTER SEVEN: SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

7.1 Introduction

This study's findings were presented in Chapter Five and the interpretation and discussions of the findings were presented in Chapter Six. This chapter therefore presents a summary of the findings of the study, the conclusions, and the recommendations that emerged from the study. This study investigated the Internet-based information behaviour of high school learners in the Ashanti region of Ghana and the summary of the findings as presented in this chapter were carried out and explained in alignment with the two models that were employed as the theoretical framework for the study - Wilson's (1999) model of information behaviour and Ellis's (1989) behavioural model of information seeking strategies. The study employed a mixed-methods approach and the findings of the current study were therefore derived from the research data that were gathered from multiple sources. The study approach employed for this study made it possible for different data collection methods to be used for the study. The data collection methods employed for this study includes:

- The use of questionnaires involving 322 high school learners.
- The use of questionnaires involving 18 ICT teachers.
- A semi-structured interview with three Heads of ICT Department.
- A semi-structured interview including three librarians.

The main aim of the study as indicated in Section 1.5 was to investigate the Internet-based information behaviour of high school learners in the Ashanti region of Ghana. The summary of findings thus responded comprehensively to the six research questions that supported the study. These questions were developed from the study's aim and were as follows:

1. Where and when do high school learners access the Internet?
2. What are the specific purposes for which high school learners search information on the Internet?
3. How do high school learners gather and select information from the Internet?
4. How do high school learners evaluate and judge their online information sources?
5. What roles do librarians play in facilitating high school learners to acquire Internet information literacy skills?

6. What are the challenges faced by high school learners when searching for information from the Internet?

7.2 Summary of findings

The summary of findings of the current study was drawn from the study's aim that was to investigate the Internet-based information behaviour of high school learners in the Ashanti region of Ghana. The findings of the study that were gathered from the questionnaires involving high school learners and ICT teachers as well as interviews with HICTD and librarians were systematically presented in Chapter Five with the aim of reporting all research responses accurately as proof for the study. The findings were then interpreted and discussed in Chapter Six through the logical use of core themes that were developed from the study outcome. The method of the discussion helped in linking all related research results under one umbrella for a better summary of findings. Therefore, the summary of findings has been presented based on the six research questions underpinning the study.

7.2.1. Where and when do high school learners access the Internet?

The first research question examined the place(s) and periods high school learners were able to access the Internet. It was important for the study to ascertain where and when learners were able to access the Internet at school and outside school. The study found that almost all the surveyed learners were housed in their schools' boarding facilities hence could only access the Internet at school when schools were in session. The findings of the study revealed that, surveyed learners were able to access the Internet at school and the only place learners could access the Internet at school was their schools' computer laboratories. They could however, have access to the computer laboratories during ICT lessons and most of them were not able to use the Internet after school hours or weekends. It was revealed in the study that, most of the schools were connected to the Internet through WiFi connections with the radius extending to some classrooms and other places. However, learners were not allowed to use Internet gadgets such as mobile phones and tablets and this situation made it impossible for learners to access the Internet outside the computer laboratories. The study found that, learners' inability to access the Internet from mobile devices

was influenced by the policy of Ghana Education Service that prohibits learners to use mobile devices at schools.

On the other hand, learners were able to access the Internet at Internet cafes when they were out of school. The use of mobile phone for Internet access was also common among learners. The study found that learners were accessing the Internet through their mobile phones when they were out of school. The use of mobile phones afforded them the opportunity to access the Internet at anytime and anywhere outside the school. Few of the learners who were living in homes connected to the Internet were also able to access the Internet at home. The results of the study show that, learners were faced with Internet access restrictions at school due to the limited Internet facilities available at school. However, they had wide avenues to access the Internet while out of school.

7.2.2. What are the specific purposes for which high school learners search information on the Internet?

The second research question sought to investigate the online information needs of high school learners. The study established that surveyed learners had both academic and personal information needs. Surveyed learners were therefore accessing information on the Internet for the purpose of satisfying both their academic and personal information needs. It was revealed that, learners were accessing the Internet for online information relating to their academic needs more than online information relating to their personal needs.

The study found that, learners were accessing the Internet for the following academic purposes:

- Class assignment
- Class test
- Examination
- Information Literacy
- Research project
- Sample/past questions
- Laboratory practical/test

Learners were also found accessing online information for the following personal purposes:

- Entertainment
- Communication
- Networking and socialisation
- News
- General awareness

The findings of the study therefore discussed both learners' online academic and personal information needs. The results revealed that, class assignment and examination were the major purposes that compelled learners to access online information for their academic needs. Communication and entertainment were also the major purposes that compelled learners to access the Internet for online information for their personal needs.

7.2.3. How do high school learners gather and select information from the Internet?

The study found that surveyed learners were able to access the Internet themselves (Montagni et al., 2016; Malliari et al., 2014). The surveyed learners perceived themselves to possess basic Internet skills that enabled them to access the Internet for online information themselves and it was clear that learners acquired these skills at school through the Information Literacy training they received at school. The study revealed that, learners who had challenges accessing the Internet preferred seeking assistance from their colleagues rather than intermediaries like teachers and librarians.

Information users need to access information from information sources in order to satisfy their information needs (Wilson, 1999). The study revealed that, the most preferred online information source consulted by learners was search engine and the most used search engine among the surveyed learners was Google. It was clear from the study that, learners were not using sources such as meta-search engines, OPACs, and directories. Majority of the surveyed learners were not aware of these online information sources since they had not been introduced to them at school. The study also found that, none of the surveyed schools had an online subject portal, thus, learners were not accessing information from subject portals. The study again revealed that, learners were introduced to academic databases; however, they rarely accessed online information from them.

The Internet makes it possible for users to access and select a number of online information resources instantaneously because of the "huge growth in the Internet" (Sales, Pinto and Fernández-Ramos, 2016:4). The study found that, learners were selecting online information from the Internet based on the merit that, the information:

- corresponded to their opinions
- would bring new thoughts to their minds
- could be accessed right away
- was similar to what they had been taught.

The findings of the study discussed the frequency at which learners were able to access the relevant or needed information online. The results revealed that learners were finding relevant results from the Internet to satisfy their online information needs most of the time. It was revealed that, the most frequent way learners gathered online information was examining the results on the first page by examining the top lists first. Only few of them were examining results on the other pages. The study also revealed that, some learners end their online search when results were found.

Information users are required to possess competence and skills in order to effectively and efficiently access online information on the Internet (Singh and Mahapatra, 2016; Malliari et al., 2014). The study found that learners perceived their Internet competence level to be high since the surveyed learners were of the view that, they possessed the necessary skills needed to access the Internet for online information. However, the study revealed that learners were frequently employing the simplest technique - keyword search – since they did not have the competence to employ other advanced online search techniques.

Moreover, the study found that surveyed learners relied heavily on the words of their questions or problems for the formulation of search queries. It was evident from the study that, the surveyed learners were beginning their online information search by typing words into search boxes. As indicated by Asher, Duke, and Wilson (2013:473), learners treated every search box like a Google search box and were thus conducting their online search by typing words from their question as search queries into search boxes.

7.2.4. How do high school learners evaluate and judge their online information sources?

The fourth research question sought to establish whether high school learners were evaluating the information sources of the information they accessed on the Internet. It also sought to ascertain if the surveyed learners were employing established criteria of evaluating online information sources when accessing information on the Internet. Although learners indicated they were evaluating online information sources, the study found that the surveyed learners were not frequent evaluators of online information sources since they were not applying the criteria used in evaluating online information sources. A possible reason for learners not evaluating their online information sources was that their teachers were not "hammering on" evaluation of online sources at school. The study revealed that learners were not taught how to evaluate online information sources based on an established criteria.

Particularly, the study found that the surveyed learners were interested in selecting online information that were similar or corresponded to what their teachers had taught them at school and they deemed such information as accurate. The study revealed that, evaluation of currency was the evaluation criteria that majority of learners employed when accessing information on the Internet.

7.2.5. What roles do librarians play in facilitating high school learners to acquire information literacy skills?

Librarians are known to play an important role in the development of users' Information Literacy skills (Sandercock, 2016; Whitmore, Agarwal and Xu, 2015). IFLA's Guidelines on Information Literacy for Lifelong Learning (2010:27) recommended librarians to spearhead Information Literacy programmes at schools. Nevertheless, the study found that, the librarians in the surveyed schools were not playing the needed role towards the development of learners' information literacy skills. The study revealed that, the libraries in the surveyed schools were not connected to the Internet, thus, librarians were not having access to the Internet. Their roles at their schools seemed to be limited to loaning out books and providing an environment for learners to read. Similarly, the study found that Information Literacy at the surveyed schools was spearheaded by the ICT teachers. A possible reason for librarians not playing much role in the development of learners'

information literacy skills, as revealed by the study, was that librarians' information literacy skills were limited, coupled with lack of Internet facilities at the library.

7.2.6. What are the challenges faced by high school learners when searching for information on the Internet?

The sixth research question sought to ascertain the challenges learners were faced with when accessing online information on the Internet. Information users are faced with a number of barriers in their quest to access information to satisfy their information need (Liu and Cole, 2013; Leeder and Shah, 2016). The study found that the surveyed learners were faced with the following challenges in their quest to access online information on the Internet:

1. Their school's Internet connection speed was slow because of limited bandwidth size. Slow Internet connection was therefore a challenge for learners to access online information to satisfy their information need.
2. Limited Internet facilities at the surveyed schools made it difficult for learners to access the Internet since the only place of access was the computer labs; and the number of workstations available in these labs was very limited. The surveyed learners were therefore faced with the challenge of Internet access restrictions due to the limited Internet infrastructure at the surveyed schools.
3. Some of the learners also indicated lack of support and training on the effective and efficient use of the Internet as a challenge in accessing online information on the Internet.
4. Poor information literacy skills also posed a challenge to learners' online information access.

The discussion on the findings revealed that, the two major challenges that learners were facing in their quest to access online information were slow Internet speed and Internet access restrictions.

7.3 Contribution and originality of the study

This current study which investigated the Internet-based information behaviour of high school learners is the first to be carried out in the Ashanti region of Ghana since there had been no other (searches conducted on UKZN's 'iCloud' and OCLC systems found no results on the topic from

Ghana). The review of existing literature revealed that, there had not been a study carried on learners' "Internet-based information behaviour" in Ghana. Related studies conducted in Ghana focused on everyday life information-seeking behaviour of the youth (Markwei and Rasmussen, 2015); adolescents Internet access (Borzekowski, Fobil and Asante, 2006); incorporating mobile learning in high school curricula (Grimus, 2015; Grimus and Ebner, 2016); and implementation of ICT in learning (Buabeng-Andoh and Issifu, 2015). The current study being the first of its kind to be carried out, aimed to investigate the Internet-based information behaviour of high school learners in the Ashanti region of Ghana. This study has therefore provided vision and deeper understanding on high school learners in the Ashanti region of Ghana's Internet-based information behaviour.

A clear departure of the current study and the studies listed above were, for example, while this study was conducted in an academic setting, both Markwei and Rasmussen (2015) and Borzekowski, Fobil and Asante's (2006) studies were conducted outside the academic environment. Furthermore, Markwei and Rasmussen (2015), and Borzekowski, Fobil and Asante's (2006) studies looked into everyday life information-seeking behaviour and Internet accessibility respectively, while the current study focused on Internet-based information behaviour. Although, Buabeng-Andoh and Issifu (2015), Grimus (2015) as well as Grimus and Ebner's (2016) studies were carried out in an academic environment, their focus differ from the current study since they looked into ICT implementation and mobile learning in high schools.

Results from the current study have highlighted major online information needs of the surveyed high school learners – both academic needs and personal needs. Clearly, the study contributes towards the understanding of the purposes and needs that compel high school learners to access the Internet for online information in the context of a developing country such as Ghana. Particularly, learners' Internet infrastructure and access places in Ghana high schools have been found to differ from the developed countries. For example, while most high schools in developed countries have Internet facilities for learners in the library, this study has revealed lack of Internet facilities in libraries at the surveyed schools. The study therefore significantly adds to the body of work on learners' Internet use purpose as well as Internet behavioural intentions. The findings of the study showed places and periods learners were able to access the Internet for online

information; how learners were accessing different online sources of information; different information seeking behaviour patterns in relation to how learners gathered and selected online information; major challenges learners were faced with when seeking online information and the role of librarians towards the development of learners' information literacy skills.

Clearly, results of the study have revealed Internet access and use challenges for high school learners in relation to lack of adequate Internet facilities at schools leading to Internet access restrictions coupled with slow Internet connection. The study has also highlighted lack of librarians' support towards the development of information literacy skills of learners at the three surveyed high schools in the Ashanti region of Ghana. The gaps in curriculum for Internet information literacy of learners as revealed through the interviews with the HICTDs has influenced the need for the study to develop a proposed Internet information literacy guideline (as outlined below) for high schools based on the findings of the study. The role of this guideline is to ensure effective and efficient delivery of Internet information literacy instructions that is geard towards the development of learners Internet information literacy competencies. As indicated in the literacture review (see section 3.6 of Chapter 3), information literacy instructions help information users to develop the needed skills for effective and efficient information access, evaluation and use.

7.3.1 Proposed Internet information literacy guidelines for high schools

Introduction: Information competency serves as the first step in attaining instructive goals. There exists a general acceptance among all educational stakeholders that learners need to be competent in Internet information, since Internet information literacy is among the attributes that emerge in almost every set of skills required to be successful in this information age or 21st Century (IFLA, 2006:4). Internet information literacy in the current age of life provides learners with the qualities needed to engage with information for critical thinking and develop learning capabilities. The Internet has provided easier access to information that has a huge potential of empowering learners to find, evaluate and use information to attain their personal and academic goals. IFLA (2006:4) argue that the development of information literacy competencies "should take place throughout citizens' lives, especially during their educational years". The proposed guidelines provided below is to serve as a theoretical pattern in guiding the development of Internet information literacy

instructions as well as providing information to structure the Internet information literacy efforts of instructors in high schools.

Purpose: This proposed guideline is anxious of the development of Internet information literacy competencies of high school learners. It is therefore intended to provide the commitment needed to ensure that schools that adopt it are able to use it to offer their learners the opportunity to become familiar with Internet information resources, in order to use and manage online information effectively. The proposed guideline also accepts that learners need to be Internet information literates in order to use Internet information and resources in ways that augment their academic activities.

Objectives: The aim of these guidelines is to develop learners' capacity to acknowledge when Internet information is needed and ability to find, create, contextualise, analytically evaluate, and use online information effectively. The objectives below will help achieve this aim in high schools:

- Highlighting the benefits of Internet information literacy competencies in this 'information age'.
- Ensuring that Internet information literacy is integrated into schools' academic curriculum.
- Defining the roles and responsibilities of the key contributors in the Internet information literacy instructions at school.
- Ensuring that the ethical and legal issues involved with the use of Internet information resources are fully understood and complied with.

Roles and Responsibilities: Libraries and librarians are noted to be in charge of information literacy instructions. However, putting Internet information literacy programme in place at a school as opined by IFLA's Guidelines on Information Literacy for Lifelong Learning (2006:13), cannot be done by librarians exclusively in libraries. This enormous task is the responsibility of all the learning community: teachers, parents (through the PTA), students and society in general. A team must therefore be formed, and partners identified who can work with the librarian. For example, in the context of school libraries, the partnership team might include one or more teachers, an outside expert, a school counselor and possibly others (for example, a PTA member).

These proposed guidelines therefore outline that:

1. The Assistant headteacher (Academic), the Head of ICT department and the School Librarian are designated as responsible for the Internet Information Literacy Guidelines of the school. They are to ensure the implementation of the guidelines and report on its performance to the appropriate bodies in the school such as the academic committee.
2. The school library and ICT department should provide an atmosphere that is conducive in the library and ICT laboratories to serve as the centres for Internet information literacy instruction and also provide leadership for Internet information literacy at the school.
3. Heads of departments with the inputs of Head of ICT department and Library are to ensure that learners in the school have the opportunity to be provided with Internet information literacy instruction by providing appropriate slots in the teaching timetable for it.
4. Management with the recommendations of ICT and library departments are to provide ICT and Internet infrastructure. The Board of Governors are also encouraged to assist in raising funds from government agencies and other private bodies towards the improvement of Internet facilities. For example, proposals could be submitted to Ghana Investment Fund for Electronic Communications (GIFEC) for Internet infrastructural development.

Structure of the Internet information literacy curricula: This section proposes the structure of the curricula for Internet information literacy instruction; and it serves as the core component of the guidelines. There are a number of information literacy models, for example, the Big Six Model, Cooke's Nine Step Plan, SCONUL Seven pillars, etc. The proposed structure of this guideline is developed based on the IFLA's (2006) international standards of information literacy. The IFLA standards are under the components of:

- Access
- Evaluation and
- Use

They are diagrammatically presented as follows:

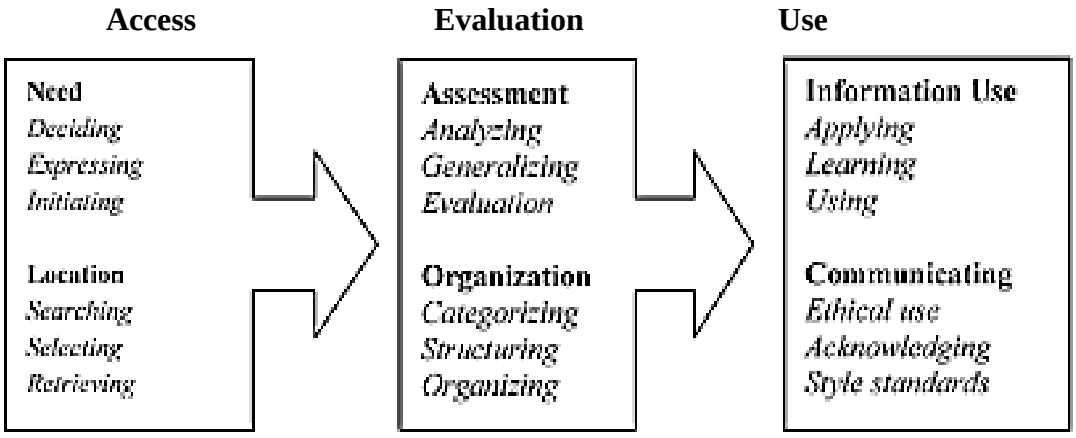

Figure 7.1 International standards of IL competencies (IFLA, 2006:17)

The current study therefore based on the findings recommends that the structure of Internet information literacy program at high schools should follow the outline below in accordance with IFLA standards of IL competencies:

A. *Access*

- The first stage in the Internet information literacy instruction is to introduce learners to a process that develops the ability to establish an online information need by defining the problem, and identifying the types and amount of information required.
- Intellectually and physically locating the Internet sources of information. Intellectual location includes the ability to outline the information problem by defining and expressing the need for online information. This initiates the Internet information search process which leads to physical location of Internet sources of information through the use of the Internet by locating appropriate Internet resources and infrastructure available at the school.
- Instructions on the use of the Internet to locate online information sources. Sources such as search engines (e.g. Google) and academic databases (e.g. Britannica library) are suitable to be introduced at high schools. This should aim at developing learners' ability to identify and assess online information sources.
- Instructions on tools, strategies and commands for online information search and retrieval. The use of specialised online sites such as Google Advanced Search for Internet information literacy instruction is recommended at the high school stage since it has in-

built search commands and tools that limit searches by date, collection of evaluated sites, location and other criteria with the help of in-built Boolean tools.

B. *Evaluation*

- Instruction on examination and analysis of online information for selection by judging the effectiveness (product) and efficiency (process) of the online information. This process should aim at identifying and determining the best and most useful online information for selection and use.
- Instruction on the use of Alexander and Tate's (1999) evaluation criteria is recommended.

C. *Use*

- Instructions on ethical use and legal principles of online information related to Internet acceptable use policies and other school rules, copyright, and plagiarism (citing and crediting sources).
- Instruction on the presentation and use of the final product (online information) as a personal product for problem-solving.

7.4 Implications for theory

The principal aim and objective of the current study was not to build a theory but rather to investigate the Internet-based information behaviour of learners. This study has proven to be vital since it shows gaps in the body of literature especially between studies done in the developed countries and studies conducted in the developing countries. Although, the study did not build theory, it employed both Wilson's (1999) model of information behaviour and Ellis's (1989) behavioural model of information seeking strategies as its theoretical framework; and these models guided the study.

7.4.1 Findings related to Wilson's (1999) model

The current study employed Wilson's (1999) model of information behaviour as a theoretical framework. The applicability of this model for the study was systematically discussed in Chapter 2 and the results of the study that were linked with the model were interpreted and discussed in

Chapter 6. This section therefore provides the summary of findings that are related to the use of Wilson's (1999) model as a theoretical framework for the study. The arrangement of the review of existing literature, presentation of findings and discussion of results followed the trend provided by the model. Wilson's model serves as a general information behaviour model and thus suited the group of people (high school learners from the surveyed schools) employed for the study.

Wilson's model highlighted that information users seek information in order to satisfy their information needs. The results of the current study indicated that, the surveyed learners (information users) were seeking information relating to their academic and personal needs. Moreover, Wilson's (1999) model highlighted that, information users' in their quest to seek information result to the use of information systems to access information in order to satisfy their information needs. Similarly, the study revealed that learners (information users) were accessing the Internet (information system) for online information to satisfy their information needs. On the other hand, Wilson's (1999) model highlighted that, information users in their quest to seek information may fail hence the 'information seeking behaviour' process may lead to 'failure'. Clearly, these failures would be encountered because of challenges the information user might face when seeking information. The findings of the study highlighted that, the surveyed learners were faced with challenges when seeking online information on the Internet.

7.4.2 Findings related to Ellis' (1989) model

Ellis's (1989) behavioural model of information seeking strategies was employed in this study as a theoretical framework to complement Wilson's (1999) model. The application of Ellis's (1989) model stages of 'differentiating' and 'verifying' guided the study's interpretation and discussion of results related to evaluation of information sources. Wilson's (1999) model lacks a clear attribute that deals with evaluation of sources hence the combination of both models helped the study to achieve all its objectives. The 'differentiating' stage of Ellis's (1989) model defines the point that the information user needs to filter the information sources based on the "nature and the quality of the material examined" (Ellis, 1989:179), while the 'verifying' stage took to account "checking the accuracy of information" (Wilson, 1999:254).

The study highlighted that, the surveyed learners were not frequent evaluators of online information sources as a result of their limitations in applying the criteria needed for the evaluation of online information sources. However, the study found that, the only criteria of evaluation learners frequently applied was 'currency' and it was also clear that learners were aware of the need to check for accuracy of information they accessed on the Internet.

7.5 Implication for policy and practice

The study contributes substantially towards the Internet information behaviour of learners especially towards the development of learners' information literacy skills and if the findings are considered seriously, it will influence policy and practice. The findings of the study have meaningful implications for stakeholders and policymakers who have the responsibility to develop learners' Internet information literacy skills and provide Internet facilities at school. The current study is important to the surveyed schools and other high schools in the country, since it provides insight on the use of the Internet for online information by learners; this will help shape investment as well as policy decisions in this area.

Moreover, the findings will help stakeholders to draw comprehensive Internet Use Policies to help in addressing some of the challenges learners are faced with when accessing the Internet for online information. Clearly, the need for librarians to develop their Information Literacy skills in order to be part of the Information Literacy programmes at their institutions have been highlighted; this coupled with the provision of Internet facilities at the libraries will help in re-focusing and re-engineering school libraries to provide information literacy instructions at schools. When taken seriously, this would improve teaching and inform curriculum on ICT and Information Literacy.

7.6 Recommendations

The current study investigated the Internet-based information behaviour of high school learners in the Ashanti region of Ghana. Three hundred and twenty-two Grade 12 learners from three public high schools in the Ashanti region of Ghana – St. Louis SHS, Effiduasi SHS, and Simms SHS – participated in the study. The study recommends the following based on the study results:

1. The study highlighted that the Internet infrastructure at the surveyed schools were inadequate. Clearly, learners' access to Internet at the schools' computer laboratories alone restricts their access to the Internet, since the number of workstations and laboratories available at the surveyed schools were not enough to accommodate the learners for Internet use regularly. The study advised that school Management and other stakeholders (e.g. Ministry of Education, community, Parent-Teacher Associations, etc.) to help in providing additional workstations and computer laboratories to increase learners access to the Internet at school.

2. The study found that almost all the surveyed schools were connected to the Internet through WiFi connection and the radius of the WiFi connections extended to some of the classrooms and other places on campus. However, learners were not able to access the Internet on the WiFi themselves since they were not allowed to possess Internet gadgets, especially mobile phones and tablets at school. In order to increase learners' access to the Internet at school, the study advises that, learners should be provided with laptops so they could access the Internet through their schools' WiFi connections. Moreover, since majority of the learners own smart phones, the study also recommends that Management permit learners to access the Internet with their mobile phones outside school hours.

   Grimus (2015) and Grimus and Ebner (2016) in their studies among high school learners in Ghana, found that the integration of mobile learning in high schools in Ghana was ripe and therefore recommended the need for school authorities to allow high school learners to use mobile phones for learning through the use of mobile learning apps such as Google Classroom. This study is in support of their recommendation. The study also recommends that, the bandwidth of the surveyed schools' Internet be increased to accommodate additional data traffic to enhance the speed of their Internet.

3. It was evident from the study that learners were offered Information Literacy instructions at school and these instructions were positively impacting on learners' Information Literacy skills development. However, the study found that, the times scheduled for Information Literacy instructions were not enough, although learners showed great interest

in these lessons. The study advised that, Information Literacy instructions for learners be extended possibly to include weekends and after school hours.

4. The study highlighted that, learners lacked certain skills needed for effective and efficient retrieval of online information from the Internet. It was clear that learners needed online information to satisfy their academic and personal needs. However, their inability to employ advanced searching skills and techniques coupled with their over reliance on Google at the exclusion of other academic databases was a challenge. The study therefore recommends that, learners be trained on advanced searching skills in order to develop and enhance their searching skills and techniques, e.g. learners could be introduced to Google Advanced Search for a start. Moreover, the study found that none of the schools had online subject portal and the study recommends that, the schools provide subject portals for learners; and introduce them to the use of other online information sources especially academic databases (or possibly Google Scholar) for information to satisfy their academic needs.

5. Evaluation of online information sources is very important, however, the study indicated that, learners were not frequent evaluators of online information sources. It was evident from the study that, learners were not adequately introduced to evaluation of online information sources. The study advised that learners are taught how to evaluate online information sources using recommended criteria in order to improve their skills in evaluating online information sources. Teachers are advised to give practical exercises on evaluation of online sources to learners as a way of improving their evaluation skills.

6. The study revealed that, school librarians were not playing the needed role towards the development of learners Information Literacy skills. Studies have recommended the need for librarians to spearhead Information Literacy instructions at schools due to their vast knowledge especialty in Information Literacy skills development (Deshmukh and Kulkarni, 2016; Sandercock, 2016; IFLA, 2010). It was evident from the study that, there were two major causes to librarians not playing the required role towards learners Information Literacy skills – lack of Internet facility at the libraries and librarians' lack of

Internet literacy skills. The study therefore advised that, Internet infrastructure be extended to the library. School authorities and Management are also encouraged to support librarians to take part in relevant academic courses or qualifications to develop their IL skills for them to be integrated in their school's IL training. This recommendation is in support of IFLA's Guidelines on Information Literacy for Lifelong Learning (2010:27-28).

7. The study revealed lack of collaboration between the ICT department and the library when it came to Information Literacy instruction for learners. A study by Curzon (2004:44) highlighted the need for librarians and instructors to partner in the teaching of Information Literacy. This study also recommends that, the ICT teachers and librarians partner to teach learners Information Literacy for better results.

7.7 Limitations and suggestions for future studies

Every social research comes with limitations thus none can be perfect (Neuman, 2003:469). As indicated earlier, this study was limited to the three high schools in the Ashanti region of Ghana. Moreover, four of the surveyed teachers were not able to return their questionnaires, however, the 18 teachers that returned their questionnaires made the study overcome this limitation.

The study suggests the following future studies to be conducted:

- The findings of this study report only high school learners' Internet-based information behaviour in the three surveyed schools in the Ashanti region of Ghana. Contextual factors in high schools in other regions of Ghana may reveal new patterns of learners' Internet-based information behaviour. It is therefore recommended that a similar study be conducted in other regions of Ghana or possibly the entire country.

- The current study was limited to only Grade 12 learners since the ICT curriculum prescribes the teaching of Internet at Grade 11 hence the study assumed that Grade 12 learners had more experience with the Internet technology. However, the study revealed limited Information Literacy skills among the surveyed learners and it was clear from the

study that majority of the learners were exposed to the use of the Internet at their current schools. It is therefore suggested that a study be conducted to identify the Information Literacy and knowledge gaps of new high school learners in order to propose the necessary content that needs to be covered during the Information Literacy programmes designed for learners.

- The study highlighted lack of Internet and other ICTs infrastructure in the surveyed schools. Clearly, inadequate funding was a major contributing factor to these limited ICT resources. There is therefore the need for a study to be conducted on high schools' ICT funding sources in order to ascertain the challenges and ways to raise adequate funds for the improvement of ICT infrastructure in schools.

7.8 Conclusion

This study investigated the Internet-based information behaviour of high school learners in the Ashanti region of Ghana by exploring the extent to which learners accessed the Internet; the place and time they accessed the Internet; the purposes that compelled them to access online information on the Internet; how they selected and gathered online information on the Internet; the challenges they faced when accessing online information on the Internet as well as the role their librarians played towards their information literacy skills development. The summary of findings grounded on the six research questions were presented in this study. The findings were also linked with the related literature reviewed in the study. The study employed both Wilson's (1999) model and Ellis' (1989) model as its theoretical framework and these models guided the discussion of findings that yielded references to improve high school learners' Internet-based information behaviour. This chapter concludes by emphasising that the main objective of the study – investigating the Internet-based information behaviour of high school learners in the Ashanti region of Ghana - was achieved.

Like many related studies in literature, the study revealed that learners accessed the Internet for online information to satisfy both their academic and personal needs. It was evident that all the surveyed high schools had Internet access for learners and learners showed interest in accessing the Internet whenever they got the opportunity to do so. The schools' computer laboratories were found to be the only places learners could access the Internet. It was revealed in the study that,

learners were offered Information Literacy instructions at school; yet, their Internet Information Literacy competencies were limited. The study found that, learners' searching skills and strategies were limited due to how they were gathering and selecting online information on the Internet. Librarians who are known to be Information Literacy skills instructors or developers were not playing the needed role towards learners Information Literacy skills development. The study therefore highlighted the need for a collaborative effort between school authorities, ICT department, and the library department towards the development of learners' Information Literacy skills.

Evidently, the Internet infrastructures at the surveyed schools were not adequate for the learners to access online information on the Internet effectively and efficiently. The need to make provisions in order to expand and improve Internet infrastructure in schools were also identified by the study.

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APPENDICES

Appendix 1: Informed consent form for questionnaires

Dear Participant,

My name is Philip Kwaku Kankam, a PhD (Information Studies) candidate studying at the University of KwaZulu-Natal, Pietermaritzburg Campus. The title of the research is "Information Seeking Behaviour of High School Learners in Ghana". The outcome from the study is expected to improve teaching, inform curriculum by examining how learners retrieve and evaluate online information to help address possible gaps in the field of study. I am interested in interviewing you so as to share your experiences and observations on the subject matter.

Kindly note that:

- The information that you provide will be used for scholarly research only.
- Your participation is entirely voluntary. You have a choice to participate, not to participate or stop participating in the research. You will not be penalized for taking such an action.
- Your views in this interview will be presented anonymously. Neither your name nor identity will be disclosed in any form in the study.
- The interview will take between 30 t0 45 minutes.
- The record as well as other items associated with the interview will be held in a password-protected file accessible only to myself and my supervisors. After a period of 5years, in line with the rules of the university, it will be disposed by shredding and burning.
- If you agree to participate please sign the declaration attached to this statement (a separate sheet will be provided for signatures)

I can be contacted at: School of Social Sciences, University of KwaZulu-Natal, Pietermaritzburg Campus, Scottsville, Pietermaritzburg. Email: efiewurah@yahoo.com
Cell: (+233) 24 484 3598 (Ghana), (+27) 63 218 3954 (South Africa)

My supervisor is Dr. Zawedde Nsibirwa who is located at the School of Social Sciences, Pietermaritzburg Campus of the University of KwaZulu-Natal. Contact details: email Nsibirwaz@ukzn.ac.za Phone number: +27 33 260 5685.

The College of Humanities Research Ethics Officer is Phumelele Ximba who is located at Humanities Research Ethics Office, University of KwaZulu-Natal. Contact details: email: ximbap@ukzn.ac.za Phone number +27 31 260 3587.

Thank you for your contribution to this research.

DECLARATION

I……..... (Full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

I understand that I am at liberty to withdraw from the project at anytime, should I so desire. I understand the intention of the research. I hereby agree to participate.

SIGNATURE OF PARTICIPANT DATE

....

Appendix 2: Informed consent form for interviews

Social Sciences, College of Humanities,
University of KwaZulu-Natal,
Pietermaritzburg Campus,

Dear Participant

INFORMED CONSENT LETTER

My name is Philip Kwaku Kankam and I am an Information Studies PhD candidate studying at the University of KwaZulu-Natal, Pietermaritzburg campus, South Africa.
I am interested in learning about the information behaviour of high school learners in Ashanti region of Ghana. Your school is one of my case studies to gather the information. I am interested in asking you some questions.
Please note that:

- Your confidentiality is guaranteed as your inputs will not be attributed to you in person, but reported only as a population member opinion.
- The interview may last for about 1 hour and may be split depending on your preference.
- Any information given by you cannot be used against you, and the collected data will be used for purposes of this research only.
- Data will be stored in secure storage and destroyed after 5 years.
- You have a choice to participate, not participate or stop participating in the research. You will not be penalized for taking such an action.
- The research aims at knowing the challenges of your community relating to resource scarcity, peoples' movement, and effects on peace.
- Your involvement is purely for academic purposes only, and there are no financial benefits involved.
- If you are willing to be interviewed, please indicate (by ticking as applicable) whether you are willing to allow the interview to be recorded by the following equipment:

	Willing	Not willing
Audio equipment		
Photographic equipment		
Video equipment		

I can be contacted at: Email: efiewurah@yahoo.com, Cell: +244843598 or +27632183954.

My supervisor is Dr. Zawedde Nsibirwa who is located at the School of Social Sciences, Pietermaritzburg campus of the University of KwaZulu-Natal.
Contact details: email: Nsibirwaz@ukzn.ac.za Phone number: +27 33 260 5685.

You may also contact the Research Office through:
P. Mohun
HSSREC Research Office,
Tel: 031 260 4557 E-mail: mohunp@ukzn.ac.za

Thank you for your contribution to this research.

DECLARATION

I…… (full name of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE OF PARTICIPANT DATE

…… ……

Appendix 3: Parental Consent Document

Dear Parent,

My name is Philip Kwaku Kankam, a PhD (Information Studies) candidate studying at the University of KwaZulu-Natal, Pietermaritzburg Campus. The title of the research is "Information Seeking Behaviour of High School Learners in Ghana". The outcome from the study is expected to improve teaching, inform curriculum by examining how learners retrieve and evaluate online information to help address possible gaps in the field of study.

Your child has been selected to participate in this study as a respondent by providing responds to the research questionnaire. The information provided by your child will be used for scholarly research only and will be presented anonymously. Neither your child's name nor identity will be disclosed in any form in the study. Participation in this study is entirely voluntary and your child has a choice to participate, not to participate or stop participating in the research at any time during the study.

Kindly sign the declaration attached to this letter (a separate sheet will be provided for signatures), if you agree to allow your child participate in this study.

I can be contacted at: School of Social Sciences, University of KwaZulu-Natal, Pietermaritzburg Campus, Scottsville, Pietermaritzburg. Email: efiewurah@yahoo.com
Cell: (+233) 24 484 3598 (Ghana), (+27) 63 218 3954 (South Africa)

My supervisor is Dr. Zawedde Nsibirwa who is located at the School of Social Sciences, Pietermaritzburg Campus of the University of KwaZulu-Natal. Contact details: email Nsibirwaz@ukzn.ac.za Phone number: +27 33 260 5685.

The College of Humanities Research Ethics Officer is Phumelele Ximba who is located at Humanities Research Ethics Office, University of KwaZulu-Natal. Contact details: email: ximbap@ukzn.ac.za Phone number +27 31 260 3587.

Thank you for your contribution to this research.

DECLARATION

I……..... (Full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to my child participating in the research project.

I understand that my child is at liberty to withdraw from the project at any time, should my child so desire. I understand the intention of the research. I hereby agree to allow my child to participate.

SIGNATURE OF PARENT DATE

....

Appendix 4: Child Assent Document

Dear Learner,

My name is Philip Kwaku Kankam, a PhD (Information Studies) candidate studying at the University of KwaZulu-Natal, Pietermaritzburg Campus. The title of the research is "Information Seeking Behaviour of High School Learners in Ghana". The outcome from the study is expected to improve teaching, inform syllabus by examining how learners retrieve and evaluate online information to help address possible gaps in the field of study.

Please note that you are not required to provide your name. This means that you name will not be used in the study and that the information you provide will not be linked to your name in any way.

Please note that this is NOT a test and there are no right or wrong answers. You are kindly asked to answer all questions to the best of your ability and as truthfully as possible.

Finally, your participation in answering the questions is completely voluntary. You have the right to withdraw at any time during the study.

Kindly sign the declaration attached to this letter (a separate sheet will be provided for signatures), if you understand and agree to participate in this study.

I can be contacted at: School of Social Sciences, University of KwaZulu-Natal, Pietermaritzburg Campus, Scottsville, Pietermaritzburg. Email: efiewurah@yahoo.com
Cell: (+233) 24 484 3598 (Ghana), (+27) 63 218 3954 (South Africa)

My supervisor is Dr. Zawedde Nsibirwa who is located at the School of Social Sciences, Pietermaritzburg Campus of the University of KwaZulu-Natal. Contact details: email Nsibirwaz@ukzn.ac.za Phone number: +27 33 260 5685.

The College of Humanities Research Ethics Officer is Phumelele Ximba who is located at Humanities Research Ethics Office, University of KwaZulu-Natal. Contact details: email: ximbap@ukzn.ac.za Phone number +27 31 260 3587.

Thank you for your contribution to this research.

DECLARATION

I, ……., hereby consent to participate in the study as outlined in the document about the study/ as explained to me by the researcher.

I acknowledge that I have been informed about why the questionnaire/interview is being administered to me. I am aware that participation in the study is voluntary and I may refuse to participate or withdraw from the study at any stage and for any reason without any form of disadvantage.

I, ……., acknowledge that I understand the contents of this form and freely consent to participating in the study.

SIGNATURE OF PARTICIPANT DATE

....

Appendix 5: Questionnaire for learners

Covering letter for the questionnaire for collecting information from high school learners on "**Internet-based Information Behaviour of High School Learners in Ashanti Region, Ghana".**

Dear Respondent,

I am seeking your help in a survey on Internet-based Information Behaviour of High School Learners in Ghana. I am interested in knowing how the high school learners seek or search for and acquire information from the internet. The main purpose of this research is to better understand these learners' online information seeking behaviour. The outcome from the study is expected to improve teaching, inform curriculum (syllabus) by examining how learners retrieve and evaluate online information to help address possible gaps in the field of Information Studies.

I kindly ask for your time to complete the following questionnaire and return it at your earliest convenience within the next three weeks after distribution. 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 (Information Studies) degree. I assure you that the information you provide will be accorded the highest confidentiality and used solely for the purposes of this study.

Your invaluable effort in completing this survey is greatly appreciated.

Thanking you in advance for your time.

Philip Kankam (Mr.)
PhD Student, University of KwaZulu Natal
Pietermaritzburg, South Africa
Department of Information Science
Mobile: +233 24 484 3598 (Ghana) / +27 63 218 3954 (South Africa)
Email: efiewurah@yahoo.com

Questionnaire for collecting information from high school learners on "**Internet-based Information Behaviour of High School Learners in Ashanti Region, Ghana".**

Instructions for completing the questionnaire

a. Unless otherwise instructed, please place a tick(√) or a cross (x) in the space provided.
b. Use the space(s) provided to answer the open questions.
c. Please answer to the best of your ability
d. Kindly be truthful – remember this is not a test.

Section 1- Demographic Information

1. Gender a. Male [ ] b. Female [ ]

2. What is your age?

a. 16 [ ] b. 17 [ ]
c. 18 [ ] d. 19 [ ]
e. 20 [ ] f. Above 20 [ ]

3. School affiliated to

a. St. Louis SHS [ ] b. Effiduasi SHS [ ] c. Simms SHS [ ]

4. Student status a. Day [ ] b. Boarding [ ]

5. In which field of study are you?

a. General Arts [ ] b. Science [ ]
c. Agricultural Science [ ] d. Business [ ]
e. Visual Arts/Home Economics[ ] f. Other, please specify .....

Section 2 - Internet Access

The purpose of this section is to find out from you where and when (places or locations and times) you are able to access the internet for online information.

6. Are you able to access internet at school? a. Yes [ ] b. No [ ]

If your answer to question 6 is "No", please explain why and thereafter do not proceed

.....
.....
..

7. Do you as a learner access the Internet? a. Yes [ ] b. No [ ]

8. If "No" to question 7, please explain.

.....
.....
..

9. At what age were you exposed to the use of Internet and information communication technology (ICTs)? .....

10. Do you use/have a computer at home? a. Yes [ ] b. No [ ]
(Please continue from question 12 if you answered "No" to question 10)

11. Is your computer at home connected to the Internet? a. Yes [ ] b. No [ ]

12. Do you own any of the following devices with internet access? (Please select all that apply):

a. Laptop [ ] b. Note pad/ Tablet [ ] c. Mobile/Smart phone [ ] d. Desktop computer/PC [ ]

13. Where are you able to access Internet at your school? (Tick all that apply):
    a. Library [ ]
    b. Computer Lab [ ]
    c. Science Lab [ ]
    d. Classroom [ ]
    e. Cell phone/mobile phone [ ]
    f. Other, please specify .....

14. Where do you access the internet other than at your school? (Please select all that apply):
    a. Home [ ]
    b. Relative/Friend's place [ ]
    c. Public library [ ]
    d. Community hall/Church/Mosque [ ]
    e. Internet café [ ]
    f. Other, please specify.....

15. When do you access the Internet?
    a. During school hours [ ]
    b. After school [ ]
    c. Weekends [ ]
    d. Anytime [ ]
    e. Other, please specify…….

.

Section 3: Online Information Need

There are a number of purposes for seeking online information. As a learner there are essentially two types of needs – one related to academic studies (for example, tests, assignments, research/project, etc.); and the other related to personal issues (health, recreational activities, etc.).The purpose of this section is to find out from you what important situation(s) you have

experienced and what kind of online information you have needed to find, learn or know in these situations

16. For what purposes aside academic, do you seek information on the Internet? (Please select all that apply)

a. Entertainment [ ]
b. Communication/Networking [ ]
c. News [ ]
d. General Awareness [ ]
e. Other, please specify.....

17. Which of the following situations compel you to find online information relating to your academic studies? (Please select all that apply)

a. Class Assignment [ ]
b. Class Test [ ]
c. Examination [ ]
d. Information Literacy Skills [ ]
e. Research/Project [ ]
f. Past/Sample questions [ ]
g. Laboratory Practical/Test/Result [ ]
h. Other, please specify.....

A subject portal is a website which has an entry point to other websites for accessing a collection of high quality, evaluated resources for a particular subject.

18. Do you have online subject portal(s) at your school? a. Yes [ ] b. No [ ]

19. Are you required by your teachers to transfer files (e.g. assignments) through the Internet for academic work? a. Yes [ ] b. No [ ]

20. Do you have an e-mail address? a. Yes [ ] b. No [ ]

21. If 'Yes' to question 22, are you required to communicate with your teachers through e-mail?
a. Yes [ ] b. No [ ]

22. If 'No' to question 22, why?
.....
……

Section 4: Selecting and gathering online information
The gathering and selection process of information on the Internet involves users' ability to know where to go, how to get there in the shortest way and how to interpret the several forms in which information is presented to achieve and construct knowledge (*Wu and Tsai, 2005). This section therefore is to find out from you how you select and gather information from the internet.*

23. Which of the following statements best define how you go about seeking information on the internet?

a. I usually seek information from the web with the assistance of an intermediary (e.g. Librarian, Lab assistant, etc.) [ ]
b. I usually get assistance from a friend or colleague [ ]
c. I usually do the searching myself [ ]
d. Other, please specify……

24. How often do you consult these information sources for your academic needs?

No.	**Information Source**	Always	Sometimes	Never
i.	Search Engines (e.g. Google)			
ii.	Online Catalog (e.g. OPAC)			
iii.	Academic Databases			
iv.	Organisational Websites (web pages)			

25. How frequently do you engage in the following when selecting information from the internet?

No.	**Ways of selecting information**	Always	Often	Sometimes	Rarely	Never
i.	I select information that corresponds to my opinion					
ii.	I select information that bring new thoughts to mind					
iii.	I select information that is accessible right away					
iv.	I select information which is similar to what my teacher has taught me					

26. How do you gather and select information from the internet?

No.	**Ways of gathering information**	Always	Often	Sometimes	Rarely	Never
i.	I examine the number of results found					
ii.	I examine only the results on the first page					
iii.	I examine the results on the other pages					
iv.	I use the top list first					
v.	I quit searching the moment I find relevant information					

27. How often do you find the information you are looking for on the internet?

a. All the time [ ]
b. Most of the time [ ]
c. Sometimes [ ]
d. Not very often [ ]
e. Never [ ]

Section 5: Online Searching Skills

Information users are required to possess certain skills in order to retrieve the desire information from the Internet to satisfy their information needs (Olorunfemi and Mostert, 2012). The purpose of this section is to find out from you the online searching skills you possess and how you employ those skills when seeking information from the internet.

28. Do you think you possess the necessary skills to use the Internet?
a. Yes [ ] b. No [ ] c. Unsure [ ]

29. Have you received any formal training or orientation on how to use the internet atn your school (Information literacy instruction)? a. Yes [ ] b. No [ ]

30. If "Yes" to question 33, do you think that such training was useful?
a. Yes [ ] b. No [ ] c. Unsure [ ]

31. If "No" to question 33, do you think that such training would have been useful?
a. Yes [ ] ` b. No [ ] c. Unsure [ ]

32. To what extent do you agree with the following statements below?

No.	**Information Literacy Skill**	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
i.	I am skilled in the use of computer					
ii.	I am skilled in the use of the Internet					
iii.	I am skilled in the knowledge of database structures					
iv.	I am skilled in formulating search queries					
v.	I am skilled in online browsing techniques					

33. When searching the web, how often do you use the five steps listed below?

No.	**Search steps**	Always	Often	Sometimes	Rarely	Never
i.	I use words from my questions as search terms					
ii.	I start by typing words in search engine					
iii.	I make a list of search terms before I start					
iv.	I formulate sub-questions					
v.	I use the 'advanced search' option					

34. How often do you use these skills when searching for online information?

No.	**Search skills**	Always	Often	Sometimes	Rarely	Never
i.	Keyword					
ii.	More than one keyword					
iii.	A phrase (Using quotations)					
iv.	Searching within results					
v.	Searching for similar results					
vi.	Searching within specific time range					

A Search engine is a program that searches for and identifies items in a database that correspond to keywords or characters specified by the user, used especially for finding particular sites on the World Wide Web.

A metasearch engine (also called aggregator) is a search tool that uses another search engine's data to produce their own results from the Internet.

Directories are selective Internet finding aids that are arranged by subject and include only selected sites.

A database is a structured set of data held in a computer, especially one that is accessible in various ways.

35. Have you been introduced to the following online information sources at your school? (Give one example each if your answer is 'Yes')

No.	**Information Source**	Yes	No	Example
i.	Search engines (aside Google)			
ii.	Meta-search engines			
iii.	Directories			
iv.	Databases			

Section 6: Evaluation of Online Information Sources

There is plenty of everything on the Web but not all of it is of a high quality (Quintana, Pujol and Romaní, 2012) hence the need to evaluate information sources to ascertain relevance and reliability of information. The purpose of this section is to determine from you how you evaluate and judge information from the internet before you use them.

36. Do you re-check and verify online information before you make a decision on it?
a. Yes [ ] b. No [ ]

37. Indicate how often you apply the following criteria when evaluating online information

No.	**Evaluation criteria**	Always	Sometimes	Never
i.	**Authority**(e.g. Do you check the author's credential?)			
ii.	**Accuracy/Quality** (e.g. Is the content verifiable or based on scientific research?)			
iii.	**Objectivity** (e.g. Do you check whether the author provides more than one point of view?			
iv.	**Currency** (e.g. Do you check the timeliness of the information?			
v.	**Coverage**(e.g. Do you check if the information source leave questions unanswered?)			

Section 7: Barriers to Online Information Seeking

A number of barriers or challenges have been identified by different studies on the obstacle of online information searching (e.g. infrastructural challenges). The purpose of this section is to find out from you the challenges you face when seeking information from the internet.

38. What challenges, if any, do you encounter when seeking online information? (Please select all that apply)

a. Slow Internet connection [ ]
b. Internet access restrictions [ ]
c. Lack of support and training [ ]
d. Information overload [ ]
e. Lack of internet skills [ ]
f. Other, please specify.....

39. Please suggest what can be done to address the challenges, if any, stated in question 42.
.....
.....
.....
...

40. How do you rate the level of your satisfaction related to training, support and Internet access at your school?

No.	**Challenge**	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
i.	Information literacy/ICT training					
ii.	Speed of internet connection					
iii.	Teacher's support					
iv.	Librarian’s support					
v.	Internet access on campus					

41. Is there anything else you would like to comment on?
.....
.....
..

Thank you very much for your time and responses, they are greatly appreciated.

Appendix 6: Questionnaire for ICT teachers

Covering letter for the questionnaire for collecting information from high school ICT teachers on "**Internet-based Information Behaviour of High School Learners in Ashanti Region, Ghana".**

Dear Respondent,

I am seeking your help in a survey on Internet-based Information Behaviour of High School Learners in Ghana. I am interested in knowing how the high school learners seek or search for and acquire information from the internet. The main purpose of this research is to better understand these learners' online information seeking behaviour. The outcome from the study is expected to improve teaching, inform curriculum by examining how learners retrieve and evaluate online information to help address possible gaps in the field of Information Studies.

I kindly ask for your time to complete the following questionnaire and return it at your earliest convenience within the next two weeks. 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 (Information Studies) degree. I assure you that the information you provide will be accorded the highest confidentiality and used solely for the purposes of this study.

Your invaluable effort in completing this survey is greatly appreciated.

Thanking you in advance for your time.

Philip Kankam (Mr.)
PhD Student, University of KwaZulu Natal
Pietermaritzburg, South Africa
Department of Information Science
Mobile: +233 24 484 3598 (Ghana) / +27 63 218 3954 (South Africa)
Email: efiewurah@yahoo.com

Questionnaire for collecting information from high school ICT teachers on "**Internet-based Information Seeking Behaviour of High School Learners in Ashanti Region, Ghana".**

Instructions for completing the questionnaire

a. Unless otherwise instructed, please place a tick (√) or a cross (X) in the space provided.
b. Where you are required to answer in your own words, please use the space(s) provided.

Section 1- Demographic Information

1. Gender a. Male [ ] b. Female [

2. School affiliated to

a. St. Louis SHS [ ] b. Effiduasi SHS [ ] c. Simms SHS [ ]

3. How long have you been teaching ICT at your school? .....

Section 2 - Internet Access

The purpose of this section is to find out from you where and when (places or locations and times) are learners able to access the internet in your school for online information.

4. Are learners able to access the Internet at your school? a. Yes [ ] b. No [ ]

If your answer to question 4 is No, explain why and thereafter do not proceed

.....
.....

5. Which of the following Internet connection types do you use?

a. Dial-Up/ regulator modem connection [ ]
b. Digital Subscriber Line (DSL) [ ]
c. Asymetric Digital Subscriber Line (ADSL) [ ]
d. Cable Modem Connection [ ]
e. Satellite Connection [ ]
f. Integrated Services Digital Network (ISDN) [ ]
g. Wireless [ ]
h. Other……

6. In your opinion, do learners of your school have enough time and access to the Internet at school? a. Yes [ ] b. No [ ]

7. Where are learners able to access Internet at your school? (Please select all that apply):

a. Library [ ]
b. Computer Lab [ ]
c. Science Lab [ ]
d. Classroom [ ]

e. Cell phone/mobile phone [ ]
f. Other (Specify) .....

8. When do learners access the Internet at your school?

a. During school hours b. After school
c. Weekends d. Anytime
. e. Other, please specify……

Section 3: Online Information Need

There are a number of purposes for seeking online information. As a learner there are essentially two types of needs – one related to academic studies (for example, tests, assignments, research/project, etc.); and the other related to personal issues (health, recreational activities, etc.).The purpose of this section is to find out from you what important situation(s) learners at your school have experienced and what kind of online information they have needed to find, learn or know in these situations

9. For what purposes do learners at your school seek information on the Web? (Please select all that apply)

a. Academic [ ]
b. Entertainment [ ]
b. Communication/Networking [ ]
c. News [ ]
d. General Awareness [ ]
e. Other (Specify) .....

10. Which of the following situations compel learners at your school to seek online information relating to their academic studies? (Please select all that apply)

a. Class Assignment [ ]
b. Class Test [ ]
c. Examination [ ]
d. Information Literacy Skills [ ]
e. Research/Project [ ]
f. Past/Sample questions [ ]
g. Laboratory Practical/Test/Result [ ]
h. Other (Specify) .....

A subject portal is a website which has an entry point to other websites for accessing a collection of high quality, evaluated resources for a particular subject.

11. Do you have online subject portal(s) at your school? a. Yes [ ] b. No [ ]

12. Do you require learners to transfer files through the Internet for academic work?
a. Yes [ ] b. No [ ]

13. Do you communicate with your learners through e-mail?
a. Yes [ ] b. No [ ]

Section 4: Online Searching Skills

Information users are required to possess certain skills in order to retrieve the desire information from the Internet to satisfy their information need (Olorunfemi and Mostert, 2012). The purpose of this section is to find out from you the online searching skills learners possess and how they employ those skills when seeking information from the internet.

14. Do you think learners at your school possess the necessary skills needed to use the Internet?
a. Yes [ ] b. No [ ] c. Unsure [ ]

15. Do you give formal training to learners on how to use the Internet at your school (Information literacy instruction)? a. Yes [ ] b. No [ ]

16. Do you collaborate with the librarian in regard to Information Literacy training programmes?
a. Yes [ ] b. No [ ]

17. Do you teach learners how to use these skills when searching for online information?

No.	Search skills	Yes	No
i.	Keyword search		
ii.	More than one keyword search		
iii.	A phrase (Using quotations) search		
iv.	Searching within results		
v.	Searching for similar results		
vi.	Searching within specific time range		

A Search engine is a program that searches for and identifies items in a database that correspond to keywords or characters specified by the user, used especially for finding particular sites on the World Wide Web.

A metasearch engine (also called aggregator) is a search tool that uses another search engine's data to produce their own results from the Internet.

Directories are selective Internet finding aids that are arranged by subject and include only selected sites.

A database is a structured set of data held in a computer, especially one that is accessible in various ways.

18. Do you introduce learners to the following online information sources at your school? (Give one example each if your answer is 'Yes')

No.	**Information Source**	Yes	No	Example
i.	Search engines (aside Google)			
ii.	Meta-search engines			
iii.	Directories			
iv.	Databases			

Section 5: Evaluation of Online Information Sources

There is plenty of everything on the Web but not all of it is of a high quality (Quintana, Pujol and Romaní, 2012) hence the need to evaluate information sources to ascertain relevance and reliability of information. The purpose of this section is to determine from you how in your opinion learners evaluate and judge information from the internet before they use them.

19. Do you teach learners how to re-check and verify online information before making decision on them? a. Yes [ ] b. No [ ]

20. Do you introduce learners to the following evaluation criteria

No.	**Evaluation criteria**	Yes	No
i.	**Authority**(e.g. checking the author's credential?)		
ii.	**Accuracy/Quality** (e.g. Is the content verifiable or based on scientific research?)		
iii.	**Objectivity** (e.g. checking whether the author provides more than one point of view?		
iv.	**Currency** (e.g. checking the timeliness of the information?		
v.	**Coverage**(e.g. checking if the information source leave questions unanswered?)		

Section 6: Barriers to Online Information Seeking

A number of barriers or challenges have been identified by different studies on the obstacle of online information searching (e.g. infrastructural challenges). The purpose of this section is to find out from you the challenges in your opinion faced by learners when seeking information from the internet.

21. What challenges, if any, do learners encounter when seeking online information? (Please select all that apply)

a. Slow Internet connection [ ]
b. Internet access restrictions [ ]
c. Lack of support and training [ ]
d. Information overload [ ]
e. Lack of internet skills [ ]
f. Other (Specify) .....

22. How do you rate the level of your satisfaction in terms of the following options at your school?

No.	**Challenge**	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
i.	Information literacy/ICT training					
ii.	Speed of internet connection					
iii.	Number of workstations					
iv.	Maintenance and management of ICT infrastructure					

23. Please suggest what can be done to address the challenge(s) you selected in question 21.
.....
.....
.....

24. Is there anything else you would like to comment on?
.....
.....

Thank you very much for your time and responses, they are greatly appreciated.

Appendix 7: Interview schedule for HICTDs

Covering letter for the interview schedule for collecting information from high school's ICT department heads on "**Internet-based Information Behaviour of High School Learners in Ashanti Region, Ghana".**

Dear Respondent,

I am seeking your help in a survey on Internet-based Information Behaviour of High School Learners in Ghana. I am interested in knowing how the high school learners seek or search for and acquire information from the internet. The main purpose of this research is to better understand these learners' online information seeking behaviour. The outcome from the study is expected to improve teaching, inform curriculum by examining how learners retrieve and evaluate online information to help address possible gaps in the field of Information Studies.

I kindly ask for your time in a short interview that will last between 30 and 45 minutes. Your free and frank feedback will be taken as an important contribution to the present research work. The results of this interview are essential to the completion of my PhD (Information Studies) degree. I assure you that the information you provide will be accorded the highest confidentiality and used solely for the purposes of this study.

Your invaluable effort in completing this survey is greatly appreciated.

Thanking you in advance for your time.

Philip Kankam (Mr.)
PhD Student, University of KwaZulu Natal
Pietermaritzburg, South Africa
Department of Information Science
Mobile: +233 24 484 3598 (Ghana) / +27 63 218 3954 (South Africa)
Email: efiewurah@yahoo.com

Interview schedule for collecting information from high school's ICT department heads on "**Internet-based Information Behaviour of High School Learners in Ashanti Region, Ghana".**

1. Gender a. Male [ ] b. Female [

2. School affiliated to

a. St. Louis SHS [ ] b. Effiduasi SHS [ ] c. Simms SHS [ ]

3. How long have you being heading the ICT department at your school? .....

4. Are learners able to access the Internet at your school?

5. What Internet infrastructure do you have available for learners?

6. In your opinion, do learners of your school have enough time and access to the Internet at school?

7. If NO, Why?

8. Where are learners able to access Internet at your school?

9. When do learners access the Internet at your school?

10. For what purposes do learners at our school seek information on the Web (Internet)?

11. What situations compel learners at your school to seek online information relating to their academic studies?

12. Do you have online subject portal(s) at your school? a. Yes [ ] b. No [ ]

13. In your opinion are learners at your school able to conduct effective online search by themselves?

14. How do learners locate information using the Internet at your school?

15. In your opinion how do they gather and select information from the Internet?

16. Do you think learners at your school possess the necessary skills to use the Internet?

17. Do you give formal training to learners on how to use the Internet at your school?

18. If "YES", do you think that such training has been useful?

19. If "NO", do you think that such training would have been useful?

20. Do you cooperate with the librarian in regards to these Information Literacy training programmes?

21. If Yes, please could you explain the nature of this cooperation?

22. If No, please could you specify the reasons for this non-cooperation?

23. What searching skills and tools do you teach learners for online information retrieval?

24. Do you introduce learners to academic databases and directories?

25. Do you teach learners how to re-check and verify online information before making decision on them?

26. Do you teach learners the criteria to evaluate online information sources?

27. What problems do learners encounter when seeking online information?

28. Please suggest what can be done to address the problem(s) raised on question 27.

29. How do you rate the level of your satisfaction in terms of the ICT service delivery including training that you provide to your learners?

30. Do you have Internet use policy document for learners?

31. Is there anything else you would like to comment on?

Thank you very much for your time and responses, they are greatly appreciated.

Appendix 8: Interview schedule for librarians

Covering letter for the interview schedule for collecting information from high school librarians on "**Internet-based Information Behaviour of High School Learners in Ashanti Region, Ghana".**

Dear Respondent,

I am seeking your help in a survey on Internet-based Information Behaviour of High School Learners in Ghana. I am interested in knowing how the high school learners seek or search for and acquire information from the internet. The main purpose of this research is to better understand these learners' online information seeking behaviour. The outcome from the study is expected to improve teaching, inform curriculum by examining how learners retrieve and evaluate online information to help address possible gaps in the field of study.

I kindly ask for your time in a short interview that will last between 30 and 45 minutes. Your free and frank feedback will be taken as an important contribution to the present research work. The results of this interview are essential to the completion of my PhD (Information Studies) degree. I assure you that the information you provide will be accorded the highest confidentiality and used solely for the purposes of this study.

Your invaluable effort in completing this survey is greatly appreciated.

Thanking you in advance for your time.

Philip Kankam (Mr.)
PhD Student, University of KwaZulu Natal
Pietermaritzburg, South Africa
Department of Information Science
Mobile: +233 24 484 3598 (Ghana) / +27 63 218 3954 (South Africa)
Email: efiewurah@yahoo.com

Interview schedule for collecting information from high school librarians on "**Information Seeking Behaviour of High School Learners in Ashanti Region, Ghana".**

1. Gender a. Male [ ] b. Female [

2. School affiliated to

a. St. Louis SHS [ ] b. Effiduasi SHS [ ] c. Simms SHS [ ]

3. How long have you being serving as the librarian at your school? .....

4. Are learners able to access the Internet from the library?

5. Where are learners able to access Internet on your school's campus aside the library?

6. In your opinion, do learners of your school have enough time and access to the Internet at your school?

7. If NO, Why?

8. Do learners at your school consult you for their online information?

9. If 'Yes', please could you explain the nature of these online information needs?

10. If No, please could you specify the reasons for learners not consulting you for their online information needs?

11. In your opinion are learners at your school able to conduct effective online search by themselves?

12. In your opinion how do learners at your schools gather and select information from the Internet?

13. Do you think learners at your school possess the necessary skills to use the Internet?

14. Do you give formal training or orientation to learners on how to use the Internet at your school?

15. If "YES", do you think that such training has been useful?

16. If "NO", do you think that such training would have been useful?

17. Do you collaborate with the ICT department in regard to Information Literacy training programmes for learners at your school?

18. If Yes, please could you explain the nature of this cooperation?

19. If No, please could you specify the reasons for this non-cooperation?

20. What searching skills and tools do you teach learners for online information retrieval?

21. Do you introduce learners to the databases and directories?

22. Do you teach learners how to re-check and verify online information before making decision on them?

23. Do you teach learners the criteria to evaluate online information sources?

24. What problems do learners encounter when seeking online information?

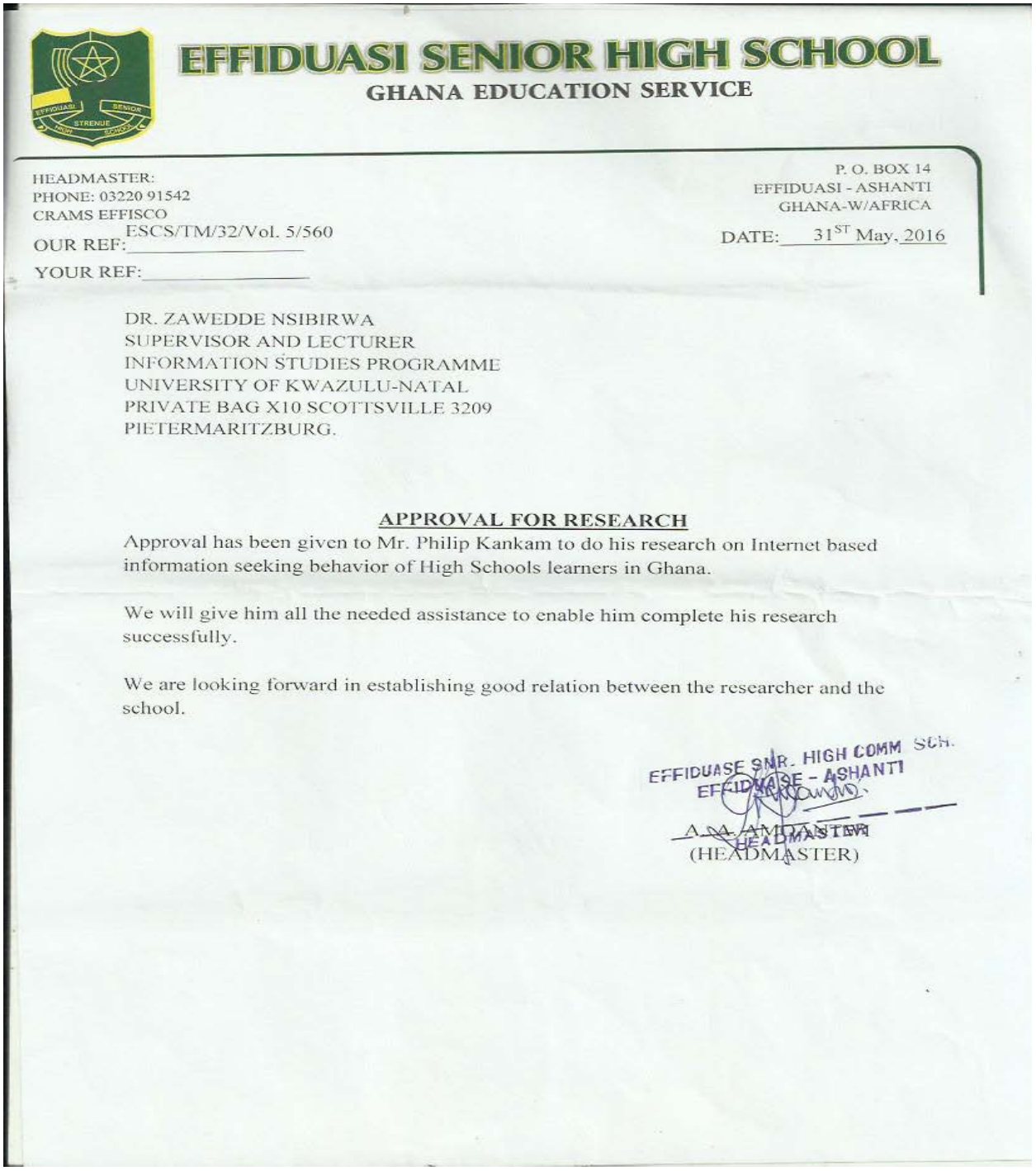
25. Please suggest what could be done to address the problem(s) raised on question 24

26. How do you rate the level of your satisfaction in terms of the ICT service delivery including training that you provide to your learners?

27. Is there anything else you would like to comment on?

Thank you very much for your time and responses, they are greatly appreciated.

Appendix 9: Gatekeeper's letter from Effiduasi SHS



EFFIDUASI SENIOR HIGH SCHOOL

GHANA EDUCATION SERVICE

HEADMASTER:
PHONE: 03220 91542
CRAMS EFFISCO

P. O. BOX 14
EFFIDUASI - ASHANTI
GHANA-W/AFRICA

OUR REF: ESCS/TM/32/Vol. 5/560

DATE: 31ST May, 2016

YOUR REF:

DR. ZAWEDDE NSIBIRWA
SUPERVISOR AND LECTURER
INFORMATION STUDIES PROGRAMME
UNIVERSITY OF KWAZULU-NATAL
PRIVATE BAG X10 SCOTTSVILLE 3209
PIETERMARITZBURG.

APPROVAL FOR RESEARCH

Approval has been given to Mr. Philip Kankam to do his research on Internet based information seeking behavior of High Schools learners in Ghana.

We will give him all the needed assistance to enable him complete his research successfully.

We are looking forward in establishing good relation between the researcher and the school.

EFFIDUASE SNR. HIGH COMM SCH.
EFFIDUASE - ASHANTI
HEADMASTER

A. A. AMOAKWA
(HEADMASTER)

Appendix 10: Gatekeeper's letter from St. Louis SHS

ST. LOUIS SENIOR HIGH SCHOOL

KUMASI ASHANTI

Tel No: +233-327-010851
E-mail address: stlouisseniorhighschool@yahoo.com
website: www.stlouisshs.edu.gh

P. O. Box 460
Kumasi - Ashanti
Ghana - W/A

Our Ref.: SLS/2015/VOL.1/2

Your Ref.:

Date: 3RD JUNE, 2016

DR. ZAWEDDE NSIBIRWA,
SUPERVISOR AND LECTURER,
INFORMATION STUDIES PROGRAMME,
UNIVERSITY OF KWAZULU-NATAL,
PRIVATE BAG X01 SCOTTSVILLE 3209,
PIETERMARITZBURG.

Dear Sir/Madam,

RE: ASSURANCE TO MR PHILIP KANKAM-PHD STUDENT AT UNIVERSITY OF KWAZULU-NATAL

With reference to your letter dated 26th May, 2016 on the above topic, I write to inform you that permission has been granted to Mr. Phillip Kankam to carry out his educational research in our school.

We assure you of the necessary support he may require from us.

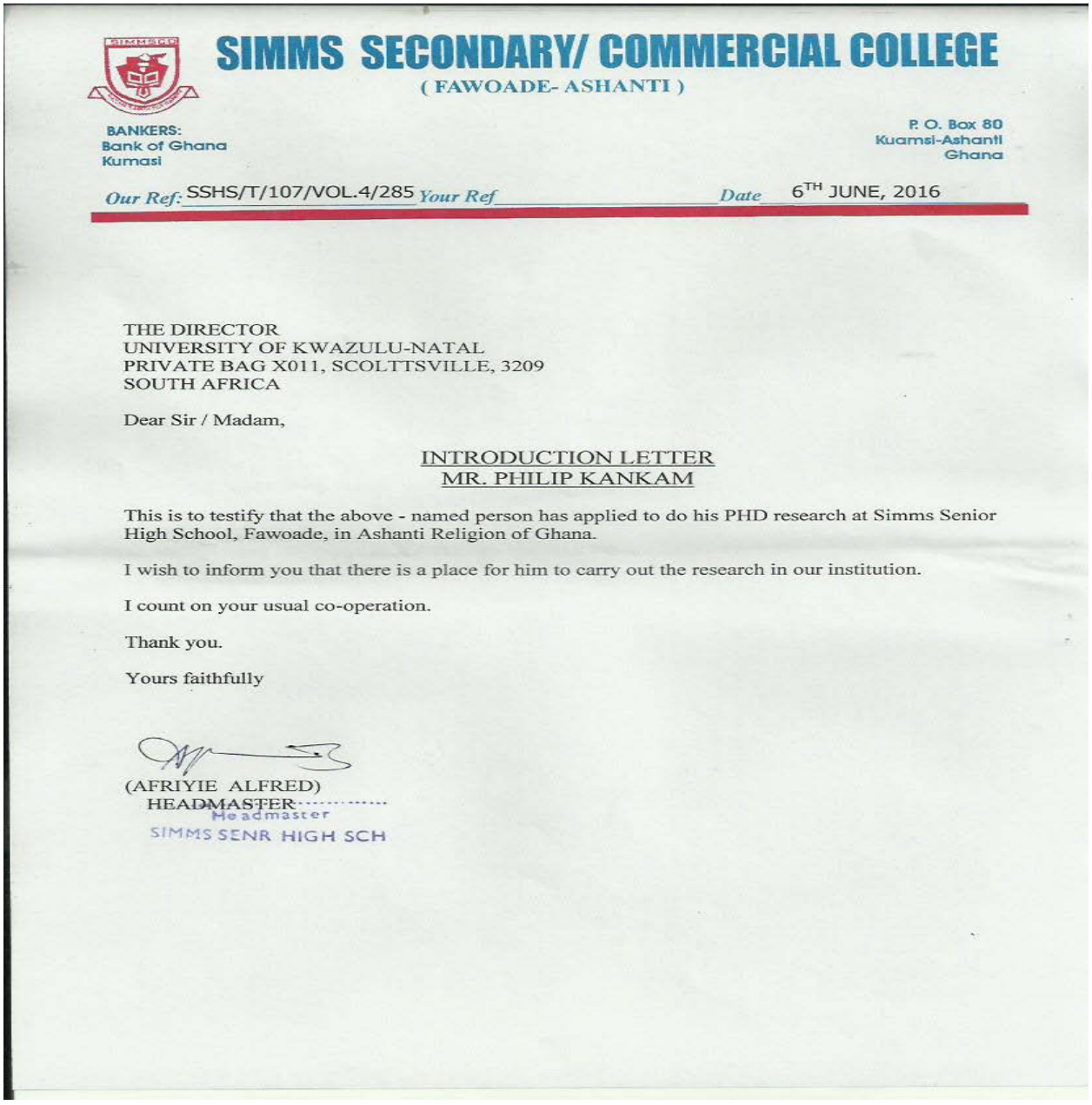
Thank you.

Yours faithfully,

VICTORIA USSHER (MS)
ASST. HEADMISTRESS (ACA)
FOR; HEADMISTRESS

ASSIST. HEADMISTRESS (ACA)
ST. LOUIS SEN. HIGH SCH.
P. O. BOX 460
KUMASI

Appendix 11: Gatekeeper's letter from Simms SHS



SIMMS SECONDARY/ COMMERCIAL COLLEGE
(FAWOADE- ASHANTI)

BANKERS:
Bank of Ghana
Kumasi

P. O. Box 80
Kuamsi-Ashanti
Ghana

Our Ref: SSHS/T/107/VOL.4/285 *Your Ref* *Date* 6TH JUNE, 2016

THE DIRECTOR
UNIVERSITY OF KWAZULU-NATAL
PRIVATE BAG X011, SCOLTTSVILLE, 3209
SOUTH AFRICA

Dear Sir / Madam,

INTRODUCTION LETTER
MR. PHILIP KANKAM

This is to testify that the above - named person has applied to do his PHD research at Simms Senior High School, Fawoade, in Ashanti Religion of Ghana.

I wish to inform you that there is a place for him to carry out the research in our institution.

I count on your usual co-operation.

Thank you.

Yours faithfully

(AFRIYIE ALFRED)
HEADMASTER
Headmaster
SIMMS SENR HIGH SCH

Appendix 12: Appendix to the proposed Internet IL guidelines

Some academic e-resources (databases) suitable for high schools

Britannica library (open access)	http://library.eb.com/levels
World history for us all (open access)	http://worldhistoryforusall.ss.ucla.edu/eras/era3.php
Internet public library (open access)	http://www.ipl.org/
Mas Ultra - School Edition	https://www.ebsco.com/products/research-databases/mas-ultra-school-edition
Student Resource Center (Gold)	http://www.gale.cengage.com/SRC/

Examples of mobile learning applications suitable for high schools

Mobile learning and study

BYJU's learning

Blackboard

Evernote (open access)

Google Classroom (open access)

Some computers and Internet funding organisations

Ghana Investment Fund for Electronic Communications	www.gifec.gov.gh
Computers for Charity	http://www.computersforcharities.org/stories/african-schools-online
UNDP	www.gh.undp.org/
IT Schools Africa	http://www.itschoolsafrica.org/
Computer Aid	http://computeraid.org/
infoDev	http://www.infodev.org/

Appendix 13: Ethical clearance certificate

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

11 November 2016

Mr Philip Kwaku Kankam 216057832
School of Social Sciences
Pietermaritzburg Campus

Dear Mr Kankam

Protocol reference number: HSS/1917/016D
Project Title: Internet-based information behaviour of high school learners in Ghana

Full Approval – Expedited Application

In response to your application received 4 November 2016, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL.**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

.....
Dr Shenuka Singh (Chair)
Humanities & Social Sciences Research Ethics Committee

/pm

Cc Supervisor: Dr Zawedde Nsibirwa
Cc Academic Leader Research: Professor Maheshvari Naidu
Cc School Administrator: Ms Nancy Mudau & Shulika Lukong Stella

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Telephone: +27 (0) 31 260 3587/8350/4557 **Facsimile:** +27 (0) 31 260 4609 **Email:** ximbap@ukzn.ac.za / snymanm@ukzn.ac.za / mohunp@ukzn.ac.za
Website: www.ukzn.ac.za