

HIGH SCHOOL STUDENTS' USE OF LICENSED DATABASES AND
DIGITAL RESOURCES VIA THE PUBLIC LIBRARY IN THE EAST COBB
AREA OF ATLANTA, GEORGIA, USA

by

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DECLARATION

I declare that “*High school students’ use of licensed databases and digital resources via the public library in the East Cobb area of Atlanta, Georgia, USA*” is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.



SIGNATURE

(Mrs NAC Krige)

30 November 2008

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ABSTRACT

The study aimed to examine high school student usage of licensed databases available through public libraries in Atlanta-USA. A descriptive quantitative survey was conducted via a web-based questionnaire among 135 East Cobb high school students.

The findings revealed that most students are aware of these licensed databases, but their usage is low (1:10) compared to Google. However, as students advance in grade levels, their database usage increases and GALILEO is the most-used licensed resource. Factors that influence student database usage include: specific academic needs; teacher instruction to use specific databases and frequent Digital Information Literacy (DIL) instruction. Most students receive DIL instruction at school, but their DIL skills are still inadequate. To increase usage of licensed databases as reliable information resources, the study recommends collaboration between public libraries and high schools, including incorporation of Generation Y's digital information preferences such as Google-type simplified interfaces, cutting-edge technology and time-saving search features.

Key Terms: High school students' information needs; user studies; information seeking behaviour of students; licensed database use; digital libraries in public libraries; GALILEO; Generation Y information attributes; Digital Information Literacy (DIL) instruction.

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CHAPTER 1

INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

In the current era of advanced information technology, high school students searching for information to complete school assignments face a deluge of information, especially in digital formats, available through multiple information sources. Students are furthermore faced with the dilemma of not always knowing whether digitally retrieved information is factually correct. On the one hand, information retrieved through Internet commercial search engines may not always be peer-reviewed or from reliable sources. On the other hand, licensed databases available through libraries contain specialised directories with authenticated information that could provide high school students with relevant, authoritative information for school assignments. Information literacy, the skill to know when, why and where to find information and how to evaluate the information, has therefore become a critical skill for high school cyber searchers.

This study investigated the extent to which high school students are using licensed databases available through public libraries in the East Cobb area of Atlanta, Georgia, as an information resource when searching for information to complete high school assignments. Situated against this background, this study attempted to identify and fill gaps in our knowledge pertaining to high school students as digital information users.

1.2 CONCEPTUAL SETTING

Within the discipline of Information Science this study is situated in the sub-discipline of *User Studies*. User studies are research studies that identify and select members of a specific user community to determine their information needs, information seeking behaviour, information literacy, their expectations of information services and how their information needs are satisfied (Moyer 2005:223). User studies tell us what users really want (their information needs), including their opinions, attitudes, expectations and ways

in which users search for information, i.e. their information seeking behaviour (Tenopir 2003a:32). User studies enable professionals in the field of library and information science to gain new insights into library user needs, user information seeking behaviour, user satisfaction with existing information services and to include library users in the planning of new or improved information services.

A critical reason for conducting library user studies is the fact that libraries, especially public libraries, are facing an increasing demand for accountability. It is imperative for libraries to clearly show responsiveness to library patrons and to have user input for making decisions about services involving the public's needs and expectations (Crist 1994:38-41).

Although user studies often confirm what we already know, the significance of user studies is the fact that they provide new insights into how libraries can better serve the library users in their communities (Tenopir 2003a:32). The results of library user studies provide librarians with information on how users view the library, including the quality of library services and its strengths and weaknesses. User study results may therefore help librarians to improve information services and collections, to decide which information resources to purchase and aid in developing effective user instruction. Improved services as a result of user studies could reinforce the library's mission to be a responsive institution in a changing information environment.

Since library users are diverse and hence their information needs, it is often necessary that a study focuses on a specific aspect or phenomenon such as a specific type of service or user group. Therefore this study focused on high school students (grades 9-12) as a public library user group when using the library's digital resources to complete school assignments. Previous research on the information seeking behaviour of high school students forms the basis of our knowledge and understanding of this library user group. Current public library information services and collection development practises relevant to high school students are based on past information needs analyses of public library users, including high school students. However, the current mix of high-tech students

vis-à-vis the growing number of digital resources poses new challenges to public libraries that need to be continually reviewed.

This study can also be situated in a wider context, since high school students' information literacy needs have pedagogical implications. This study could make a contribution to the knowledge, understanding and improvement of the information literacy needs of high school students. Information literacy is especially relevant in the current era of digital information technology, since students have access to multiple sources of digital information via the Internet. High school students need to have the ability to evaluate information in order to submit school assignments that are factually correct. A pitfall of the common assumption that high school students are technology "savvy", is the fact that research indicates they may lack basic information literacy skills (Valenza 2004:2). Better understanding of high school students' information literacy should lead to improved user instruction, which could result in more effective use of licensed databases by high school students, improved school assignments and ultimately contribute to improved academic performance.

1.3 CONTEXTUAL SETTING

The study was conducted in the East Cobb area of Marietta, Georgia, to provide some insight into the extent to which licensed databases are being used by high school students. The East Cobb area of Cobb County forms part of the greater Atlanta metropolitan area in Georgia, USA. The East Cobb area is located in the city of Marietta to the east of Interstate 75 and is northwest of the Atlanta CBD. The East Cobb area spans approximately 80 square miles (207 square kilometres) of Cobb County's 340 square miles (892 square kilometres), with a population of approximately 213 000 of the County's total population of 679 325, according to the United States Census Bureau 2006 estimate (<http://quickfacts.census.gov>).

The East Cobb area in Marietta is a relatively prosperous suburban area, for instance: the annual median household income for the 30066 zip code area is approximately \$85 000,

compared to the Cobb County median household income of approximately \$66 000, according to the Cobb Chamber of Commerce website (<http://www.cobbchamber.org>).

Demographic data indicate that the majority of the adult population in the East Cobb area has a high level of education and socio-economic status. Population members are from middle to upper class families, made up of individuals primarily between the ages of 32 and 50 years. The excellent public schools in the East Cobb area are a major consideration for families with school age children to move into the area. The high schools in Cobb County rank in the top quadrant of Georgia high schools in terms of SAT scores, with the six East Cobb high schools ranking at the top of Cobb County's public high schools according to the Georgia Department of Education website (<http://www.public.doe.k12.ga.us>). High school students from these high ranking public schools have access to multiple sources of information, including East Cobb high school media centres and East Cobb public libraries.

1.3.1 East Cobb high school media centres

The six high school media centres in the East Cobb area are well-equipped both in terms of printed and digital sources of information. Printed resources provided by media centres consist of traditional book collections based on high school students' information needs and include non-fiction, fiction and reference collections. Each high school media centre has a collection of approximately 20 000 items that can be checked out by students, according to the Cobb County School District website (<http://www.cobbk12.org>). The media centres also provide access to digital information resources via the Internet: computer deployment at high schools in the United States is at 100% availability (Wells & Lewis 2006:5). The media centres subscribe to licensed databases, which could be accessed at school or remotely from home via a password that changes at regular intervals. High school media specialists generally provide students with user instruction and a password to the licensed databases. If students do not receive licensed database user instruction or the password to these databases, this could prevent them from accessing the licensed databases remotely from home. The password to the licensed databases changes quarterly and in most cases can only be obtained from the media

centre, which makes the remote use of licensed databases by high school students problematic.

Access to high school media centres is limited: students can visit the media centre 30 minutes before or after school hours, or with permission and a pass from teachers during school hours, or during the relatively short lunch recess of approximately 30 minutes, according to the school district website (<http://www.cobbk12.org>). Teachers often allow students to use the media centre during regular school hours for research purposes, but the time allowed for research is often not sufficient to complete school projects. Considering the difficulties associated with access to high school media centres, high school students might turn elsewhere to satisfy their information needs, for instance to Internet search engines and/or the public library.

1.3.2 East Cobb public libraries

Public libraries are generally more accessible and convenient in terms of hours of operation than high school media centres. The public libraries in the East Cobb area of Atlanta are open from 9am-9pm during weekdays; 9am-6pm on Fridays and Saturdays and on Sundays the regional library is open from 1pm-5pm, according to the library website (<http://www.cobbcat.org>). Public libraries in the area are therefore accessible for longer hours, including weekends when the school media centres are closed.

Public libraries in the East Cobb area consist of one large regional library and three relatively large branch libraries. These libraries are well-equipped: each has a large collection ranging from approximately 40 000 - 130 000 items per branch. Collection development tailored to the needs of public library users is a high priority both in terms of printed and digital information sources. Collection development priorities are revised each year at the beginning of the new fiscal year after assessment of the library collections.

Since a good education is a high priority for the majority of East Cobb parents, they often accompany their children (including high school students) to the public library and for the most part rely on reference librarians' expertise and services to solidify their

educational experience. The reference librarians instruct parents and students in the use of the licensed databases, so that they have an appreciation for what is available online. However, in most cases students also need printed materials, so they avail themselves of the online public access catalogue (OPAC) and librarians' assistance to supply the additional information. Some patrons find it more convenient to use the licensed databases at home and remote access is available via a password.

Licensed databases subscribed to by the East Cobb public libraries include the Georgia University System's Virtual Library Initiative (GALILEO), which is a virtual library consisting of almost 200 licensed databases; Gale databases (e.g. Literature Resource Center); NetLibrary (full text e-books); EBSCOhost Databases (e.g. academic journal articles); NewsBank (newspaper/current events database covering newspaper articles across the country); LitFinder (poetry database) and more, according to their website (<http://www.cobbcat.org>).

These libraries are also well-equipped in terms of high-speed Internet access: each library has public computers ranging from approximately 30 public computers at the regional library to 11 public computers at the smallest branch. A study conducted in 2006 on Internet availability in public libraries, reported that 98.9% of public libraries in the USA have public computers with access to the Internet (Bertot, Jaeger & McClure 2006:1). High school students who do not have Internet access at home often turn to public libraries for Internet access in order to work on school assignments.

The East Cobb public libraries are well-patronised by the general public, including high school students: the regional library circulates approximately 50 000 library items per month. The teenage population, also called "young adults" (ages 12-18), represents approximately 25% of the communities served by public libraries in the USA (Hughes-Hassell & Miller 2003:143). High school students constitute the majority of the above mentioned public library user group: ages 14-18 in grades 9-12. The four public libraries in the East Cobb area therefore serve a large number of high school students: the six public high schools in the area each have 500 - 700 students per grade, totalling 12 550 high school students.

1.4 PROBLEM STATEMENT

The challenge that public libraries face is how to provide for the information needs of such large numbers of high school students, when students are required to read the same publication in subjects such as English Literature. Books are not readily available to read online via the Internet as a result of copyright restrictions and high school media centres have limited accessibility, therefore many high school students turn to the public library for their information needs.

Furthermore, high school students searching the Internet in subjects such as social studies, science and geography, face a plethora of digital information that may not always be factually correct. Research indicates that although high school students are considered to be computer savvy, they may lack the information literacy skill of evaluating the authenticity of retrieved digital information (Valenza 2004:2).

After conducting an in-depth literature research on high school students' information seeking behaviour, the researcher found evidence in the literature that many high schoolers visit public libraries for the completion of school assignments (Clabo 2002:34). However, it is not always clear whether or not they make use of the licensed databases available through the public library system that could provide them with factually correct, peer-reviewed information. In fact, it is possible that high school students do not perceive the public library's licensed databases as a significant information resource for school assignments. Furthermore, considering that the public library attends to a larger audience, it is also possible that the information needs of high schoolers are not fully addressed in terms of resources, skills and guidance.

1.5 AIM OF THE STUDY

The aim of this study is to determine the extent to which high school students use the licensed databases available through the public libraries in the East Cobb area of Atlanta, Georgia, when searching for information to complete high school assignments. In economic terms the aim of this study is to provide recommendations for more effective

use of the public library's digital resources, in order to achieve better returns on the substantial investment in licensed databases.

1.6 STUDY OBJECTIVES

The study aim branches into the following research objectives:

- 1.6.1 Examine why high school students visit public libraries in the East Cobb area of Atlanta, Georgia, when they need information for school assignments.
- 1.6.2 Determine the information needs and information seeking behaviour of high school students when finding information for school assignments, especially when using the licensed databases available through the public library.
- 1.6.3 Reveal high school students' awareness levels of the licensed databases available to them via the public library.
- 1.6.4 Uncover the factors that would encourage high school students to use the public library's licensed databases.
- 1.6.5 Determine if high school students have the skill of information literacy in order to evaluate the accuracy, relevancy, authenticity and sufficiency of retrieved digital information.
- 1.6.6 Recommend measures to more effectively address high school students' information needs, their information literacy skills and use of digital resources available through the public library system (Chapter 6 section 6.3).

1.7 RESEARCH QUESTIONS GUIDING THE STUDY

Each of the research objectives branches into a number of research questions guiding the study. Each research question has been used to formulate questions for the questionnaire that is discussed in the research methodology section of the study (Chapter 4). The following research questions guided the study in order to fulfil the stated objectives:

- 1.7.1 Why do high school students visit public libraries in the East Cobb area of Atlanta, Georgia, when they need information for school projects? (Study objective 1.6.1)

- 1.7.2 Which academic information needs and expectations lead high school students to turn to the public library? (Objective 1.6.2)
- 1.7.3 What is the digital information seeking behaviour of high school students when finding information for school assignments? (Objective 1.6.2)
- 1.7.4 To what extent are they currently using the licensed databases available through the public library? (Objective 1.6.2)
- 1.7.5 What are high school students' perceptions and attitudes towards the public library's licensed databases as an information resource for school assignments? (Objective 1.6.2)
- 1.7.6 To what extent do they use Internet search engines to satisfy their information needs? (Objective 1.6.2)
- 1.7.7 Are high school students aware of GALILEO (the Georgia University System's state-wide virtual library initiative) and the wide spectrum of licensed databases available to them via public libraries? (Objective 1.6.3)
- 1.7.8 Which factors would encourage high school students to use licensed databases available through the public library when requiring information for school assignments? (Objective 1.6.4 and 1.6.6)
- 1.7.9 Will high school students make more use of the public library's licensed databases if user instruction classes aimed at high school students could be provided by public libraries? (Objective 1.6.4 and 1.6.6)
- 1.7.10 Are high school students able to conduct successful information searches and evaluate the reliability and quality of information retrieved via commercial search engines and digital libraries? (Objective 1.6.5 and 1.6.6)
- 1.7.11 Do high school students receive instruction in the skill of information literacy? (Objective 1.6.5)

1.8 SIGNIFICANCE OF THE STUDY

Research of this study can be justified from the following perspectives, which represents the significance of the study:

1.8.1 Significance from an Information Science perspective

As a user study within the discipline of Information Science, the significance of this study is the contribution on various levels to the knowledge and understanding of the high school student as a library user. On a theoretical level this study aims to add new knowledge to the theory of this library user group: as far as can be determined, little research has been conducted on high school students' use of digital libraries via the public library. On a descriptive level this study aims to add interesting and relevant information about the information seeking behaviour of high school students using the public library's licensed databases and digital resources. This study also contributes to the knowledge field of this user group on an applied level: it rests on the premise that improved knowledge and understanding of high school students' information seeking behaviour could be applied to provide solutions to various problems relating to this public library user group:

- Better understanding of the information needs, information seeking behaviour and use of the public library by high school students, could improve the planning and provision of information and reference services to this user group, since this study attempts to address their information needs, information retrieval abilities and information literacy skills. Several studies emphasise the importance of involving the library user in the design of library services that will address their information needs (Walter, 2005; Hughes-Hassell & Miller, 2003).
- The results of this study could be used by public librarians to gain a better understanding of a significant public library user segment, high school students who could be used for better promotion of library resources and more effective library staff support and user training.

1.8.2 Significance from the high school student perspective

This study can also be justified from a high school student and an educational perspective. When high school students visit public libraries and school media centres to satisfy their information needs, they may find that these libraries do not have the capacity

to satisfy the information needs of such large numbers of students if they only rely on printed format as an information source. Accessing licensed databases via the public library, such as NetLibrary that provides full text e-books in electronic format, could provide a possible solution to the problem of large numbers of high school students simultaneously requiring the same publication for a school assignment.

When high school students access the Internet to find information for school projects, commercial search engines could guide them to unverified sources of information such as the popular online encyclopaedia, Wikipedia (Tenopir 2007:26; Barack 2005:30; Harris 2007:26). The use of Wikipedia as a reference tool is discouraged by many tutors because of the (sometimes) doubtful accuracy of its information and the inability to critically evaluate information sources and author credentials. (Tenopir 2007:26). In order for high school students to complete their school assignments successfully, it is therefore important that they are guided to use reliable digital sources of digital information, such as licensed databases that provide authenticated, peer-reviewed information. Improved library information services aimed at meeting the information needs of high school students, could result in improved information literacy among high school students, ultimately contributing to improved academic performance.

1.8.3 Significance from a public library perspective

Results of this study are also significant from a public library perspective, since most public libraries in the USA spend substantial amounts of financial resources to obtain the rights to access licensed databases, including public libraries in the East Cobb area of Atlanta, Georgia. On the surface there does not appear to be a large number of high school students using the heavy investment in licensed databases. This study brings to light some of the issues that surround the use of the above mentioned digital resources, especially from the high school student perspective. Thus the results of the study may provide management of the public library system with a basis for future decisions relating to promotion of these key resources among high school students. The study recommendations could be used to introduce measures for more effective use of the

public library's digital resources, in order to achieve better returns on the investment in licensed databases.

1.8.4 Significance from a digital library perspective

This study is also relevant from a digital library perspective, since digital library vendors could use researched insight into the information seeking behaviour of the high school student as a digital library user to improve the accessibility and use of digital libraries.

1.9 RESEARCH SCOPE

The research scope of this study is limited to high school students' information seeking behaviour as public library users during the completion of school assignments, focussing on their use of the licensed databases available through the public library.

Limitations and delimitations of the study are the following:

1.9.1 Geographical: East Cobb Area, Cobb County, Atlanta, Georgia, US.

1.9.2 Age: high school students ages 14-18, grades 9-12.

1.9.3 Schools: public high schools serving the East Cobb area; no private schools or home-schooled students are included in the study.

1.10 DEFINITION OF TERMS

1.10.1 Digital Resources

Digital/electronic information resources are information resources that are accessed online via the Internet and include licensed databases, digital libraries (also known as virtual libraries) and web-published information retrieved by commercial search engines (Tenopir 2003b:7).

1.10.2 Licensed databases

Licensed databases are information resources available online that require subscription by institutions in order to gain access to the organised digital information in the databases (also referred to as “subscription databases”). The digital information in the databases is the intellectual property of the vendors; therefore the information is licensed and requires subscription in order to gain access to the information. The information in licensed databases is verified, peer-reviewed and authenticated (Gunn 2002:27).

1.10.3 Commercial search engines

Commercial search engines are services on the World-Wide Web that allow users to search large databases of web-pages (3+ billion web pages) by word, phrase or other criteria (Hock 2007: 63).

1.10.4 Information literacy

Armstrong (2005:1) defines this concept clearly: “Information literacy is knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner”.

1.11 DISSERTATION PROFILE

Chapter 1: Introduction to the study

This chapter covers the following: introduction and description of the topic, conceptual and contextual settings, the problem statement, research aim, study objectives, research questions guiding the study, significance, the scope of the study indicating limitations and delimitations, definitions of key terms/concepts, a brief chapter outline and a time schedule of the study.

Chapter 2: The Internet and licensed databases as information resources for high school students

The chapter provides background to the literature review, including an overview of the history of the Internet, the World-Wide Web, search engines and the influence of the Internet on high school students. It covers licensed databases and digital libraries available through East Cobb public libraries and the relevance of these information resources for high school students needing information for school assignments.

Chapter 3: High school students' information needs and digital information seeking behaviour

This chapter covers the literature review and includes a profile of high school students, describing the characteristics of the high school student as part of Generation Y. High school students' information needs, information seeking behaviour and digital information literacy skills are discussed, as well as the role of the public library in supporting high school students' use of licensed databases.

Chapter 4: Research design and methodology

This chapter covers the quantitative approach selected for the research design, the descriptive survey method, the sampling techniques employed and the web-based questionnaire as the selected research instrument. The research process is discussed, including identification and selection of the data sources; developing the measuring instrument including validity and reliability of the chosen instrument; the process of collecting the data; the fieldwork and data documentation, data capturing and data analysis.

Chapter 5: Data Analysis and interpretation

This chapter covers the analysis and interpretation of the research data. The data obtained from the 135 responses to the electronic questionnaire is tabulated and statistically analysed, using table analysis techniques such as z-tests, chi-square tests and row mean tests. Various diagrams visually illustrate the data used in cross tabulation

tables. Null hypotheses as they pertain to research questions are subjected to statistical tests to determine if they should be rejected.

Chapter 6: Discussion of research findings, conclusions and recommendations

The research findings and conclusions based on the study objectives are discussed in the final chapter. The extent to which the research results supported the study objectives is discussed in this chapter and the study is concluded with recommendations for more effective high school students' use of the licensed databases available through the public library.

1.12 RESEARCH TIME SCHEDULE

The researcher conducted the study over a period of two years, divided into six phases. During the first year the researcher followed the MInf guided programme, which was recommended by UNISA as a programme that prepares students for writing the dissertation and conducting the research. The guided programme included four assignments, which formed the bases of Chapters 1 - 4 of the dissertation and culminated in the submission of a detailed research proposal in November 2007. The researcher subsequently conducted the fieldwork and wrote the dissertation over a period of twelve months from November 2007 - November 2008.

The following time schedule of the researcher is based on research time management principles as suggested by Mouton (2006:67):

- Phase 1: MInf Guided programme and Research Proposal: 12 months
- Phase 2: Fieldwork preparation: 14 weeks
- Phase 3: Pilot-testing: 4 weeks
- Phase 4: Conducting the fieldwork: 8 weeks
- Phase 5: Data analysis, interpretation and findings: 14 weeks

Phases 2-5 included writing, submission and revision of the dissertation on a chapter-by-chapter basis.

- Phase 6: Revision, proof-reading and submission of the final draft of dissertation:
12 weeks.

1.13 SUMMARY

In this chapter the researcher sketched the conceptual and contextual settings for the study, which provided the basis for discussing the aim and objectives of the study and the research questions that needed to be addressed. The researcher then gave an overview of the significance of the study and concluded with the research time schedule that is based on research time management principles suggested by Mouton (2006:67). This chapter served as an introduction to the study and the next chapter covers the Internet and licensed databases as information resources for high school students.

CHAPTER 2

THE INTERNET AND LICENSED DATABASES AS INFORMATION RESOURCES FOR HIGH SCHOOL STUDENTS

2.1 INTRODUCTION

The review of the current scholarly work and published literature on high school students' use of digital resources via the public library covers an overview of the development of the Internet and applications such as the World-Wide Web. Furthermore, licensed databases available through public libraries in the East Cobb area of Atlanta, Georgia, are examined as an information resource for high school students when they require information for high school assignments.

2.2 THE INTERNET AND THE WORLD-WIDE WEB

In order to understand the use of digital resources by high school students, it is necessary to reflect on the foundations of information delivery in digital format. This section covers the following aspects:

- A brief history of the development of the Internet as an infrastructural network to create access to digital information and create person to person collaboration and communication.
- Understanding how the World-Wide Web, the major application of the Internet, organises and accesses the information content available via the Internet.
- Development of search tools such as Internet search engines and directories to organise the available content on the World-Wide Web.
- Accessibility of the Internet to high school students via schools and public libraries.

- The impact of the Internet, World-Wide Web and search engines on high school students' digital information seeking behaviour.

2.2.1 Brief review of the development of the Internet

The Internet developed as a result of a concept concerning a “galactic network” written by J.C.R. Licklider of Massachusetts Institute of Technology (MIT) in 1961 (Leiner 2007:1). Leonard Kleinrock at MIT published a paper on packet-switching theory and convinced Lawrence G. Roberts at the US Defence Advanced Research Projects Agency (DARPA) of the theoretical feasibility of using packets (digitally formatted message carriers with an address header and control information), rather than circuits (analogue signals) in telecommunication. Roberts published a paper in 1967 on a computer networking concept using packet switching in resource sharing called “ARPANET” (Advanced Research Projects Agency Network). Roberts, Roger Scantlebury (UK) and Paul Baran (RAND Group) collaborated and by 1968 they had refined the overall structure and specifications of ARPANET. The first node of ARPANET was installed in 1969 at UCLA (University of California, Los Angeles), headed by Kleinrock (Sterling 1993:1).

The network's use soon expanded beyond that of the official US scientific and military decentralised computing facility, to an unofficial electronic post office and personal news service. Ray Tomlinson of BBN Technologies wrote the first basic email message send-and-read software in 1972. Email expanded and rapidly became the largest network application of the 1980's (Leiner 2007:1-3).

A need developed to establish a communication capability between different networks. In 1972 Robert Kahn developed the idea of open architecture networking with a program called “Interneting”, which eventually led to the Transmission Control Protocol/Internet Protocol (TCP/IP). Vint Cerf incorporated the implementation standards of each of the operating systems involved in an open architecture.

One of the most significant contributions was David Clark's (MIT) development of a compact and simple implementation of TCP/IP that could run on a personal computer.

ARPANET and NSFNET (National Science Foundation Network) merged in architecture and the use of TCP/IP and developed into what we know today as the Internet (Leedy 2005:15). By 1990 ARPANET was decommissioned; TCP/IP had replaced most wide-area computer network protocols world-wide and IP was well on its way to becoming the bearer service for the “Global Information Infrastructure” (Leiner 2007:8). By 1995, as a result of the world-wide acceptance of Internet standards, the responsibility for the Internet was handed over from Federal control (NSFNET) to a number of private companies.

According to Leiner (2007:12) the US Federal Networking Council (NFC) defined the term “Internet” in 1995 as a global information system that is linked together by a unique address space based on the Internet Protocol (IP); supports communications using the Transmission Control Protocol/Internet Protocol (TCP/IP) and provides high level services layered on the communications and related infrastructure described above.

As businesses and individuals embraced the concept, the Internet grew beyond calculation. In 2003 it was estimated that world-wide more than 200 million Internet hosts were connected to the Internet (Hock 2007:6). The Internet and its applications continue to develop and due to its pervasive networking, availability of powerful, affordable computing and communication in portable format (cell phones, PDA’s etc.), new paradigms are continuously opening up to user communities (Leiner 2007:13).

2.2.2 Internet applications: the World-Wide Web

The most important Internet application, the World-Wide Web (WWW), rose to prominence in 1990 (Ebersole 1999:3). The World-Wide Web is a multimedia, hypertextual collection of information and entertainment resources available to computer users who are connected to the Internet. The concept of the World-Wide Web was conceived in the late 1980’s by Tim Berners-Lee at CERN. The World-Wide Web was constructed from the following building blocks: Hyper Text Mark-up Language (HTML) and Hyper Text Transfer Protocol (HTTP). The World-Wide Web’s success was based on the ease of use via a Graphical User Interface (GUI), employed by the leading browser

applications. A “browser” is an application allowing the user access to the World-Wide Web, employing “point and click” navigation through hypertext links and icons. The first Internet browser became available in 1994 and was called “Mosaic” (later called Netscape Navigator), but in 1999 Microsoft’s Internet Explorer took over from Netscape Navigator as the most popular Internet browser and still maintains that leadership position today (Hock 2007:5).

The Internet was originally designed for simply transporting documents and information. The technology it was built upon lacked the interactivity required by the multimedia and entertainment needs of the more sophisticated user. Today the trend of Internet applications is toward rich, dynamic, user-friendly, process-relevant and personalised applications. Rich Internet Applications (RIA) now delivers desktop software-like functions on the web to enable new kinds of engaging, highly-interactive applications and user experiences (Noda & Helwig 2005:1-8; Xin 2006:1-3). These applications, collaboration and sharing among users are called the second generation of the World-Wide Web or Web 2.0. The most common applications of Web 2.0 are user applied “tags”, zooming in and out of maps and instant windows opening up when the cursor is moved over a web page (Hock 2007:7).

The latest trend in Internet end-user information manipulation is towards mashups. Mashups are web applications that seamlessly combine content from more than one source into an integrated experience (Hock 2007:75). The benefit of this development for high school students is the combination of multiple sources of related information, in order to gain a more holistic view of a topic. Users can integrate various pieces of software into one application using wikis, blogs and content from various websites to create an informed view of the subject at hand.

The significance of the Internet and its major application, the World-Wide Web, is not in the technological functionality, but in the content. The diversity of the content is meeting the needs of users searching the World-Wide Web on multiple fronts: information, education, entertainment, and social interaction (Ebersole 1999:7; Jansen & Spink 2006:256).

2.2.3 Searching the World-Wide Web

The Internet is an enabler, i.e. an infrastructure allowing access from multiple points that carries electronic signals among those points. This allows access to information content that is unfiltered, unprocessed and enormous in quantity. To get to the available content, the user can attempt to search for it manually by typing in various web addresses (URL's), using available searching software or choosing to rely on the expertise and judgement of others to assist (Lorenzen 2001:3).

The most often-used tools to explore the content of the World-Wide Web can be categorised as general directories, specialised directories and web search engines (Hock 2007:8):

- *General directories* select sites that are relevant to certain selection criteria and are organised into categories that allow users to browse topics (Hock 2007:8).
- *Specialised directories* are sub-categories of general directories that are distinguished by the fact that they are focused on a specific topic (Hock 2007:11). Specialised directories are valuable to users who need immediate expertise in a specific area of interest and are therefore valuable information retrieval tools for academic users, including high school students.
- *Internet search engines*: web pages become searchable by a web search engine service in a four step process which also corresponds to the search engine “parts:” the crawlers, indexing program and index, search engine program and HTML (HyperText Markup Language) interface (Hock 2007:63-64). Crawlers or spiders scan the Internet to gather information from websites and feed this information to the search engine’s indexing mechanism. The indexing program then indexes virtually every word, link, URL, metatag and image file name on every new page found by the crawlers. The search engine program then matches a user’s search criteria and delivers the retrieved results in a rank order determined by the relevance-ranking algorithm used by the search engine. The HTML user interface gathers query data from the user. The interface is located on the home page of a

search engine. The interface contains the search box, links to searchable databases (e.g. news) and may include various other features.

Commercial search engines treat all their users equally for simple queries. Relevancy is not determined by the needs of a user, but rather by a linking structure based on popularity of use and the frequency of the search criteria appearing in an article or web page. This will result in a multitude of web pages being retrieved. To narrow down the number of retrieved references it is advisable to use an advanced search option (Hock 2007:65).

Major search engines such as Google and Yahoo! have advanced search features that include Boolean operators (AND, OR, NOT), with some automatic stemming and prefixes such as “intitle”, “allintitle”, “inurl”, etc. Information can also be searched by media type and the popular search engines usually also include formats such as images, audio and video streaming (Hock 2007:129).

The search for information on commercial search engines has become the world-wide norm. Apart from Google, the largest Internet search engine, the bulk of the rest of the search engine market space is taken up by Yahoo!, MSN Live and AOL. The following are key Internet search engine statistics in the USA (10 billion per month) from Nielsen/NetRatings for March 2008 (Burns 2007:1):

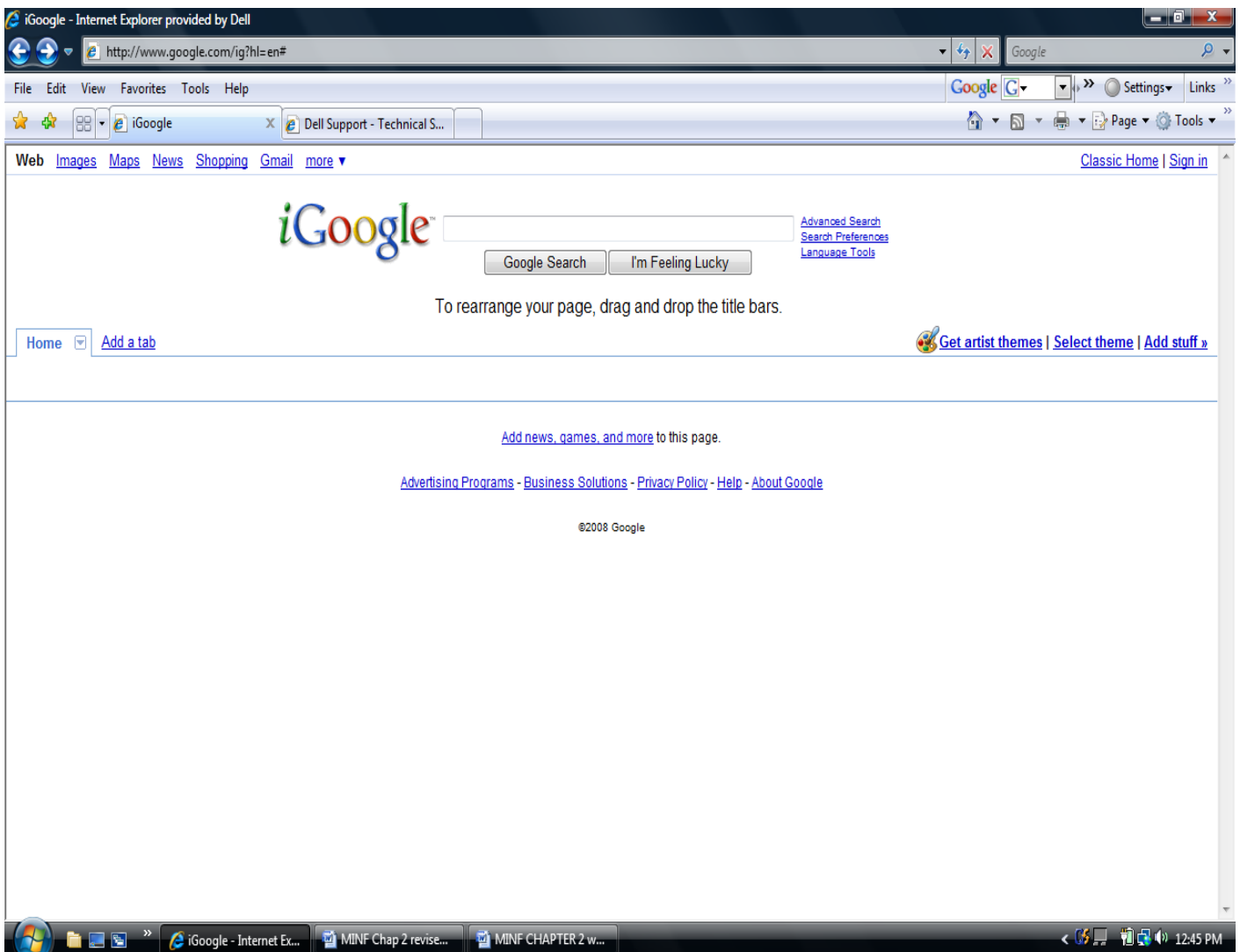
- Google 5.9 billion searches, 58.7% share of Internet searches.
- Yahoo! 1.8 billion searches, 18.1% share of Internet searches.
- MSN/Live 1.2 billion searches, 12% share of Internet searches

2.2.3.1 Google Search Engine

The above statistics confirm that Google is the most popular search engine consulted by computer users, including high school students (Burns 2007:1). Hock (2007:90) mentions several reasons for Google’s phenomenal popularity and success: Google is firstly the largest of all the commercial search engines, with more than eight billion

searchable web pages, resulting in more retrieved results per search. In conjunction with this, the internal algorithm for relevancy ranking of retrieved results is based on the popularity of previous use. Furthermore, the user-friendly, uncluttered simplicity of the Google interface also contributes to its popularity (Figure 2.1, as permitted under “fair use”).

Figure 2.1: Simplicity, User-Friendliness of Google Interface



The basic Google search feature with its simple search box will accept one or more search terms or keywords. An advanced search option for narrowing retrieved results is also available (Hock 2007:80-81).

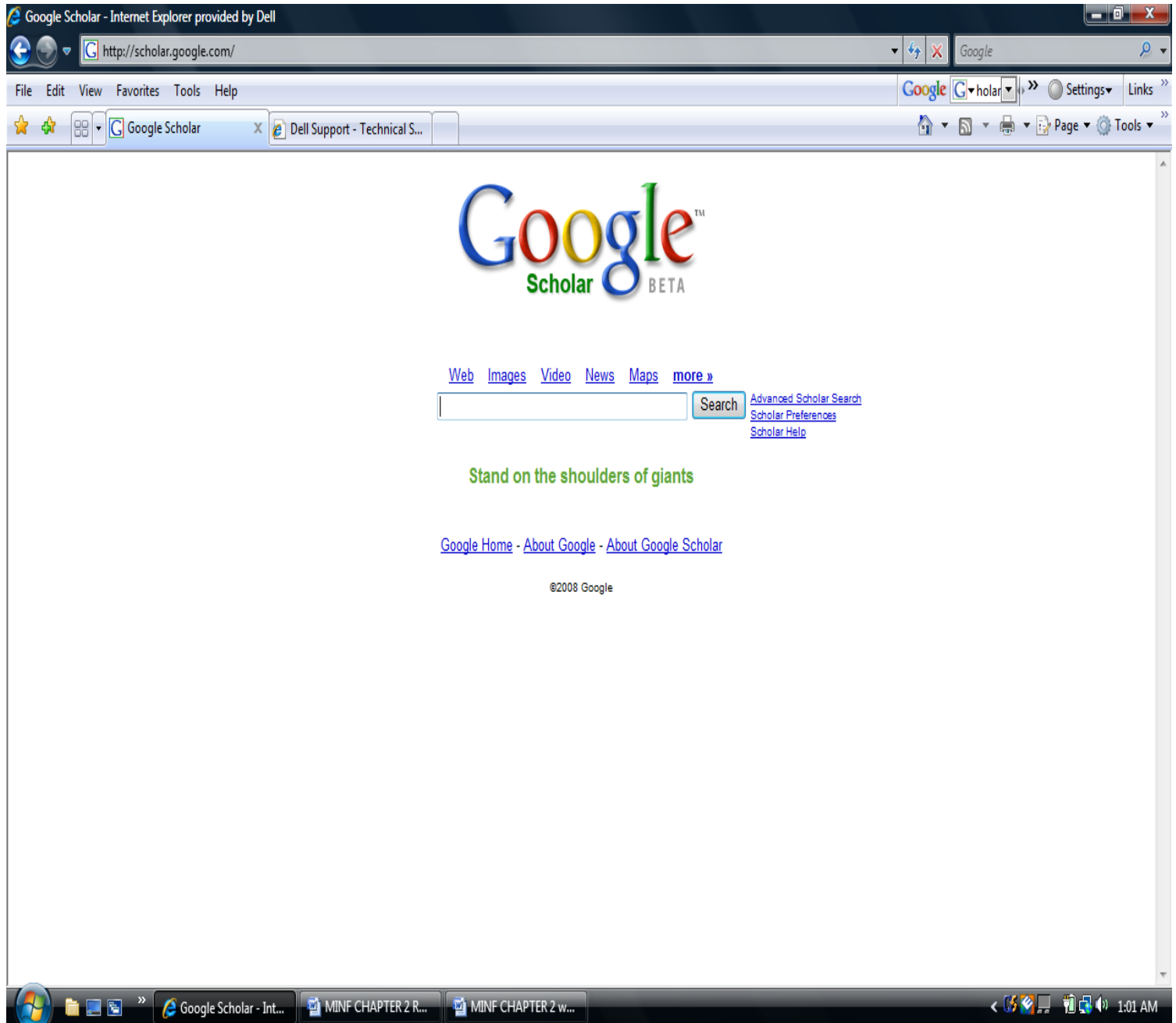
The Google results page offers a number of useful features. The results page could suggest refining the search or if a misspelled word is suspected, it will come up with suggested alternatives. The search results page also offers a link to cached pages or similar pages and a translation feature for foreign language materials. Among the many other searchable databases offered by Google, one of the most interesting databases for high school students is Google Earth, that offers aerial views of places throughout the planet (Hock 2007:79-97).

2.2.3.2 Google Scholar Search Engine

Google Scholar is a specialised Google search engine that provides a simple way to access scholarly, peer-reviewed information. Of interest are the words below the Google Scholar search box: “Stand on the shoulders of giants,” in recognition of the academic scholars upon whose work Google Scholar is based (<http://scholar.google.com>).

Free access to scholarly information is limited, however, since search results often lead users to a website that provides abstracts only and requires the user to pay for full-text information. Google Scholar provides a potential solution by offering a link resolver to libraries, which makes libraries’ licensed resources available to their library patrons, including free access to the full-text academic articles. Google Scholar also provides a “Library Search” link for book results, which leads users to the OCLC WorldCat website that provides patrons with a list of libraries owning the required book (Hock 2007:184).

Google Scholar provides a simple way to conduct information searches for scholarly literature: from one search location by using one simple search box, or by using an advanced search with multiple search boxes (Figure 2.2, as permitted under “fair use”). Google Scholar enables the user to search specifically for scholarly literature, including peer-reviewed articles, theses, books, abstracts and technical reports from all subjects or disciplines of research, made available by agreements with a wide variety of academic publishers, professional associations, universities, etc, according to their website (<http://scholar.google.com>)

Figure 2.2: Google Scholar Interface

Google Scholar aims to sort articles in a scientific manner by weighing the full-text of each article, the author, the publication in which the article appears, and how often the information has been cited in other scholarly literature (Hughes 2007). In a study updating previous findings on the depth of coverage of scientific journals by Google

Scholar, Mayr & Walter (2007) found some deficiencies in the coverage and the up-to-datedness of their index. These aspects, in conjunction with the criticism of the sources not being transparent, deterred them from recommending Google Scholar as the only source for citation analyses. However, they found merit in the ability of Google Scholar to create a relevancy ranking based on the full-text availability.

Google Scholar is a valuable search tool for high school students, since it combines the best of Google (simplicity, user-friendliness, speed of access, etc.) with access to large amounts of reliable, quality information for school assignments. Google Scholar also helps the high school student to identify the most relevant research across the world of scholarly research.

High school students' access to the Internet is discussed in the next section as it relates to the socio-economic levels of the high school student population in the United States.

2.2.4 Ubiquitous access to the Internet

The formalisation of the Internet in 1994 resulted in certain hopes and fears on the educational front. Many articles were written about “the digital divide” expressing concern about economically disadvantaged population groups' accessibility to computers, connectivity to the Internet and level of computer literacy (Novak & Hoffman 1998). However, the launching of the Technology Literacy Challenge Fund and an Education Rate Program (E-rate) in 1996 established funding and made Internet access and internal infrastructures available to schools and libraries in the USA (Levin & Arafeh 2002:1). As a result the 2005 FRSS (Fast Response Survey System) study reported that 100% of schools in the USA (vs. 35% in 1994) had access to the Internet without bias towards any group. The “Public Libraries and Internet 2006 Results and Findings Report” (Bertot, Jaeger & McClure 2006:5) reported that 98.9% of all public libraries were connected to the Internet.

Since research indicates that most high school students in the USA have access to the Internet via schools, public libraries and at home, it is next necessary to examine the impact of the Internet on high school students.

2.2.5 The Internet as an information resource for high school students

The emergence of the Internet meant that a plethora of information, previously mostly limited to libraries and book stores, were made available to a much wider community. Restrictions created by distance, availability and access to information were to a large extent removed. More information continues to become available in electronic format as the move to electronic format is embraced by publishers, museums and archives (Schmidt 2003:3). The Google Library Book Search Project was launched in 2004 to digitise large parts of library book collections (CIC 2007: 36).

The Pew Internet & American Life Project has conducted significant research on the impact of the Internet on families, communities, the work place, children, teenagers (including high school students), schools, health care and the political environment (Pew Research Center 2008). The project is an initiative of the Pew Research Center, an unbiased "fact tank" that provides information on issues and trends in the United States and the world. So far the project has produced four reports that are relevant to this study on the influence of the Internet on society.

The first Pew Internet Project (Jones & Madden 2002:2) conducted in 2000; found that 64% of students use the Internet as an essential study aid outside the classroom to browse the World-Web Web. The second Pew Internet Project conducted in 2002, showed that 78% of high school students searched online for assistance with homework or to conduct information research for the completion of school projects (Levin & Arafeh 2002:1). They also communicated via the Internet with other students to share information about school projects, tests, quizzes, homework shortcuts and sources of information relevant to school assignments.

The third Pew Internet Project conducted in 2006 (Horrigan 2006:1-10), although not limited to high school students, confirmed Tenopir's findings that the Internet has indeed become the primary information resource for students. The study found that high school students were increasingly using the Internet to learn about science – for research,

homework, satisfying their curiosity and searching for evidence about scientific propositions and trends.

The fourth Pew Internet Project research results released at the end of 2007 (Estabrook, Witt & Rainie 2007:18-22) produced an interesting finding: Generation Y (especially ages 18-30) is currently the biggest library user age group, with 62% having visited a public library during the past year and more than 40% saying that they will most likely use the public library in the future. Their reasons for using public libraries include the availability of public computers with high speed Internet and wireless access, finding help in solving problems and satisfying outcomes in terms of obtaining the information they were seeking. The study was funded by the US Institute of Museum and Library Services, a federal agency that offers support to U.S. libraries. The study results challenge the assumption that libraries are losing relevance in the Internet age.

Tenopir (2003b:1-137) undertook a project for the US Council of Library and Information Resources (CLIR) and analysed over 200 studies about the users of online information resources and the impact of the library on users. She concluded that high school and college/university students use the Internet more than the library. Her findings also indicated the following: when high school students evaluated digital information retrieved from the Internet for reliability/factual correctness, their judgments were not based on criteria that met educational standards.

In a 2006 study Jansen & Spink (2006: 248-263) analysed the transaction log studies of nine search engines over a lengthy period and also confirmed that the Internet is now the primary source of information for high school students. They found that 38% of all online queries contained only one search term and that the average time spent per session was 15 minutes. Geck (2006:19-23) confirmed these findings and added that students rapidly concluded that retrieved results at the top of a web page are usually more relevant than results found at the bottom of the page.

According to Leibenluft (2007) the most popular Internet website for educational and reference purposes is the online encyclopaedia, Wikipedia. Wikipedia is an online, free,

open source web-based encyclopaedia, designed in 1995 by software researcher Ward Cunningham. Wikipedia was founded as a non-profit organisation with more than 1 million entries in at least 10 languages (Boutin 2005). It is the biggest multilingual free-content encyclopaedia on the Internet and provides web-published information to which Internet users may contribute, which is not always authenticated.

In an article concerning the quality of information, Tenopir (2007:26) refers to the ongoing debate about the lacking quality of Wikipedia entries (both intentional and unintentional) and the falsified credentials of some Wikipedia editors. The use of Wikipedia as a reference tool is discouraged by many tutors because of the (sometimes) doubtful accuracy of its information and the inability to critically evaluate information sources and author credentials. Harris (2007:26) stated that many schools have instructed students not to cite Wikipedia as a source in research assignments. Wikipedia agrees that it is not a valid resource for scholarly research, but rather a good starting point for research and recommends that students check facts they find in Wikipedia against other information resources (Harris 2007:26; Barack 2005:30).

“Yahoo! Answers” is another popular website that has been a huge success with Internet users (Leibenluft 2007). This is a website where any user of the Yahoo search engine can post a question or an answer to a question. The site has 120 million users world-wide, and has compiled 400 million answers searchable in its archives. According to a web tracking company, Yahoo! Answers is the most visited Internet education and reference website after Wikipedia (Leibenluft 2007).

As explained by Harris (2007), these open Internet-based information resources are not always authentic. Thus librarians prefer to provide access to authenticated information resources, most of which are found within licensed databases. In the next section licensed databases are examined as an additional source of information to satisfy high school students’ academic information needs.

2.3 LICENSED DATABASES AT EAST COBB PUBLIC LIBRARIES RELEVANT TO HIGH SCHOOL STUDENTS

The manner in which public libraries accomplish their mission of providing intellectual and physical access to human record, found a new avenue in the creation of the Internet and its many applications for digitally formatted record. The concept of a digital library was developed in the early 1990's, such as the University of Michigan's Digital Library project (UMDL 1992) and in 1995 GALILEO, the state-wide initiative of the Board of Regents of the University System of Georgia (Birmingham 1994: 53-75).

The public libraries in the East Cobb area of Atlanta, Georgia, subscribe to reference databases and make them available to library patrons free of charge. These databases include the following which are most relevant to high school students: GALILEO, several Gale databases, Wilson Biography, LitFinder and NetLibrary (CCPLS 2008). Registered library users may access these subscription databases in the public library or remotely from home (with the exception of a few databases that are available in the library only) via a protected password that changes quarterly. Before discussing these databases, however, it is necessary to define and describe the concept of licensed databases.

2.3.1 Definitions and description of licensed databases

The terms digital or virtual libraries, licensed or subscription databases, electronic or e-libraries, Web portals, library websites and cyber libraries or cybraries, are used in the Information Science literature to describe a range of digital efforts that give information seekers (in national, state and local libraries, archives of major institutions, museums, universities and commercial databases) access to digitised, organised and reliable information via services on the Internet and the World-Wide Web. The most widely accepted definition of digital libraries is that of the US Digital Library Federation (DLF), that describes digital libraries as "organisations that provide the resources, including the specialised staff, to select, structure, offer access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that

they are readily and economically available for use by a defined community or set of communities” (Greenstein 2000:2). Furthermore, access to digital libraries is not limited by organisational or geographical distance or time (Schmidt 2003:3; Lamb & Callison 2005:32). A digital/virtual library typically consists of a number of licensed databases and resource links.

Licensed databases are provided by metadata aggregators and contain scholarly journal articles and reference works that provide authentic, peer-reviewed information. Databases are licensed by metadata aggregators such as EBSCO and Cengage Gale, mainly since the licensed databases are the intellectual property of the owners of digital information services. Further reasons for licensing databases include enhanced value by adding, grouping, editing and reviewing data from available resources and building digital libraries for various communities.

Access to these databases is restricted to institutional subscribers that are licensed to make the services available to authorised users in accordance to the terms and conditions of the agreement with the licensee. Typically the use is subject to copyright (including fair use) protection and non-commercial use restrictions. The database owners also prohibit the content being made available on publicly available websites that can be indexed, for instance Google. However, remote access is permissible to authorised users via a protected password that changes regularly and allows the download and print of limited copies of citations, abstracts or full text (or portions thereof) from the database for personal use. Licensees may not post the passwords to the licensed databases on any publicly indexed websites.

Licensed databases have increased rapidly in number, size and use in recent years and their services are continuously revised and improved in order to keep up with competitors in the field. Improvements include enhanced search ability and navigation of interfaces, more customisation and continued provision of multiple formats (Kuzyk 2007:8). Most digital libraries and licensed databases today have a customised user interface that can accommodate the unique information needs of the user. A customised interface could be used by high school students’ to get the correct information faster, if the information is

aptly categorised, or even faster with capabilities such as full-text search, federated search, spelling suggestions and relevance tuning (Ultraseek 2006:2).

The development of scholarly, academic digital libraries and licensed databases provide authentic, peer-reviewed published information to users that could be gathered from a wide field of reliable sources. Information seekers accessing commercial search engines often have to deal with information overload and low relevancy results. Digital libraries and licensed databases provide relevant, reliable information to users and are less likely to provide information overload. Frequent digital library use may lead to an increase in information literacy skills (Birmingham 1994:58-63; Schmidt 2003:12-13). Digital libraries and licensed databases are constructed environments, designed with the needs of the user community they serve in mind. The way digital libraries are constructed influences the way they will be used and to what extent they will be used (Gunn 2002:30).

It is clear that much effort is expended in the building and design of digital libraries, in order to provide users with high quality, authenticated information. Licensed databases and digital libraries form the bulk of the digital reference resources subscribed to by the public libraries in the East Cobb area of Atlanta, Georgia. The licensed databases most relevant to high school students' academic information needs are discussed in the next section.

2.3.2 GALILEO, the Georgia virtual library

In 1995 the Board of Regents of the University System of Georgia (a State Government agency) launched and sponsored a project to create a digital library that would give equal information access to all Georgia citizens, called GALILEO Virtual Library (Georgia Library Learning Online). This study's aim is to determine the extent to which high school students use licensed databases (including GALILEO) available through public libraries in the East Cobb area of Atlanta, Georgia.

GALILEO's objectives are stated on the GALILEO website (<http://www.galileo.usg.edu>) and can be summarised as the following: providing digital access to information

resources for every student in the state of Georgia - from elementary school to university level; facilitating information resource sharing among Georgia libraries; providing a range of information resources covering all academic subjects and providing adequate network bandwidth and state-wide backbone to all educational institutions.

As an award-winning virtual library of licensed, commercial databases and selected free Internet resources, GALILEO's scope covers access to almost 200 databases, covering a full range of educational institutions' academic courses according to the GALILEO website (<http://www.galileo.usg.edu>). Participating institutions may access multiple databases that provide full-text access to thousands of periodicals and scholarly journals, for instance a selection of EBSCO and ProQuest databases. Other resources include encyclopaedias, business directories, health directories and government publications. Georgia citizens may gain access to GALILEO through a participating institution using a password which changes quarterly. According to the GALILEO website (<http://www.galileo.usg.edu>) the community of more than 2000 GALILEO institutions includes most of Georgia's colleges/universities, kindergarten to 12th grade schools, public libraries, technical institutes, and a group of private academic colleges and universities.

GALILEO is relevant to high school students due to the fact that the virtual library provides a world-wide range of information resources covering all high school academic subjects/courses. According to the GALILEO website (<http://www.galileo.usg.edu>), the GALILEO High School virtual library covers a vast range of licensed databases relevant to East Cobb high school students' academic needs, such as: Academic Search Complete (EBSCOhost journal articles); Biology Digest; Business & Management Practices; EconLit (economics); GEOBASE (geology/geography); History Reference Center; Literary Reference Center; Psychology & Behavioural Sciences Collection; Science and Technology Collection; Social Science Information Gateway; World History Collection and many more. Some of these databases are specifically developed for high school students (Board of Regents of the University System of Georgia 2008).

GALILEO usage statistics provide a measurement of the success of the GALILEO initiative (Figure 2.3, with permission from GALILEO).

Figure 2.3: Increase in GALILEO users (1995 – 2007)

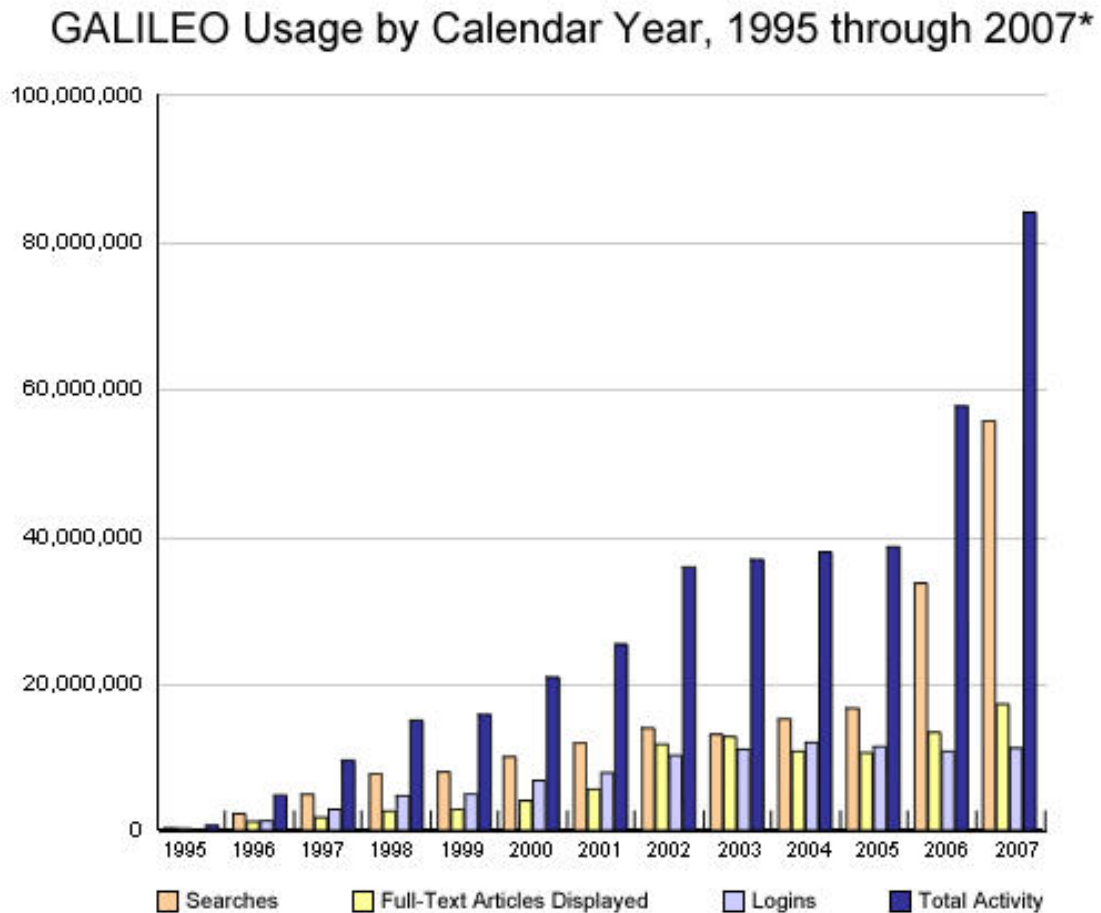



Figure 2.3 shows GALILEO usage statistics from 1995 – 2007, indicating the number of searches conducted per year, full-text articles displayed, log-ins and total activity (Board of Regents of the University System of Georgia 2008). An interesting aspect is the escalation in the number of searches which tripled from 2005 – 2007. Total GALILEO activity has also increased significantly during the last three years: from approximately 39,000,000 in 2005 to 85,000,000 in 2007.

Considering the wide variety of almost 200 academic databases under the GALILEO umbrella and positive usage increase, it would seem that all high school students' academic needs should be satisfied by using GALILEO. However, research indicates that this was not always the case. In an observation study of high school students and university students' use of GALILEO, Fitzgerald and Galloway (2002) found that students did not have the ability to draw conceptual maps as to what the information available to them via GALILEO was, or how to retrieve the information they needed. As a result they could not determine which licensed database would cater to their information needs and therefore sometimes failed to select appropriate databases. However, considering the significant increase in GALILEO usage as indicated in Figure 2.3, it is possible that high school students overcame the problems mentioned by Fitzgerald and Galloway.

GALILEO regularly conducts user surveys to obtain feedback on how to improve the content and upgrade the interface, according to the Board of Regents of the University System of Georgia (<http://www.galileo.usg.edu>). A federated search option has been an issue regularly requested during user feedback and utility studies in the past (Bruce 2004). A federated search solution offers users a full view of available information that can be accessed with a single query, by using pre-built connectors and federated plug-ins to a wide variety of repositories and other highly targeted web sources (Ultraseek 2006:4). This is in contrast to Google that creates its own index of metadata searches by the system's crawlers. In an implementation by a consortium such as GALILEO, the unique user needs of the consortium participants require the federated search solution to be flexible and scalable.


In an attempt to make information searching more user-friendly and intuitive, GALILEO redesigned the user interface (rolled out in March 2008) thereby aiming to create an integrated learning environment. GALILEO now has customised interfaces for each community it serves (Board of Regents of the University System of Georgia 2008). The improved GALILEO provides a "GALILEO High School" interface for students in Grades 9-12 (Figure 2.4, with permission from GALILEO).


Figure 2.4: GALILEO High School Interface




[Home](#)
[About GALILEO](#)
[Contact Us](#)
[Help](#)

Georgia's Virtual Library...bringing quality content to you!

 High School (grades 9-12)

 Teen (grades 6-8)

 Kids (grades K-5)

Search

Browse by Subject

Browse by Type

Databases A-Z

Magazines A-Z

Search databases

Articles

Images

Web Links

Encyclopedias

1. Enter search keywords
2. Choose databases to search
 - [Consumer Health Complete](#) - Reports, fact sheets, videos, drug information [more »](#)
 - [Encyclopædia Britannica Online High School](#) - Encyclopedia articles, high school students [more »](#)
 - [History Reference Center](#) - Articles, books, images, video, U.S. and world history [more »](#)
 - [Literary Reference Center](#) - Literature, criticism, author biographies [more »](#)
 - [MAS Ultra \(at EBSCOhost\)](#) - Articles, high school students [more »](#)
 - [Science and Technology Collection](#) - Scientific research, peer-reviewed [more »](#)
 - [SIRS Researcher \(SIRS Knowledge Source\)](#) - High school research tools, articles [more »](#)

Search Selected Databases

[More search options »](#)

GALILEO Scholar
(Higher Education)

GALILEO Library
(General Use)

GALILEO High School
(Grades 9-12)

GALILEO Teen
(Grades 6-8)

GALILEO Kids
(Grades K-5)

Getting Started

- [What can I do in GALILEO?](#)
- [Choosing a database](#)
- [Finding a peer-reviewed article](#)
- [Have a citation?](#)
- [Computer configuration tips](#)
- [Why is GALILEO Different?](#)


About Cobb County Schools

- [Cobb County Schools](#)

In the Spotlight

[Arts of the United States](#)

Images, artistic works, architecture [more »](#)



GALILEO News & System Alerts

- [News & System Alerts](#)
- [The GALILEO Planet](#)

The new GALILEO high school interface provides search options for high schoolers, viz. a federated search feature that searches across multiple databases; the ability to browse by subject, material type, database or journals. The redesigned interface also includes an Online Library Learning Center Tutorial guiding the high school student user through effective search strategies to access the information in the academic databases (Board of Regents of the University System of Georgia 2008).

The GALILEO developers spent a great deal of time and effort on developing interfaces that will meet the Georgia educational community's user needs. The outlook is positive and the GALILEO user community has high expectations of the new user interfaces.

2.3.3. Gale Licensed Databases

Cengage Gale, formerly Thomson-Gale, is a subsidiary of Cengage Learning and is one of the three largest metadata aggregator companies in the USA (Hoover's 2008). Cengage Gale licenses the use of their databases to libraries, academic institutions and business corporations. Cengage Gale publishes educational and reference materials for schools, libraries and businesses, available online or in print. Online Gale databases are also referred to as GaleNet, viz. "Gale on the Internet". The Gale databases are widely known for their authoritative and accurate information content (Cengage Gale 2008). The company creates, publishes and maintains a wide spectrum of more than 600 licensed databases covering educational and reference materials for schools, libraries and businesses. The Gale databases are powered by Infotrac, Gale's robust search engine.

East Cobb public libraries subscribe to the following Gale databases that are relevant to high school students: Literature Resource Center, Biography Resource Center, Student Resource Center - Gold, History Resource Center: U.S and LitFinder.

2.3.3.1 Gale Literature Resource Center Licensed Database

The *Literature Resource Center* (LRC) is a comprehensive literature reference database and is considered to be the premier online resource for students requiring literary information (Cengage Gale 2008). *Literature Resource Center's* objective is to maintain

its reputation as the world's premier online literature database by adding new and updated information continuously. Websites are checked and death dates, major awards, major literary works, newsworthy events and career-related events are added to biographical essays to keep the information content accurate and reliable, according to the LRC website (<http://www.galenet.galegroup.com>).

Literature Resource Center's scope covers a vast collection of literary criticism, author biographies, work overviews, timeline events, author-related websites and bibliographies. *Literature Resource Center* is based on Gale's three hallmark databases: *Contemporary Literary Criticism Select*, *Contemporary Authors* and *Dictionary of Literary Biography*. The database also includes the popular *For Students Series*, consisting of full-text articles appearing in academic literary journals and much more.

The *Literature Resource Center's* relevance to high school students is due to the fact that it is a valuable resource for high school students searching for information for literature assignments. The database's critical, biographical and contextual materials support interdisciplinary approaches and the development of critical thinking skills. High school students can find the information they need on authors and their works in all genres and disciplines, from all time periods and from around the world, relevant to school curricula and assignments. *Literature Resource Center* should therefore cover most of high schoolers' literature and Language Arts academic needs.

The *Literature Resource Center* interface is intuitive and allows users to use various search paths with relative ease (Figure 2.5, with permission from Cengage Gale). *Literature Resource Center* offers several search paths to facilitate literary research, according to the LRC website (<http://www.galenet.galegroup.com>):

The *Person Search* search feature allows the student to search by the author's full name, a part of the name, or variant names and pseudonyms. The person search takes the user to an alphabetically arranged results list of author names that matched the query, for example a search for Samuel Langhorne Clemens or Mark Twain returns a list of articles referring to this author as either Mark Twain or Samuel Langhorne Clemens.

Figure 2.5: Literature Resource Center Interface

Literature Resource Center - Basic Search - Internet Explorer provided by Dell

http://go.galegroup.com/ps/start.do?p=LitRC

Literature Resource Center

Preferences | Change Databases | Logout

Bookmark | Dictionaries | Title List | Help | Tips | Guided Tour

Basic Search | **Advanced Search** | Person Search | Works Search | Gale Literary Index

Powered by InfoTrac®

Currently searching *Literature Resource Center* with 1,153,977 documents.

Basic Search

Find : **Search** **Clear**

Search for words in: Person - By or About Name of Work Keywords All Text

limit results:

to peer-reviewed publications

by publication date(s) All Dates Before On After Between

Day *Month* *Year* and
Day *Month* *Year*

by publication century: **None selected***
21st Century A.D.
20th Century A.D.
19th Century A.D.

by content type: All

<input checked="" type="checkbox"/> Biographies	<input checked="" type="checkbox"/> Literature Criticism
<input checked="" type="checkbox"/> Multimedia	<input checked="" type="checkbox"/> Primary Sources & Literary Works
<input checked="" type="checkbox"/> Reviews & News	<input checked="" type="checkbox"/> Topic & Work Overviews

by publication title: [Browse](#)

Internet | Protected Mode: On | 100%

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The *Works Search* search feature allows the student to search the title/works authority for a title/work containing any, some, or all of the words entered. The use of an algorithm which searches for titles containing a particular word or phrase yields less precise results than searching for an exact title, according to the LRC website (<http://www.galenet.galegroup.com>). An example of a works search: searching on Prometheus returns a results list of biographies and critical essays that discuss Frankenstein, or the New Prometheus by Mary Shelley, Prometheus Bound by Aeschylus, and Prometheus Unbound by Percy Shelley.

2.3.3.2 Gale Biography Resource Center Licensed Database

Biography Resource Center's objective is to be an online biographical reference database created to meet the information needs of public, school and academic libraries' users when they need information about people in the fields of literature, science, multicultural studies, business, entertainment, politics, sports, government, history, arts and newsmakers. *Biography Resource Center* is a comprehensive database that provides up-to-date biographical information according to the BRC website (<http://www.galenet.galegroup.com>)

Biography Resource Center's scope covers more than 435,000 biographies on more than 340,000 people from around the world and throughout history. The add-on Marquis Who's Who module features more than 1 million additional brief biographies including the fields of government, business, science and technology, the arts, entertainment and sport.

The *Biography Resource Center's* relevance to high school students is due to the fact that it is a primary information resource for in-depth, up-to-date biographies when students need a biographical profile that provides an extensive look at an individual's life.

The *Biography Resource Center's* interface is relatively easy to use and provides students with several search paths to find information about individuals (Figure 2.6, with the permission of Cengage): Name Search, Biographical Facts, Advanced Search and Category Browse, according to the BRC website (<http://www.galenet.galegroup.com>).

Figure 2.6: Biography Resource Center Interface

Biography Resource Center - Internet Explorer provided by Dell

http://galenet.galegroup.com/servlet/BioRC

Cobb County Public Library

GALE CENGAGE Learning™

Help Gale Databases Toolbox Dictionary List of Sources

Home Biographical Facts Search Advanced Search Category Browse

Category Browse

- Presidential Election 2008
- American Presidents
- Native Americans
- Nobel Peace Prize Winners
- Authors--Children
- [more...](#)

Biographical Facts Search

Search based on:

- Occupation
- Nationality
- Ethnicity
- Birth/Death Year
- Birth/Death Place
- Gender

Advanced Search

Search by:

- Full Text
- Keyword
- Source
- Magazine Date

Search by Name

Name contains Start of last name

Spotlight On...

Arthur Ashe

American tennis player Arthur Ashe (1943-1993) was the first African-American man to win a singles title at Wimbledon. In 1992, Ashe announced he was suffering from AIDS, which he contracted from a blood transfusion during open-heart surgery. He established the Arthur Ashe Foundation for the Defeat of AIDS, and joined the boards of the Harvard AIDS Institute and the UCLA AIDS Institute.

[Spotlight On... Archive](#)

[Home](#) | [Help](#) | [Gale Databases](#) | [Toolbox](#) | [Dictionary](#) | [List of Sources](#) | [Contact Gale](#) | [Comments](#)

GALE CENGAGE Learning™ [Copyright and Terms of Use](#)

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1:20 AM

2.3.3.3 Gale Student Resource Center – Gold Licensed Database

The *Student Resource Center – Gold (SRC)* is licensed by Cengage Gale and the database's objective is to be a comprehensive database based on national US curriculum standards, which provides information of a high standard to students. The database is aimed at middle and high school students and covers all core curriculum areas on state and national levels, according to the SRC website (<http://www.galenet.galegroup.com>)

The database's scope covers core curriculum areas including history, literature, science, social studies, and more. The reference content includes the American Journey Series, American Decades, Career Information Center, primary sources, millions of articles from magazines and newspapers, thus contributing to award-winning information content that includes multimedia features.

This database is especially relevant to high school students, since it is based on high school curricula in major subject areas such as history, literature, science and social studies. High school students will especially appreciate the multimedia content, including video, audio clips and podcasts. The database also offers content level recommendations (basic, intermediate and advanced) to assist students in choosing appropriate content for their abilities, as well as research tools and guides linking information literacy skills to use of the database. The databases provide the content and context high school students need to develop critical thinking skills.

The *Student Resource Center - Gold* database interface offers easy access to the database information content. Students can conduct information searches by means of various search paths: Basic Search, Subject Guides, Publications Search, Advanced Search, Curriculum Standards and Topic Trees (Figure 2.7, with permission from Cengage). The Power Search feature provides students with the ability to find relevant research results quickly and easily across all available Gale databases. The intuitive interface also allows students to access multimedia material without the learning curve necessary when searching multiple electronic sources.

Figure 2.7: Gale Student Resource Center - Gold Interface

Student Resource Center Gold Basic Search - Internet Explorer provided by Dell

http://find.galegroup.com/srcx/start.do?prodId=SRC-1

Student Resource Center Gold

Preferences | Change Databases | Logout

Search Types: Basic | Subject Guide | Publication | Advanced | Curriculum Standards | Topic Trees

Basic Search

Or select from the popular topics below:

Basic Search

Find: **Search**

Search for words in: Subject Keyword Entire document

Limit the results:

to document with images

by content level

None selected
Basic
Intermediate
Advanced

by content type

<input type="checkbox"/> Academic Journals	<input type="checkbox"/> Creative Works
<input type="checkbox"/> Magazines	<input type="checkbox"/> Multimedia
<input type="checkbox"/> News	<input type="checkbox"/> Primary Sources
<input type="checkbox"/> Reference	<input type="checkbox"/> Statistics

[Hide search options](#)

Cultures | Geography | Literature

Abortion
The Adventures of Huckleberry Finn (Novel)
Affirmative action
Afghanistan
AIDS (Disease)
Anatomy
Angelou, Maya
Anorexia nervosa
Astronomy
Biology
Cancer
Capital punishment
The Catcher in the Rye (Novel)
Cells (Biology)
Censorship
Chemistry
Child abuse
China
Civil rights
Cloning
Cold War, 1945-1991
Communism
Computers
The Crucible (Play)
Dickens, Charles
Dickinson, Emily
Diseases
DNA
Drug abuse

Hurricanes
India
Industrial Revolution, ca. 1750-1900
Inventions
Iraq
Japan
Julius Caesar (Play)
King, Martin Luther, Jr.
Leonardo da Vinci
Lincoln, Abraham
Lord of the Flies (Novel)
Macbeth (Play)
Malcolm X
Marijuana
Mathematics
Mexico
Miller, Arthur
Native Americans
Natural disasters
Of Mice and Men (Novel)
Parks, Rosa
Pearl Harbor Attack, 1941
Physics
Planets
Poe, Edgar Allan
Pollution
Prohibition

Internet | Protected Mode: On | 100%

Student Resource C... | MINF Dissertation N... | 1:27 AM

2.3.3.4 Gale History Resource Center: U.S. Licensed Database

History Resource Center: U.S. (HRC) is a vast Gale database that covers U.S. history from Pre-Colonial times to the present. *History Resource Center's* objective is to be the most comprehensive electronic U.S. history resource that provides access to primary and secondary history sources according to the HRC website (<http://www.galenet.galegroup.com>)

This database's scope provides a complete coverage of U.S. history, including most-studied historical and current events, individuals and historical issues in U.S. history. The history content includes primary source documents, full-text articles from respected encyclopaedias and scholarly journals, digitised special collections, audio and video clips of historic events and speeches, as well as the entire *American Journey Online Series*.

The *History Resource Center: U.S.* is relevant to high school students due to the fact that it has been designed with the high school and college student in mind: it provides comprehensive historical information for high school students' history information needs, by making both primary and scholarly secondary history resources available to students in a variety of formats.

As with most Gale databases, *History Resource Center: U.S.* interface is relatively easy to use (Figure 2.8, with permission from Cengage). The search interface offers five main search paths: Basic Search, Advanced Search, Person Search, Time Period/Chronology Search and Subject Search. One of the major advantages of *History Resource Center: U.S.* is that it provides students with integrated access to many different types of information. The *Research Guide* introduces high school students to the basics of historical research and provides excellent, understandable definitions of primary and secondary sources. An outline guides students through the research process and provides easy instructions on how to go about writing a research paper, according to the HRC website (<http://www.galenet.galegroup.com>)

Figure 2.8 Gale *History Resource Center: U.S. Interface*

History Resource Center: US - Internet Explorer provided by Dell

http://galenet.galegroup.com/servlet/HistRC

History Resource Center: U.S. We the People

GALE CENGAGE Learning™

Home Help Search Tips Research Guide Faculty Guide Dictionary Gale Databases List of Sources

HOME PERSON SEARCH SUBJECT SEARCH ADVANCED SEARCH CHRONOLOGY

Basic Search:

SEARCH Clear Form

Spotlight On...

REPORTS OF the death of New Orleans

REPORTS OF the death of New Orleans as a major American city have not been greatly exaggerated; they have only been greatly delayed. Although the funeral was not conducted until Katrina struck, the death took place several decades ago. [Read more...](#)

Search by:

Person Subject Advanced

Chronology

Prehistory -1451 1492-1531 1565-1776 1775-1783 1784-1812 1812-1815

Roll over chronology images for more info

Search a Reference Work

9-11 Commission Report: Report from the National Commission on Terrorist Attacks upon the United States

American Decades

American Decades 1990-1999

American Eras, Vol. 1: Early American Civilizations and Exploration to 1600

American Eras, Vol. 2: The Colonial Era, 1600-1754

American Eras, Vol. 3: The Revolutionary Era, 1754-1783

American Eras, Vol. 4: Development of a Nation, 1783-1815

American Eras, Vol. 5: The Reform Era and Eastern U.S. Development, 1815-1850

American Eras, Vol. 6: Westward Expansion, 1800-1860

American Eras, Vol. 7: Civil War and Reconstruction, 1850-1877

American Eras, Vol. 8: Development of the Industrial United States, 1878-1899

Home | [Help](#) | [Search Tips](#) | [Gale Databases](#) | [Dictionary](#) | [Research Guide](#) | [List of Sources](#) | [Contact Gale](#) | [Comments](#) | [Advanced Search](#)

Internet | Protected Mode: On 100%

History Resource Ce... MINF Dissertation N... 1:34 AM

2.3.3.5 Gale LitFinder Licensed Database

LitFinder's objective is to provide the opportunity for complete appreciation and study of great literary works, such as poems, stories, plays, essays and speeches. *LitFinder* is often used as a complement to Gale *Literature Resource Center*. *LitFinder's* scope covers access to more than 135,000 full-text poems, stories, essays, plays and speeches, according to the *LitFinder* website (<http://www.galegroup.com>).

LitFinder's relevance to high school students is due to the fact that it provides high school students with complete literary works and additional information sources such as biographies, essays and explanations for further study, evaluation and enjoyment. Most literature needs of high school students could be satisfied by using *LitFinder*; poetry, short stories, plays and essays.

As with most Gale databases, *LitFinder* search interface is relatively easy to use. There are four search paths: Basic Search, Advanced Search, Person Search and Works Search. Search results can be limited by Publication Date, Publication Century, Content Type and Type of Work (Figure 2.9, with permission from Cengage), according to the *LitFinder* website (<http://www.galegroup.com>).

Figure 2.9: Gale *LitFinder* Interface

The screenshot displays the Gale LitFinder Basic Search interface within an Internet Explorer browser window. The browser's address bar shows the URL <http://go.galegroup.com/ps/dispBasicSearch.do?prodId=LITF>. The page header includes the CENGAGE Learning logo and the LitFINDER™ logo, along with navigation links for Preferences, Change Databases, and Logout. Below the header, there are tabs for Basic Search, Advanced Search, Person Search, and Works Search, with the Basic Search tab currently selected. The main content area is titled "Basic Search" and features a search input field with "Find:" and buttons for "Search" and "Clear". Below the input field, there are radio buttons for "Keywords" (selected), "Person - By or About", "Name of Work", and "All Text". A "limit results:" section includes a checkbox for "to documents with full text" and radio buttons for "All Dates" (selected), "Before", "On", "After", and "Between". There are also date selection dropdowns for Day, Month, and Year, along with a "by publication century:" dropdown menu showing options: "None selected", "21st Century A.D.", "20th Century A.D.", and "19th Century A.D.". The "by content type:" section has a checked "All" option and a grid of checkboxes for Biographies, Multimedia, Primary Sources & Literary Works, and Topic & Work Overviews. At the bottom, there is a "Type of Work:" dropdown menu with "None selected" and "Autobiography" as options. The browser's status bar at the bottom indicates "Internet | Protected Mode: On" and "100%". The Windows taskbar at the very bottom shows the LitFinder - Basic Sea... and MINF Dissertation N... tabs, along with the system clock showing 1:42 AM.

2.3.4 H.W.Wilson Biographies Plus Illustrated Licensed Database

The *Wilson Biographies Plus Illustrated* database is licensed by the H.W. Wilson Company and its objective is to offer students extensive biographical information. The editorial standard is high, the user interface relatively easy to use and the coverage one of the most comprehensive available, according to the Wilson Biographies website (<http://www.hwwilson.com>). The *Wilson Biographies Plus Illustrated* database's scope covers approximately 147,000 biographies and obituaries with over 32,000 photos of the subjects. It consists of more than 100 volumes of biographical reference books of many renowned publishers.

This database is relevant to high school students due to the fact that it provides current and relevant information to complete high school biographical profiles, in addition to *Gale Biography Resource Center*. The latter is a more comprehensive biographical database with 435,000 biographies versus *Wilson Biographies Plus Illustrated's* 147,000 biographies.

The *Wilson Biographies Plus Illustrated* database interface is relatively easy to use and users can find relevant biographical information quickly and easily. Search paths consist of Basic Search, Advanced Search and Browsing. Other search features include a thesaurus, search history, print/email/save, exporting/citing, a translation capability and a "suggested subjects" feature (Figure 2.10, with permission from H.W. Wilson Company).

WilsonWeb is a comprehensive search tool that simplifies access to information stored in databases. Access to relevant information can be obtained by entering query searches as a single term, phrases, or complex Boolean search strings (H.W. Wilson Company 2008).

Figure 2.10: WilsonWeb Biographies Plus Illustrated Interface

HW Wilson: Advanced Search - Internet Explorer provided by Dell

http://vnweb.hwwilsonweb.com/hww

MY WILSONWEB | CUSTOMIZE DISPLAY | HELP | TECHNICAL SUPPORT | EXIT PROGRAM

Wilson Web

Interface Language: Library Default | Quick Links: Journal Directory

BASIC SEARCH | **ADVANCED SEARCH** | BROWSE | THESAURUS | SEARCH HISTORY | PRINT EMAIL SAVE | EXPORTING / CITING

Searching In: Biographies Plus Illustrated Database Descriptions Journal Directory

FIND First Name: Last Name:

and All - Smart Search

Clear Start

Date of Birth: Date of Death:

is Month Day Year A.D.

Month Day Year A.D.

Profession/Activity:

Place of Origin:

Gender: All

Limit to: Results with Images

Expand: Also search the text of biographies, for extra results

Basic Search | **Advanced Search** | Browse | Thesaurus | Search History | Print Email Save | Exporting / Citing

© 2002-2008 H.W. Wilson Company. Use of WilsonWeb means acceptance of the [license agreement](#).
For customers who have signed the Wilson license agreement, that agreement takes precedence over the one listed here.

Internet | Protected Mode: On | 100%

HW Wilson: Advanc... | MINF Dissertation N...

2:12 AM

2.3.5 *NetLibrary* Licensed Database

NetLibrary's objective is to be an electronic database providing full-text eBooks, eAudiobooks and eJournals. *NetLibrary* is licensed by OCLC (Online Computer Library Center). *NetLibrary* provides continuous access to public libraries' eContent collections and database content according to their website (<http://www.netlibrary.com>). The *NetLibrary* database's scope covers hundreds of subject areas with full-text ebook access to bestselling titles from the world's leading publishers.

Reading of books in electronic format was slow to take off, but is now accepted more readily among students (Dearnley, McKnight & Morris, 2004:175-182). *NetLibrary's* relevance to high school students is due to the fact that it offers a growing range of full-text ebooks assisting high school students in meeting their information needs for school-related projects.

One of the major challenges faced by public libraries is the demand created by large numbers of students having to read a specific publication for a school assignment, especially literature assignments. The availability of ebooks as an alternative to limited numbers of books in print could be a solution to the above problem. The East Cobb public libraries, however, subscribe to a one-ebook-one-user option; with the result that only one student can read an ebook during a four hour time period. Subscribing to a one-ebook-multiple-user option would be a more realistic solution to the above problem. However, the pricing model for multiple simultaneous readers of eBooks is high and erroneously based on a concept that it should reflect the revenue that would have been earned if multiple copies of the publication were acquired by a library (Connaway 2003:11-19). A more customised pricing structure will greatly increase the use of ebooks.

The *NetLibrary* database offers an easy-to-use interface and the search paths consist of a Basic Search and Advanced Search option (Figure 2.11, with the permission from *NetLibrary*). eBook information resources integrate seamlessly into the *NetLibrary* interface and allow public libraries to supplement their eBook collections with the latest resources in many subjects, according to their website (<http://www.netlibrary.com>).

Figure 2.11: NetLibrary Interface

NetLibrary - Basic Search - Internet Explorer provided by Dell

http://www.netlibrary.com/

File Edit View Favorites Tools Help

NetLibrary - Basic Search

» Home Log In Favorites and Notes Create a Free Account Help

NetLibrary

Welcome to the Cobb County Public Library eContent Collection

» Basic Search ?

Full-Text English Search

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2.4 SUMMARY

This chapter covered a brief overview of the development of the Internet and its main application, the World-Wide Web (WWW), especially the impact of the World-Wide Web on the information seeking behaviour of high school students. The major search engines used by high school students were discussed, such as Google and the academic search engine, GoogleScholar.

The concept of licensed databases, accessible to high school students at public libraries and school media centres, was introduced. The academic databases described in this section are instrumental in providing high school students with reliable, authenticated information for the completion of high school assignments, with the caveat that they should learn how to use these databases by receiving frequent digital information literacy instruction. It is therefore necessary to next examine high school students' information needs, information literacy skills and information seeking behaviour when using digital resources for school assignments and the role of the public library in supporting high school students' use of licensed databases.

CHAPTER 3

HIGH SCHOOL STUDENTS' INFORMATION NEEDS AND DIGITAL INFORMATION SEEKING BEHAVIOUR

3.1 INTRODUCTION

This chapter covers a review of the scholarly published literature pertaining to the information seeking behaviour of high school students, especially as it relates to their use of digital information resources available through the public library. Factors influencing high school students' use of digital resources are highlighted, especially high school students' information literacy skills. The literature review furthermore covers the role of the public library in supporting and promoting high school students' use of digital information resources.

3.2 HIGH SCHOOL STUDENTS' PROFILE

Before examining high school students' information seeking behaviour, it is firstly necessary to place high school students as a user group within their generational context in order to determine their generational profile, viz. the characteristics, perceptions, attitudes and expectations that influence their information seeking behaviour.

3.2.1 Generation Y age group

Demographers and sociologists define the birth years of the various generations, but do not seem to agree about the birth and end dates of Generation Y. The majority of the literature on the subject, however, indicates that Generation Y birth dates are from 1980 to 2000. This generation is also referred to as the Millennials/Millennial Generation, Next Generation, Nexters, Net Generation, Nintendo Generation, Digital Generation or Echo Boomers (Sweeney 2005: 165). Sweeney also believes that this generation will outnumber the Baby Boomers (born 1946 – 1960) by the year 2010. Generation Y is therefore a force to be reckoned with, also in the library and information environment.

The current generation of high schools students (grades 9-12) was born from 1990 - 1994 and is therefore part of Generation Y. They are also referred to as Young Adults (ages 12-18) by YALSA, the Young Adult Library Services Association, which is a division of the American Library Association (<http://www.ala.org>).

3.2.2 Characteristics of Generation Y

Sweeney (2005:165-175) researched the vast literature concerning Generation Y and conducted more than twenty Generation Y focus groups in the USA. Based on his findings, he identified the following Generation Y characteristics, which relates to students' expectations of library and information services when needing information for school assignments:

Consumers: Generation Y students expect more choices and selectivity, want more personalisation, expect instant gratification and are impatient. The lesson libraries could take from this, is that high school students' expectations of library and information services include having a variety of information sources that will provide instant/quick satisfaction of their information needs. Most public libraries provide a variety of information services and sources, from books and media to licensed databases, as discussed in Chapter 2.

Lifestyle: Generation Y students value education and training, expect an income to exceed that of their parents, are independent, practice a healthy lifestyle, are flexible, expect more balance between work and personal lives, are achievement-oriented and believe in merit-based systems. It is therefore possible that high school students would value training in information literacy, which could contribute to improved academic performance. Public libraries provide reference support to library patrons and the licensed databases provide online user guides or tutorials.

Information and learning: Generation Y students are digital natives - Abram & Luther (2004:34) succinctly describe them as being "born with the chip"- not digital immigrants (as most librarians and teachers are). They have an enthusiasm for learning, provided

they learn via digital technology. Librarians should expect Generation Y's digital information expectations to be very different from those of previous generations.

Gaming and Media: Generation Y students have very different digital experiences and expectations than those of previous generations of library users. On average they would have had sixteen thousand hours of electronic gaming by the time they graduate from college. Libraries and vendors will have to consider building gaming characteristics into their information systems in order to be successful with this generation, especially characteristics such as instant feedback and interaction, multimedia, progressing through levels, learning by mistakes and analytical reasoning.

Communications: Generation Y students expect their technology to be mobile and to be accessible anywhere, anytime. Libraries could learn from this by making their databases available on portable devices such as a PDA, laptop (most public libraries have wireless connectivity), cell phone or any other pocket device favoured by this generation.

Visual learners: Weiler (2005:46-53) found that Generation Y students are primarily visual learners, a learning style that may conflict with that of many librarians/teachers.

Internet-based world: since Generation Y students know no other reality than their Internet-based world, they have heightened technical expectations, attitudes and beliefs regarding library services and research resources (Geck 2006). They feel "crunched" for time; therefore they turn to information resources that they perceive will save their time, for instance Google search engine. More than 90% have a computer at home and over 50% have high speed Internet access at home.

The above characteristics and tendencies can be expected to influence high school students' information needs and information seeking behaviour.

3.3 INFORMATION NEEDS OF HIGH SCHOOL STUDENTS

Wilson (2006:663) states that information needs are secondary to basic needs such as physiological, cognitive and affective needs, which implies that users have to understand the basic need as well as the information need, adding to the complexity of describing

user needs. Wilson further states that users seek information to solve a problem. As the user moves through each of the stages of problem identification, definition, resolution and solution presentation, uncertainty must be reduced and the user engages in interaction with the information source to resolve the uncertainty.

In order to satisfy an information need, an individual engages in information seeking behaviour. Wilson (2006:664) suggests that it may be advisable to replace the term “information needs” with “information seeking towards the satisfaction of needs”, since this phrase describes the inter-relationship between information needs and information seeking behaviour more succinctly. Kuhlthau (2004:1-12) approaches the relationship between information needs and information seeking behaviour from a constructivist point of view: students are actively involved in building on existing knowledge (what they already know), to come to a new understanding (construct) of the subject under study by exploring the topic, then learning to select the best information for the topic and knowing when they have sufficient information. This information is then internalised and a new meaning is constructed that can be communicated to others in a manner that is authentic to the topic.

High school students’ information needs are limited by the scope of this study to their academic needs when requiring information for school assignments. Although their academic needs are mostly of a cognitive nature, these needs could overlap with affective needs (such as a desire to compete, achieve, etc.), therefore their information needs are interrelated. Students’ academic needs vary according to the courses offered by each high school, which could vary from school to school. Courses offered by high schools in the East Cobb area of Atlanta, Georgia, cover a vast range of subjects, according to the Cobb County School District website (<http://www.cobbk12.org>).

- *English/Language Arts:* Literature (American, British), Journalism, etc.
- *Mathematics:* Algebra, Geometry, Trigonometry, Calculus, Statistics, etc.
- *Science:* Physiology, Biology, Chemistry, Physics, Ecology, etc.

- *Social Studies*: History, Geography, Law, Sociology, Psychology, etc.
- *Foreign Languages*: Spanish, French, Latin, German and Japanese.
- *Business*: Finance, Accounting, Economy, Marketing Principles, etc.
- *Information Technology*: Computer Science, Computer Programming, etc.
- *Telecommunications, Electronics and Computer Repair*.
- *Physical Education*: Health, Personal Fitness, Self Defence, etc.
- *Fine Arts*: Visual Arts, Music (Band, Orchestra, Chorus) and Drama Arts/Theatre.
- *Healthcare Science Technology Education*.
- *Family and Consumer Science* (Nutrition & Wellness, Child Development).
- *Technical/Careers*: Culinary Arts, Interior Design, Health, Architecture, etc.

Considering the vast array of high school subjects offered to students at East Cobb high schools, public libraries and school media centres face a considerable challenge to cover the wide spectrum of high school students' academic information needs. Supplementing printed resources with reliable, peer-reviewed digital resources has therefore become a critical factor in providing information to high school students, especially considering the large numbers of students attending public high schools. High school students' academic information needs have an impact on their information seeking behaviour, as discussed in the following section.

3.4. INFORMATION SEEKING BEHAVIOUR OF HIGH SCHOOL STUDENTS WHEN USING DIGITAL RESOURCES

The current generation of high school students was born after the introduction of the World-Wide Web in the late 1980's and during the transition period when the information seeking behaviour of students changed from print and static electronic information (CD ROM and Legacy Databases) to electronic resources via the Internet, hence the name Net/Internet Generation. They are sometimes called "screenagers" due to

their preference for communicating electronically via screens (Rushkoff 1996:2). Generation Y students have grown up in front of electronic screens: television, video games and computer monitors. It is possible that students' critical thinking and other cognitive skills are suffering due to the large proportion of time spent passively absorbing words and images, rather than in reading. It is possible that Generation Y students' cognitive skills are not fully developing due to ubiquitous digital information technologies. However, it may also be that the world is currently in a massive and wide-ranging shift in the way knowledge is disseminated and learned. The information seeking behaviour of Generation Y students is therefore very different from that of their parents or previous generations.

The information seeking behaviour of high school students as a part of Generation Y is thus a critical component of this study, i.e. their opinions, attitudes, preferences, expectations and ways in which they search for information, based on their information needs (Tenopir 2003a:32). Tenopir furthermore describes information seeking behaviour as “what users actually do, why they do it, what they would prefer, and what they are likely to do in the future” (Tenopir 2003a:32).

3.4.1 Information seeking behaviour models

Information seeking behaviour has been studied since the 1950s, but the early studies involved mostly the information-seeking activities of researchers and scientists. Information seeking behaviour has only been studied in the general population, and particularly within student groups, during the past 26 years.

The first model of information-seeking behaviour in the general population was developed by Krikelas (1983:5-20) in 1983. This model suggested that the information seeking steps were the following: (1) perceiving a need, (2) the search itself, (3) finding the information, and (4) using the information, which results in either satisfaction or dissatisfaction. Krikelas' model is linear in nature and research done at a later stage suggested that it lacks complexity and flexibility necessary to address the topic. Of relevance to later studies is the fact that this model states that information seeking is

based on "need," a concept which is closely related to motivation and theories of learning.

Kuhlthau (2004:29-164) developed an information seeking behaviour model which stresses a process approach with a focus on cognitive skills: as these skills increase, so does information-seeking effectiveness. Kuhlthau's model goes beyond the actions of information seeking and looks at the thoughts, feelings, and actions of information seekers as they go through the information search process. It is based on a longitudinal study of high school students, as well as additional studies using larger, more diverse groups of users and two additional longitudinal studies.

Kuhlthau's information search process (ISP) model therefore includes cognitive and affective aspects, such as feelings which arise during the information search process. Thoughts that begin as vague and uncertain become more focussed and specific as the search process progresses. Feelings of doubt and anxiety become more certain and confident. Through their actions, users seek information relevant to their topic throughout the stages of the information search process. The formulation of a focus or personal perspective of the topic is a pivotal point in the information search process: at this point thoughts shift from vague to more clear and feelings change from uncertain to confident. Kuhlthau's model reveals a search process in which the user is seeking meaning during the process of seeking information.

Kuhlthau's ISP model (Kuhlthau 2004:29-88) presents a constructivist approach to information seeking that incorporates affective, cognitive and physical dimensions at each of the six information seeking stages (Table 3.1):

Table 3.1: Kuhlthau's Information Search Process (ISP)

Stages	Task Initiation	Topic Selection	Pre-focus Exploration	Focus Formulation	Information Collection	Presentation
Feelings (Affective)	Uncertainty	Optimism	Confusion Frustration Doubt	Clarity	Sense of Direction/ Confidence	Satisfaction/ Disappoint- ment
Thoughts (Cognitive)	Vague	Focused	Increased interest	
Actions (Physical)	Seeking	relevant Exploring	information		Seeking pertinent Documenting	information

Kuhlthau (2004:82)

- *Initiation:* during the first stage of the ISP a user first becomes aware of an information need or a lack of knowledge and feelings of anxiety and uncertainty are experienced. The information need initiates, motivates and directs the user's information seeking activities.
- *Selection:* topic selection takes place during this stage of the ISP. The four criteria for selecting a topic are: personal interest, requirements of the assignment, information available and time allotted for the assignment. When a general topic or problem is identified and uncertainty changes to a sense of optimism, the user feels ready to begin the information search.
- *Exploration:* during this stage of the ISP users first use information resources they had used before, or recommended resources and then they turn to lesser known or accessible information resources. When they find inconsistent or incompatible information it leads to increased feelings of uncertainty, confusion and doubt.

- *Formulation:* this stage of the ISP involves a critical moment or turning point of the ISP when the user forms a focused perspective, resulting in diminished feelings of uncertainty and increased confidence. Thoughts involve identifying and selecting ideas to form a focused perspective. Students described formulation occurring towards the middle or latter part of the ISP, after they had been searching for some time.
- *Collection:* this is the information gathering stage of the ISP and when information relevant to the focused perspective is found, feelings of uncertainty decreases as interest and involvement increases. In addition to the due date of the assignment, completion of an information search was determined either by exhaustion of information resources or by having enough information to complete the assignment.
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- *Presentation:* this stage of the ISP occurs when the search is completed with a new understanding which enables the user to put the learning to use. Outlining is an important part of organising information for presentation and often a sense of personal ownership with the research product is experienced.

Kuhlthau developed two extensions based on the ISP model: the principle of uncertainty and the concept of a zone of intervention. Application of this model to students need to include activities such as collaborating and continued searching for information until a focused perspective is revealed; conversing with others to resolve conflicting information or ideas (which opens the doors to the zone of intervention for intermediaries such as librarians) and the formulation of thoughts through charting and composing to give meaning to the information gathering process in terms of constructs previously held (Kuhlthau 2004:71-143).

Eisenberg and Berkowitz (1992:37-42) developed a component-based information seeking behaviour model for students based on the “Big Six Skills:” task definition, information seeking, implementation, use, synthesis and evaluation. Advantages of this approach include the following: the model is flexible and linear in the same way that hyper-text is; various search areas can be explored out of sequence and information seekers can go back and refine or re-identify the information need and implement new search strategies. This information seeking behaviour model incorporates flexible learning theories and cognitive development theory (Eisenberg and Berkowitz 1992).

After studying various information seeking models, Weiler (2005:46-53) concluded that information seeking research often refers to motivation, critical thinking, and learning

theory as core factors in the information seeking behaviour of Generation Y students. The information search process starts when a user perceives an information need, followed by the information search, succeeded by finding the information and concluded when the information is used, which results in either satisfaction or dissatisfaction. Weiler states, however, that information seeking behaviour and the information search process is a highly complex process that involves many aspects, including generational characteristics, which is discussed in the next section.

3.4.2 Generation Y information seeking behaviour

In their research paper “Born with the Chip”, Abram & Luther (2004:34) identified several aspects of Generation Y students’ information seeking behaviour that differentiate their information seeking behaviour from that of previous generations:

- *Format agnostic*: Generation Y high school students do not limit information formats when doing research, for example they accept Google results which could include information from encyclopaedias, websites, blogs, videos, audios, etc.
- *Nomadic*: students of this generation expect information to be available when/where they need it, including the availability of wireless technology.
- *Multitasking*: a core behavioural aspect of this generation’s students - they have the ability to integrate and navigate multiple applications simultaneously, combining their worlds in a single environment. This could for instance include surfing the web while working on school assignments, participating in Instant Messaging (IM) with friends and listening to music on their MP3 players.
- *Experiential*: this generation grows up playing video, PC and interactive games that help them to develop skills based on their experience. The result is that students of this generation prefer content-rich web pages versus exploring table-of-content web pages. Game-type interfaces would be the preferred search interface when these students conduct information searches.

- *Collaborative*: this aspect is intrinsic to the Generation Y information seeking behaviour. High school students collaborate when playing multiplayer web games, when participating in IM, chat rooms, virtual classrooms, etc. This behaviour suggests that virtual reference services or any other collaborative information services would be appreciated by this generation.
- *Integrated*: content and technology are inseparable for students of this generation. The implication for librarians is that they need to be integrated with virtual environments and be a mentor, coach and information advisor to these students.
- *Directness*: this generation prefers direct communication and will ask the librarian for help, but they will also express dissatisfaction with services that do not meet their information needs. Librarians will need to bridge the generation gap and be sensitive to cross-generational issues in an attempt to meet the information needs of this generation.
- *Instant gratification and high expectations*: Sweeney (2005:165-75) found that Generation Y students are impatient and expect instant access to information as well as immediate feedback, as a result of the instant response they experience with electronic games and commercial search engines. They therefore also expect instant responses when accessing licensed databases and expect these services to be available whenever/ wherever they choose to access them.
- *Saving time*: Weiler (2005:46-53) found that students of this generation are more concerned with time issues and levels of difficulty when seeking information than with the accuracy of the information.

3.4.3 Information seeking behaviour categories

In order to obtain a comprehensive picture of high school students' digital information seeking behaviour, Valenza (2006:1-4) suggests categorising high school students' digital information seeking behaviour into four broad categories:

- *Cognitive*: what high schoolers know and do not know about searching for information and digital resources.
- *Affective*: high schoolers' attitudes and emotions towards the process of seeking for digital information.
- *Social*: learning as a social activity and how their needs for achievement, acceptance and power can be satisfied by seeking digital information resources while interacting with peers.
- *Physical access*: constraints in accessing libraries and digital information resources, as well as interaction with service infrastructures.

Addressing the issues identified in these categories will provide a better understanding of the digital information seeking behaviour of high school students and allow measures to be recommended to prepare students to be life-long effective information seekers.

3.4.3.1 Cognitive aspects of Information Seeking Behaviour

Valenza (2006:1-4) describes the cognitive aspects of high schools students' information seeking behaviour, as what students know and do not know about a topic. Fourie (2006:23) confirms this by describing a user's cognitive framework as the user's knowledge about a topic, the search system and their previous experience, including what the user do not know about the topic or do not fully understand about the search system. Knowledge of the search system environment plays a major role in the cognitive framework. Cognitive frameworks are never static and develop and change over time as the student experience the search process.

Another aspect of search system knowledge is computing skills. Research indicates that a significant relationship exists between computing, Internet skills and the use of digital libraries and licensed databases. Lazonder (2003:1-3) found in an observation study of a group of high school students given specific search tasks on the Internet that those with a

high level of computing skills performed the tasks quicker and with better success in the results obtained.

Tenopir (2003b:4) studied research studies covering the use and users of digital resources, by analysing eight major and 200 smaller research reports. She confirmed that high school students' first choice of information is digital resources, especially the Internet. The reasons for this preference include their perception that digital resources are convenient, relevant and time-saving with regard to their normal activities and workflow. This finding corresponds with similar findings in various other studies in terms of the web searching behaviour of high school students (Connaway & Radford 2007; Lippincott 2005; Weiler 2005; Sweeney 2005; Fitzgerald & Galloway 2002).

Although search engines have been available for several years, they were initially not well-understood or well-used. This finding has changed, as more expertise in the frequency and use of search engines developed among students (Lippincott 2005). Students can evaluate the relevance (but not always the quality) of search results and whether the results are significant in achieving the students' goals of completing the school assignments at hand. Students are quick to start a new search if the results delivered in a previous search are of little interest. They also tend to ask for assistance from peers and librarians when lost or unsuccessful in their search efforts.

Waldman's findings (2003:1-37) indicate that students who use the library's digital resources regularly are able to distinguish between the quality of information found via digital libraries and licensed databases, versus the quality of information found via commercial Internet search engines. Frequent use of digital libraries and licensed databases could therefore translate into enhanced information literacy skills.

Fitzgerald & Galloway (2002) found that high school students using GALILEO do not have the ability to draw conceptual maps as to what information is available to them. This aspect of limited ability to create mental models of information seeking and therefore the information available to them necessitates the digital library as a navigational tool to

present an effective interface to the user for finding, managing, using and publishing digital information in a way that is both powerful and easy to use (Valenza 2004).

Weiler (2005: 46-53) found that the scholarly literature about information seeking refers to motivation, critical thinking and learning theory as critical aspects of the information seeking process. Motivation relates to user rewards and critical thinking relates to user evaluation and effective use of retrieved information. Weiler's findings indicate that high school students often seem incapable of thinking critically about coursework, information needs and information resources. Learning theory is closely related to user motivation, since students will only seek information and learn if they are motivated to do so.

Apart from the cognitive aspects of high school students' information seeking behaviour, there are various affective factors that could influence their information seeking behaviour, as examined in the next section.

3.4.3.2 Affective aspects of information seeking behaviour

Valenza (2006:1-4) describes the affective aspects of high school students' information seeking behaviour as their emotions and attitudes while seeking information. Valenza (2004:3) found that high school students displayed confusion, doubt, frustration or anxiety when they conducted unsuccessful searches in digital information technologies, in spite of self-proclaimed or publicly-bestowed self-efficacy. She states that research reveals troubling data about their searching capabilities, their abilities to navigate the web to find the resources they need for school projects and their understanding of search environments. Weiler (2005:46-53) found that students tend to overrate their Internet skills, since the Internet is a popular medium that they are expected to have good knowledge of.

Information retrieval research and theory focus increasingly on the role of "affect" in user information seeking behaviour and how it influences cognitive operations. Affective variables that have been explored in research include: need, preference, attitude, task motivation, expected and felt effort, uncertainty, self-efficacy, optimism, relevance, satisfaction and acceptance of or loyalty to the system. "Affective load" is a recently

developed term that, along with "user coping skills," could reduce the negative effects of uncertainty, frustration, anxiety, irritation and rage during information searches (Nahl 2005). Valenza (2006:2-3) points out that information overload both within individual sites as well as on the Web overall, creates a feeling of frustration and therefore an attitude of "satisficing" (good enough), another recently developed term appearing in Information Science literature. Self-efficacy (a student's belief about his/her ability to accomplish a task), confidence and motivation are important factors in the ability of students to recover from unsuccessful search efforts.

Waldman (2003:1-37) investigated ninth grade students' use of library electronic resources and self-efficacy (self-confidence, effectiveness) and found that frequency of library visits by high school students influenced their information literacy and self-efficacy: the more a student used the library, the more familiar the student became with library resources. Lazonder (2000) found that high self-efficacy led to higher information seeking efficiency, success and satisfaction.

Although most research findings indicate that high school students have confidence when asking the librarian for assistance if lost or unsuccessful in their search efforts (Lorenzen 2001:5), a later study by Connaway & Radford (2007:6) found that some students expressed a reluctance/anxiety to approach librarians, due to a pre-conceived notion of librarians being unapproachable and fears/anxiety that students could feel inadequate when asking for information assistance.

Another affective aspect of high school students' information seeking behaviour is students' concern for time spent locating information for school assignments. Weiler (2005:47-53) found that students rate information seeking experiences on how much time they took and will often accept information of lower quality if it takes less time to find. Students perceive information seeking as taking time away from things they view as more important. Of importance to this study is Weiler's finding that teachers' lack of guidance and lack of discernment about the accuracy and quality of information, lead to less motivation for students to find accurate, quality information (Weiler 2005:47-53).

This section covered the affective aspects of high school students' information seeking behaviour, particularly as it relates to student use of digital resources. In the next section the social factors influencing students' information seeking behaviour are examined.

3.4.3.3 Social aspects of high schoolers' information seeking behaviour

Valenza (2006:3) found that high schoolers' information seeking actions are both social and academic events. Students seem to enjoy social interaction while searching, but they generally focus their search on getting information or answers for their school assignments (Fidel 1999). Students enjoy collaborating on school assignments and conducting information seeking with other students. Kuhlthau (1999:715) states that collaboration is one of the strategies students employ to get through the more difficult stages of the ISP she developed. This information sharing would involve aspects of planning, the discovery of resources and contributes to each individual's ability to construct a new meaning and understanding of what he/she developed in terms of the problem at hand. They also have the ability to multitask, for instance they enjoy conducting web information searches while Instant- Messaging (IM) with peers (Abram 2004:34).

Apart from the cognitive, affective and social aspects of high school students' information seeking behaviour, high school students often experience barriers to accessing information; discussed in the next section.

3.4.3.4 Access limitations to information resources

Valenza (2006:3) recognises that the Internet has removed some physical information seeking barriers such as physically going to the library to find information. Although students appreciate the ease with which they can access digital information, they are frustrated by the restrictions on time and access to high school media centre computers. High school students were the focus of the 2002 Pew Internet and American Life Project, "The Digital Disconnect: the widening gap between Internet savvy students and their schools" (Levin & Arafeh 2002). This study found that students claimed they faced numerous roadblocks when using the Internet at schools and these roadblocks in many

cases discouraged them from using the available digital resources as much or as creatively as they would have preferred. Schools not only restrict the use of the Internet to hours of school operation, but also to specific times of the day, to computer laboratories, only with the permission of specific administrators or teachers and under constant supervision (surveillance cameras).

Considering that high school students need to complete school assignments when school media centres and computers are not available for use, the public library often becomes a viable alternative. However, if a student does not live close to a public library and has no transport, the public library would cease to be a viable alternative.

Tenopir (2003b:29-30) found a number of barriers to digital library/licensed database use when analysing the 2002 OCLC/Harris survey: students' inability to access databases remotely because of password requirements or license restrictions; difficulty searching and navigating within a library website and lack of user orientation. Access barriers to school media centres, public libraries and licensed databases could therefore be a contributing factor to the Internet being high school students' primary source of information when requiring information for school assignments.

This section covered the factors influencing the information seeking behaviour of high school students. Although a large number of studies have been done on information-seeking behaviour, the process itself is still to a large extent a mystery. Although recently researchers have been expressing the need for more qualitative research in studies of this type, quantitative and/or longitudinal studies on generalised information seeking are also scarce, particularly in student populations. Considering concerns about students' information seeking behaviour uncovered in research, it is next necessary to examine their information literacy skills.

3.5 INFORMATION LITERACY SKILLS OF HIGH SCHOOL STUDENTS

In the USA information literacy is perceived to consist of a series of communication abilities, including the ability to access, analyse, evaluate, and communicate information in a variety of formats, including print and digital formats (AMLA 2007:1).

3.5.1 Information Literacy definitions

The Alliance for a Media Literate America (AMLA 2007:1) provides the following definition of information literacy: “Interdisciplinary by nature, information literacy represents a necessary, inevitable and realistic response to the complex, ever-changing electronic environment and communication cornucopia that surround us”. Armstrong (2005:1) defines information literacy as the following: “Information literacy is knowing when and why the searcher needs information, where to find it and how to evaluate, use and communicate it in an ethical manner” (Armstrong 2005:1).

3.5.2 Need for information literacy training

Researchers agree that there is a need for high school student user training in web searching strategies and techniques (Valenza 2004:1; Fitzgerald & Galloway 2002). Tal (2006:28) highlights the fact that face-to-face guidance by a librarian diminishes in a ubiquitous computing environment. Tenopir (2003b:4) concludes that students’ information quality judgements of Internet information are absent or not on the level of academically accepted standards. Research on the topic of information literacy indicates that this skill is lacking or not satisfactory at most user levels, including at the high school student level (Fitzgerald & Galloway 2002; Balas 2006).

Lorenzen (2002) states that the discerning capability of the student is developed over a four stage life cycle: dualism; multiplicity; contextual relativism and dialectic phases. It was found, however, that high school students rarely move beyond the second phase (multiplicity) of discerning capability. Multiplicity is the ability to recognise that multiple sources of knowledge exist and that a student must further study these sources before a “dualistic” judgement of “right” or “wrong” can be made. This critical thinking skill is crucial to the learning process, to cognitive development, and to effective information seeking (Weiler: 2005:47-49).

Students must therefore develop skills in distinguishing between non-authoritative, anonymous web pages and peer-reviewed, scholarly information. The lack of skills

necessary to access and utilise digital information effectively has been referred to as the “second-level digital divide” (Gunn 2002:33).

3.5.3 Information literacy standards

According to the American Library Association’s “Information Literacy Standards for Student Learning” (1998:1-2), a student is only information literate if the student “accesses information efficiently and effectively, evaluates information critically or competently and uses information accurately and creatively.” Judging by the ALA standards and research on the subject, high school students are not sufficiently information literate (Tenopir 2003b; Fitzgerald & Galloway 2002; Balas 2006).

Cahoy (2002:13-15) discusses the formal standards for information literacy set for school and college students. Two sets of educational information literacy standards exist for students K-12 and post-secondary audiences. The Association for Educational Communications and Technology (AECT) in 1998 set the information literacy standards for K-12 students. The Association of College and Research Libraries (ACRL), a division of the ALA, followed up in 2000 with Information Literacy Competency Standards for Higher Education students. Formulated by committees of librarians and leaders in education, each set of standards communicates the skills that students need in order to be lifelong learners, critical thinkers, and effective users of information. The two sets of standards complement each other, as well as the ALA standards for information literacy (ALA 1998:1-2). These standards focus almost entirely on the skills inherent in finding and using information effectively and ethically. The standards should therefore be used as a basis to evaluate the required service standard within public libraries, in order to address high school students’ information seeking behaviour effectively.

Cahoy (2002:15) states that according to the AECT Information Literacy Standards for K-12 students, the information literate student should be able to:

- Determine the nature and extent of the information needed.
- Access the required information effectively and efficiently.

- Evaluate the information critically.
- Use the information effectively to accomplish a specific purpose.
- Understand the ethical and legal issues surrounding the use of information.

3.5.4 Enhancing Information Literacy

Information literacy standards emphasise that information literacy is a critical life skill for students. Research on a wide front indicates the need for this skill to be taught to all library users and recommends that public and school libraries should incorporate digital training into their user interfaces in order to enhance information literacy (Wang 2003).

In order to enhance information literacy, the key elements in the design of a virtual library should be collaboration, communication and personalisation (Makani & Woo Shue 2006). Digital library developers need to understand their users: how they use information, how they create knowledge and how digital libraries should support these processes. Their research findings also indicate that students at all levels choose the route of least resistance by initially choosing a commercial search engine (especially Google) to start an information search.

Valenza (2004:1) suggests enhancing students' use of digital libraries by having the librarian fulfilling a guiding role by providing reference services and a learner-centred virtual library interface, to increase students' information literacy skills and therefore prepare them for a lifetime of efficient and effective information use. Lippincott (2005) agrees with these sentiments and finds that the heavy reliance of students on search engines could be due to the fact that information literacy services offered by libraries are presented from a librarian perspective rather than that of the user. New emerging services such as Google Scholar should be embraced by library services to provide access to more reliable information resources in the general Internet environment.

At the 2007 ALA Annual Conference in Washington DC, George Needham from OCLC presented a paper on Gaming and Information Literacy. Considering students' preference for computer and video games, Needham suggests that skills acquired through mastery of electronic games, could be applied to help students conquer the maze of library databases

and research. Since computer and video games shaped the way students learn and process information, librarians and digital library designers should use this understanding of students in their planning of information resources, services and information literacy instruction to this user group. He further suggests that the gaming elements of urgency, complexity, learning by trial-and-error, active learning, experiential learning and problem-based learning, could be incorporated into high school student information literacy programs and digital library designs (Needham, Gee & Morgridge 2007).

Geck (2006: 19-23) has several useful suggestions for librarians on enhancing high school students' information literacy:

- Collaborate with high school teachers to incorporate information literacy and digital library technologies into the curriculum.
- Provide students and teachers with quality information from digital libraries.
- Show students and teachers how to save time when searching for information in digital libraries and licensed databases.
- Create communities of learners or e-learning modules by linking students' web pages to a central page or starting point.

This section covered various possibilities of enhancing high school students' information literacy and the next section examines digital library user instruction, which is closely related to information literacy enhancement.

3.5.5 Digital library user instruction and design

Valenza (2004) found that high school students searching the web expect it to be fast and convenient and expect libraries to deliver information services of the highest standard. In order for high school students to become effective seekers and users of information, they need instruction/training and improved systems design to support their interaction with information resources. She recommends that libraries should create communities of

digital learners, by exploiting the professional skills of the librarian and offering instruction in information literacy.

Research studies have found that high school students would welcome direction and instruction in information search strategies; and would like the opportunity to share thoughts, discoveries and information with their peers and instructors (Fidel 1999; Urquhart 2005). The creation of interfaces that satisfy their information needs could create venues for higher levels of thinking, learning and socialising. Valenza (2004) states that a virtual library for a high school student community should be a customised, structured online learning environment, designed by a librarian to extend and improve the services and mission of the (public) library programs to the community. Kuhlthau (2004:202-206) introduced the concept of a zone of intervention during the digital information search process, as a critical time when a student needs the help of an intermediary to move ahead in the information seeking process. The critical moment when to intervene is a skill that needs to be developed as part of a librarian's professional tasks. The intervention by an intermediary during the ISP process while the student is feeling self-sufficient would be considered intrusive. Through conversing students will let an intermediary know when they are stuck in the ISP process and need help to move on – at this critical moment intervention is enabling and enriching.

After analysing the 2002 OCLC/Harris survey, Tenopir (2003:29b) states that students indicated a desire for libraries to assist them with using digital libraries, by:

- Making it easier to use and access digital library information.
- Making both print and electronic resources available.
- Offering interactive maps, study guides, and resource guides.
- Providing links to other libraries and research sites.

Weiler (2005:36-53) states that high school students may be more open to instruction in search techniques (Boolean and other techniques) if they realise the time-saving aspects

associated with these search techniques, which could also lead to more frequent use of digital libraries by high schools students.

This concludes the discussion about high school students' information literacy, the enhancement of students' information literacy skills and improved digital library user instruction. The next section examines the role of the public library in supporting high school students' use of digital libraries.

3.6 THE ROLE OF THE PUBLIC LIBRARY IN SUPPORTING HIGH SCHOOL STUDENTS' USE OF LICENSED DATABASES

Should the public library in this era of advanced information technology still focus on the information needs of high school students? The answer to this question can be found in the American Library Association's (ALA) Bill of Rights: libraries should provide books and other library resources for the interest, information, and enlightenment of all people of the community the library serves, according to the ALA website (<http://www.ala.org>). The community served by the public library includes high school students and research indicates that the young adult population (mostly high school students) makes up 25% of the public served by the public library (Estabrook, Evans & Rainie 2007:18; Hughes-Hassell & Miller 2003:143). High school students therefore represent a significant segment of the community served by the public library, thus their information seeking behaviour is relevant on many levels, but perhaps not fully addressed by current public library policies and practices.

The last few years have seen a number of significant changes in the landscape of how public libraries fulfil their mission. The availability of Federal, State and local funding for public schools and libraries to ensure Internet access for all communities, as well as funding for the development of digital libraries, have given public library patrons access to the Internet and thereby to electronic research collections and licensed databases (Levin & Arafah 2002).

One of the most active and adaptive organisations involved in the promotion of public library use by young adults (ages 12-18 years old), is the Young Adult Library Services

Association (YALSA). YALSA was founded more than 50 years ago to promote reading skills among young adults and now also actively promotes the use of digital libraries, blogs and wikis through their annual Tech-Week. The 2008 Tech-Week promoted the ethical use of online resources through thousands of participating members in public libraries and school media centres, in an effort to increase information literacy skills among young adults, according to the ALA/YALSA website (<http://www.ala.org/yalsa>).

3.6.1 Reasons for high school students to visit public libraries

In the 2007 Pew study of public library patronage, Estabrook, Witt & Rainie (2007:18-22) surprisingly found that Generation Y (especially ages 18-30) is currently the largest library user age group, as discussed in Chapter 2 subsection 2.2.5. The study results challenge the assumption that libraries are losing relevance in the Internet age.

The use of public libraries by high school students is influenced by factors such as parent/teacher instruction, habitual use of the public library since early childhood, accessibility/convenience of library location, long hours of operation and the availability of library collections relevant to school assignments (Clabo 2002; Enujioké 1994). The public library offers high school students access to printed information collections, media, the Internet and therefore to the ever-popular first port of call, the commercial search engine, as well as access to a rich reservoir of licensed databases, which were discussed in Section 2.3. Waldman (2003) found that factors which could influence students to use digital libraries include the fact that public libraries provide access to scholarly literature via digital resources that as a rule are not freely available via commercial search engines.

School media centres (and school computers) are not accessible after the school day ends, or during weekends, public holidays and school vacations (including the long summer vacation). Considering the fact that high school students need to complete school assignments when school media centres or computers are not accessible, they often turn to the public library to satisfy their information needs.

3.6.2 Organisation of information resources

Makani & Woo Shue (2005) found that the library's organisation of information resources is a critical factor in the delivery of quick results. Fitzgerald & Galloway (2001) and Valenza (2006) highlighted the fact that library users should have a clear understanding of how the information they needed was organised, otherwise they had difficulty forming mind maps on how to retrieve information.

Digital library information resources should be effectively organised, so that information resources for a particular group of users, for instance high school students, are easily identified. Digital libraries accessible via the public library could be customised for particular schools, grades, and subjects. GALILEO, the Georgia virtual library, reorganised their virtual library by developing new search interfaces for each library user group, as discussed before. Public libraries generally organise their digital resources on their websites (Figure 3.1, permitted under "fair use"). There is usually a link to the licensed databases/digital libraries from the home page, as well as information on how to obtain the password necessary to access the licensed databases. Database licensing requires that only registered library users may access the licensed databases via a protected password. High school students could access licensed databases subscribed to by East Cobb public libraries via their website (<http://www.cobbcat.org>).

Figure 3.1: East Cobb Public Libraries' Online Resources

Online Resources - Internet Explorer provided by Dell

http://www.cobbcat.org/online.htm

LIBRARY CARD LOCATIONS GENEALOGY VIRTUAL LIBRARY

ONLINE RESOURCES

[Automotive](#) [Electronic Books](#) [Magazines and Journals](#) [Newspapers](#)
[Biographies](#) [Georgia](#) [Maps](#) [Pictures](#)
[Business](#) [History](#) [Medicine and Health](#) [Reader's Advisory](#)
[Careers](#) [Libraries](#) [Music](#) [Science](#)
[Drama](#) [Literature](#)

Reference Databases:

These are subscription databases available to you free from the Cobb County Library. Some of them are also [available from your home computer with a password](#). Keep scrolling down the page for more information on the databases and instructions for getting the current password.

[ALLDATA® Online](#) [GALILEO](#) [Informe](#)
 Digital Library of Georgia: [GALILEO Kids' Page!](#) [Litfinder](#)
[Gale Ready Reference](#) [H. W. Wilson Biography](#) [NetLibrary](#)
 REMOTE access to: [eLibrary!](#) [Newsbank](#)
[Gale Ready Reference](#) [Infotrac-Gale Group](#) [Reference USA](#)

Search Engines:

[Google](#) [Ask Jeeves](#) [Yahoo](#)

Reference Database List:

	Direct Link	Password Needed
<p>Password Needed: Database licensing requires that we provide remote access only to registered library users via a protected password, which can be obtained by logging into Cobbcat with your library card number and PIN. Once you are logged in, click on My Profile in the thin blue banner. The current password is displayed here.</p> <p>Link to COBBCAT to enter "MY PROFILE" for the current password.</p>		

GALILEO Georgia Library Learning Online – Georgia's Virtual Library, funded by the Governor and the General Assembly for the citizens of Georgia since 1995. Tutorial – How to Use [Use In Library](#) [Use Outside Library](#)
 GALILEO: [Link](#)

Internet | Protected Mode: On 100% 12:58 PM

Some public libraries reach out to high school students by developing a homework webpage, e.g. Fig. 3.2 (<http://www.boisepubliclibrary.org>, permitted under “fair use”).

Figure 3.2: Student Homework Webpage

Homework Help - Boise Public Library - Internet Explorer provided by Dell

http://www.boisepubliclibrary.org/Research/homework/default.asp

File Edit View Favorites Tools Help

Homework Help - Boise Public Library

Idaho Information

Obituaries

Homework Help

Presentations & Tours

Funding Information Center

Ask a Librarian

Search the Web

Contact Us

Site Map

City of Boise.org

Boise Public Library
715 S. Capitol Blvd
Boise, Idaho 83702
Ph. (208) 384-4076
Telecirc (208) 384-4450
TTY: 1-800-377-3529

Director: Kevin Booe

DO YOUR HOMEWORK!

E-Collections

It's online! Magazines, newspapers, books, photos, encyclopedias and more. Titles include:

- eLibrary
- Infotrac: Student, Junior & Kids InfoBits
- Learning Express: practice tests
- Novelist: find a good book
- ProQuest: eLibrary, History Study Center, Literature, Newspapers.

Search Now! Students K - 6th

Search Now! Students 6th - 12th

Library Search Help

Search the Catalog

Find books, audio & music CDs & DVDs

answerXpress.com

Need help? Chat with a librarian, 24/7.

Websites by Topic

Our Web Picks for K-6th grade
Animals, geography, history, Idaho, math, science & [more](#).

Our Web Picks for 6 - 12th grade
Math, literature, citation makers, study guides for the classics & [more](#).

Need more help? Try this . . .

LIBRARIANS' INTERNET INDEX

Recommended Search Tools

Google

Ask.com

Media Search

Find images, sounds, photos, & other special effects.

Computer

Minif Chapter 2 Janu...

GALILEO - Internet E...

Homework Help - B...

9:01 PM

The above mentioned public library has further organised its homework website with an additional webpage listing recommended licensed databases and websites by school subject.

3.6.3 Pre-Selection to support just-in-time learning

Virtual libraries, especially those with customised collections, facilitate just-in-time learning. Riel (1998) describes just-in-time learning as learning needed for a particular purpose. Just-in-time learning can be independent of time and place. Public libraries with virtual libraries can make resources available just-in-time for specific assignments, especially if collaboration with teachers/media specialists in their communities could be facilitated within the virtual library infrastructure.

An example of pre-selection to support just-in-time learning is the following: an Atlanta metro public library system promotes licensed databases by selecting a database-of-the-month or group of databases based on a relevant monthly topic, e.g. Martin Luther King Day is celebrated each year in the USA on the third Monday in January; therefore MLK Day was selected as the January 2008 topic, along with African American related databases. Students usually have school assignments on this topic each year in January: Figures 3.3 - 3.4 (<http://www.afplweb.com>, permitted under “fair use”).

Figure 3.3: Licensed Database Promotion: Database of the Month

The screenshot shows the Atlanta-Fulton Public Library System website in Internet Explorer. The browser's address bar displays <http://www.af.public.lib.ga.us/>. The website header includes navigation links: My Account | News | Hours and Locations | Contact Us | Español. The main navigation menu contains: Home, Library Locations, Events & Classes, Books & Materials, Services, Support AFPLS, and About AFPLS.

The central banner features the Atlanta-Fulton Public Library System logo and a search bar with a dropdown menu labeled 'How do I' and a 'Choose One:' dropdown. Below the banner is a navigation menu with the following items:

- Catalog Quick Search
- Search by [dropdown] GO
- Single Search - New!
- Bookletters: Got Reads?
- Bestsellers
- Library Locations Map
- Central Library
- Auburn Avenue Research Library
- KIDS' PAGES
- Atlanta Teen Links
- Make a Donation

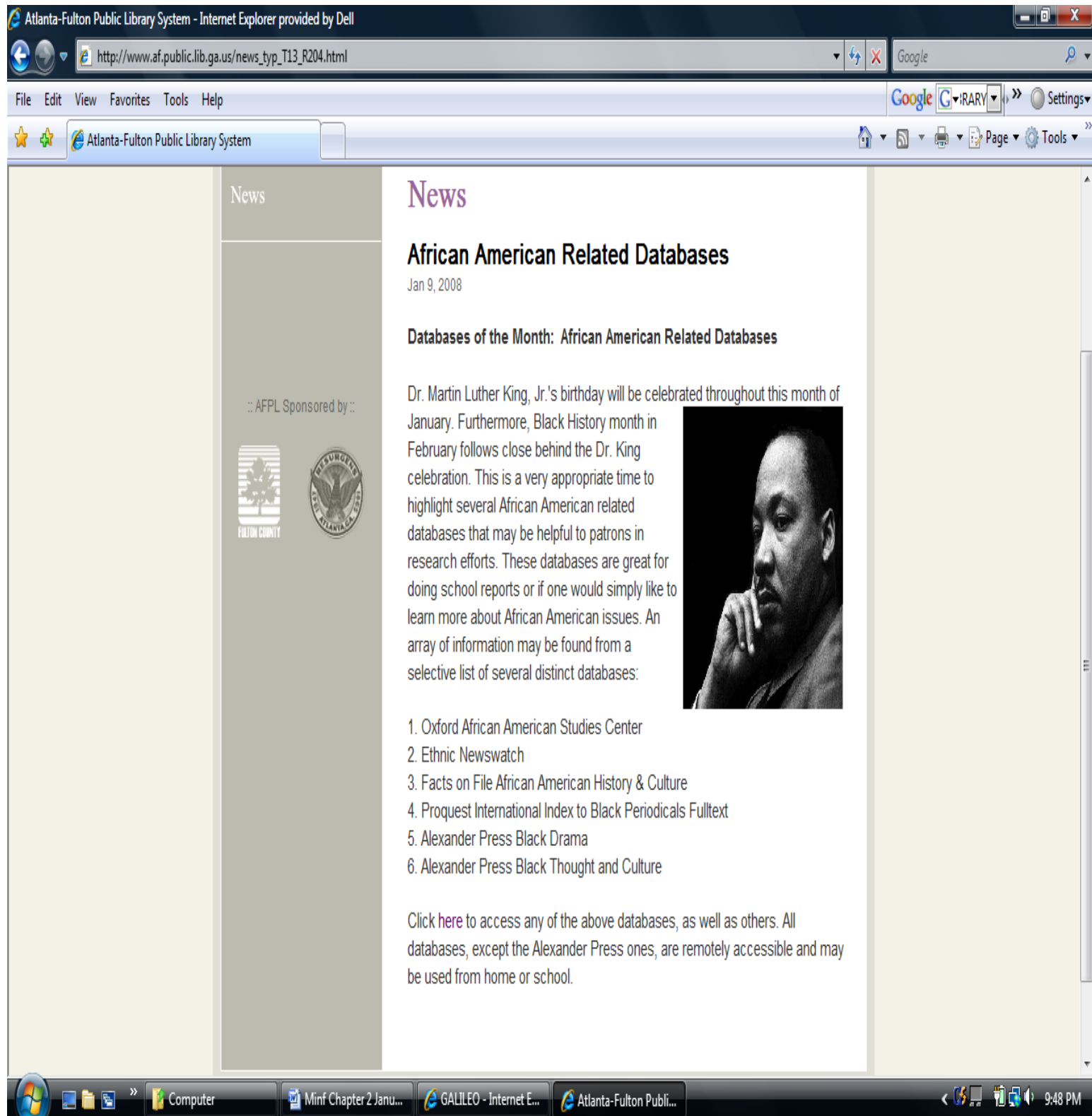
The 'Database of the Month' promotion is highlighted with a purple background and the text 'MLK Day' in large, stylized letters. Below this, it says 'Database of the Month' and 'learn more >>'. To the right, the 'Latest News...' section lists several articles:

- African American Related Databases
- First Annual Savannah Book Festival
- [ALA to Provide Live Webcast of Top Children/Teen Literary Awards](#)
- Cinderella Story Hour with the Atlanta Ballet
- Financial Planning Workshops at Southwest
- Friends of East Atlanta Meetings and Reception
- Northside Branch Closed for Recarpeting
- Celebrating the Life of Dr. Martin Luther King Jr.
- Trailblazing Our Rights And Our Freedoms
- Auburn Avenue Research Library Programs
- Learn More about Your Library's Facility Master Plan
- Meet Brian Jordan at Southwest Regional Library in February

Below the news section, there is a 'More News...' link and a 'Books, Research, & Databases' section with links for 'Catalog Search' and 'A-Z List of Databases'. At the bottom of the page, there are links for 'Auburn Avenue Research' and 'Research a Topic'.

The taskbar at the bottom shows the Windows Start button, several open applications (Computer, Minif Chapter 2 Janu..., GALILEO - Internet E..., Atlanta-Fulton Publi...), and the system clock showing 9:47 PM.

Figure 3.4 Selection of African American Related Databases



Atlanta-Fulton Public Library System - Internet Explorer provided by Dell

http://www.af.public.lib.ga.us/news_typ_T13_R204.html

Google

File Edit View Favorites Tools Help

Atlanta-Fulton Public Library System

News


News

African American Related Databases

Jan 9, 2008

Databases of the Month: African American Related Databases



Dr. Martin Luther King, Jr.'s birthday will be celebrated throughout this month of January. Furthermore, Black History month in February follows close behind the Dr. King celebration. This is a very appropriate time to highlight several African American related databases that may be helpful to patrons in research efforts. These databases are great for doing school reports or if one would simply like to learn more about African American issues. An array of information may be found from a selective list of several distinct databases:



1. Oxford African American Studies Center
2. Ethnic Newswatch
3. Facts on File African American History & Culture
4. Proquest International Index to Black Periodicals Fulltext
5. Alexander Press Black Drama
6. Alexander Press Black Thought and Culture

Click [here](#) to access any of the above databases, as well as others. All databases, except the Alexander Press ones, are remotely accessible and may be used from home or school.

AFPL Sponsored by ::



3.6.4 Communication support and collaboration

Digital libraries can be constructed to facilitate collaboration among learners either synchronously (real-time), or asynchronously (delayed-time). They can also incorporate instruction, tutorials, and reference service or assistance by e-mail or real-time (IM). A virtual reference service providing user support to information users of virtual libraries is a relatively simple implementation (Walter 2005). Although virtual reference services are not available through all public libraries, these extended online services could be incorporated into the public library infrastructure, by utilising existing reference or young adult services to assist high school students.

In an international study funded by the US Institute of Museum and Library Services and OCLC, Connaway & Radford (2007) conducted focus group interviews with high school students in both urban and rural settings to determine the factors influencing the use of virtual reference services (VRS). Even though some students had previous negative experiences with librarians, they preferred face-to-face interaction with the librarian to interacting with a “stranger” on the Internet (Ask-A-Librarian, etc.). Factors that would make them use the VRS would be recommendations by the teacher or librarian, an environment of trust and better marketing of the services (Connaway & Radford 2007).

Tenopir (2003b) comments on the fact that many studies found that teacher/librarian recommendations play a major role in the use of digital libraries and licensed databases. Lamb & Callison (2005:34) point out that many teachers are not aware of the available digital resources they could integrate into the resource lists for their curricula. Fitzgerald & Galloway (2001:10) emphasise the importance of librarians collaborating with teachers to integrate student digital libraries usage into school projects.

3.6.5 Continuous evaluation

Continuous evaluation by public libraries (in collaboration with schools) of user needs and the use of digital libraries and licensed data bases will be the key to providing an information infrastructure that supports high school students in the creation, assimilation and leverage of knowledge (Wang 2003). Valenza (2006:4) simplifies this issue: “Can we

help to make these resources as easy to use and access as Google?" The digital library developers frequently conduct user surveys in an attempt to make these information resources as user-friendly as possible. Until the issue of high school students' digital information literacy is resolved, the public library will continue to fulfil an important role as mentor, mediator and coach to guide students in the use of digital libraries.

Abram (2004:37) suggests that libraries will have to seriously consider students' expectations of information services in order to be a relevant factor in their information seeking behaviour in the future. Notable is the fact that Stephen Abram himself is the vice president of Innovation for Sirsi/Dynix, company developing library catalogue software for OPAC implementation (Bannwart 2007:46). Sirsi/Dynix's OPAC upgrade called Vista Horizon Unicorn Rome is popular with many library systems and has a federated search interface that allows searching across a library's information resources. This would be a positive development for high school students in view of their high expectations of information services.

3.7 SUMMARY

The literature review indicated that the public library, high schools, media centres and licensed database vendors will need to adjust to cater to the changing information needs of Generation Y, including the high school student as a substantial portion of the public library user community. Digital information literacy skills were explored as a critical factor in high school students' effective use of digital resources. The role of the librarian is not becoming obsolete (Sherman 2007), but the application of professional librarian skills will be tested to meet the increasingly demanding digital information needs of library users such as high school students. The public library's role will have to change to incorporate this generation's information seeking behaviour and preference for digital cutting edge technologies. These needs should be incorporated into library planning, training, promotion and services in order to remain relevant to this generation in their quest for information.

The research methodology discussed in the next chapter, includes the development of the research instrument to gather data for research on the aspects covered in this chapter.

CHAPTER 4

RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

This chapter explains the research design and method the researcher used to determine the extent to which high school students use the licensed databases available through public libraries in the East Cobb area of Atlanta, Georgia.

Mouton (2006:49) distinguishes between the research design and the research process and sees them as different phases in the logic of a research framework. The research design focuses on the planning phase and indicates what type of research study provides acceptable answers to the research questions raised. The research process opens up the discussion as to how the fieldwork was conducted.

Thus the first part of this chapter provides a brief overview of the main research approaches and more specifically the research method selected for this study, survey research, as a form of descriptive quantitative research design. In the later part of the chapter the researcher covers the sampling techniques and the research instrument that was employed to collect the data, as well as the various stages of the research process, as suggested by Mouton (2006:99).

4.2 RESEARCH DESIGN APPROACHES

The two main research design approaches used in research studies are quantitative and qualitative research approaches. Quantitative design approaches in the social sciences involve the systematic investigation of phenomena and their relationships. The objective of quantitative research is to develop theories, hypotheses or research questions pertaining to natural phenomena. Quantitative research using statistical methods typically begins with the collection of data based on a theory, hypothesis or research questions, followed by descriptive or inferential statistical methods (Leedy 2005:179). A

fundamental principle in quantitative research is that correlation does not imply causation. Correlations could be examined between any combination of continuous and categorical variables using statistical methods. Various research methods such as survey research, observation studies and correlation research are available to yield quantitative information that can be further processed by statistical analysis.

Qualitative design approaches have two central factors: firstly phenomena are studied in their natural field settings or the “real world”; and secondly phenomena are studied in their entire complexity (Leedy 2005:133). The researcher did not use the qualitative research approach, since it would require researching high school students in their natural field setting and in the USA there are strict legal and ethical constraints on access to this population as minors and a vulnerable research group (Neumann 1997:450).

Even though most research studies would be improved by combining both qualitative and quantitative research approaches, novice researchers generally do not yet have the expertise or resources to use both approaches. Leedy (2005:105) recommends that novice researchers select one or the other for initial research projects, therefore this researcher selected the quantitative research approach and more specifically the descriptive design, which is further discussed in the next section.

4.2.1 Descriptive Quantitative Design Approach

Leedy (2005:179) states that descriptive quantitative research examines a situation “as it is” and involves either identifying the characteristics of an observed phenomenon or exploring possible correlations among two or more phenomena. It neither changes nor modifies the situation under investigation nor determines cause-and-effect relationships. In the field of Information Science this study is a user study that describes the opinions, attitudes, expectations and search behaviour of high school students when seeking academic information to complete school assignments using the public library’s licensed databases. Tenopir (2003b:6) is of the opinion that the methods used will determine at which level valid conclusions can be drawn and that using the quantitative descriptive

research method will allow conclusions to be drawn at the user level for both behaviour and preferences.

The aim of this study was to investigate the extent to which high school students make use of licensed databases when they search for information to complete school assignments. The aim of this study was further to investigate whether the public library and high school media centre sufficiently address the academic information needs of high school students, including providing user instruction for digital resources relevant to high school students.

The quantitative research design method that accommodates the aim and objectives of this study best is the descriptive survey. Descriptive designs are used to gain more information about a particular characteristic within a particular field of study. A descriptive study could also be used to develop theory, identify problems or justify current practice, make judgments or identify behaviour in similar situations.

The selection of the descriptive survey method enabled the researcher to learn about a large population (several thousand high school students), by surveying this population by means of a descriptive or normative survey. The survey research involved obtaining information about different grade levels of high school students, their characteristics, opinions, attitudes, and experiences relating to the use of licensed databases. During the survey the researcher posed a number of questions relevant to the research problem (the extent to which high school students use licensed databases via the public library), to willing participants (high school students) and summarised the responses in statistical tabulations and graphic representations (Chapter 5), before drawing conclusions about this particular population based on the research findings (Chapter 6).

4.2.2 Web-based Questionnaires

Survey research typically consists of interviews or questionnaires (Leedy 2005:184). The speed and economy offered by using an electronic questionnaire made it an attractive choice, especially when the bias of non-accessibility to computers and the Internet can be marginalised or eliminated.

The researcher selected an electronic, web-based questionnaire to research the information seeking behaviour of high school students and their use of the licensed databases via the public library. The advantages of using a web-based questionnaire for this study were: relative ease of access to survey a large number of high school students without travel or postage expenses; ease of soliciting and obtaining parental consent online; students could respond to questions more truthfully, since their anonymity was protected; no direct contact with the participants and therefore the legal and ethical problems associated with doing research among high school students or minors were avoided (Leedy 2005:185).

The main objection to web-based surveys is that some members of the population could perhaps not have access to a computer. However, as Wells (2006:2) and Bertot, Jaeger & McClure (2006:5) pointed out in their respective surveys of Internet access by high school students, all US high schoolers have access to the Internet either via school or the public library. Also most students in the USA have access to the Internet at home (Hock 2007:8). These facts eliminate the concern that, by doing a web-based survey, the sample would be biased, as all members of the population have access to the Internet, and no student were excluded from the population of respondents.

4.3 THE RESEARCH PROCESS

This section covers the process of conducting the fieldwork to gather data for analysis and interpretation.

4.3.1 Identification and selection of the data sources

The researcher attempted to gain an informative and more valid picture of the information seeking behaviour of high school students when accessing licensed databases via the public library in the East Cobb area of Atlanta, Georgia. The study focused on the views of high school students attending public schools: students who are home-schooled or attend private schools were excluded from this study.

The East Cobb area of Atlanta, Georgia is served by six public high schools, which were all envisaged as data sources for this research study. The schools, identified by an alphabetic symbol to protect their anonymity, had the following numbers of student enrolments: High School A (2200 students); High School B (1900 students); High School C (2050 students); High School D (2300 students); High School E (2000 students) and High School F (2100 students). The entire East Cobb public high school student population therefore consisted of 12 550 high school students at the time of the study.

A pilot study was conducted at High School E to test the ambiguity of the language and phrases used in the questionnaire and to attend to any other problems that occurred during the pilot testing, which is discussed in Section 4.3.3.2.

4.3.2 Sampling

Sample design in a descriptive survey study (which aims to describe the nature of the total population as it is) requires that the researcher choose an appropriate sampling design if it is not practical to study the total population. The most important aspects are the sample composition and sample size.

4.3.2.1 Sample Design

Sampling design can be grouped into probability sampling and non-probability sampling. Probability sampling allows the researcher to state upfront that each segment of the population under study will be represented in the sample. Random selection would allow each member of the population an equal chance of being selected allowing the researcher to assume that the characteristics of the sample approximates the characteristics of the total population. This can be done by generating a table of random numbers, creating a random starting point and allocating the participants as per the random allocation.

Non-probability sampling does not guarantee each member of the population an equal chance of being selected. In convenience sampling the participants are selected purely on their availability when the participants are requested to participate. Quota sampling

selects respondents in the same proportions as they are found in the general population, but mostly not in a random fashion (Leedy 2005:199-206).

In the next section the researcher discusses why a combination of the above mentioned sample designs were used to determine the sample composition and size.

4.3.2.2 Sample size

The researcher intended to obtain data from a representative sample of high school students in the East Cobb area of metro Atlanta, Georgia. There are two major considerations for obtaining an acceptable sample size: the first is that the sample should be representative of the total population from which it is drawn and secondly the size of the sample should be sufficient to reflect the total population. The determination of a representative sample is referred to as the external validity of the research design.

The total population of high school students attending the six East Cobb public high schools at the time of the study was 12 550. A sampling frame is a listing of the individuals in the population from which a sample is drawn. As the sampling frame for this study was based on all the e-mail addresses of parents of all high school students attending public high schools in the East Cobb area, it was considered an exhaustive sampling frame. This availability and relatively high accuracy (98%) of the sampling frame ensured a high degree of external validity to the sampling technique used to randomly draw a representative sample.

Factors influencing the sample size include the homogeneity of the population under study - the more homogeneous the population, the smaller the sample size needs to be. The population surveyed by this study was relatively homogeneous in terms of the characteristics of interest to the researcher. Assuming that the distribution of the sample was approximately normal, the following formula (Gang: 1999: 2) was used to calculate the sample size based on the total East Cobb high school student population:

$$n = \frac{Z^2 S^2}{d^2}$$

Where:

n is the size of sample;

Z is the z-statistics for the desired level of confidence ($Z^2 99\% = 2.58$);

S is the population standard deviation;

d is the half width of the desired interval ($2/2 = 1$).

Thus to provide a sample with a 95% confidence interval and statistical power at a .01 significance level in a univariate analysis (based on a descriptive quantitative design approach) the researcher calculated the sample size as:

All high school students = 12 550

Sample size ($s^2=12.83$) = 425 students

The margin of error was equal to one divided by the square root of the sample size, thus in this case $1/20.616 = 4.8\%$.

If this calculation is compared to readily available sample calculation tables (Krejcie & Morgan 1970), a sample size of 375 would have been required for a representative sample of randomly selected elements, giving a margin of error of 5% and a confidence interval of 95%. Thus to increase the statistical power of the data obtained from the sample from .05 to .01 only required an increase of 50 respondents.

The researcher, however, faced a number of challenges that required an increase in the number of elements included in the representative sample. Obtaining and administrating parental permission had been a major obstacle in previous research efforts and reduced expected response rates tenfold (Clabo 2001). To ensure that the total number of responses provided a base to facilitate valid conclusions based on a true probability sample, the researcher therefore decided to increase the sample size to 600. This gave a standard error of 4% and a confidence interval of 95% with a statistical power of .05.

Another challenge faced by the researcher, was obtaining East Cobb high school principals' permission to conduct the survey among high school students attending their respective schools. Even though permission was granted by the Cobb County School System, it still remained the prerogative of the individual school principals whether they would allow research to be conducted among their students. High school principals receive numerous requests for research surveys, which they perceive as impacting on both teachers' and students' time to cover the curricula, thus principals often have a blanket policy of not allowing surveys to be conducted in their schools.

Four of the six East Cobb public high school principals granted permission for the survey to be conducted among their students - the principals at High School B and High School F declined the researcher's research request. With two of the schools deciding not to participate in the research, the number of high school students enrolled in participating East Cobb high schools was reduced to 8 550 students and the associated sample size to 421 students.

The researcher randomly drew the participants from the sampling frame according to a sequence generated by a computer-based random number generator, which allocated to each participating high school a selection of numbers based on their proportion to the total population of 12 550 enrolled high school students. The research frame was previously established by randomly selecting the order in which each school's email address lists would appear and by numbering each email address from 1 - 12 250, for example numbers 1 - 1 896 were allocated to High School E; numbers 1897 - 4474 to the next school, etc. until all the numbers were allocated. The selection of random numbers allocated to each participating East Cobb high school was then matched with the school's email address list. Email requests for student participation were then sent to parents selected by the computer-based random number generator.

The researcher initially hoped that the total number of potential respondents could be divided into strata according to student grade level within the sampling frame of elements. However, the researcher found that email listings at the individual East Cobb

high schools were not available by high school student grade level; therefore the researcher could not apply stratification to the sample selection.

4.3.2.3 Informed Consent

When participants for research studies are recruited, it is mandatory in the United States to obtain informed consent from minors' parents. Parents of minors have to be informed of the nature and purpose of the research and have to receive a non-disclosure guarantee from the researcher that students' responses and identities will be treated confidentially. The researcher obtained permission at both county and school levels to approach the student bodies for willing participants. An informative e-mail was sent to the parents of randomly selected high school students from the email listing available at each East Cobb public high school, requesting online parental consent for students to participate in the research (Appendix A).

Each email request had a hyperlink that opened up a document explaining the process and requesting parental permission. Upon agreeing that the student may participate in the survey, the parent could enter the parent/student's email address, the date, parent's initials and could then submit the informed consent by clicking on the "I agree" button. This process then stored the parental consent on the server, allocated a unique parental control number and forwarded the questionnaire to the student with a request to participate in the survey.

4.3.3 Development of the measuring instrument

Based on the measuring instruments used by similar research projects (Clabo, Enujiokwe, etc.), as well as for economic and logistical reasons, the researcher decided to use a web-based questionnaire to obtain the data required to analyse and draw conclusions posed by the research problem. The researcher believed that the ease of use of a web-based questionnaire would lead to an increase in the response rate.

The parental consent form (Appendix A) was sent via e-mail to the parents of high school students randomly selected from student enrolment lists covering all students enrolled in

each participating school. The email addresses for 98% of these parents were available at the school or via the Parent Teacher Association (PTA). When parents accepted the invitation to let their students participate in the online questionnaire, a link to the website (including the parental consent control number) was sent to students' email addresses to enable them to participate in the survey. The major advantage of this online measuring instrument was that the questionnaire could be completed at the choice of place/convenience/time for the respondents, since the software was based on a server accessible 24 hours per day via the Internet.

The research questions guiding the study (Chapter 1 section 1.7) were used as the basis for developing the questionnaire questions that would ultimately provide the answers to the research questions after data analysis and interpretation. After analysing eight major studies using surveys, Tenopir (2003b:7) observes that the main distinctions between types of questions asked could be characterised in the following manner:

- Preference questions: focusing on what people want or think about a particular service (e.g. Questionnaire question (Qq) 13).
- Reported behaviour questions: focusing on what people say they do in general (e.g. Qq 5, 6, 10, 12, and 15).
- Critical incident questions: focusing on what people say they did (or will do) regarding a specific instance (e.g. Qq 11).

The researcher made use of all three types of questions to develop the web-based questionnaire (Appendix B).

The researcher made use of structured questions with lists where chosen options were indicated by a click in the appropriate option box. Rating scales to facilitate the complexity associated with or the difficulty in quantifying people's behaviours, characteristics, attitudes and opinions were used.

When selecting from a list of options, the respondent indicated with a click in the appropriate option box which of a list of behaviours, characteristics or other entities were applicable to the participant. The purpose of the options list was to accumulate the different options selected and therefore to quantify the responses when aggregated.

In order to move beyond the nominal scale of grouping data or even ordering results, the researcher needed a scale of measurement to measure responses on a continuum. A rating scale was used when a particular behaviour, attitude or other phenomenon of interest needed to be evaluated on a continuum, for instance the respondent was asked to indicate on a scale how likely or unlikely it was that he/she would do x if condition y was met. The rating scale concept was developed by Rensis Likert and is referred to as Likert scale (Leedy 2005:185). The Likert rating scale was extensively used by the researcher to quantify the intensity of responses to a number of questions related to attitudes, behaviours and beliefs posed in the questionnaire survey (questions 5 to 18 in the questionnaire, with the exception of questions 9 and 13).

The questionnaire (see appendix B) covers basic demographics in questions 1-3 & 18. Questions 4 - 6 and 8 - 17 are reported behaviour questions related to the information source and extent that electronic resources are used for the completion of school assignments. Questions 5, 11 and 15 are preference questions relating to the use of digital and printed resources and specifically relating to the licensed databases available via public libraries. Question 11 is a critical incident question relating to the experience encountered the last time a specific digital resource was used. Question 17 reflects on the perceptions of high school students of the user support services associated with their use of digital resources for academic purposes. As stated before, the measurement in the instrument was achieved by using Likert scales or check lists.

4.3.3.1 Validity and reliability of the instrument

The questions constructed and implemented by the researcher in the questionnaire (see Appendix B) were tested for validity by evaluating whether they were relevant to the research questions raised, e.g. responses to questionnaire questions 7, 12 and 14 could be

used to answer the first research question in Chapter 1 section 1.7. The research questions were formulated in a manner that clarified the objectives of the study stated in Chapter 1 section 1.6, in order to achieve the aim of the study: the extent to which high school student respondents used licensed databases via the public library in the East Cobb area of Metro Atlanta, Georgia when requiring information to complete school projects.

Validity and reliability of the data are critical in making logically valid conclusions from the analysed results of the study. The validity of a measuring instrument is the extent to which the instrument measures what it is supposed to measure (Leedy 2005: 28), for instance: when measuring insubstantial phenomena the researcher needed to be aware that the wording on the scale had to be clear, precise and unambiguous. The researcher also had to be conscious of the fact that the responses might not always reflect the respondents "true" feelings or perspectives, but rather what they thought the interviewer (or society at large) expected the response to be. The testing of the truthfulness and consistency of students' responses and the validity and reliability of the data were acquired by repeating a question using different wording and in a different format, for example a number of different questions and statements tested if students would ask a librarian for assistance in obtaining the most relevant information sources.

Reliability is the consistency with which a measuring instrument yields a certain result when the entity being measured has not changed (Leedy 2005:29). Instruments designed to measure preferences or opinions (insubstantial phenomena) do not always deliver consistent results due to changes in interpretation of the scales by various participants or the same participant over time. This could create errors of validity in the scale of measurement. Errors in reliability may be caused by the use of the instrument. The researcher was of the opinion that the reliability of the instrument could be enhanced by not asking open-ended questions. The words or terms used in responses to open-ended questions are not always clear and the interpretation thereof could reflect personal bias or incorrect scoring and thereby compromise the reliability of the instrument.

The content validity of the questionnaire was enhanced by obtaining input from teachers/librarians and making appropriate changes where feedback was considered valuable.

4.3.3.2 Pilot testing

The questionnaire questions were pilot-tested and reviewed for elimination of ambiguity and the capability to code and then to quantify responses.

- The pilot testing was conducted at High School E among 10 students from various grade levels. The purpose was to test the user-friendly nature of the questionnaire, investigate the order of questions as well as the clarity of the language used to phrase the questions, as suggested by Mouton (2006).
- Minor adjustments to the wording and order of the questions in the questionnaire were necessary after the pilot testing.
- A major concern was the time students were willing to spend on completing the questionnaire without abandoning it. After receiving negative feedback about the length of time it took to complete the survey, the researcher reduced the questionnaire by eliminating a number of options in the questions, while still being mindful of maintaining the validity of the instrument.
- It was also the intention of the researcher to test the ability of the web-based software to uniquely and correctly code responses, as per the code book, into a database and then produce a data file that can be used as input to the statistical analysis software package (SAS 9.1.x) that was used by the researcher. No changes were required.

4.3.4 Fieldwork/data documentation

It was not necessary for the researcher to travel to the locations of the participants, except to obtain the principals' permission to conduct the research in their schools. The researcher employed relatively inexpensive Internet and web-based software to

accomplish most of the fieldwork. Various Internet-based companies offer services of designing the interaction between a researcher and the willing participants of a research study. The selected company assisted in incorporating drop-down menus in the screen designs and had expertise in making the interface easy to understand and user-friendly. The questionnaire was self-editing to ensure that all responses were entered and that single entries were recorded where required.

After gaining the cooperation and permission of the school principals of the participating high schools to use the high school email listings, the researcher established electronic communication with the selected high school students' parents, in order to obtain the required informed consent that allowed the student to proceed with completing the questionnaire online. The software had the capability to monitor whether the recipient of the email opened up the communication. Thus follow-up messages were sent to parents who had not read the communication within the allotted time. The researcher similarly followed up with the high school students where the informed consent had been obtained, but the student had not yet submitted a completed questionnaire.

The researcher sent out the first email requests for consent in April of 2008 and accepted the participants' web responses for a period of 30 days. During this time various efforts were made through follow-up email requests as well as reminders from the high school principals to encourage the selected students to complete the survey on time.

Due to the fact that two of the school principals declined the request for their schools to participate, a total of 421 requests for parental permission were forwarded to the parents of selected high school students. Email address lists seemed to be up to date and only 18 emails were returned as undeliverable. The researcher had expected a higher return and even after follow-up only 241 parents submitted agreements for their children to participate in the survey. Follow-up email messages were sent out to encourage the students to participate in the 10-15 minute questionnaire, emphasising that the school system, principal and parental permissions had been granted for the students to participate. A total of 150 high school students attempted to do the questionnaire, of which only 135 successfully completed the survey. This represents a return of 32% on the

initial 403 successfully sent out email requests for participation and a 57% response rate based on the number of parents permitting their children to participate. The researcher considers this response rate as acceptable in view of the experiences of other researchers who had to work through the parental permission and school administration approval challenges.

4.3.4.1 Data construction

The research questions guiding the study (as discussed in Chapter 1.7) have been used as the basis for developing the questionnaire questions that ultimately provided the answers to the research questions after data analysis and interpretation. In order to identify the variables in each research question, the researcher developed sub-questions for each research question and consequently identified 300+ variables (dependant and independent) present throughout the entire questionnaire. Since a discussion of each variable would entail a lengthy and tedious process, the researcher decided to build constructs (categorising variables or data items from the questionnaire questions that would be relevant in providing the data to be analysed) or pivotal tables for each sub-question and developed a hypothesis to be tested where relevant.

For an item to be included in a construct, that item had to be relevant to that construct. In a new construct, an item had to be relevant to answering the specific research question. When considering all item means (for items making up that construct), it should have contributed individually to the larger data construct. These means indicated whether each item was important or irrelevant. To see if an item was relevant, the researcher first constructed a contingency table (at a bi-variate level) to do tabular analysis performing either a Chi-square goodness of fit test or a Row Mean Score test to measure the strengths of these associations. As more items were considered for inclusion in the construct, the tests were performed at the multi-variate level. For item analysis the proc corr procedure in SAS was used to see if items could be grouped together; to find significant general attitude or behavioural constructs and thereby reduce the multiple dimensions found in the instrument. The resulting coefficient, the Cronbach-alpha, indicated in the case of a value of equal or greater than 0.65, internal consistency and therefore a valid construct.

4.3.4.2 *Data capturing and editing*

One of the advantages of web-based questionnaires is that all responses were automatically edited and subsequently used to populate a database associated with the online questionnaire. The task of data capturing and cross-tabulations was performed through the basic statistical software associated with the database product. In a web-based survey, codes are pre-coded into the instrument and are assigned automatically. This meant that most coding decisions were made early on in the process and embedded in the database software before the instrument was fielded.

The researcher attempted to organise datasets by categorising variable groups and corresponding variable group lists in the codebook, as the collection contained 300+ variables. The following factors were considered:

- *Identification variables:* The researcher provided enough space at the beginning of the record to accommodate all identification variables. Identification variables included were school and grade level identifiers, as well as a respondent number to represent each response uniquely. An IP address label was also kept for follow-up on non-respondents.
- *Code categories:* Code categories are mutually exclusive, exhaustive, and precisely defined. Each questionnaire response fitted into only one category, so that ambiguity would not cause difficulties and problems with the interpretation of the data. A total of 300+ variables were created for the questionnaire.
- *Closed-ended questions:* Questions were pre-coded in the questionnaire and the coding scheme retained in machine-readable data to avoid errors and confusion in later interpretation.
- *Constructed variables created:* Some of the variables that were used in the analysis, were constructed on the basis of other variables.

4.3.5 Data analysis and interpretation

Leedy (2005:254) states that there are various categories of data or basic forms of data found in research, as discussed in the section that follows.

4.3.5.1 Data categories and data conversion

The basic forms of data typically found in research are: nominal data (categories named by the researcher), ordinal data (order, sequence or rank), interval data (equal units of measure giving relative difference between the units of measure) and ratio (same as interval but with a true zero point) (Leedy 2005:254). As most of the measuring in this study was done by using a five point Likert scale, the responses rendered mostly ordinal data, but other measurements yielded some nominal data. In statistical analysis these different types of data are treated differently, but all contribute to the major functions of statistics viz. to describe the data (descriptive statistics), or to make inferences about the larger population or for testing hypotheses (inferential statistics) (Leedy 2005:179-185). The researcher mostly used inferential statistics to test hypotheses for statistically significant variations between datasets, created to enlighten aspects relevant in answering some of the research questions. Descriptive statistics were used as well during the data analysis, but to a lesser extent.

The first step in the data analysis was to convert the questionnaire data into numbers. This was done by pre-coding responses to the questionnaire before populating the database associated with the web-based survey. All responses for each item (question) were used to accumulate a total for each response option as per the checklist or scale of measurement used. This allowed the researcher to describe each of the variables. In order to develop an idea of what the statistics were summarising or attempting to convey, a descriptive plot was first produced, represented by histograms showing accumulated responses for each sub-question. This offered visual inspection of data, which is paramount to understanding it. Raw data, midpoints, ranges, and frequency distributions needed to be examined visually before they were fed into a computer for advanced analyses.

A statistical software package, SAS 9.1.x, was used to determine the inferential and descriptive statistics.

The researcher created sub-groups within the responses based on variables that included the level of digital information literacy instruction received, level of self-assessment in terms of various categories, as well as different grade levels. These inferential statistics allowed the researcher to compare and describe differences or similarities in the response data from the sub-groups created.

4.3.5.2 Organising the data: constructs and tables

Once the responses were plotted, a frequency table of counts and percentages for each variable was obtained and analysed by using multi-way tables to describe relationships between that item and other items in the survey.

Considering that the research instrument generated approximately 300 different variables, it became impractical to describe each individually, or structure each as a dimension in multivariable frequency tables. The researcher therefore attempted to group items (variables) together that were relevant in answering each research question, by firstly grouping items with a similar response format together and secondly constructing “new” variables that indexed the responses of various relevant responses into one coherent response. Where the same measuring scale was used, multiple items (such as “what is the first step in finding relevant information for a school assignment?”) were tabulated and the relative strength of each used to determine a ranking order. This facilitated comparison among similar types of variables in the survey.

A valid construct can (as any other single variable) be used in a frequency table and viewed in other summary type calculations. In this study, however, it was mostly used to compare its response pattern to other constructs (items with dissimilar response categories) in order to identify similarities or differences. The following statistical analyses were performed on most of the pivotal tables to test various hypotheses as they relate to each of the research questions: Z-tests, Row Mean Score and Chi-Square tests.

4.3.5.3 Cross tabulations

Moving beyond the single variable analysis, the researcher attempted to establish a relationship between some of the newly created variables and/or several variables in the questionnaire data. This was done by using cross tabulations which could be easiest described as a frequency table between two or more variables. If more than two variables were selected, the researcher had to determine from the research question that needed to be answered what the anchor variable was (most relevant to answering the research question) and to relate the other variables to that variable. For example, in answering the research question as to which academic courses/subjects would motivate high school students to use licensed databases, the anchor variable was the “use of licensed databases” and then related to how much each of the constructed variables were reported as a “motivation” to use those licensed databases. Going beyond three interrelated variables became difficult to present or calculate without optimising software.

A frequent goal in data analysis is to efficiently describe or measure the strength of relationships between variables, or to detect associations between factors used to set up a cross tabulation (Leedy 2005). The Chi square and Row Mean tests were used to test for the statistical significance of the cross tabulations. The Chi Square test tested for the independence (as opposed to the goodness of fit test performed earlier) of each variable by creating an expected value for each cell and comparing that against the observed values for the cell to calculate the Chi square value. It used a smoothing factor by incorporating the degrees of freedom (total rows -1*total columns -1) to calculate the probability (Chi Square value *degrees of freedom) that the variables were independent. A probability of less than 5% (<0.05) was an indicator of a good value. In cross tabulations Pearsons Chi square test was used to test the underlying strength of relationships between variables. The alpha value gave an indication of the extent of the relationship between the two variables.

In this study, as with most social research where a descriptive quantitative design approach is selected, the research instrument (questionnaire) yielded ordinal data reflecting measured (as per scale) behaviour, attitudes, opinions and preferences. These

ordinal datasets were created by requesting the respondents to answer various questions using a five point scale rating, ranging from “never/not at all to very often/very likely” or from “strongly agree to strongly disagree”. The researcher used Row Mean score tests instead of Chi Square tests when response variables were ordinal and the explanatory was nominal. The Row Mean score statistics compared the different rows (explanatory variables) to see if there was a statistically significant difference in the mean responses from row to row or between the different explanatory variables. The Row Mean Score test statistic is much more robust when it comes to cell counts than Chi-Square tests - it only requires that the row count be large enough.

4.3.5.4 Development of constructs, tables and hypotheses based on the research questions

The data were analysed and structured to cover: (a) the research questions guiding the study, with (b) sub-questions and hypotheses and (c) constructs grouping together variables from the questionnaire questions with a common denominator:

Research question 1: *Why do high school students visit public libraries in the East Cobb area of Atlanta, Georgia, when they need information for school projects?*

In order to answer this question the researcher divided the research question into four parts. The researcher then built four constructs that were analysed in the data analysis chapter (Chapter 5).

Research question 1, sub-question 1: *Do high school students visit the public library because teachers/parents instruct them to use the public library’s information resources?*

Construct_{1a} and Construct_{1b} were built from response data obtained from questionnaire questions (Qq) 7b, 12a, 12b, 14f, which related to teacher/parent instruction to use the public library.

Research question 1, sub-question 2: *Do high school students visit the public library due to reasons of convenience (hours, location, wireless and high speed Internet access)?*

Construct₂ was built from responses to Qq 7c, 7e, 7f, 7h, 7i; 12c and 12e, which related to factors of convenience in terms of using the public library.

Research question 1, sub-question 3: *Do high school students visit the public library because they expect to find relevant information resources and user support?*

Construct₃ was built from responses to Qq 7a, 7d, 7g; 12d; 12f; 12g; 14d, 14g, 17a, 17d which all related to either the relevancy of the information resources found at the public library, or the support provided by library staff in finding the relevant information resources.

Research question 1, sub-question 4: *Is there a general association between convenience and teacher/parent instruction as reasons for high school students to visit the public library and which reason is the primary motivating factor?*

The above sub-question was answered by using a Row Mean test in the table analysis of construct scores from the previous four construct scores, in order to test the following set of hypotheses:

To test the difference between the following reasons for visiting the public library: high school students visiting the public library due to general/specific instruction or for reasons of convenience, the following were hypothesised:

H_0 : There is no general association between the likelihood that high school students use the public library due to general/specific instruction on the one hand and for reasons of convenience on the other hand.

H_1 : There is a general association between the likelihood that high school students use the public library due to general/specific instruction on the one hand and for reasons of convenience on the other hand.

To test the difference between the following reasons for visiting the public library: students being instructed to use the public library or the public library being perceived as a source of relevant information, the following were hypothesised:

H_0 : There is no general association between the likelihood that high school students use the public library due to general/specific teacher/parent instruction and students' perception of the public library as a source of relevant information.

H_1 : There is a general association between the likelihood that high school students use the public library due to general/specific teacher/parent instruction and students' perception of the public library as a source of relevant information.

The final step was then to compare the outcomes of testing the different hypotheses to determine a ranking order, if any.

Research question 2: *Which academic information needs influence high school students to turn to the public library?*

The researcher built a contingency table from responses to questionnaire question 8, to analyse whether high school students requiring information for school assignments were influenced to use the public library as an information outlet, depending on the academic course (Math, Science, Information Technology, English Language Arts, Social Studies, Business, Fine Arts) in which the assignment was given.

Research question 3: *What is the digital information seeking behaviour of high school students when seeking information for school assignments?*

Research question 3, sub-question 1: *Is there a difference in the emotions experienced by high school students of different grade levels during the digital information seeking process?*

The researcher constructed 5X5 pivotal tables to analyse responses to questionnaire question 15 and grouped students' responses to questionnaire questions 2, 5 and 6, to reflect the emotions that high school students' experienced during the digital information search process.

Research question 4: *To what extent are high school students currently using the licensed databases available through the public library?*

Research Question 4, sub-question 1: *Is there a difference in the extent to which digital information resources are used by high school students of different grade levels when seeking information for school assignments?*

The researcher built a 5X9 pivotal table to analyse the responses to Qq 2a-d; Qq10a-h.

The purpose of this question was to determine if high school students of different grade levels perceived the public library as a digital information outlet when faced with a choice of where to find information for school projects. Qq 10 collected data related to the frequency of use of each digital resource available through the public library that could be relevant to the information seeking behaviour of high schoolers.

Research Question 4, sub-question 2: *Is there a relationship between students receiving instruction in the skill of Digital Information Literacy (DIL) and students' use of licensed databases available via the public library?*

The researcher constructed a 9X2 pivotal table to analyse responses from Qq 19a and 19b grouping responses into two major groups: those from students receiving DIL instruction on a frequent basis and those that do not receive DIL instruction or receive DIL instruction on an infrequent basis. Each of these groups was then divided as how extensively (high or low) they made use of the various digital resources available to them. Analysis was done by comparing the percentages in the cells with each other.

Research question 5: *What are high school students' perceptions and attitudes towards licensed databases as an information resource for school projects?*

Research Question 5, sub-question1: *Is there a difference in the perceived ease of use and value of information retrieved, between students using licensed databases and those using the Internet to find information for school projects?*

The researcher built pivotal tables to analyse responses to Qq10a-d; Qq 11; and Qq10f-p; Qq11.

The attitudes, beliefs and perceptions of high schoolers in terms of the value of licensed databases to provide information for school assignments, influence their use of these information resources. Qq 10 is a reported behaviour question that attempted to determine the attitude of the respondent towards the use of various information resources. Indicating responses on a five point Likert scale, the researcher collected data indicating the likelihood that licensed databases available via the public library were used to find quality information for scholastic projects. Qq 11 related to the perceptions and attitudes students experienced during a specific information seeking incident - the last time students used a digital resource “very often”. Data from these responses offered the researcher data to analyse the attitudes and perceptions of high schoolers to the digital resources available via public libraries. A graphical representation illustrated a comparison of the different attitudes toward licensed databases on the one hand and Internet search engines on the other hand.

Research Question 6: To what extent do high school students use Internet search engines to satisfy their information needs?

Research Question 6, sub-question 1: *Do more students use the Internet as first and subsequent source of information for school projects than any other information resource?*

The researcher constructed a 3X4 table to analyse student responses of “Internet Search Engines” as a first choice in Qq13a-c. Responses of “very often” or “often” indicated high use and the balance of the responses to Qq10a-d were grouped into low use. Qq 13

was a preference question as to which information resource (printed books, online databases or the Internet) the information seeking high school student preferred when topics changed from literature to scientific subjects to social studies.

Research Question 6, sub-question 2: *Is there a relationship between feelings experienced by users of Internet Search Engines versus users of Licensed Databases, as well as the frequency of using these resources?*

The researcher built two constructs to determine the difference between feelings experienced between students who indicated that they are high level users of either Internet Search Engines or licensed databases, when choosing an online resource. The constructs were built from responses to Qq 15a, with responses of “satisfaction” and “confidence” in one column, compared to responses of “anxiety”, “confusion” and “frustration” in another column. The rows were divided into two groups: Internet users and licensed database users.

Research question 7: *Are high school students aware of GALILEO (the University System of Georgia’s state-wide virtual library initiative) and the wide spectrum of licensed databases available to them via public libraries?*

Questionnaire question 9 was asked as a dichotomous question relating to the awareness of specific online resources. The researcher then further attempted to determine if hypotheses could be tested to indicate that there was no difference in the student awareness levels of the licensed databases between students that assessed themselves high on having a specific attribute and those that assessed themselves low on the same attribute. The null hypothesis was also tested for students indicating a high level of DIL instruction (Qq19), versus the group that indicated no DIL instruction or a low level of DIL instruction.

Research question 8: *Which factors would encourage high school students to use licensed databases available through the public library when seeking information for school assignments?*

Research Question 8, sub-question 1: *Will more high school students use licensed databases if instructed and recommended to do so by a teacher/librarian, especially if it is listed on a resource list for school assignments?*

The researcher constructed a 7X2 pivotal table to analyse responses to Qq 5d, 5e; Qq 12a-c; Qq 14a; 14f; Qq 19 a-d

This question was posed to determine if the use of licensed databases by high school students could be influenced by student awareness of the intrinsic value of these resources, or by the recommendation of authoritative figures in their lives. Qq 12 of the questionnaire solicited a response relating to whether teachers/parents or database attributes would change their attitude and therefore their information seeking behaviour.

This research question was tested by the following hypothesis:

H_0 : There is no general association between the likelihood that high school students with a high frequency of DIL instruction would use licensed databases when instructed to do so.

H_1 : There is a general association between the likelihood that high school students with a high frequency of DIL instruction would use licensed databases if instructed to do so.

Research Question 8, sub-question 2: *Would features that speed up the information search process, such as federated/metadata search options and Google-type user-friendly interfaces encourage students to use licensed databases?*

The researcher built Construct₁₆ from responses to Qq 12d, 12e, 12f, 12g; Qq 17b, 17d.

In Qq 17 a number of search features were listed and the respondents had to indicate if any of these features would encourage better use of the available digital resources.

The following hypothesis was tested against the data in this construct:

H_0 : There is no general association between user-friendly search features and the likelihood that high school students would use a licensed database.

H_1 : There is a general association between user-friendly search features and the likelihood that high school students would use a licensed database.

Research question 9: *Will high school students make more use of licensed databases if user instruction and support could be provided by libraries?*

Research Question 9, sub-question 1: *Will a significant portion of high school students use licensed databases if they receive user instruction and assistance in the effective use of licensed databases?*

The researcher built a 5X2 pivotal table to analyse responses to Qq 12c, 12e; Qq 14e; Qq 17 c, 17 e, 17 f to indicate high school students' likelihood of using licensed databases after digital information literacy (DIL) instruction.

A table analyses was used to test the following hypothesis:

H_0 : There is no difference in the frequency of licensed database usage after students received instruction in the skill of digital information literacy.

H_1 : There is a difference in the frequency of licensed databases usage after students receive instruction in the skill of digital information literacy.

Research question 10: *Are students able to conduct successful information searches and evaluate the reliability and quality of information retrieved via commercial search engines and licensed databases?*

The purpose of this question was to evaluate the level of digital information literacy among high school students. The data were obtained from a number of statements in Qq14 to which respondents had to indicate their level of agreement. A checklist in Qq 16 listed attributes of digital information literacy and the respondents had to indicate if these steps would be part of their information seeking behaviour.

The researcher built a pivotal table to analyse responses to Qq 11a-e; Qq 16a-g; Qq 14b and 14c.

Research Question 10, sub-question 1: *Do students who received instruction in digital information literacy skills, apply those skills more often than students who did not receive digital information literacy instruction?*

The researcher constructed two 7X5 tables to analyse responses to Qq 19a-b and 16a-g.

The researcher developed hypotheses for the stages of the information search process to test if there was a statistically significant difference in the application of digital information literacy (DIL) attributes between respondents who received DIL instruction on a frequent basis and respondents who received no/low frequency DIL instruction. The same hypotheses were tested for each of the stages by changing the attribute being tested:

H_0 : There are no differences in Row Mean scores for high school students' likelihood to *plan the information search* between the two frequency levels of instruction (very often/often versus occasionally/rarely/never).

H_1 : There are differences in Row Mean scores for high school students' likelihood to *plan the information search* between the two frequency levels of instruction (very often/often versus occasionally/rarely/never).

Research question 11: *Do high school students receive instruction in the skill of information literacy?*

The researcher built a 4X4 pivotal table to analyse the responses to Qq19a-d.

In order to determine if there were any differences between high school student grade levels in terms of DIL instruction received, the following hypotheses were tested:

H_0 : There is no general association between the grade level of high school students and the frequency of DIL instruction received.

H_1 : There is a general association between the grade level of high school students and the frequency of DIL instruction received.

4.4 SUMMARY

In this chapter the researcher described the research methodology used for the gathering, conversion and analyses of the data needed to answer the research questions guiding the study. The descriptive quantitative survey was described as the research design and the online questionnaire as the research instrument used by the researcher. The research process was discussed, including identification and selection of the data sources; development of the measuring instrument; the process of collecting the data; the fieldwork and data documentation, data capturing and editing and the discussion was concluded with a description of how the data were analysed.

In the next chapter the data obtained from the 135 completed questionnaires are grouped into various categories and tabulated in order to statistically analyse and interpret the data, to allow the researcher to draw valid study conclusions.

CHAPTER 5

DATA ANALYSIS AND INTERPRETATION

5.1 INTRODUCTION

The purpose of this study was to describe the extent to which high school students in the East Cobb area of Atlanta, Georgia, use licensed databases via the public library when they need information for school assignments. The aim of this study was achieved by analysing the empirical research data collected from 135 high school student responses obtained by means of a web-based questionnaire.

The data analysis in this chapter is structured into two sections: the first section provides a summary tabulation of the respondents' profile, which reflects basic demographics such as gender, grade level and high school attended. The second part of the first section provides frequency tables summarising the demographic responses indicating the mean, standard deviation and percentages. In the second section the data are presented as it relates to the research questions posed in Chapter 1 section 1.7.

Following the frequency tables are contingency tables, created to efficiently describe or measure the strength of relationships between variables and to detect associations between factors used to set up cross-tabulations. The Chi Square and Row Mean Score tests were used to test for the statistical significance of the cross-tabulations and tested the hypotheses stated for a number of the research questions. The findings as they relate to each of the study objectives are discussed in the next chapter, Chapter 6.

In order to present the data in a manner that would allow meaningful conclusions to be drawn and the research questions to be answered, the response data were analysed to determine whether the response sample was representative of the total high school population. This was achieved by comparing the grade level proportion of the sample to

the grade level proportion of the total high school student population in the East Cobb area of metro Atlanta, Georgia.

In Table 5.1 a Z-test was used to compare the proportionality of the grade level distribution of the total high school population to the grade level distribution of the responses received.

Table 5.1: Z-Test for Proportionality						
Grade Level	East Cobb High Schools: Total Population	% of Total Population	Sample/ Response (n)	% of Sample/ Response	Z-test Values	P-value
Grade 9	3514	28%	42	31%	-0.78	0.441
Grade 10	3263	26%	39	29%	-0.74	0.461
Grade 11	3012	24%	30	22%	0.49	0.621
Grade 12	2761	22%	24	18%	1.28	0.202
Total	12,550	100%	135	100%		

The results of the Z-test ($p\text{-value} > 0.01$) showed that the grade level proportion of the respondents was not significantly different from the grade level distribution of the total high school population being studied. It could therefore be concluded that the data obtained from the respondents' completed survey questionnaires are representative of the total East Cobb high school population.

5.2 RESPONDENTS' PROFILE

In this section the main characteristics or profile of the respondents is described as it relates to the information seeking behaviour of the respondents. Responses to the

research questionnaire were collected from high school student respondents attending four public high schools in the East Cobb area of metro Atlanta, Georgia.

5.2.1 Respondents by high schools, grade levels and gender

Table 5.2 summarises the responses received to the questionnaire, indicating the number of responses received from each school per grade level.

Table 5.2: Total Responses received by grade level						
	Grade 9	Grade 10	Grade 11	Grade 12	Total	%
School A	14	12	8	7	41	30%
School B	7	8	1	5	21	16%
School C	9	6	8	3	26	19%
School D	12	13	13	9	47	35%
Total n	42	39	30	24	135	
Total %	31%	29%	22%	18%		100%

This table indicates that two high schools (School A and School D) constituted 65% of the respondents and the two remaining high schools constituted 35% of the respondents. High School A had the most Grade 9 respondents (33%) and High School D had the most respondents in Grade 10 (33%), Grade 11 (43%) and Grade 12 (37.5%). The Z-test results used in Table 5.1 indicated that these proportions are within a statistically acceptable level.

Tables 5.3 - 5.6 reflect student responses to questionnaire questions that were used for cross-tabulations. The tables show frequency counts for each measurement on the five point Likert scale used to measure responses to a specific question - the totals for each, the percentage for that score of the total, the average score for that measurement and the standard deviation.

Table 5.3 shows demographic data by gender and grade level.

Table 5.3: Gender/Grade level Responses (N= 135)							
	Standard Deviation	Mean	Male	Male %	Female	Female %	Total n
Grade 9			19	28%	23	34%	42
Grade 10			18	26%	21	31%	39
Grade 11			18	26%	12	18%	30
Grade 12			13	19%	11	16%	24
	1.496296	0.5018	68	50.4%	67	49.6%	135

The table indicates that the female high school student responses from Grades 9 - 10 were higher, whereas more male students from Grades 11 - 12 responded. The respondent count per grade level declined for each grade level from grades 9 – 12, corresponding with the student population distribution at the participating schools. These demographics are in proportion to the overall East Cobb high school student enrolment numbers (Table 5.1). A total of 68 male students responded to the questionnaire (50.4%), whereas a total of 67 female students responded to the questionnaire (49.6%).

5.2.2 Respondents' self-assessment

In Table 5.4 the respondents are categorised into two groups (high profile: excellent/good; low profile: poor/not at all), reflecting respondents' self-assessment as academic achievers, athletes, library users, information literate and technology savvy.

Table 5.4: Respondents' Self-Assessment						
High profile=Excellent/Good; Low profile=Poor/Not at all [N=135]						
	Mean	Standard Deviation	High Profile	% of Respondents	Low Profile	% of Respondents
Scholastic Achiever	4.1185	.9546	104	77%	31	23%

Athlete	3.5111	1.4345	76	56%	59	44%
Library User/reader	3.0000	1.3494	51	38%	84	62%
Information Literate	3.9778	1.0680	96	71%	39	29%
Technology Savvy	3.8963	1.2050	97	72%	38	28%

The high schools in the East Cobb area of Metro Atlanta rate among the top academic schools in the state, according to the Georgia Department of Education website (<http://www.public.doe.k12.ga.us>). This is reflected in the fact that more than 70% of the high school student respondents rated themselves as academic achievers, information literate and technology savvy. However, the self-assessment of only 38% of the respondents describing themselves as high profile/good library users is unexpected, given the fact that 78% of the East Cobb high school respondents have library cards (Table 5.5). Although owning a public library card would not necessarily make the student a good library user, the researcher had expected that the self-assessment would resonate with that of being an academic achiever.

The mean and standard deviations were calculated on a statistical value attributed to each of the five points (1 = Not at all, to 5 = Excellent) on the Likert scale. Therefore, a mean of 3.5 would indicate a position between Average (= 3) and Good (= 4). The standard deviation would then indicate the distribution of the responses (for example 1.3 positions up or down from the mean).

5.2.3 Information access tools

Table 5.5 shows library cards, computers and email access owned by high school students in order to access licensed databases available through public libraries.

Table 5.5: Owning Information Access Tools that enable students to access Licensed Databases via the Public Library [N=135]								
	Grade 9	%	Grade 10	%	Grade 11	%	Grade 12	%
Respondents	42	100%	39	100%	30	100%	24	100%
Public Library Card	34	81%	31	79%	20	67%	20	83%
PC	42	100%	38	97%	30	100%	23	96%
Email	40	95%	36	92%	30	100%	22	92%

Table 5.5 indicates that most of the high school student respondents own computers (99%); 95% have email addresses and 78% of the respondents have a library card.

5.2.4 Information outlets preferred by respondents

Table 5.6a indicates how frequently high school students use different information outlets when they need information for school assignments.

Table 5.6a: Where/how often high school students use Information Outlets for school projects N=135												
Information Outlets	Never		Rarely		Some-times		Often		Very Often		Low Freq. Total %	High Freq. Total %
	n	%	N	%	n	%	N	%	n	%	Never/Rarely	Very Often/Often
Public Library	43	32%	46	34%	24	18%	16	12%	6	4%	66%	16%
Media Centre	18	13%	37	27%	36	27%	27	20%	17	13%	40%	33%
Internet at Home	0	0%	1	1%	0	0%	6	4%	12	9%	1%	99%
Paid Internet Centre	104	77%	11	8%	12	9%	7	5%	1	1%	85%	6%

All high school student respondents' first choice to find information for school projects was clearly to use the Internet from home (99% on a high frequency basis). Although 68% of the high school student respondents indicated that they visit the public library to a more or lesser extent when requiring information for school projects, only 16% visit the public library on a high frequency basis. The school media centre is used by 87% of the high school student respondents to some extent when working on school projects - approximately 28% more than the public library. Although only 33% of high school students use the school media centre on a high frequency basis, this percentage constituted twice the number of students compared to the public library. Only 6% of the respondents visit commercial Internet centres on a high frequency basis when seeking information for school assignments.

In order to determine if there is statistically a significant difference in the frequency that high school students visit the public library, as opposed to the school media centre when seeking information for school projects, the data of the first two rows of Table 5.6a was analysed by using a Row Mean Score to test the following hypotheses:

H_0 : There are no differences in Row Mean scores relating to the frequency of student visits between the public library and the school media centre.

H_1 : There are differences in Row Mean scores relating to the frequency of student visits between the public library and the school media centre.

There is sufficient statistical evidence to reject H_0 and to conclude that there are differences in the Row Mean scores relating to the frequency of student visits between the public library and the school media centre:

$$\alpha = .05, Q_{S(df=1)} = 20.4595, p - value < 0.0001.$$

The critical chi-square value for Q_S is 3.84146. $Q_S = 20.4595 > 3.84146$ confirms the decision to reject H_0 .

High school students are therefore more likely to visit the school media centre than the public library, when seeking academic information. Considering school media centres' limited hours of operation, it is possible that students' higher usage of media centres (compared to public libraries), could be due to students' proximity to the media centre during school hours and/or due to teachers allowing students to work on school assignments in the media centre during regular school hours.

Table 5.6b reflects how frequently respondents visit information outlets *by grade level*.

Table 5.6b: Where/how often high school students use Information Outlets for school projects by grade level (Percentages)								
High = Often/Very Often; Low = Sometimes/Rarely/Never								
Information Outlets	Grade 9		Grade 10		Grade 11		Grade 12	
	High %	Low %	High %	Low %	High %	Low %	High %	Low %
Media Centre	31	69	23	77	37	63	42	58
Public Library	19	81	13	87	10	90	25	75
Internet at Home	100	0	100	0	100	0	96	4
Internet Centre	10	90	46	54	3	97	8	92

The Internet accessed at home was the first choice for all respondent grade levels. Grades 11-12 respondents were the most frequent users of the school media centres (students' second choice); Grades 9 and 12 were the most frequent users of the public library (students' third choice). A very low percentage of high school students used commercial Internet services, with the exception of 46% of Grade 10 students who used paid Internet access services on a high frequency basis to find school related information.

In order to differentiate between high school students grouped by grade level on the one hand and frequency of media centre and public library visits on the other hand, the following hypotheses were tested for each grade level, using a Pearson χ^2 (Q_p) analysis:

H_0 : There is no general association between the information service (media centre/public library) and the frequency of visits when controlling for Grade 9.

H_1 : There is a general association between the information service (media centre/public library) and the frequency of visits when controlling for Grade 9.

There is insufficient statistical evidence to reject the null hypothesis. Therefore there is not enough evidence to conclude that there is a general association between the information service (media centre/public library) and the frequency of visits when controlling for Grade 9:

$$\alpha = 0.05, Q_{P(df=1)} = 1.5873, \text{P-value} = 0.2077.$$

The critical chi-square value for Q_p is 3.84146. $Q_p=1.5873 < 3.84146$ confirms the decision not to reject H_0 .

The same results are true for Grade 10 students:

$$\alpha = 0.05, Q_{P(df=1)} = 1.3929, \text{P-value} = 0.2379.$$

The critical chi-square value for Q_p is 3.84146. $Q_p=1.3928 < 3.84146$ confirms the decision not to reject H_0 .

The same results are true for Grade 12 students:

$$\alpha = 0.05, Q_{P(df=1)} = 1.5000, \text{P-value} = 0.2207.$$

The critical chi-square value for Q_p is 3.84146. $Q_p=1.5000 < 3.84146$ confirms the decision not to reject H_0 .

However, for Grade 11 students the H_0 is rejected:

There is sufficient statistical evidence to reject the null hypothesis. Therefore there is evidence to conclude that there is a general association between the information service (media centre/public library) and the frequency of visits when controlling for Grade 11:

$$\alpha = 0.05, Q_{p(df=1)} = 5.9627, \text{P-value} = 0.0146.$$

The critical chi-square value for Q_p is 3.84146. $Q_p=5.9627 > 3.84146$ confirms the decision to reject H_0 .

There is thus not enough evidence to conclude that there is a general association between the frequency of student visits and a particular information service (media centre/public library), when controlling for Grades 9, 10 and 12 (with the exception of Grade 11 students). High school students therefore have a differentiating pattern in their visits to the media centre and the public library, except for Grade 11 students.

5.3 RESPONSE DATA ANALYSIS AND INTERPRETATION: ANSWERS TO EACH RESEARCH QUESTION

As explained in the research methodology discussion (Chapter 4) of this study, the researcher developed a number of constructs to reduce the dimensions of the research matrix. These constructs were relevant in answering a number of the research questions. The constructs were subjected to Chi-Square statistical analysis which determined the construct reliability, by analysing the items (questionnaire questions) comprising each construct and then computing the Cronbach-alpha coefficient to determine internal consistency. The purpose of the construct data analysis was to establish whether the items selected from the questionnaire responses to build the constructs, could reliably be grouped together in describing the phenomenon at hand. The result obtained was an alpha value (the Cronbach-alpha) that indicated a level of reliability for the items grouped together in describing the phenomenon being investigated. Any item with an alpha value of less than 0.65 was not included in the construct, but rather analysed separately when the Chi-square goodness of fit procedure was used.

The response data are presented as it relates to the research questions posed in Chapter 1 section 1.7. Each research question is individually discussed and the data relevant to each research question is analysed and interpreted. The data analysis and interpretation are the foundation for the research findings and conclusions discussed in the final chapter.

5.3.1 Reasons why East Cobb high school students visit the public library

Research question 1: Why do high school students visit public libraries in the East Cobb area of Atlanta, Georgia, when they need information for school projects?

In order to analyse the data from the questionnaire responses relating to this question, four constructs were built to reflect the reasons why high school students in the East Cobb area visit the public library when requiring information for school assignments. The first two constructs were built on data from responses reflecting the following reasons for visiting the public library: firstly, due to general instruction by teachers/parents in the use of the public library's information resources; secondly, due to specific instruction by teachers to use specified public library information resources, such as specific licensed databases or a number of printed sources. The third construct was built around data from responses relating to the public library as a convenient information outlet due to long hours of operation, convenient location, etc. The fourth construct focused on the possibility that high school students perceive the public library as a source of relevant information and user support.

5.3.1.1 Constructs relating to Teacher/Parent Instruction

Research question 1, sub-question 1: *Do high school students visit the public library because teachers/parents instruct them to use the public library's information resources?*

Construct_{1a} and Construct_{1b} were built from response data obtained from questionnaire questions (Qq) 7b, 12a, 12b, 14f. Initially only one construct was created, but the proc corr procedure in SAS generated Cronbach-alpha values that indicated inconsistencies in the items (questionnaire questions) included, therefore two separate constructs were built.

Table 5.7a construct_{1a} reflects the average value of data calculated from responses to two questions, which were included to determine a construct value for the likelihood that high school students would visit the public library due to teacher/parent *general* instruction to do so.

Table 5.7a Construct 1a: High school students' visits to the Public Library (PL): Teacher/Parent General Instruction [N = 135]						
	Not at All	Maybe	Neutral	Likely	Very Likely	Alpha Value
Visit PL when suggested by Teacher/Parent	13	18	25	47	32	0.6
Only visit PL when instructed by Teacher	16	9	22	34	54	0.71
Total	29	27	47	81	86	
Construct 1_a Value (General Instruction)	14.5	13.5	23.5	40.5	43	0.68

The answer to the above question is therefore that more than 60% of East Cobb high school students would be likely to visit the public library due to general teacher/parent instruction, whereas approximately 25% of the students would not be motivated by general teacher/parent instruction to visit the public library.

Table 5.7b reflects high school students visiting the public library due to *specific* teacher/parent instruction to use the public library's resources. Construct 1_b was built as a separate construct by using the two low score items excluded from the original construct.

Table 5.7b: Construct1b: High school students' visits to the Public Library (PL): Specific Teacher/Parent Instruction [N = 135]						
	Not at All	Maybe	Neutral	Likely	Very Likely	Alpha Value
Online database recommended by Teacher	11	7	18	31	68	0.74
Online database recommended by Librarian	22	19	19	31	44	0.74
Total	34	26	37	62	112	
Construct 1_b Value (Source specific instruction)	17	13	18	31	56	0.85

The purpose of the construct was to determine the likelihood that high school students would visit the public library if instructed to accomplish a specific task. The new alpha value for each reason in construct 1_b was 0.74 and the standardised alpha value for the construct was 0.85. These two constructs were used in the Chi Square analyses that are discussed later in this chapter. The average construct value in construct 1_b was determined for each of the response options.

The answer to the research sub-question posed in 5.3.1.1 is that almost 65% of high school students would be likely to visit the public library if they were *specifically* instructed by teachers/parents to use specified information resources at the public library. Nearly one in five (22%) of the students would not heed the specific recommendation to visit the public library.

5.3.1.2 Construct on Convenience

Research question 1, sub-question 2: *Do high school students visit the public library due to reasons of convenience (hours, location, wireless and high speed Internet access)?*

Construct₂ was built from responses to Qq 7c, 7e, 7f, 7h, 7i; 12c and 12e.

Table 5.8 shows the main items built into the construct relating to convenience, which are responses to questions relating to Internet access, hours of operation, convenience of location, services offered to increase time spent on information searches and the opportunity to collaborate with friends.

Table 5.8: Construct2: High school students' visits to the Public Library for Reasons of Convenience						
[N = 135]						
	Not at All	Maybe	Neutral	Likely	Very Likely	Standardised Alpha
High speed Internet Access	71	22	8	5	29	0.73
Socialise, collaborate with Friends	57	17	19	23	19	0.72
Laptop: Wireless Access	74	19	11	11	20	0.71
Convenient Location	48	17	17	27	26	0.66
Long hours of Operation	51	20	19	26	19	0.66
Trained to use Online Databases	16	14	19	36	50	0.76
Fast Information Gathering	12	4	16	23	80	0.79
Total	329	113	109	151	243	
Construct Value	47	16.1	15.6	21.6	34.7	0.75

The alpha values for all items were either above 0.7 or very close to it, therefore all the items were included in construct₂.

The answer to the research sub-question posed in 5.3.1.2 is the following: the average value for the seven items included in the construct indicates that 42% of high school students consider convenience a reason to visit the public library. The motivating items “fast information gathering” (76%) and “trained to use licensed databases” (64%) are the major contributors to the construct value for student visits to the public library due to reasons of convenience.

5.3.1.3 Construct on relevant information and user support

Research question 1, sub-question 3: *Do high school students visit the public library because they expect to find relevant information resources and user support?*

Construct₃ was built from responses to Qq 7a, 7d, 7g; 12d; 12f; 12g; 14d, 14g, 17a, 17d.

Table 5.9 shows the items included in the construct focusing on the relevancy of information and reference services, as well as the awareness of the licensed databases.

Table 5.9: Construct3: High school students' visits to the public library: Relevant information and user support						
[N = 135]						
	Not at All	Maybe	Neutral	Likely	Very Likely	Standardised Alpha
Relevant Books Available	14	17	16	37	51	0.78
Experienced Reference Staff	44	30	29	19	13	0.78
Licensed Databases Available	57	21	15	21	21	0.77
Reliable Information	8	14	17	34	62	0.74

Relevance of Search Results	12	9	22	34	58	0.74
Federated Search Option	16	6	18	40	55	0.74
Awareness of Licensed Databases	8	16	29	38	44	0.81
Source of eBooks	38	23	29	27	18	0.80
Homework Help on Webpage	26	10	27	27	45	0.75
Project Resource Lists Available	16	12	22	37	48	0.75
Total	239	158	224	314	415	
Construct Value	23.9	15.8	22.4	31.4	41.5	0.79

All the alpha values in this construct were above 0.74, which indicated a high level of internal consistency among items making up the construct. The construct was built from ten items and the major motivators for likely visits to the library were the public library as a source of reliable information (71%) and the availability of federated search features (70%). The construct value indicated that 54% of respondents were likely to visit the public library due to high school students perceiving the public library as an information venue where relevant, reliable information and user support services are available. Approximately 30% of the respondents were not motivated by the fact that the public library offers relevant information and information support services.

The answer to the research sub-question posed in 5.3.1.3 is the following: East Cobb high school students are likely to visit the public library due to students perceiving the public

library as an information outlet where they can find relevant, reliable information and user support services. This confirms the finding in Table 5.6a that approximately 68% of East Cobb high school students visit the public library to a more or lesser extent (16% very often/often) when requiring academic information for school assignments.

5.3.1.4 Instruction versus Convenience

Research question 1, sub-question 4: *Is there a general association between convenience and teacher/parent instruction as reasons for high school students to visit the public library and which reason is the primary motivating factor?*

The above sub-question was addressed by a Pearson χ^2 (Q_p) analysis of the Construct Values from Construct_{1a}, Construct_{1b}, Construct₂ and Construct₃ to test the following hypotheses:

H_0 : There is no general association between the likelihood that high school students will visit the public library due to general/specific instruction and for reasons of convenience.

H_1 : There is a general association between the likelihood that high school students will visit the public library due to general/specific instruction and for reasons of convenience.

There is sufficient statistical evidence to reject the null hypothesis and to conclude that there is a general association between the likelihood that high school students will visit the public library due to general/specific teacher/parent instruction and for reasons of convenience:

$$\alpha = 0.05, Q_{P(df=8)} = 38.0417, \text{P-value} < 0.0001.$$

The critical chi-square value for Q_p is 15.5073. $Q_p = 38.0417 > 15.5073$ confirms the decision to reject H_0 .

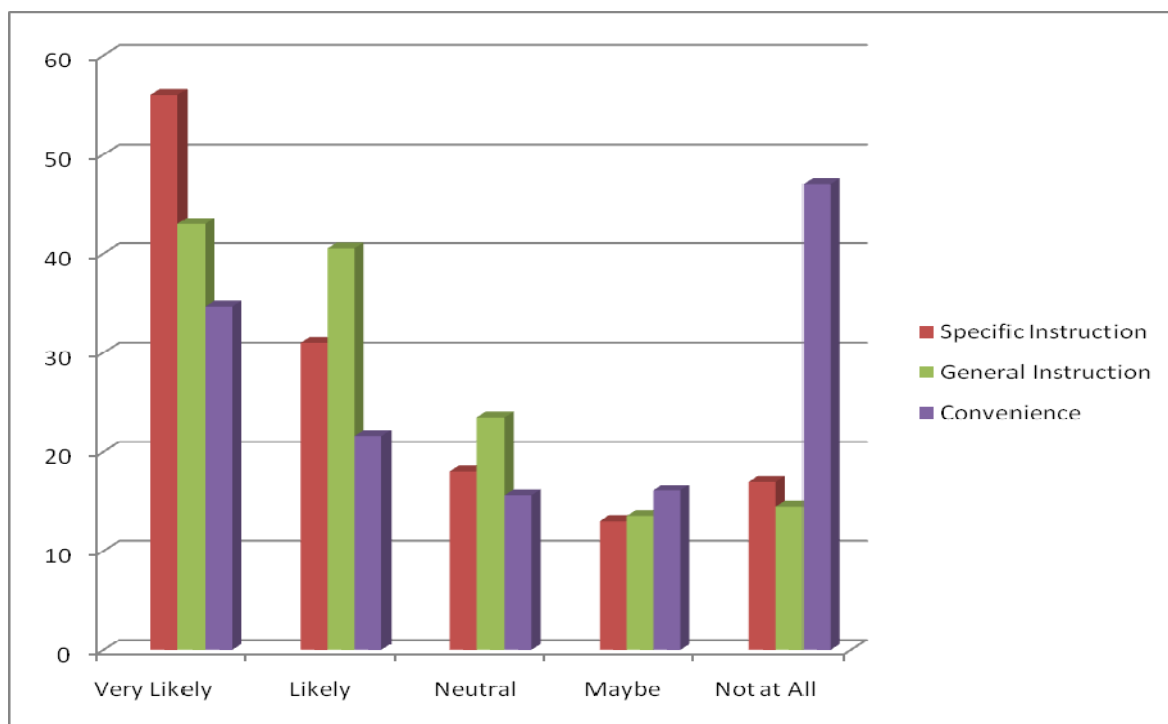


Diagram 5.1: Comparing Convenience versus Instruction as reasons why high school students visit the Public Library

Diagram 5.1 visually supports the notion that if teachers *specifically* instruct high school students to use a specific resource at the public library (for instance a licensed database or a specified number of printed sources), the likelihood of students visiting the public library is higher than when a *general* instruction is given, or when compared to the public library's convenience of hours.

Diagram 5.1 indicates that high school student respondents were equally motivated to visit the public library by either general or specific instructions to do so from teachers/parents. Convenience was the least influential reason for students to visit the public library, when compared to teacher/parent instruction versus convenience.

The researcher attempted to confirm this statistically by a Row Mean Score test (Q_s), which tested for differences among the scores for the levels (general instruction, specific instruction and convenience) in the mean of the likelihood to use the public library. The following hypotheses were tested:

H_0 :There are no differences in Row Mean scores for the likelihood that high school students will use the public library for the following three reasons: general instruction, specific instruction, and convenience.

H_1 :There are differences in Row Mean scores for the likelihood that high school students will use the public library for the following three reasons: general instruction, specific instruction, and convenience.

There is sufficient statistical evidence to reject H_0 and to conclude that there are differences in Row Mean scores for the likelihood that high school students will use the public library for the following three reasons: general instruction, specific instruction, and convenience:

$$\alpha = .05, Q_{S(df=2)} = 26.0297, p - value < 0.0001.$$

The critical chi-square value for Q_s is 5.99. $Q_s = 26.0297 > 5.99$ confirms the decision to reject H_0 .

It is therefore necessary to further analyse the data to determine the strength of each reason as a motivator. Table 5.10 shows the two instruction constructs merged as one reason to visit the public library.

Table 5.10: Comparing two reasons for students to visit the Public Library (PL): General/Specific Instruction vs. Convenience						
	Not at all	Maybe	Neutral	Likely	Very likely	Total
General/ specific instruction	31.5	26.5	42	71	99	270
Convenience	47	16.1	15.6	21.6	34.7	135

The instruction constructs were compared to the convenience motivator and tested for the following hypotheses in a Pearson Chi-Square test:

H_0 : There is no general association between the likelihood that high school students would use the public library due to general/specific instruction on the one hand and for reasons of convenience on the other hand.

H_1 : There is a general association between the likelihood that high school students would use the public library due to general/specific instruction on the one hand and for reasons of convenience on the other hand.

There is sufficient statistical evidence to reject the null hypothesis and to conclude that there is a general association between the likelihood that high school students would use the public library either due to general/specific instruction or for reasons of convenience:

$$\alpha = 0.05, Q_{P(df=8)} = 38.0417, P\text{-value} < 0.0001.$$

The critical chi-square value for Q_p is 15.5073. $Q_p = 38.0417 > 15.5073$ confirms the decision to reject H_0 .

The Row Mean Score test is repeated for Table 5.10 and confirmed that there is sufficient statistical evidence to reject H_0 . It is therefore concluded that there are differences in the Row Mean scores between the two motivators (instruction, convenience), with instruction being the stronger motivator:

$$\alpha = .05, Q_{S(df=1)} = 25.6804, p\text{-value} < 0.0001.$$

The critical chi-square value for Q_s is 3.84146. $Q_s = 25.6804 > 3.84146$ confirmed the decision to reject H_0 .

The answer to the research sub-question posed in 5.3.1.4 is therefore that high school students visit the public library when they are generally/specifically instructed to do so by teachers/parents and because they consider the public library to be convenient due to long

hours of operation, location, etc. However, teacher/parent instruction is a stronger motivator than convenience.

5.3.1.5: Instruction versus Relevant Information and User Support

Research question 1, sub-question 5: *Is there a general association between teacher/parent instruction for high school students to visit the public library and the relevancy of information/reference support available at the public library?*

Table 5.11 shows the comparison of two reasons for high school students to visit the public library: Teacher instruction versus relevant information and user support.

Table 5.11: Comparing two reasons why high school students visit the Public Library: Relevant Information vs. Instruction [N=135]						
	Not at All	Maybe	Neutral	Likely	Very likely	Total
General/ Specific Instruction	31.5	26.5	42	71	99	270
Relevant Information	23.9	15.9	22.4	31.4	41.5	135

Since the association between Construct_{1a} and Construct_{1b} was already established in 5.3.1.4, the sub-question in 5.3.1.5 was addressed by a Pearson χ^2 (Q_p) analysis of the construct values as reflected in Table 5.11, which was used to test the following hypotheses:

H_0 : There is no general association between the likelihood that high school students would use the public library due to general/specific teacher/parent instruction and students' perception of the public library as a source of relevant information.

H_1 : There is a general association between the likelihood that high school students would use the public library due to general/specific teacher/parent instruction and students' perception of the public library as a source of relevant information.

There is insufficient statistical evidence to reject the null hypothesis. It is therefore concluded that there is not enough evidence to state that there is a general association between the likelihood that high school students would use the public library due to general/specific teacher/parent instruction and students' perception of the public library as a source of relevant information:

$$\alpha = 0.05, Q_{p(df=4)} = 4.0459, \text{P-value} = 0.3996.$$

The critical chi-square value for Q_p is 9.48773. $Q_p = 4.0459 < 9.48773$ confirms the decision not to reject H_0 .

The Row Mean Score Test Q_s was then repeated to determine the following:

H_0 : There is no difference in the Row Mean scores between the two levels (instruction/ relevant information) as reasons for high school students to visit the public library.

H_1 : There is a difference in the Row Mean scores between the two levels (instruction/ relevant information) as reasons for high school students to visit the public library.

There is insufficient statistical evidence to reject H_0 . It is therefore concluded that there is not enough evidence to state that there is a difference in the Row Mean scores between the two levels (instruction; relevant information) as reasons for high school students to visit the public library:

$$\alpha = .05, Q_{S(df=1)} = 3.834, p - \text{value} = 0.0502.$$

The critical chi-square value for Q_s is 3.84146. $Q_s = 3.834 < 3.84146$ confirms the decision not to reject H_0 .

Table 5.12 shows data related to high school students' frequency of visiting the public library when seeking information for school assignments.

Table 5.12: Reasons for high school students' visits to the Public Library (PL): Comparing construct score percentages of High/Low Frequency Visits										
Frequency of visiting the Public Library (PL)	Very likely		Likely		Neutral		Maybe		Not at all	
	High freq.	Low freq.	High freq.	Low freq.	High freq.	Low freq.	High freq.	Low freq.	High freq.	Low freq.
	%	%	%	%	%	%	%	%	%	%
Relevant Information	45.5	27.9	26.8	22.6	9.1	18.1	9.1	12.1	9.5	19.3
Instruction	43.2	35.4	29.5	25.9	13.6	15.9	5.7	10.6	8	12.2
Convenience	36.4	23.6	22.7	14.7	5.2	12.8	14.3	11.5	21.4	37.4

The test score was very close to the alpha level and the data were further analysed by a Row Mean Score Test on the percentage scores reflected in Table 5.12, to determine if there was a significant difference between the reasons why high school student respondents visited the public library frequently (very often/often) in Questionnaire question (Qq) 6b, as opposed to reasons why respondents had a low frequency of visiting the public library (occasionally/rarely/never) in Qq 6b, when they needed information for school projects.

The answer to the research sub-question posed in 5.3.1.5 is therefore the following: for high school students who are high frequency public library visitors by choice, there is no difference in the motivating strength of being instructed to do so by teachers/parents, or the public library as a source of relevant information and support. For high school students who are low frequency public library visitors, being instructed to visit the public

library is a more compelling reason to do so, than a perception of the public library as a source of relevant information and support. Instruction also negates convenience as a strong motivator for the low frequency public library student visitor.

The summarised answer to Research Question 1 is therefore that the main reasons for high school students to visit the public library when they need information for school projects are the following: teacher/parent instruction to do so; students' perceptions of the public library as a source of relevant information and support; convenience (long hours of operation, location, etc.). The strength of being instructed to use specific information resources by teachers/parents is stronger than reasons of convenience, especially for the low frequency public library student visitor. There is statistically no significant difference in the strength of motivation between being instructed to use the public library resources and the relevancy of information/user support available at the public library.

5.3.2 Academic information needs that influence high school students to visit the public library

Research question 2: *Which academic information needs influence high school students to turn to the public library?*

Table 5.13a is a 7x5 frequency table indicating the likelihood that high school students would visit the public library when requiring information for school projects, as influenced by the academic subject at hand.

Table 5.13a: Likelihood of high school students visiting the Public Library (PL) influenced by Academic Course/Subject					
	Very likely %	Likely %	Neutral %	Maybe %	Not at all %
Language Arts	48	22	15	8	7
Mathematics	3	8	6	28	55
Science	13	31	21	17	18

Social Studies	34	30	18	7	11
Business	10	17	26	19	28
Information Technology	13	10	23	19	35
Fine Arts	11	24	10	19	36

This table indicates that high school student respondents perceived the public library as a likely source of information for academic courses such as English Language Arts/Literature (70%) and Social Studies (64%). Science-related school assignments influenced 44% of high school students to use the public library's information resources. Information for school projects on academic subjects such as Information Technology (23%) and Mathematics (11%) were the least likely to lead high school student respondents to visit the public library.

As discussed in Chapter 2 section 2.3, the public library offers a number of licensed databases that could satisfy high school students' academic information needs, especially in courses such as Language Arts/Literature (e.g. Gale Literature Resource Center, LitFinder) and Social Studies (Gale Student Resource Center, History Resource Center, Biography Resource Center, GALILEO virtual library).

The summarised answer to Research Question 2 is therefore that the academic information needs that would most likely influence high school students to turn to the public library are school assignments relating to English Language Arts (Literature) and Social Studies. Other high school academic courses would lead high school students to use the public library to a lesser extent, depending on the academic subject at hand.

5.3.3 Digital information seeking behaviour of high school students when seeking information for school assignments

Research question 3: *What is the digital information seeking behaviour of high school students when seeking information for school assignments?*

Table 5.6b as discussed in Section 5.2 indicates that high school students prefer to search information predominantly using Internet commercial search engines (99%) from the convenience of their homes. School media centres are the next most used information outlet by high school students (87%, although only 33% use the school media centre on a high frequency basis) and the public library is high school students' third information outlet choice (68% in total, although only 16% use the public library on a high frequency basis), to find information for to school assignments.

Table 5.13b shows high school students' ranking of information resource preferences by academic course/subject. The table indicates high school students' first, second and third choices when choosing to use licensed databases, Internet search engines or printed resources for school assignments.

Table 5.13b: Ranking information resource preferences by Academic Subject						
	Licensed Databases		Internet Search Engines		Printed Resources	
	n	% total	n	% total	N	% total
Science	37	27.4	69	51.1	29	21.5
Social Studies	36	26.7	76	56.3	23	17
Language Arts/ Literature	36	26.7	21	15.6	78	57.8

When the data in Table 5.13b was analysed, it became apparent that when Language Arts (Literature) respondents were required to read literary works, 58% preferred to read the printed format rather than the digital format/ebooks (27%). Their second choice was to use licensed databases to find literary criticism information beyond the reading of the literary works. Respondents preferred digital formats to find information for assignments in academic subjects such as Social Studies (83%) and Science (79%), with 80% opting

for either the Internet search engines or licensed databases when seeking information for school projects.

It can therefore be concluded that the preferred format for high school students seeking academic information is digital formats. However, the specific academic need will determine the format and Generation Y students are generally format agnostic if their information needs can be satisfied by other formats (Chapter 3 subsection 3.4.2).

5.3.3.1 Difference in student emotions during the Information Search Process

Research question 3, sub-question 1: *Is there a difference in the emotions experienced by high school students of different grade levels during the digital information search process?*

Data displayed in Diagrams 5.2 - 5.7 indicates the spectrum of emotions that high school student respondents experienced during the information search process, as discussed in Chapter 3 subsection 3.4.1 and subsection 3.4.3.2 in terms of the affective aspects of students' information seeking behaviour. Valenza (2006:1-4) describes the affective aspects of high school students' information seeking behaviour as the emotions they experienced and their attitudes during the information search process.

The data displayed in Diagrams 5.2 - 5.7 had numerous cells with a count of less than five, which made a Chi-Square analysis unreliable. Therefore no statistical variance or correlation tests were applied and only the percentages are discussed.

Diagram 5.2 illustrates high school students' emotions during the information seeking process, when they made a choice between licensed databases and Internet search engines.

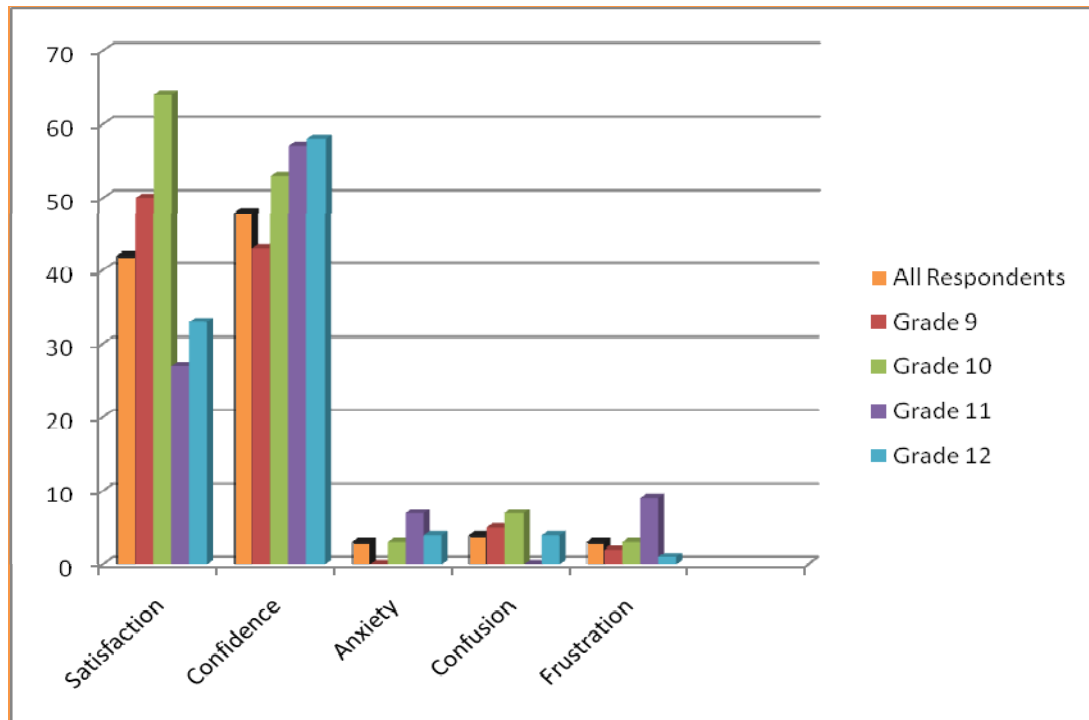


Diagram 5.2: High school students' emotions when selecting Licensed Databases or Internet Search Engines for school projects (percentages)

Diagram 5.2 indicates that the selection of information resources was accomplished with confidence and satisfaction by 90% of the respondents. The respondents in Grades 11 and 12 showed a marginally higher level of confidence when choosing a licensed database or Internet search engine than Grade 9 respondents. This could possibly be due to the fact that respondents in higher grades had more research experience than lower grades' respondents. Similar responses were found when defining the search terms.

Diagram 5.3 illustrates high school students' emotions during the information seeking process when they retrieve too many search results.

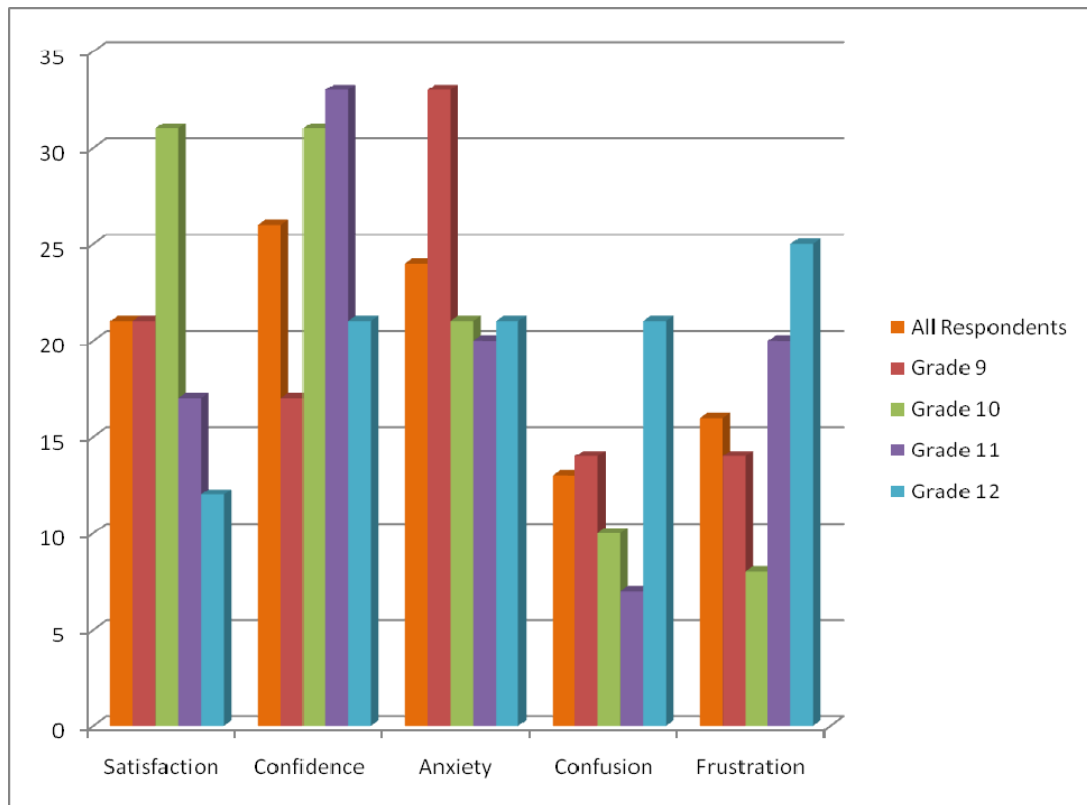


Diagram 5.3: High school students' emotions when retrieving too many search results (percentages)

Diagram 5.3 indicates that respondents' emotions when retrieving too many search results, ranged from positive (satisfaction and confidence) to negative (anxiety, frustration and to a lesser degree, confusion). Notable among grade level responses was the fact that grade 9 students felt considerably more anxious about the high number of search results than grade 12 students. This could possibly be due to the fact that they had less experience and therefore a smaller knowledge base than higher grade respondents in evaluating the information retrieved for relevancy and correctness.

However, Grade 12 respondents experienced considerably more frustration than Grade 10 students when retrieving too many search results – this could possibly be due to time constraints and more work pressure on Grade 12 students than lower grade level students.

Diagram 5.4 illustrates students' emotions when they receive no information results.

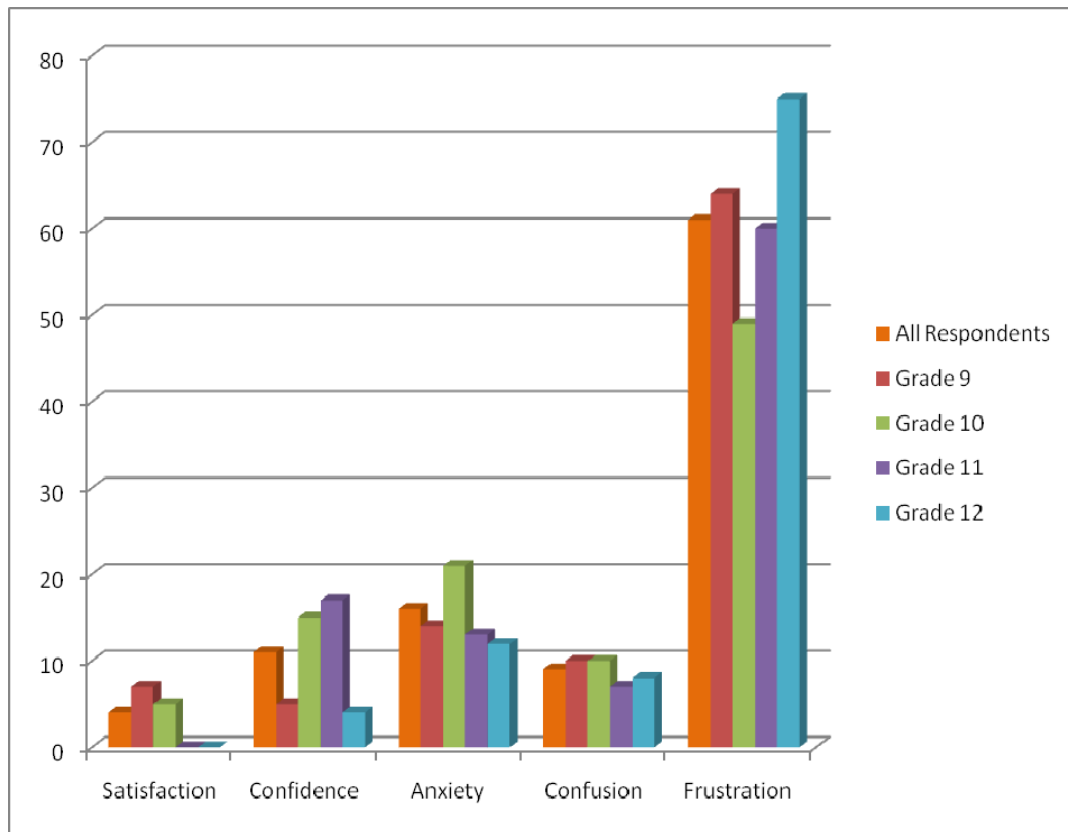


Diagram 5.4: High school students' emotions when they receive No Information (percentages)

Diagram 5.4 indicates that a high level of frustration was experienced by all grade level respondents when the information search retrieved no information results. The frustration could be due to respondents' inability to properly utilise the available search features if they had not received Digital Information Literacy instruction. The lack of information also did not provide a basis from where to explore new ideas. The high frustration levels are also an indication of the instant gratification demand of Generation Y students, as discussed in Chapter 3 subsection 3.4.2.

Diagram 5.5 illustrates students' emotions when having to repeat information searches in other databases or search engines.

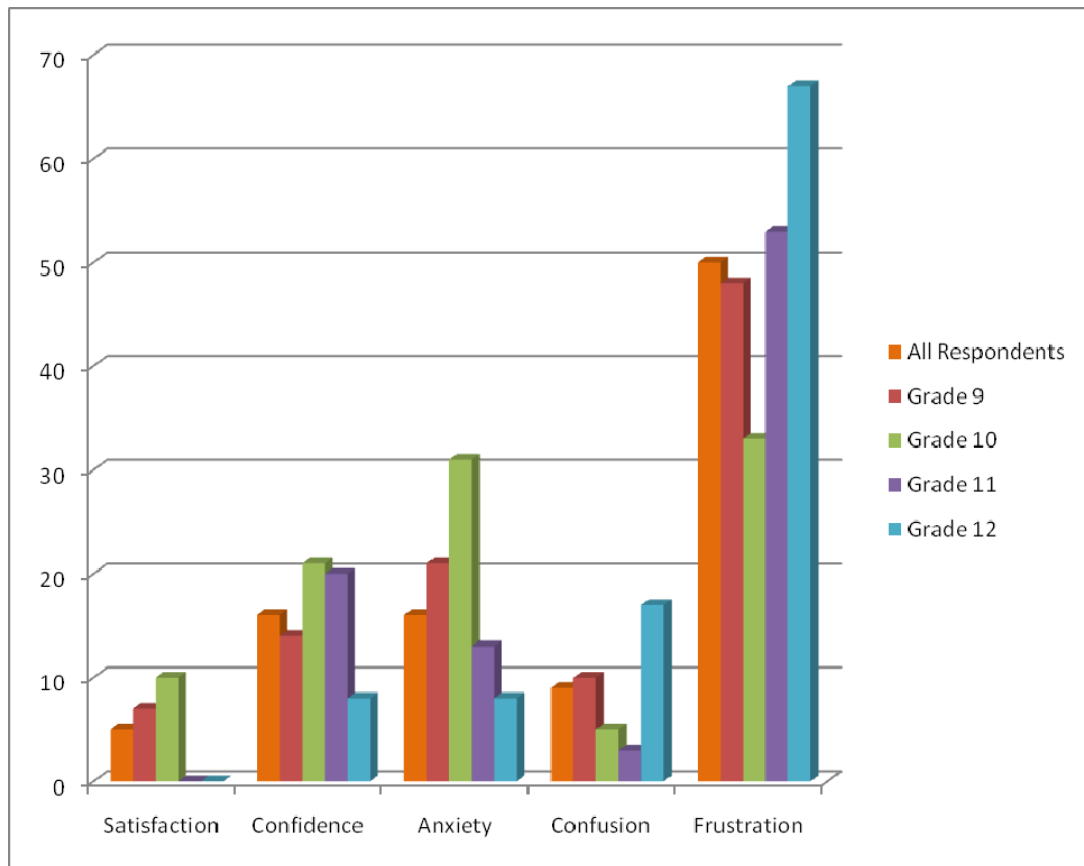


Diagram 5.5: High school student's emotions when having to Repeat information searches in other databases or search engines (percentages)

High levels of frustration among all respondent grade levels were experienced (Diagram 5.5) when having to repeat the same search over multiple databases. This could possibly be due to Generation Y students being generally impatient as well as their dislike for performing repetitive tasks, as discussed in Chapter 3 subsection 3.4.2.

Diagram 5.6 illustrates the emotions experienced by high school students when performing a federated search (one search across several databases) during the information seeking process. A federated search option facilitates exploring multiple sources of information that could lead to the formulation of a focused perspective for a

new construct and then to the collection of information relevant to the topic.

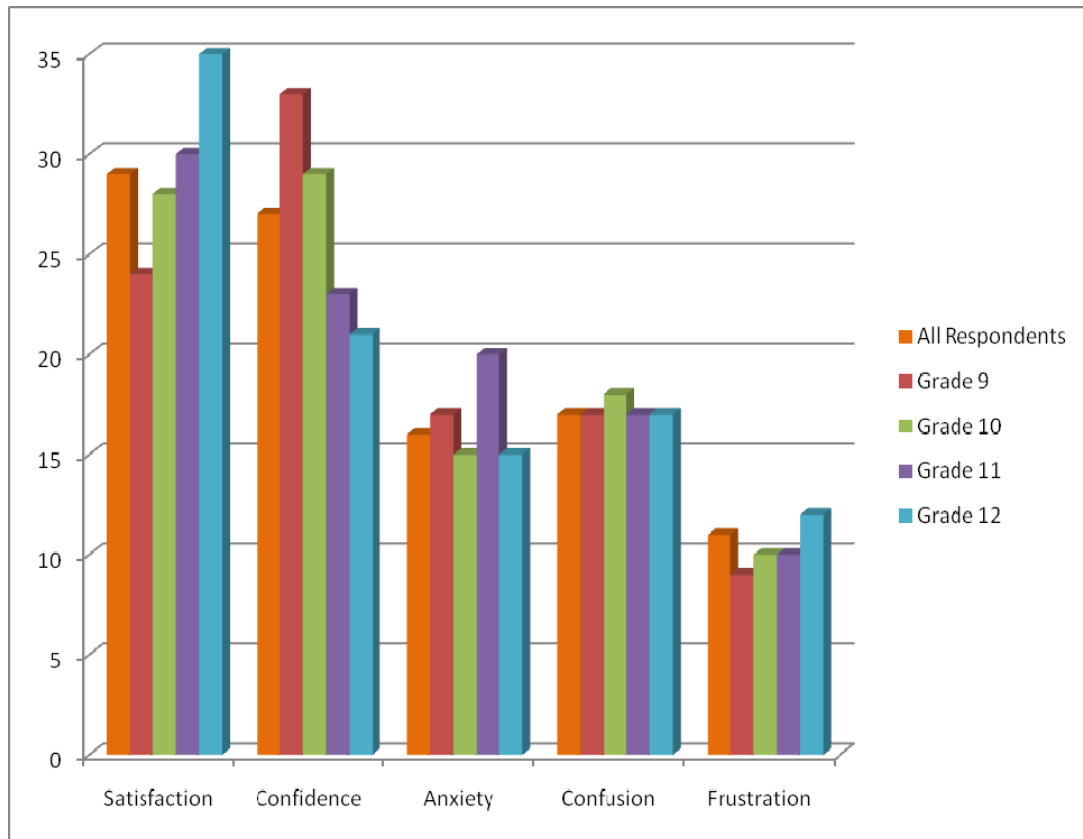


Diagram 5.6: High school students' emotions when performing one search across several databases: Federated Search (percentages)

When a federated search option was available (i.e. one search across all available databases), respondents generally experienced positive emotions, but the concept was possibly not positively understood by respondents of all grade levels. Grade 12 respondents appeared to understand and appreciate the benefits of a federated search feature more than high school student respondents of other grade levels. It is possible that not all respondents fully grasped the benefits of a federated search feature, or might not have received digital information literacy instruction in this relatively new

search feature.

Diagram 5.7 illustrates high school students' emotions when having to ask a librarian for information assistance during the information seeking process.

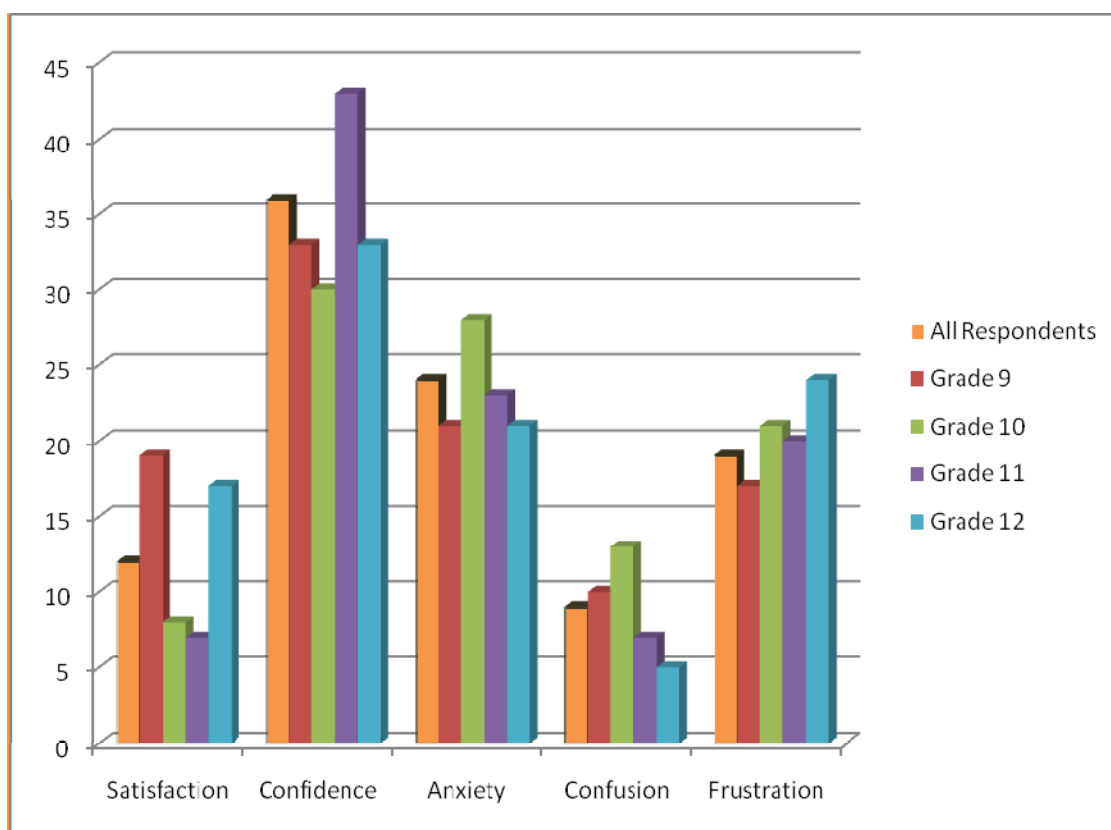


Diagram 5.7: High school students' emotions when having to ask a librarian for information assistance (percentages)

Diagram 5.7 indicates that many respondents experienced positive emotions of confidence and satisfaction (48%) when approaching a librarian for assistance. Negative emotions experienced include anxiety (24%) and frustration (19%). Feelings of frustration could be due to the requested information/publication not being immediately available, since large numbers of high school students often simultaneously request the same publication, therefore the public library might not be able to supply in the high demand for a specific publication right away. The librarian might therefore suggest

reserving the publication in order for the publication to be transferred from another library. However, the delay might cause students to feel frustrated, possibly due to impatience or a demand for instant gratification, as discussed in Chapter 3 subsection 3.4.2.

The answer to Research Question 3 regarding high school students' information seeking behaviour therefore includes the following: high school students prefer to search for scholastic information by accessing Internet search engines, but use school media centres and public libraries to a more or lesser extent due to teacher/parent instruction and the reliability/relevance of information and user support available at the public library. Although high school students prefer digital formats when searching for academic information due to the instant availability, accessibility and convenience of using the Internet at home, they are generally format agnostic and prefer to read the printed format of literary works. Academic courses/subjects that are most likely to lead them to the public library are English Language Arts (Literature) and Social Studies.

High school students display the following affective behaviour during the information search process: the majority of students experience positive emotions of confidence and satisfaction when selecting information resources. A small percentage of students feel the need to approach a librarian during the early stages of the information seeking process. Formulating the search terms lead to increased levels of anxiety, although students continue to experience mostly positive emotions. When too many search results are retrieved, students experience frustration, anxiety and confusion. These emotions' levels increase when search terms yield no search results. When having to search for information in several databases, many students feel frustrated. The frustration levels, however, are drastically reduced when the option of a federated search (one search across the available licensed databases) is offered and students experience mostly positive feelings such as satisfaction and confidence. When asking a librarian for assistance, most students experience positive emotions. Negative emotions when approaching a librarian include anxiety and frustration, the latter possibly due to the required information not always being readily available.

5.3.4 Extent of high school student digital information resource usage

Research question 4: *To what extent are high school students currently using digital information resources, including the licensed databases available via the public library?*

5.3.4.1 Difference in student use of digital information resources by grade level

Research question 4, sub-question 1: *Is there a difference in the extent to which digital information resources are used by high school students of different grade levels when seeking information for school assignments?*

Table 5.14 indicates the current trend in the use of digital information resources by high school students for school assignments.

Table 5.14: High school students' use of a specific Digital Information Resources by Grade Level										
High = Very often/Often; Low=Occasionally/Rarely/Never										
	Total %		Grade 9 %		Grade 10 %		Grade 11 %		Grade 12 %	
	High	Low	High	Low	High	Low	High	Low	High	Low
Google	99	1	100	0	97	3	93	7	100	0
Wikipedia	79	21	64	36	87	13	83	17	83	17
Yahoo! Answers	38	62	36	64	36	64	33	67	29	71
Google Scholar	40	60	17	83	31	69	27	73	29	71
GALILEO	33	67	24	76	8	92	33	87	50	50
EBSCO host	9	91	7	93	3	97	13	87	21	79
Gale Databases	16	84	12	88	3	97	27	83	25	75

Wilson Biography	4	96	0	100	8	92	4	96	8	92
NetLibrary	7	93	19	81	8	92	13	87	8	92

The extent of high school student respondents' use of digital information resources is the following: commercial Internet search engines such as Google were used most frequently (99%); secondly Wikipedia (79%); while other popular digital information resources were GoogleScholar (40%) and Yahoo! Answers (38%). The most popular licensed database resource was GALILEO (33%). The use of other licensed databases such as the Gale Databases (16%), EBSCOhost (9%), NetLibrary (7%) and Wilson Biography (4%) remained virtually untapped information resources for most of the high school student respondents.

However, it was encouraging to note that as the respondents advanced through high school, their use of licensed databases increased. EBSCOhost was used by 21% of Grade 12 respondents and 13% of Grade 11 respondents in contrast to only 3% in Grade 10 and 7% in Grade 9. The Gale databases (covering all core curriculum courses) were used by one in four (1:4) of both Grade 11 and 12 respondents, but had low use of less than one in ten (1:10) among Grade 9 and 10 respondents. NetLibrary (eBooks) users bucked the trend since one in five (1:5) Grade 9 respondents used the database versus less than one in ten (1:10) for all the other grade level respondents. Wilson Biography was relatively unknown and unused by all respondents.

The answer to the research sub-question posed in 5.3.4.1 is therefore that licensed databases are generally under-utilised as digital information resources, but are used more often as students advance through high school when seeking information for school assignments. The licensed database resource most frequently used by high school students from the databases available through the public library system, is GALILEO

(33%), the Georgia virtual library consisting of almost 200 databases and online resources.

5.3.4.2 Impact of Digital Information Literacy (DIL) instruction on high school students' use of licensed databases/online resources

Research question 4, sub-question 2: *Is there an association between high school students who receive instruction in the skill of Digital Information Literacy (DIL) and students' use of online resources?*

The data concerning the use of digital information resources was divided into use by high school students who received DIL instruction on a frequent basis and students who did not receive DIL instruction or received it on an ad hoc basis.

In Table 5.15 the use of licensed databases by high school students is reflected in dual 9x2 pivotal tables.

Table 5.15: Comparing high school student Usage of Digital Information Resources to Digital Information Literacy (DIL) Instruction received				
	High DIL Instruction		Low/No DIL Instruction	
	High use	Low use	High use	Low use
Google	100%	0%	96%	4%
Wikipedia	80%	20%	79%	21%
Yahoo! Answers	30%	70%	48%	52%
Google Scholar	25%	75%	59%	41%
GALILEO	31%	69%	27%	73%
EBSCOhost	10%	90%	7%	93%

Gale Databases	20%	80%	9%	91%
Wilson Biography	5%	95%	2%	98%
NetLibrary	6%	94%	9%	91%

Responses to questionnaire question (Qq) 19a, 19b, 19c and 19d were plotted in two columns. Responses of very often/often were plotted as one group and responses of occasionally/rarely/never as the other group. The responses to questionnaire question 10 a-d and 10e-i pertaining to the use of various digital information resources by high school students were then plotted into the cells in the rows.

The answer to the research sub-question posed in 5.3.4.2 is the following: while no differences were found in the usage of Google and Wikipedia by either group, the responses indicate that the group which received low/no Digital Information Literacy (DIL) instruction, used commercial Internet information resources such as Yahoo!Answers and GoogleScholar more extensively than those with a high frequency of DIL instruction. This indicates a student need for more scholarly-based information, but possibly a lack of knowledge as to where to find academic resources/licensed databases. The state-sponsored licensed virtual library, GALILEO, reflects equivalent usage levels by both groups in this study.

However, data obtained from the analyses of responses to the licensed databases reflects that nearly twice the percentage of high school students with high frequency DIL instruction use licensed databases when compared to those who received DIL instruction on a low frequency basis or not at all.

The summarised answer to Research Question 4 is therefore that licensed databases are generally under-utilised as digital information resources by high school students, but are used more frequently as students advance through high school when seeking information for school assignments. Furthermore, high school students who receive Digital Information Literacy (DIL) instruction, reflect an increased usage of licensed databases,

especially the licensed databases in which high school students receive frequent DIL instruction.

5.3.5 High school students' perceptions of digital information resources

Research question 5: *What are high school students' perceptions and attitudes towards licensed databases as an information resource for school projects?*

The attitudes, beliefs and perceptions of high school students as to the value of licensed databases to assist them in completing school assignments, largely determine their future use of these digital information resources.

Table 5.16 is a tabulation of the percentage of responses from questionnaire question 10 to indicate how often students use digital information resources to for school projects.

Table 5.16: Positive perceptions of Frequent Users of Licensed Databases and Internet Search Engines					
	Ease of use %	Relevance of results %	Quantity of results %	User support %	Overall rating %
Google	99	91	94	67	94
Wikipedia	98	94	79	62	89
Yahoo! Answers	62	69	72	66	72
Google Scholar	77	77	92	77	92
GALILEO	88	94	81	69	81
EBSCOhost	75	50	75	75	80
Gale Databases	80	80	70	60	80
Wilson Biography	n/a	n/a	n/a	n/a	n/a
NetLibrary	80	80	70	60	80

Respondents were asked in questionnaire question 10 to reflect on a five point Likert scale how often they used various digital information resources to obtain relevant information for school projects. All respondents who indicated they used a specific digital information resource “very often,” were asked to respond to a number of questions rating their experience the last time they had used that particular resource. Table 5.16 is a tabulation of the responses from Qq 10a-i (Very Often) and Qq 11 (Very Good/Good), indicating positive experiences with each licensed database. Respondents were asked to allocate an overall rating to each experience with an information resource used frequently, which did not necessarily correspond with the ratings in the preceding columns of Table 5.16.

Wilson Biography shows no data in this table since none of the respondents indicated that they use this database very often. Respondents using information resources very frequently rated all of them easy to use, with the exception of Yahoo! Answers. EBSCOhost was not considered favourably when the relevancy of results was considered. Most of the digital resources listed in Table 5.16 returned a sufficient amount of information to satisfy the respondents. User support was considered to be outstanding by almost 70% of the respondents. Overall the respondents’ experiences using licensed databases were scored on the same level as commercial Internet search engines and specialised Internet search services.

Diagram 5.8 illustrates the comparison of positive ratings by frequent high school student users of Internet search engines (87%) and licensed databases (85%).

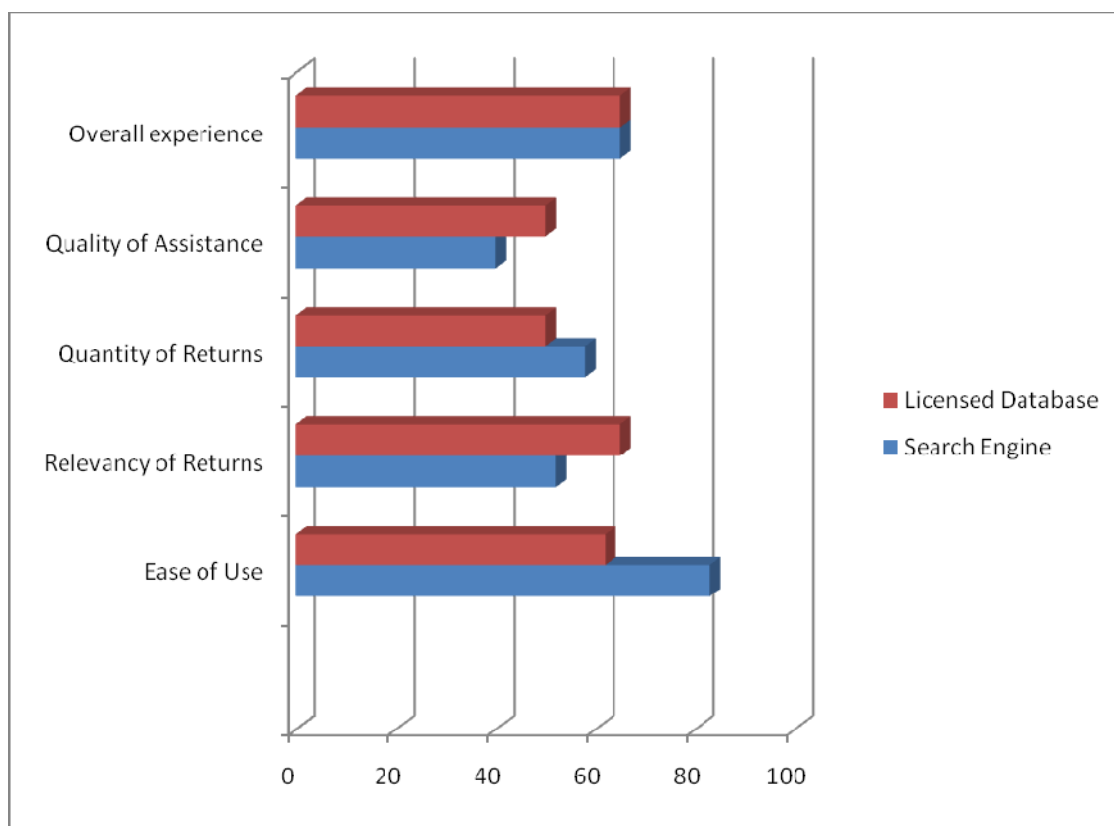


Diagram 5.8: Comparison of Positive Ratings by Frequent (High School Student) Users of Internet Search Engines and Licensed Databases

“Ease of use” rated higher with search engines than with licensed databases; “quality of assistance” rated higher with licensed databases than with search engines; “quantity of results from a search effort” rated higher with search engines than with licensed databases and “relevancy of results” ranked higher with licensed databases than with search engines. The exception was “user support” (67%) which rated lower than any of the other factors for each of the information resources.

However, the actual number of respondents who evaluated Internet search engines was much higher than the number of respondents who evaluated licensed databases. Nevertheless, Diagram 5.8 shows conclusively that when licensed databases are used, user experiences are almost as positive as user experiences with Internet search engines.

The answer to Research Question 5 is therefore that high school students who are experienced in the information seeking process perceive/rate their experiences when using licensed databases on a par with their information seeking experiences when using commercial Internet search engines.

5.3.6 High school students' use of Internet search engines

Research Question 6: *Do high school students use Internet search engines to satisfy their information needs?*

5.3.6.1 Internet search engines as high school students' primary source of information

Research Question 6, sub-question 1: *Do more high school students use the Internet as the first source of information for school projects rather than any other information resource?*

Construct₄ was built from the option "Internet Search Engines" as first choice in Qq13a-c and then Qq 5b; Qq10a-d; Qq 14b, 14c, Qq 14b and Qq 17.

Table 5.17 shows student preference for Internet search engines as primary information resource (Construct₄) when requiring information for school assignments.

Table 5.17: Construct₄: High school student Preference for Internet Search Engines as Information resource			
	Internet Search Engines		
	Very Often	Often	Low use
Google	98	1	0
Wikipedia	48	22	30
Yahoo! Answers	16	7	77
Google Scholar	14	16	70

The data in Table 5.17 indicates that the respondents used Internet search engines first and foremost for school projects, which confirms the data analysis in Table 5.6a. Furthermore, Google (98%) was used twice as much as Wikipedia (48%) on a “Very Often” basis. The use of more scholarly search engines such as GoogleScholar (14%) and Yahoo! Answers (16%) on a “Very Often” basis appeared to be more in line with the use of the licensed databases.

The answer to the research sub-question posed in 5.3.6.1 is therefore that high school students use Internet search engines extensively as the first, foremost and overall information resource when requiring information for school assignments.

5.3.6.2 *Licensed databases versus the Internet: high school student emotions*

Research question 6, sub-question 2: *Is there an association between emotions experienced by high school student users of Internet search engines versus users of Licensed Databases?*

Table 5.18 shows the association between high school students’ emotions when using Internet search engines versus their emotions when using licensed databases.

Table 5.18: High school student Emotions when using Internet Search Engines vs. Emotions when using Licensed Databases		
Internet Search Engines	Satisfaction/Confidence	Anxiety/Confusion/Frustration
Google	91	9
Wikipedia	92	8
Yahoo! Answers	83	17
Google Scholar	91	9
Construct₅ Score	89	11

Licensed Databases	Satisfaction/Confidence	Anxiety/Confusion/Frustration
GALILEO	88	12
EBSCOhost	73	27
Gale Databases	90	10
NetLibrary	77	23
Construct₆ Score	82	18

Table 5.18 indicates that respondents experienced high confidence and satisfaction levels when using Internet search engines and low anxiety, confusion and frustration levels. The data in the table indicates that respondents experienced similar emotions when using licensed databases, although the respondents' positive emotions scored slightly lower and the negative emotions slightly higher.

The researcher further analysed the scores in construct₅ and construct₆ using Pearsons Chi Square test to test the following hypotheses:

H_0 : There is no general association between the emotions experienced by high school students when using Internet search engines and the emotions experienced by high school students when using licensed databases.

H_1 : There is a general association between the emotions experienced by high school students when using Internet search engines and the emotions experienced by high school students when using licensed databases.

There is insufficient statistical evidence to reject the null hypothesis. It is therefore concluded that there is no statistically significant difference between the emotions experienced by high school students when using Internet search engines and the emotions experienced by high school students when using licensed databases during the information seeking process:

$\alpha = 0.05$, $Q_{p(df=1)} = 2.9348$, P-value = 0.0867.

The critical chi-square value for Q_p is 3.84146. $Q_p = 2.9348 < 3.84146$ confirming the decision not to reject H_0 .

The answer to the research sub-question posed in 5.3.6.2 is therefore that high school students do not experience significantly different emotions when using Internet search engines versus licensed databases to find information for school assignments and the emotions experienced are mostly positive. This is a confirmation of the findings in 5.3.5.

The summarised answer to Research Question 6 is thus that high school students use Internet search engines extensively as the first, foremost and overall information resource when requiring information for school assignments.

5.3.7 High school students' awareness of the public library's databases

Research question 7: *Are high school students aware of GALILEO and the wide spectrum of licensed databases available to them via the public library?*

Diagram 5.9 illustrates high school students' awareness of the licensed databases available via the public library by grade level.

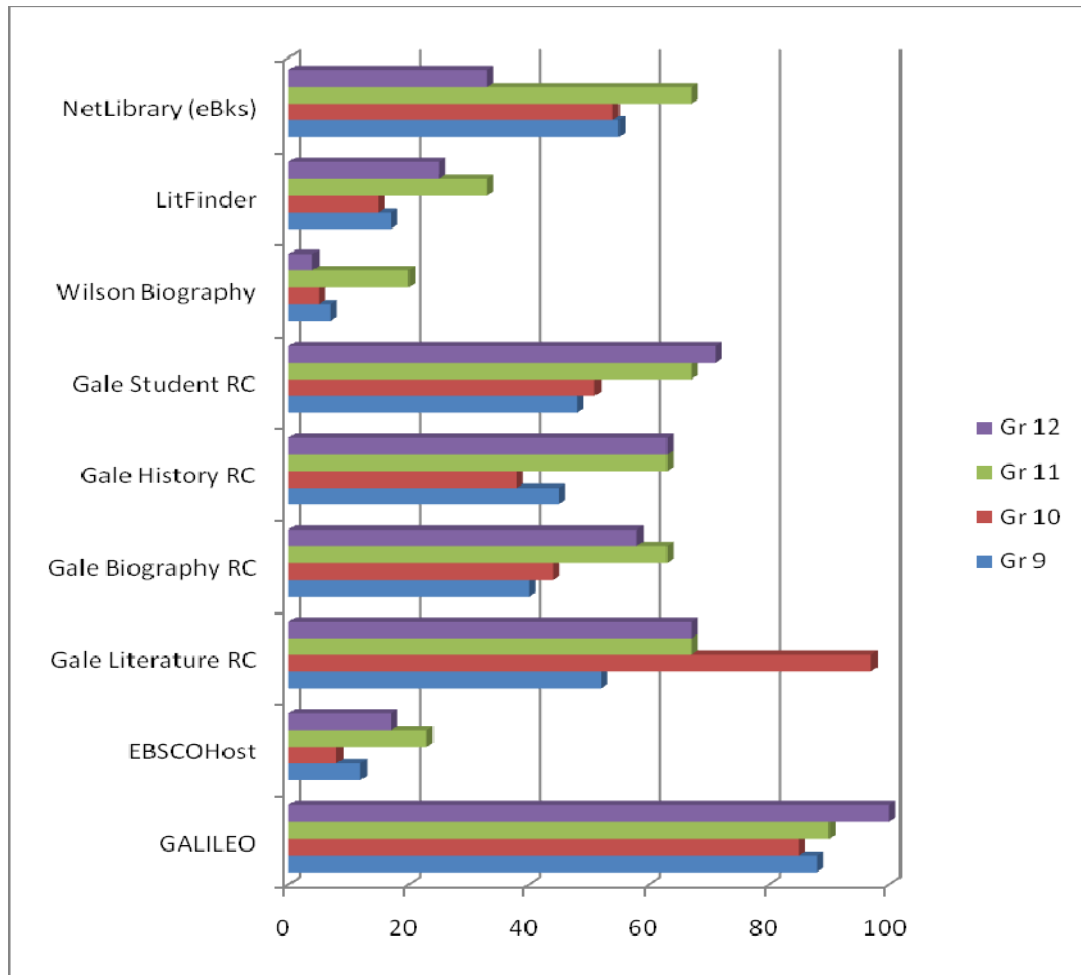


Diagram 5.9: High school students' Awareness of Licensed Databases by Grade Level

Diagram 5.9 indicates that there was not significant differentiation between respondents' awareness of licensed databases based on their grade levels, except for Grade 10 students' awareness of Gale Literature Resource Center. It is clear from the diagram above that the respondents were most aware of GALILEO in all grade levels and least aware of Wilson Biography and EBSCOhost databases. The research question above was addressed by the use of a Pearson Chi-square test to analyse if the data in diagram 5.9 test the following hypotheses:

H_0 : There is no general association between high school student grade level and high school student awareness of licensed databases.

H_1 : There is a general association between high school student grade level and high school student awareness of licensed databases.

There is insufficient statistical evidence to reject the null hypothesis. It can therefore not be concluded that there is a general association between high school student grade level and high school student awareness of licensed databases:

$$\alpha = 0.05, Q_{p(df=24)} = 22.1309, \text{P-value} = 0.5715.$$

The critical chi-square value for Q_p is 36.4150. $Q_p = 22.1309 < 36.4150$ confirmed the decision not to reject H_0 .

The answer to Research Question 7 relating to high school students' awareness levels of licensed databases available via the public library is the following, as illustrated in Diagram 5.9: GALILEO has the highest level of awareness among high school students (90%); followed by Gale Literature Resource Center (71%); Gale Student Resource Center (57%) and NetLibrary eBooks (53%). These licensed databases all have relatively high student awareness levels of more than 50%. Licensed databases such as LitFinder (21%), EBSCOhost (14%), and Wilson Biography (9%), indicate low levels of high school student awareness. There is not a statistically significant difference between high school students' awareness levels of licensed databases and high school students' grade levels.

5.3.7.1 Awareness of licensed databases: Scholastic achievers

Research question 7, sub-question 1: *Is there a difference in the awareness of licensed databases between high school students rating themselves as excellent scholastic achievers versus those who do not rate themselves as scholastic achievers?*

Table 5.19 compares high school student awareness of licensed databases between high school students perceiving themselves as excellent scholastic achievers versus scholastic non-achievers.

Table 5.19: Awareness of Licensed Databases: Scholastic Achievers vs. Scholastic Non-Achievers						
	Scholastic Achievers		Scholastic Non-Achievers		Z-test	
	Aware %	Unaware %	Aware %	Unaware %	Z-score	P Value
GALILEO	93	7	77	23	1.92	0.055
EBSCOhost	13	87	16	84	-0.43	0.667
Gale Lit. Resource Center	58	42	52	48	0.66	0.508
Gale Biography Resource Center	52	48	42	58	0.98	0.325
Gale History Resource Center	53	47	45	55	0.75	0.453
Gale Student Resource Center	60	40	52	48	0.85	0.398
HW Wilson Biography	8	92	13	87	-0.69	0.488
LitFinder	17	83	35	65	-2.02	0.043
NetLibrary	52	48	58	42	-0.62	0.538

The above question was addressed by a Z-test analysis of the data in Table 5.19 to test the following hypotheses:

H_0 : There are no differences between high school students' perceptions of themselves as academic achievers and high school students' awareness of licensed databases.

H_1 : There are differences between high school students' perceptions of themselves as academic achievers and high school students' awareness of licensed databases.

The only category that shows a statistically significant difference at $\alpha = 0.05$ between those perceiving themselves as scholastic achievers and those who do not perceive themselves as scholastic achievers, is in the awareness of LitFinder: $z = -2.02$, P-value = 0.043. In all other categories there is insufficient statistical evidence to reject the null hypothesis.

The answer to the research sub-question posed in 5.3.7.1 is therefore that there is statistically no significant difference in the awareness of the licensed databases between high school students perceiving themselves as scholastic achievers and those who do not perceive themselves as scholastic achievers.

5.3.7.2 Awareness of licensed databases: Athletes

Research question 7, sub-question 2: *Is there a difference in the awareness of licensed databases between high school students rating themselves as excellent athletes and those not rating themselves as athletic?*

Table 5.20 indicates high school student awareness of licensed databases by high school students perceiving themselves as athletic achievers as opposed to non-athletic students.

Table 5.20: Awareness of Licensed Databases: Athletic Achievers versus Non-Athletic students						
	Athletic Achievers		Non-Athletic Students		Z-test	
	Aware %	Unaware %	Aware %	Unaware %	Z-score	P value
GALILEO	88	12	92	8	-0.65	0.516

EBSCOhost	13	87	15	85	-0.34	0.730
Gale Literature Resource Center	55	45	59	41	-0.47	0.636
Gale Biography Resource Center	47	53	53	47	-0.60	0.550
Gale History Resource Center	49	51	54	46	-0.64	0.521
Gale Student RC	53	47	64	36	-1.39	0.164
HW Wilson Biography	8	92	10	90	-0.45	0.649
LitFinder	25	75	17	83	1.16	0.248
NetLibrary	59	41	46	54	1.56	0.118

The research question was addressed by means of a Z-test analysis of the data in Table 5.20 to test the following hypotheses:

H_0 : There are no differences between high school students' perceptions of themselves as excellent athletes and high school student awareness of licensed databases.

H_1 : There are differences between high school students' perceptions of themselves as excellent athletes and high school student awareness of licensed databases.

There is insufficient statistical evidence to reject the null hypothesis for any of the licensed databases. The answer to the research sub-question posed in 5.3.7.2 is therefore that there is no statistically significant difference in the awareness of the licensed

databases between high school students who evaluate themselves as athletic achievers and those who do not consider themselves to be athletic.

5.3.7.3 Awareness of licensed databases: Library users

Research question 7 Sub-question 3: *Is there a difference in awareness of licensed databases between high school students rating themselves as excellent library users versus those who do not rate themselves as good library users?*

Table 5.21 indicates high school student awareness of licensed databases by high school students rating themselves as excellent library users versus those not rating themselves as good library users.

Table 5.21: Awareness of Licensed Databases: Excellent library users vs. Not Good library users						
	Excellent library users		Not good library users		Z-test	
	Aware %	Unaware%	Aware %	Unaware %	Z-score	P value
GALILEO	88	12	90	10	-0.41	0.685
EBSCOhost	18	82	12	88	0.90	0.370
Gale Literature Resource Center	53	47	60	40	-0.75	0.455
Gale Biography Resource Center	49	51	50	50	-0.11	0.912
Gale History Resource Center	47	53	54	46	-0.74	0.462
Gale Student Resource Center	55	45	61	39	-0.66	0.508
HW Wilson	8	92	10	90	0.05	0.957

Biography						
LitFinder	18	82	24	76	-0.87	0.384
NetLibrary	55	45	52	48	0.29	0.776

This question was addressed by means of a Z-test analysis of the data in Table 5.21 to test the following hypotheses:

H_0 : There are no differences between high school students' perceptions of themselves as good library users and high school student awareness of licensed databases.

H_1 : There are differences between high school students' perceptions of themselves as good library users and high school student awareness of licensed databases.

There is insufficient statistical evidence to reject the null hypothesis for any of the licensed databases. The answer to the research sub-question posed in 5.3.7.3 is therefore that it could not be concluded that there is a statistically significant difference in the awareness of licensed databases between high school students who consider themselves as excellent library users versus those who do not consider themselves as good library users.

5.3.7.4 Awareness of licensed databases: Technology savvy high school students

Research question 7 Sub-question 4: *Is there a difference in awareness of licensed databases between high school students rating themselves excellent as technology savvy students versus those who rate themselves as non- technology savvy?*

Table 5.22 indicates awareness of licensed databases by high school students perceiving themselves as technology savvy versus non-technology savvy students.

Table 5.22: Awareness of Licensed Databases: Technology Savvy vs. Non-Technology Savvy students

	Technology Savvy		Non-Technology Savvy		Z-test	
	Aware %	Unaware %	Aware %	Unaware %	Z-score	P Value
GALILEO	93	7	82	8	1.64	0.100
EBSCOhost	14	86	13	87	0.06	0.953
Gale Lit. Resource Center	62	38	45	55	1.81	0.070
Gale Biography Resource Center	55	45	37	63	1.91	0.056
Gale History Resource Center	56	44	39	61	1.72	0.085
Gale Student Resource Center	62	38	47	53	2.4	0.017
Wilson Biography	10	90	5	95	1.06	0.289
LitFinder	25	75	13	87	2.14	0.032
NetLibrary	57	43	45	55	1.26	0.208

The data in Table 5.22 indicates that there was not a significant difference in the awareness of licensed databases between respondents who were technology savvy and non-technology savvy respondents, although the exceptions (highlighted in yellow on Table 5.22) were that respondents perceiving themselves as technology savvy were more aware of Gale Student Resource Center and LitFinder than high school students who did not perceive themselves as technology savvy.

The answer to the research sub-question posed in 5.3.7.4 is therefore that there is not a significant difference in the awareness of licensed databases between high school students who are technology savvy and students who are not technology savvy.

Diagram 5.10 shows the comparison between high school students' awareness of licensed databases and excellent scholars/athletes/library users/technology savvy students.

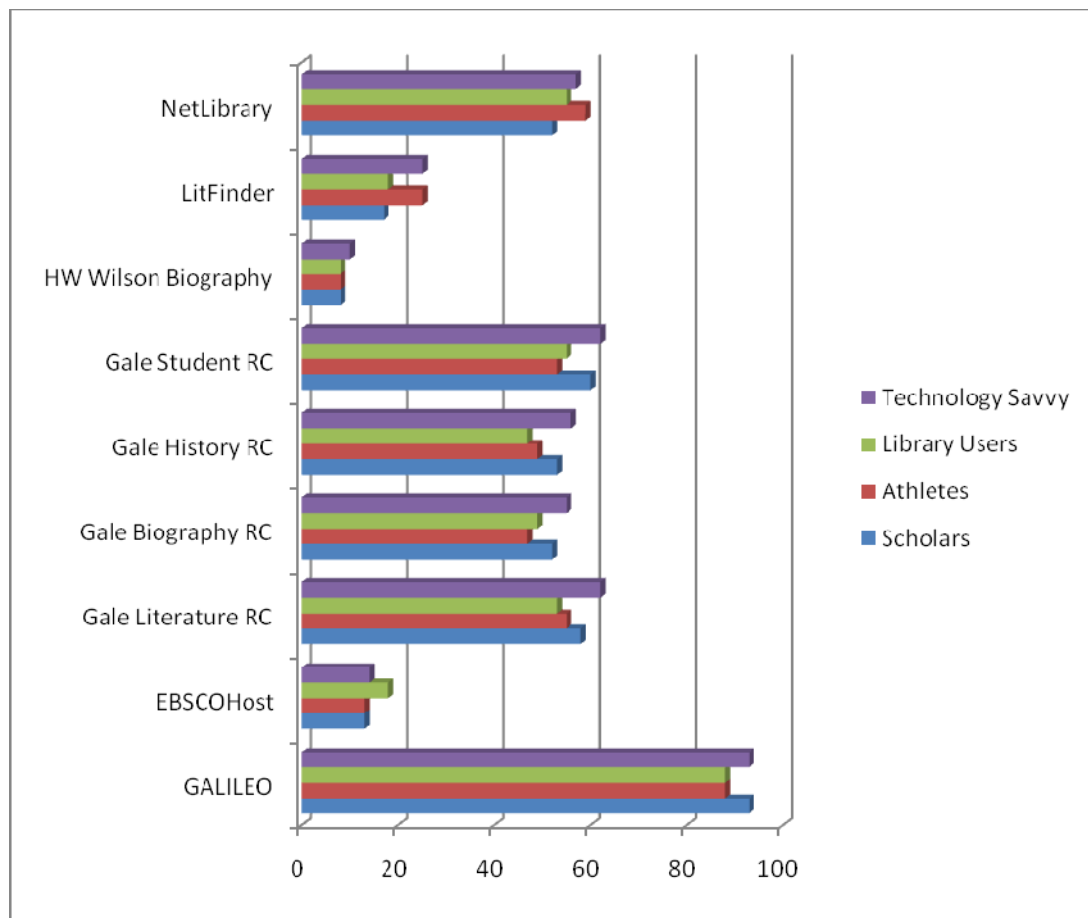


Diagram 5.10: Comparison of Awareness of Licensed Databases among Excellent Scholars/Athletes/Library Users/Technology Savvy Students

Diagram 5.10 summarises the findings: when respondents' awareness levels of licensed databases were compared among different categories of high school students who rated themselves as excellent/high in self-assessment categories on the one hand, to poor/low

self-assessment in the same categories on the other hand, no significant statistical differences could be found. The exception was that excellent/high technology savvy respondents were more aware of Gale Student Resource Center and LitFinder than non-technology savvy students.

5.3.7.5 Awareness of licensed databases: Digital Information Literacy Instruction

Research question 7, sub-question 5: *Is there a difference in the awareness of licensed databases between high school students who receive instruction in the skill of DIL and students who do not receive DIL instruction?*

Table 5.23 indicates student awareness of licensed databases according to their level of Digital Information Literacy (DIL) instruction.

Table 5.23: Awareness of Licensed Databases according to Level of Digital Information Literacy (DIL) Instruction				
	High DIL Instruction %	Low DIL Instruction %	Z-Test	P-Values
GALILEO	96	80	2.85	0.002
EBSCOhost	15	13	0.31	0.380
Gale Literature Resource Center	66	45	2.52	0.006
Gale Biography Resource Center	54	43	1.31	0.095
Gale History Resource Center	60	39	2.56	0.005
Gale Student Resource Center	66	46	2.33	0.010

Wilson Biography	13	4	1.73	0.042
LitFinder	23	20	0.40	0.343
NetLibrary	57	48	1.10	0.135

The data in Table 5.23 was analysed to determine if digital information literacy (DIL) instruction indicated a statistically significant difference in awareness levels between respondents who received a high level of DIL instruction (very often/often) as opposed to respondents who received low/no DIL instruction (occasionally/rarely/never). The data were analysed by means of a Z-test. The Z-test confirmed that there was no significant difference in the awareness of EBSCOhost, Gale Biography Resource Center, H.W.Wilson Biography, LitFinder and NetLibrary at $\alpha = 0.05$ significance level between respondents who received a high level of DIL instruction and those who received no/low DIL instruction. This result confirms that all the high school student respondents were equally unaware of the availability of the above mentioned online resources via the public library. However, the P-values for GALILEO, Gale Literature Resource Center, Gale History Resource Center and Gale Student Resource Center indicated an awareness difference between the two groups.

The answer to the sub-question posed in 5.3.7.5 is therefore the following: high school students who receive DIL instruction on a high frequency basis are more aware of the following licensed databases available via the public library, than students who receive DIL instruction on a low/no frequency basis: GALILEO, Gale Literature Resource Center, Gale History Resource Center and Gale Student Resource Center. However, there is no significant difference in the awareness of EBSCOhost, Gale Biography Resource Center, H.W.Wilson Biography, LitFinder and NetLibrary between students who receive a high level of DIL instruction and those who receive no/low DIL instruction.

The summarised answer to Research Question 7 is therefore the following: when high school students' awareness levels of licensed databases are compared among different student categories (scholastic achievers, athletes, technology savvy students and good

library users) that rate themselves as excellent on the one hand to poor/low on the other hand, no significant statistical differences could be found. However, high school students who receive frequent Digital Information Literacy instruction are generally more aware of licensed databases than students who receive low/no DIL instruction.

5.3.8 Factors that could encourage high school students to use licensed databases

Research question 8: *Which factors would encourage high school students to use licensed databases available through the public library when seeking information for school assignments?*

5.3.8.1 Likelihood of high school students with high Digital Information Literacy (DIL) skills using licensed databases

Research Question 8, sub-question 1: *Will high school students with high DIL skills make more use of licensed databases if instructed to do so by teachers/parents?*

Table 5.24 a 7x2 table was created from responses to questionnaire question (Qq) 5d-e; Qq 12a-c; Qq 14a; Qq 14f and Qq 19a-d, to reflect the likelihood that high school students who receive DIL instruction on a high frequency basis would use licensed databases more often when a teacher/parent instructs them to do so.

Table 5.24: Likelihood of high frequency DIL Instruction leading to Licensed Databases Use per Teacher/Parent Instruction		
	Very Likely/Likely %	Neutral/Maybe/Not at all %
Ask librarian for input	24	76
Ask teacher for resource list	46	54
Recommended by Teacher	81	19

Recommended by Librarian	62	38
Trained to use it	68	32
Supplied Resource List	76	24
Instructed to use	68	32

Table 5.24 indicates that respondents who received DIL instruction on a high frequency basis appeared to be reluctant to ask a librarian/teacher for assistance in the use of licensed databases. The same group, however, was very likely/likely to use a licensed database if it was recommended by a teacher or listed on a teacher resource list or if they were instructed to do so.

The data in Table 5.24 was analysed by means of a Pearson's Chi-Square test to test the following hypotheses:

H_0 : There is no general association between the likelihood that high school students with a high frequency of DIL instruction will use licensed databases when instructed to do so.

H_1 : There is a general association between the likelihood that high school students with a high frequency of DIL instruction will use licensed databases if instructed to do so.

There is sufficient statistical evidence to reject the null hypothesis and it is therefore concluded that there is a general association between the likelihood that high school students with a high frequency of DIL instruction would use licensed databases when instructed to do so:

$$\alpha = 0.05, Q_{P(df=6)} = 68.4438, \text{P-value} < 0.0001.$$

The critical chi-square value for Q_p is 12.5916. $Q_p = 68.4438 > 12.5916$ confirmed the decision to reject H_0 .

The answer to the research sub-question posed in 5.3.8.1 is therefore that high school students are likely/very likely to use a specific licensed database if they are instructed to do so by teachers/parents, especially after being trained to use a specific licensed database.

5.3.8.2 Possibility that user-friendly features will increase the use of licensed databases

Research question 8, sub-question 2: *Would time-saving features such as federated/metadata search options and Google-type user-friendly interfaces encourage high school students to use licensed databases?*

Diagram 5.11 illustrates the user-friendly features that could lead to increased student use of licensed databases.

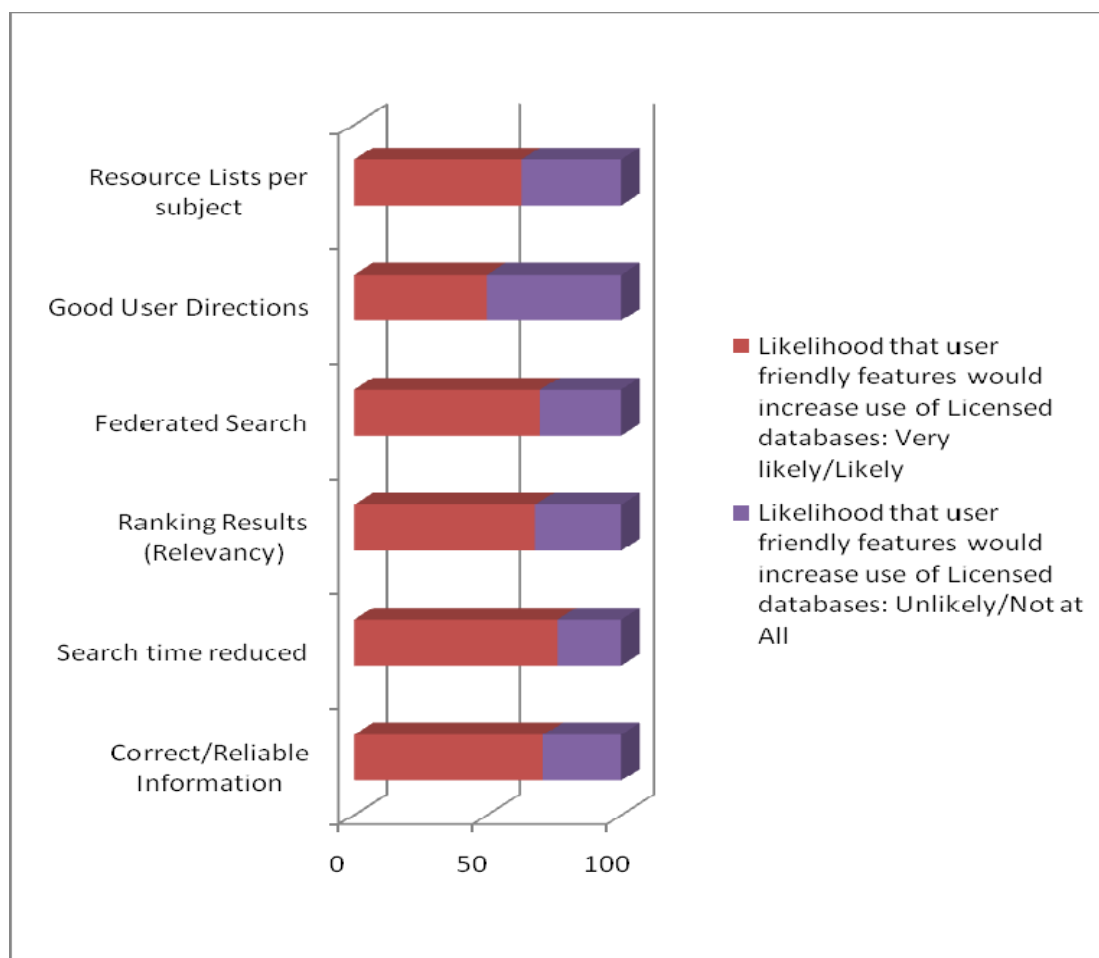


Diagram 5.11: Possibility that User-Friendly Features would increase high school students' use of Licensed Databases

In Questionnaire question (Qq) 17 the respondents had to indicate if any of the user-friendly features listed would encourage them to use the licensed databases available through the public library. Students' responses to Qq 17 are represented in Diagram 5.11, including responses to Qq 12d-g.

The following user-friendly features listed in Questionnaire question 17 and Diagram 5.11 scored a more than 50% possibility each to attract high school student respondents to very likely/likely use licensed databases available through the public library: a public library "homework web page" highlighting homework resources; easy to follow database user instructions on the public library web page; resource lists by academic subject;

option to email information questions to an online librarian; teen blog for high school students to share information; federated search feature and reduced search time; search results ranked by relevancy; availability of reliable, relevant information and tutoring on how to use the databases – the latter scored slightly lower at 42%.

The data were analysed by means of a Pearson's Chi-Square test to test the following hypotheses:

H_0 : There is no general association between user-friendly search features and the likelihood that high school students would use a licensed database.

H_1 : There is a general association between user-friendly search features and the likelihood that high school students would use a licensed database.

There is sufficient statistical evidence to reject the null hypothesis and it is therefore concluded that there is a general association between user-friendly information search features and the likelihood that high school students would use a licensed database:

$$\alpha = 0.05, Q_{P(df=5)} = 23.8235, P\text{-value} < 0.0001.$$

The critical chi-square value for Q_p is 11.0705. $Q_p = 23.8235 > 11.0705$ confirmed the decision to reject H_0

The answer to the research sub-question posed in 5.3.8.2 is therefore that user-friendly information search features could influence high school students to use licensed databases available through the public library more frequently when they need information for school assignments.

The overall answer to Research Question 8 is thus the following: high school students are likely to use a specific licensed database if they are instructed to do so by teachers/parents, especially after being trained to use a specific licensed database. Furthermore, user-friendly information search features could influence high school students to use licensed databases available through the public library more frequently when they need information for school assignments.

5.3.9 Licensed database user instruction and support

Research question 9: *Will high school students make more use of licensed databases if user instruction and support could be provided by public libraries?*

5.3.9.1 Likelihood that high school students will use licensed databases after Digital Information Literacy (DIL) instruction

Research question 9, sub-question 1: *Will more high school students use licensed databases if they receive user instruction and assistance in the effective use of licensed databases?*

The 5x4 table in Table 5.25 was created using responses from Qq 12c, Qq 14e; Qq 17c, 17e, 17f to indicate high school students' likelihood of using licensed databases after Digital Information Literacy (DIL) Instruction.

Table 5.25: Likelihood of high school students using Licensed Databases (LD) after Digital Information Literacy (DIL) Instruction						
	Current High DIL instruction %		Current Low/No DIL instruction %		Z-test	P-Values
	Very Likely/likely	Neutral/Maybe/ Not at all	Very Likely/likely	Neutral/Maybe/Not at all		
Trained to use it	68	32	57	43	5.22	<0.001
Ask Password	28	72	23	77	-0.49	0.687
Tutoring on how to use LD	39	61	46	54	-0.89	0.814
Email Questions	54	46	48	52	0.77	0.221
Teen blog on	57	43	41	59	1.48	0.070

Website						
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A Z-test for the hypotheses that respondents' usage of licensed databases were the same for respondents who received digital information literacy (DIL) instruction versus respondents who did not receive DIL instruction, is rejected in all items with the exception of respondents who were trained in the use of licensed databases.

The answer to Research Question 9 is therefore that high school students would be more likely to use licensed databases when they receive DIL instruction on a high frequency basis, than when they receive DIL instruction on a low/no frequency basis. A further conclusion is that training students in the use of specific licensed databases would increase the use thereof, irrespective of the level of DIL instruction they received.

5.3.10 High school students' ability to evaluate digital information resources

Research question 10: *Are high school students able to conduct successful information searches and evaluate the reliability and quality of information retrieved via commercial search engines and licensed databases?*

The purpose of this question was to evaluate the level of digital information literacy among high school student respondents. The data were obtained from responses to Questionnaire question (Qq) 16 that lists the attributes of digital information literacy and the respondents had to indicate if DIL attributes would be part of their information seeking behaviour.

Diagram 5.12 illustrates high school students' Digital Information Literacy (DIL) levels relating to the application of DIL skills/attributes.

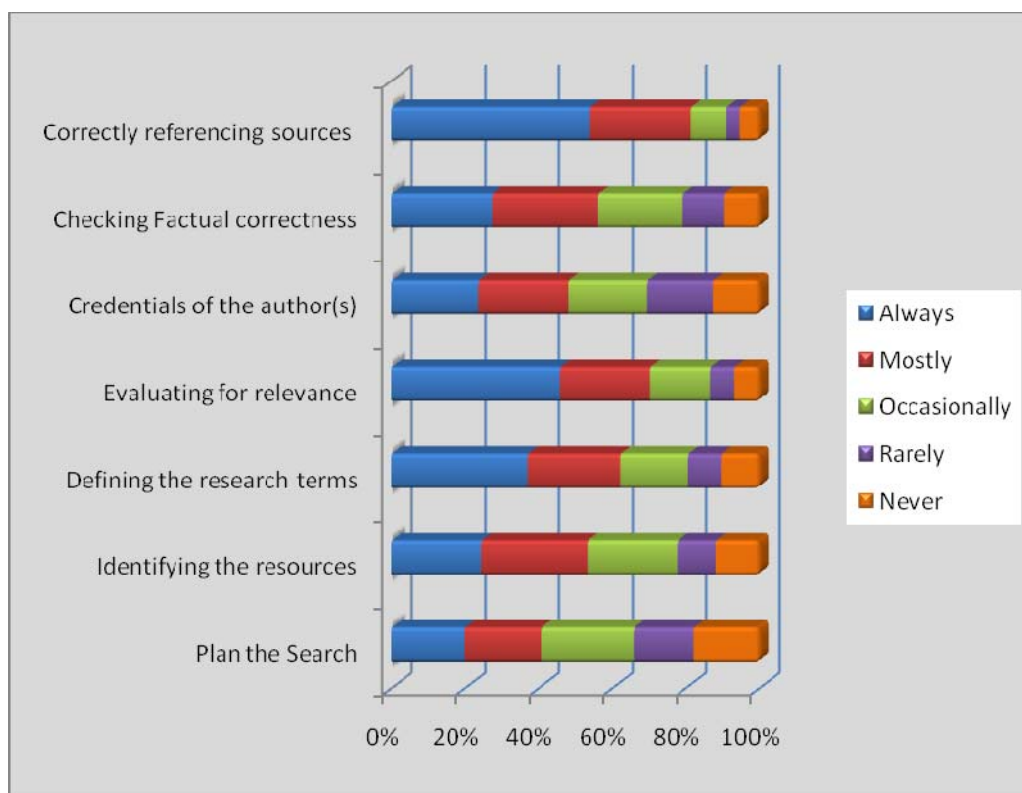


Diagram 5.12: High school students' application of the attributes of Digital Information Literacy (DIL)

Diagram 5.12 illustrates that a high percentage of high school student respondents always/mostly used the following attributes of information literacy:

- Defining the search terms (62%)
- Evaluating the retrieved data for relevancy (70%)
- Checking factual correctness (56%)
- Correctly referencing the online sources (81%)

The data indicates that over 50% of all high school students used most of these attributes on a regular (always/mostly) basis. The exceptions were planning the search effort (40%) and checking the credentials of the author (48%).

The answer to Research Question 10 is therefore the following: the majority of East Cobb high school students have the skill of Digital Information Literacy; viz. the ability to conduct successful information searches by evaluating the reliability, factual correctness and relevance of information retrieved via Internet search engines and licensed databases.

5.3.10.1 Student application of Digital Information Literacy Skills

Research question 10, sub-question 1: *Do high school students who receive instruction in Digital Information Literacy (DIL) apply these skills more often than students who do not receive DIL instruction?*

To answer the sub-question the researcher analysed if there was a difference in the application of DIL skills between high school students who received frequent instruction in digital information literacy and students who received DIL instruction on an infrequent/not at all basis.

Table 5.26 indicates high school students' Digital Information Literacy (DIL) instruction levels related to the application of the attributes of DIL.

Table 5.26: High school students' Digital Information Literacy (DIL) instruction level relating to the application of the attributes of DIL (percentages)										
<i>A=always; M=mostly; O=occasionally; R=rarely; N=never</i>										
	High DIL Instruction Very Often/Often					Low DIL Instruction Occasionally/Rarely/Never				
	A	M	O	R	N	A	M	O	R	N
Plan the Information Search	24	23	23	16	14	14	18	29	16	23
Identify the Resources	28	30	23	9	10	20	27	27	12	14
Define Search Terms	39	22	23	9	7	34	30	13	9	14

Evaluate the Relevance	50	23	16	6	5	41	27	16	7	9
Check Author credentials	19	27	23	16	15	30	21	20	20	9
Check Factual Correctness	28	27	23	14	8	27	32	23	7	11
Reference Sources Correctly	63	22	6	2	7	41	36	14	5	4

The data represented in Table 5.26 was analysed by means of a Row Mean Score test to determine if there was a statistically significant difference in the application of Digital Information Literacy (DIL) attributes between respondents who received DIL instruction on a frequent basis and respondents who received no/low frequency DIL instruction. The same hypotheses were tested for each of the steps by changing the attribute being tested for each of the tests:

H_0 : There are no differences in Row Mean scores for high school students' likelihood to plan the information search between the two frequency levels of instruction (very often/often vs. occasionally/rarely/never).

H_1 : There are differences in Row Mean scores for high school students' likelihood to plan the information search between the two frequency levels of instruction (very often/often vs. occasionally/rarely/never).

There is insufficient statistical evidence to reject H_0 for any of the attributes analysed. It could therefore not be concluded that there are significant differences in Row Mean scores for the likelihood that high school students would apply the attributes of DIL between the two frequency levels of instruction (high frequency DIL instruction and low/no frequency DIL instruction).

- *Planning the information search:*

$$\alpha = .05, Q_{S(df=1)} = 3.2363, p - \text{value} = 0.0720$$

The critical chi-square value for Q_s is 3.84146 and would remain the same for each of the attributes tested.

$$Q_s = 3.2363 < 3.84146 \text{ confirmed the decision not to reject } H_0.$$

- *Identify the information resources to be used in the project:*

$$\alpha = .05, Q_{S(df=1)} = 1.9293, p - \text{value} = 0.1648.$$

$$Q_s = 1.9293 < 3.84146 \text{ confirmed the decision not to reject } H_0.$$

- *Define the search terms to be used:*

$$\alpha = .05, Q_{S(df=1)} = 0.2394, p - \text{value} = 0.6246.$$

$$Q_s = 0.2394 < 3.84146 \text{ confirmed the decision not to reject } H_0.$$

- *Evaluating the relevancy of the retrieved information:*

$$\alpha = .05, Q_{S(df=1)} = 1.4611, p - \text{value} = 0.2267.$$

$$Q_s = 1.4611 < 3.84146 \text{ confirmed the decision not to reject } H_0.$$

- *Check the credentials of the author(s) of retrieved information*

$$\alpha = .05, Q_{S(df=1)} = 1.1772, p - \text{value} = 0.2779.$$

$$Q_s = 1.1772 < 3.84146 \text{ confirmed the decision not to reject } H_0.$$

- *Check multiple resources for factual correctness of information:*

$$\alpha = .05, Q_{S(df=1)} = 0.0026, p - \text{value} = 0.9597.$$

$Q_s = 0.0026 < 3.84146$ confirmed the decision not to reject H_0 .

- *Reference and cite information sources correctly:*

$\alpha = .05$, $Q_{S(df=1)} = 1.9285$, $p\text{-value} = 0.1649$.

$Q_s = 1.9285 < 3.84146$ confirmed the decision not to reject H_0 .

The answer to the research question posed in 5.3.10.1 is that high school students who receive instruction in Digital Information Literacy (DIL) do not generally apply these skills significantly more often than students who do not receive Digital Information Literacy instruction.

5.3.11 High school students' instruction in Digital Information Literacy

Research question 11: *Do high school students receive instruction in the skill of Digital Information Literacy (DIL) and if so, where do they receive DIL instruction?*

In order to determine if/where high school students received instruction in the skill of Digital Information Literacy (DIL), the responses were initially grouped by grade level and then by the location where DIL instruction was offered. Each grade level group was then sub-divided into students who received DIL instruction frequently (very often/often) and those who received DIL instruction on an infrequent/low frequency basis (occasionally/rarely/never).

Table 5.27 shows high school student Digital Information Literacy instruction by grade level and location.

Table 5.27: Information literacy Instruction by Grade level and Location								
	Grade 9		Grade 10		Grade 11		Grade 12	
Frequency of Instruction	Very Often/Often	%	Very Often/Often	%	Very Often/Often	%	Very Often/Often	%
Count	42		39		30		24	
Media Centre	27	64	16	41	14	47	10	42
Classroom	24	57	15	38	8	27	11	46
Public Library	4	10	1	3	0	0	2	8
Online Tutorials	0	0	4	10	4	13	0	0

Table 5.27 shows that the responses were totalled and expressed as a percentage for each of the four main locations where respondents received DIL instruction. It is apparent from the data in Table 5.27 that East Cobb high school media centres and classrooms were the main locations where respondents received DIL instruction. Approximately 50% of all the respondents received frequent instruction in DIL skills at both locations. It is evident from the data in Table 5.27 that the respondents did not make frequent use of online tutorials to increase their use of licensed databases and that formal DIL instruction was not offered at the public library. However, the data in Table 5.27 indicates a low frequency of DIL instruction at the public library, which could be due to individual DIL instruction by librarians at public library information desks, as part of information services to library patrons in general.

The question of whether there is a difference in the frequency of DIL instruction per grade level was addressed by means of a Pearson Chi-Square test analysis applied to the data represented in the first two rows of Table 5.27, to test the following hypotheses:

H_0 : There is no general association between the grade level of high school students and the frequency of DIL instruction received.

H_1 : There is a general association between the grade level of high school students and the frequency of DIL instruction received.

There is insufficient statistical evidence to reject the null hypothesis. It could therefore be concluded that there is not a general association between the grade level of the high school student and the frequency of DIL instruction received:

$$\alpha = 0.05, Q_{p(df=3)} = 1.2512, \text{P-value} = 0.7408$$

The critical chi-square value for Q_p is 7.81473. $Q_p = 1.2512 < 7.81473$ confirmed the decision not to reject H_0 .

The answer to Research Question 11 is therefore that high school students receive instruction in Digital Information Literacy at most East Cobb high schools, but not at all high schools or to the same extent/frequency. No formal DIL instruction training is offered at the public library, although individual DIL instruction at public library information desks is offered as part of information services to public library patrons.

5.4 SUMMARY

The data obtained from the 135 high school student respondents to the research questionnaire, was analysed and interpreted in this chapter by using constructs, contingency tables and diagrams. Table analyses were done to determine if the data offered statistically significant insights and answers to the research questions posed by using Z-tests, Chi-square tests and Row Mean Score tests to test the various hypotheses developed. The data analysed and interpreted in this chapter is the basis for the research findings, conclusions and recommendations in the final chapter.

CHAPTER 6

DISCUSSION OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter concludes the study with a discussion of the research findings, based on the data analysis and interpretation of the response data obtained from the research questionnaire. The discussion culminates into conclusions drawn about the extent that the research results support the study objectives. The chapter finally provides recommendations for more effective high school student use of the licensed databases available through the public library, which are based on the conclusions of the study.

The study aim as stated in Chapter 1 section 1.5 was to determine the extent to which high school students use the licensed databases available through the public libraries in the East Cobb area of Metro Atlanta, Georgia, when requiring information for high school assignments. The objectives of the study as stated in Chapter 1 section 1.6 were the following:

- Examine why high school students visit public libraries in the East Cobb area of Atlanta, Georgia, when requiring information for school assignments.
- Determine the information needs and information seeking behaviour of high school students during completion of school projects, especially when using the public library's licensed databases.
- Reveal high school students' awareness levels of the licensed databases available to them via the public library.
- Uncover the factors that encourage high school students to use licensed databases available through the public library.

- Determine if high school students have the skill of information literacy in order to evaluate the accuracy, relevancy, authenticity and sufficiency of retrieved digital information.

Measures are recommended at the conclusion of this chapter for high school students' information needs, information literacy skills and use of digital resources via the public library, to be more effectively addressed.

In the next section the findings based on the data analysis and interpretation are discussed, as well as conclusions relating to the findings and study objectives as stated above.

6.2 DISCUSSION OF FINDINGS AND CONCLUSIONS

In the previous chapter the data obtained from the responses to the research questionnaire was analysed, in order to find answers to each research question posed in Chapter 1 section 1.7. In this the findings and conclusions of the data analysis relating to the study objectives are discussed.

6.2.1 High school students' reasons for visiting the public library

The following findings and conclusions relate to high school students' reasons for visiting the public library when they need information for school assignments:

6.2.1.1 High school students' self-assessment as library users

Findings: The public high schools in the East Cobb area of Metro Atlanta rate among the top academic schools in the state of Georgia, according to the Georgia Department of Education (<http://www.public.doe.k12.ga.us>). This is reflected in the fact that more than 70% of the respondents rated themselves as being academic achievers, information literate and technology savvy. However, only 38% described themselves as high profile/good library users, even though 78% of these students owned a public library card (Chapter 5 Table 5.5). Although owning a library card does not necessarily make a

student a “good” library user, the researcher had expected a closer association between academic achievers and high profile/good library users.

Conclusions: It is therefore concluded that there is no direct association between a high school student owning a public library card and being a high profile/good library user.

6.2.1.2 High school students’ use of the public library versus the media centre

Findings: Although 68% of the respondents visited the public library to a more/lesser extent to find information for school assignments, only one in six respondents (16%) turned to the public library on a high frequency basis. The study found a statistically significant difference when comparing respondents’ choice between the public library and the high school media centre. The media centre is used by 87% of high school students when requiring information for school assignments, with 33% of the respondents using the media centre on a high frequency basis. Compared to the public library, nearly twice the number of respondents chose the school media centre as the first step in an information search (Chapter 5, Table 5.6a).

Conclusions: It is therefore concluded that significantly more high school students visit the high school media centre than the public library when seeking information for school assignments. Given school media centres’ limited access and hours of operation (Chapter 1 subsection 1.3.1) it is therefore possible that teachers allow students to use the media centre for school assignments during regular school hours. Another reason for high school students’ preference for the media centre versus the public library could be the proximity of high school students to the school media centre during the school day.

6.2.1.3 Visiting the public library motivated by teacher/parent instruction

Findings: In analysing the data pertaining to the reasons respondents visited the public library to find information for school assignments, the research results indicated that more than 50% of high school students were very likely/likely to visit the public library if instructed to do so by a parent/teacher, confirming the findings by Clabo 2002 and Enujioké 1994 as discussed in Chapter 3, subsection 3.6.1. Furthermore, if instructed to

use *specific* public library resources such as a specified number of printed resources or a specific licensed database, an even higher number of respondents (55%) indicated that they would turn to the public library for school assignments (Chapter 5 subsection 5.3.1.1).

Conclusions: It is therefore concluded that high school students are motivated to visit the public library if instructed to do so by teachers/parents, especially if they are instructed to use specified information resources such as licensed databases available through the public library.

6.2.1.4 Visiting the public library for relevant information/user support and convenience

Findings: 43% of the respondents indicated that they were motivated to visit the public library due to the fact that they perceived the public library as an information outlet where they could obtain relevant information and reference/user support (Chapter 5 subsection 5.3.1.3). Factors concerning convenience (such as longer hours of operation at the public library) motivated 37% of the respondents to visit the public library (Chapter 5 subsection 5.3.1.2).

The study found that there was statistically a difference between the following reasons for respondents to visit the public library: “the availability of relevant information and reference/user support” and “being instructed to use specific public library resources by teachers” on the one hand and the “public library as a convenient information outlet in terms of longer hours of operation” on the other hand. The strength of relevant information/user support at the public library and instruction to use specific public library information resources by teachers were stronger than reasons of convenience. There was statistically no difference in the strength of motivation between “instructed to use specific public library resources” and “the relevancy of information and user support” available at the public library (Chapter 5 subsection 5.3.1.5).

Conclusions: The study concluded that high school students perceive the public library as an information outlet where they can find relevant information and user support for

school assignments. Although convenience is still cited as a reason to visit the public library, the researcher concluded that factors such as the public library's convenience in terms of location and long hours of operation did not offer the same strength of motivation to the current generation of high school students as it had for previous generations, due to the Internet's availability and accessibility.

6.2.2 Information needs and information seeking behaviour of high school students

The data analysed for demographic characteristics confirmed the Generation Y profile as discussed by Sweeney (2005:165-175) and Abram & Luther (2004:34) in Chapter 3 subsections 3.2.2 and 3.4.2: high school students (as part of Generation Y) value education and training, are technology savvy, format agnostic and prefer to collaborate and communicate electronically.

The study results also confirmed that respondents primarily used the Internet to search for information for school assignments from the convenience of their homes. Most of the respondents owned a computer and communicated electronically (via Instant Messaging (IM), text messaging and email) in order to find required information for school assignments.

The following research findings and conclusions relate to the academic information needs and information seeking behaviour of high school students when seeking information for school assignments:

6.2.2.1 Students' use of digital resources relating to high school academic courses

Findings: More than 65% of the respondents indicated that high school assignments in English Language Arts (Literature) and Social Studies would lead them to use licensed databases available through the public library. Although the majority of the respondents indicated that they used Internet Search Engines for Science-related assignments, more than 40% of the respondents indicated that they used licensed databases for Science-related assignments. This finding confirmed the findings of the third Pew Study as discussed in Chapter 2 subsection 2.2.5, that students primarily used the Internet for

Science-related assignments. Fine Arts school assignments led to more than 30% of the respondents using licensed databases; Business assignments more than 25% and Information Technology assignments led approximately 20% of the respondents to use licensed databases available through the public library (Chapter 5 subsections 5.3.2 - 5.3.3).

Findings related to respondents' ranking of information resources by academic subject (Table 5.13b), indicated the following: when Language Arts/Literature students are required to read literary works, their first choice was to read the printed publication (almost 60%) rather than the digital format/ebook (27%). Their second choice was to use licensed databases to find literary criticism after reading literary works. High school students preferred to use digital resources for assignments in academic subjects such as Social Studies (83%) and Science (79%), with Internet search engines ranking as their first choice and licensed databases as their second choice.

Conclusions: It is therefore concluded that specific academic information needs influence high school students to use licensed databases available through the public library to a more or lesser extent, depending on the academic subject at hand. Academic subjects that would most likely influence high school students to use the licensed databases available via the public library are English Language Arts (English Literature) and Social Studies.

Research results relating to high school students' ranking of information resources, led to the conclusion that high school students prefer to use Internet search engines as their first choice and licensed databases as their second choice for most academic subjects, with the exception that high school students prefer to read printed literary works rather than ebooks for English Language Arts/Literature assignments.

6.2.2.2 High school student information seeking behaviour traits

Findings: The research findings showed conclusively that the current generation of high school students use the Internet (digital format) extensively to satisfy their information needs. All respondents (100%) indicated that they accessed the Internet to find information for school assignments. As stated before, the only academic category where

respondents preferred printed format, was reading the printed format of literary works rather than ebooks in English Language Arts/Literature (almost 60%) (Chapter 5, Table 5.13b).

Nearly all respondents (99%) indicated that they owned a computer (Chapter 5, Table 5.5) and accessed the Internet at home to find information for school assignments, because of the instant availability and accessibility of using the Internet at home (Chapter 5 subsection 5.3.3). The remaining respondents (1%) accessed the Internet at school or at the public library. As discussed in sub-section 6.2.1.2 of this chapter, 87% of the high school student respondents indicated that they visited the school media centre (33% frequently) and 68% of respondents visited the public library (16% frequently) when seeking information for school assignments. Commercial Internet paid services were not popular with the respondents – approximately 80% indicated that they never made use of these services (Chapter 5, Table 5.6a).

Conclusions: This study therefore concluded that high school students prefer to use digital formats when seeking information for school assignments, with the exception of English Language Arts/Literature - students still prefer to read required English literature publications in printed format (60%), rather than digital format (ebooks). Reasons for preferring digital formats for all other school assignments include the following: as part of Generation Y high school students are “digital natives” (Sweeney 2005:165-175), “born with the chip” (Abram & Luther 2004:34) and therefore they have a natural affinity for digital formats. Other reasons include the instant availability and accessibility of using the Internet at home (instant gratification).

As far as information outlets/locations are concerned, the study concluded that 99% of East Cobb high school students access the Internet at home to find information for school assignments. Other information outlets used to a more/lesser extent include the media centre and the public library, due to teacher instruction to use specific information resources, such as specified licensed databases and due to students perceiving the public library as an information outlet where they can find relevant information and reference support. Commercial Internet access outlets (paid services) are not popular with high

school students and only a small percentage occasionally makes use of these services (Chapter 5, Table 5.6a).

These conclusions support the vast body of research findings (discussed in Chapter 2.2.5 and Chapter 3) about the information seeking behaviour of Generation Y students. This study's conclusions also support research findings that students of this generation do not limit information formats when seeking information (Chapter 3 subsection 3.4.2): they use a wide variety of information formats such as websites, blogs, wikis, videos, audios, books, encyclopaedias, and journal articles.

6.2.2.3 Affective behaviour during the information seeking process

Findings: When advancing through the stages of the information seeking process, high school students experienced emotions similar to the affective aspects of the ISP as reported in Chapter 3 subsection 3.4.1 and subsection 3.4.3.2. The following affective behaviours (emotions) were reported by high school students during the information search process:

- When selecting the information resources, 90% of the study respondents experienced positive emotions (Chapter 5 Diagram 5.2) of confidence (48%) and satisfaction (42%); only 19% of the respondents felt the need to approach a librarian as one of the initial steps in the information seeking process.
- As soon as the search terms had to be formulated, respondents' anxiety levels tripled from 3% to 10%, although respondents still continued to experience mostly positive emotions.
- However, when respondents were faced with the retrieved results of their information searches, their emotions became negative when too many search results were retrieved, with 25% feeling anxious and approximately 33% feeling either confused or frustrated (Chapter 5 Diagram 5.3). This negative emotional trend increased when the search terms yielded no results, with 60% of the respondents feeling frustrated and 25% feeling either anxious (16%) or confused (9%) (Chapter 5 Diagram 5.4). When

searching for the same information in several licensed databases, 50% of respondents felt frustrated (Chapter 5 Diagram 5.5). The frustration level, however, was reduced to 25% when the option of a federated search was offered (one search across the available licensed databases) (Chapter 5 Diagram 5.6).

- When asking a librarian for assistance, nearly 50% of the respondents experienced positive emotions in approaching a librarian. Negative emotions experienced by respondents to a lesser extent were anxiety (24%) and frustration (19%) (Chapter 5 Diagram 5.7).

Conclusions: When advancing through the stages of the information seeking process, high school students experience emotions similar to the affective aspects of the ISP as reported in Chapter 3 subsection 3.4.1 and subsection 3.4.3.2. When initiating the information seeking process, high school students become aware of an information need or a lack of knowledge and feelings of anxiety and uncertainty are experienced. During the selection stage students select the assignment topic, resulting in a sense of optimism. During the exploration stage of the ISP the student explore information resources and experience increased feelings of uncertainty, confusion and doubt. The formulation stage of the ISP results in diminished feelings of uncertainty and increased confidence when students form a personal or focused perspective. During the information collection phase too many search results lead to feelings of anxiety, confusion and frustration; no search results lead to an escalation of these negative emotions; repeating the information search in several licensed databases lead to feelings of frustration and the availability of a federated search option leads to a drastic reduction in students' frustration levels. During the presentation stage or writing of the assignment, students experience mostly positive emotions such as a sense of ownership of the information.

East Cobb high school students experience positive emotions of confidence and satisfaction when approaching or interacting with a librarian. Students also experience negative emotions such as anxiety and frustration to a lesser extent, the latter possibly due to the required information not always being readily available (Chapter 5 Diagram 5.7).

6.2.2.4 High school students' use of licensed databases and other digital resources

Findings: The study findings confirmed the plethora of research findings (e.g. Chapter 2.2.5) that high school students turned to Internet search engines first and foremost (100%) when they need information for school assignments. Almost all the respondents searched for academic information using Google search engine (99%) as a first choice to initiate the information seeking process (Chapter 5, Table 5.14). Despite the fact that many teachers do not recognise Wikipedia as an authenticated information resource, searching Wikipedia for information was respondents' second choice of information resource (80%). One in three respondents searched GALILEO for more in-depth information, as well as commercial websites such as Yahoo! Answers and Google Scholar.

However, the study found that only one in ten (1:10) respondents used licensed databases available through the public library when they needed information for school assignments (Chapter 5 subsection 5.3.4.1). The most popular licensed resource used by respondents was GALILEO (33%), the Georgia virtual library. Other licensed databases used to a lesser extent were Gale Databases (16%), EBSCOhost (9%), NetLibrary (7%), and Wilson Biography (4%).

Encouraging, however, was the research finding that high school student respondents' use of licensed databases increased as they advanced from one high school grade to the next, peaking during their senior year (Grade 12). An example of this trend is EBSCOhost's Academic Search Complete journal database, which was used by 21% of the Grade 12 respondents and 13% of the Grade 11 respondents, in contrast to only 3% of Grade 10 respondents. Furthermore, the Gale databases (covering most of the core curriculum courses) were used by one in four (1:4) of both Grade 11 and 12 respondents, but had a very low usage of less than one in ten (1:10) among Grades 9 and 10 respondents. However, when respondents accessed NetLibrary to read eBooks, the trend was reversed, with one in five (1:5) Grade 9 respondents reading ebooks from

Netlibrary versus less than one in ten (1:10) of all the other grade level respondents (Chapter 5 subsection 5.3.4.1). Wilson Biography database was relatively unknown and unused by all the respondents.

Another important finding relating to high school students' use of licensed databases, was the fact that students who were frequently exposed to licensed databases via Digital Information Literacy (DIL) instruction, were more inclined to use these resources than students who did not receive the same exposure due to infrequent or no DIL instruction (Chapter 5 subsection 5.3.4.2).

The study revealed that when respondents used licensed databases for more in-depth information as reflected by their most recent information searches, their experiences were mostly positive and rated on a par with their experiences when using Internet commercial search engines (Chapter 5, Diagram 5.8). The study findings also indicated that respondents experienced commercial search engines such as Google to be more user-friendly than licensed databases. However, the findings indicated that searching licensed databases resulted in more relevant and authoritative information returns. Furthermore, respondents who used licensed databases did not experience statistically significant different emotions when searching Internet search engines for information versus when searching licensed databases for information (Chapter 5 subsection 5.3.6.2, Table 5.18). This finding could be due to licensed databases being mostly used by respondents who received frequent Digital Information Literacy (DIL) instruction in the use of licensed databases.

Conclusions: The study found that the use of licensed databases by high school students for academic information is much lower (1:10) than the use of commercial search engines (100%). However, as students advance in grade level, their use of licensed databases increases threefold. High school students exposed to licensed databases through frequent DIL instruction are more likely to use licensed databases, than students who do not receive the same exposure due to infrequent or no DIL instruction. When high school

students use licensed databases all aspects of the experience are perceived to be as positive as when they use commercial search engines.

6.2.3 High school students' awareness of licensed databases

Awareness of licensed databases is linked to Digital Information Literacy (DIL) instruction, which in turn influences the decision to use specific licensed databases to satisfy information needs. The following research findings and conclusions relate to high school students' awareness levels of the licensed databases available through the public library:

6.2.3.1 High awareness levels of licensed databases

Findings: The study found that when respondents had an average level of 50% plus awareness of a specific licensed database, it indicated that respondents had received Digital Information Literacy Instruction (DIL) in that specific licensed database and would be more likely to use that specific database than students who had not received DIL instruction (Chapter 5, Diagram 5.9). Respondents had relatively high awareness levels of the following licensed databases: GALILEO (90%), Gale Literature Resource Center (71%), Gale Student Resource Center (57%), NetLibrary (53%), Gale History Resource Center (50%) and Gale Biography Resource Center (50%).

The study also found that there was not a statistically significant difference between high school students' self-assessment characteristics versus awareness levels of licensed databases available through the public library (Chapter 5 subsection 5.3.7.1-4). The exception was students who perceived themselves as technology savvy – these students had higher awareness levels of lesser known licensed databases such as LitFinder, than students who did not rate themselves as technology savvy (Chapter 5 subsection 5.3.7.4).

Conclusions: More than 60% of the East Cobb high school respondents are aware of the licensed databases available through the public library, due to the fact that many students receive Digital Information Literacy (DIL) instruction at school. Furthermore, high school students who receive high frequency DIL instruction are significantly more aware

of the availability of licensed databases at the public library, than those who receive DIL instruction on a low frequency basis or not at all. High schools students have relatively high awareness levels of the following licensed databases: GALILEO, NetLibrary and Gale Databases relevant to high school students.

6.2.3.2 Low awareness levels of licensed databases

Findings: The study findings indicated that approximately 40% of the respondents did not receive Digital Information Literacy (DIL) instruction on a frequent basis (Chapter 5 subsection 5.3.7.5). Most high school students had low awareness levels of the following licensed databases: LitFinder (21%), EBSCOhost databases (14%) and Wilson Biography (9%).

Conclusions: The researcher therefore concluded that high school students who receive DIL instruction infrequently or not at all are significantly less aware of the availability of licensed databases through the public library. High schools students have low awareness levels of the following licensed databases: LitFinder, EBSCOhost databases and Wilson Biography.

6.2.4 Factors that encourage high school students to use licensed databases

The following research findings and conclusions relate to factors that would encourage high school students to use the licensed databases available through the public library:

6.2.4.1 Teacher/parent instruction

Findings: This study's research results supported Weiler's findings (2005:46-53) that high school students' use of licensed databases is driven by motivation and learning theory as critical aspects of the information seeking process. Weiler states that motivation is closely related to learning theory, as students will seek information and learn only if they are motivated to do so. This study supported Weiler's finding, since it found that the respondents rated teacher/parent instruction to use specified public library resources as a significant motivation for visiting the public library. The study found that almost 75% of

respondents were very likely/likely to use a licensed database as an information resource after teacher instruction to do so (Chapter 5 subsection 5.3.8.1).

Conclusion: Teacher/parent instruction to use a specific licensed database or as part of a recommended teacher resource list, motivates high school students to use licensed databases.

6.2.4.2 User-friendly features and reduced information search time

Findings: This study's findings supported research about Generation Y students' need for instant gratification - they are impatient; expect instant access to information and immediate feedback. They would therefore also expect instantaneous responses when accessing licensed databases and expect these services to be available whenever/wherever they choose to access them. Other factors that would encourage high school students to use licensed databases available through the public library include user-friendly features incorporated into the user interface, relevancy and quality of information results and user instruction (Chapter 5 subsection 5.3.8.2).

Conclusion: It is therefore concluded that additional factors that would encourage high school students to use licensed databases, include user-friendly features that would enhance the search process, viz. retrieving relevant, quality information faster, with reduced search time and effort (Chapter 5, Diagram 5.11).

6.2.4.3 Digital Information Literacy (DIL) Instruction

Findings: Other study findings relating to factors that would influence high school students to use licensed databases more extensively include Digital Information Literacy (DIL) instruction associated with specific teacher instruction (81%). An important finding on a statistically significant level was that respondents were more likely to use licensed databases when they received DIL instruction on a high frequency basis, than when they received DIL instruction on a low frequency basis or not at all (Chapter 5, Table 5.24).

Conclusions: The researcher therefore concluded that factors that would influence high school students to use licensed databases more extensively include frequent Digital Information Literacy (DIL) instruction associated with teacher instruction to use specific licensed databases.

6.2.5 High school students' Digital Information Literacy (DIL) skills

The following research findings and conclusions relate to the location and frequency of Digital Information Literacy (DIL) instruction and the application of the attributes of Digital Information Literacy:

6.2.5.1 Frequency/location of Digital Information Literacy (DIL) instruction

Findings: The data analysis in Chapter 5 subsection 5.3.11 indicated that 68% of the respondents received Digital Information Literacy (DIL) instruction on a high frequency basis. However, they mostly received DIL instruction at the school media centre or in the classroom. East Cobb public libraries do not specifically offer DIL instruction classes to library patrons, but they do offer DIL instruction on an individual basis as part of reference services to public library patrons. The study also found that the respondents were not inclined to use online self-instruction tutorials.

A significant study finding was the fact that 57% of the respondents who received no/low DIL instruction, indicated that they would use the licensed databases available via the public library more often if they received instruction in the effective use of these databases.

Conclusions: Based on the research findings, the following could be concluded regarding East Cobb high school students' DIL instruction: the majority of East Cobb high school students receive frequent DIL instruction at school via media specialists/teachers (68%). Very few students receive individual instruction at the public library and are not inclined to use online self-instruction tutorials. Not all East Cobb high schools offer frequent Digital Information Literacy instruction to their students. High school students who

receive low frequency/no DIL instruction indicated that they would use licensed databases if they could receive frequent DIL instruction in the use of these databases.

6.2.5.2 Attributes of Digital Information Literacy (DIL)

Findings: The study found that no statistically significant differences existed among respondents who received a high/low frequency of DIL instruction as far as the application of the attributes of Digital Information Literacy were concerned (Chapter 5 subsection 5.3.10.1). The study found that a high percentage of the respondents frequently (always/mostly) applied the following attributes of information literacy: defining the search terms (62%); evaluating the retrieved data for relevancy (70%); checking factual correctness (56%) and correctly referencing the online sources (81%). The data indicated that over 50% of the respondents applied most of these attributes on a regular basis. The exceptions were planning the search effort (40%) and checking the credentials of the author (48%) (Chapter 5, Table 5.27).

Conclusions: There is not a statistically significant difference between high school students who receive high/low DIL instruction as far as applying the attributes of DIL (evaluating digitally retrieved information) are concerned. Since more than 50% of the students apply DIL attributes when searching for information, it could be concluded that the majority of East Cobb high school students have DIL skills (to a more/lesser extent) to evaluate digitally retrieved information (Chapter 5 subsection 5.3.10).

However, although 70% of high school students are able to evaluate retrieved information for relevance, only 56% of the students are checking the retrieved information for factual correctness - this aspect of their DIL skills should therefore be improved during DIL instruction. This conclusion confirms Tenopir's findings (2003b:4) that students' information quality judgements of Internet information are often not on the level of academic accepted standards (Chapter 3 subsection 3.5.2).

In the next and concluding section of this chapter measures are recommended to address high school students' information needs, information literacy skills and use of licensed

databases more effectively, based on their information seeking behaviour and preferences as members of Generation Y.

6.3 RECOMMENDATIONS

Libraries will have to change and adjust according to the information needs and information seeking behaviour of Generation Y (including high school students), in order to be relevant to this generation. The role of libraries in organising information may increasingly need to be adjusted to include the organising of digital information such as digital libraries according to the information needs and information seeking behaviour of different user groups such as high school students, as an alternative to the Internet that is not organised and could provide inaccurate and dated information.

Based on the study findings and conclusions, the researcher therefore recommends the following measures to enhance the use of licensed databases via the public library:

6.3.1 Public library outreach to high school students: Based on the study conclusion that the majority of high school students do not consider themselves to be good library users (Conclusion 6.2.1.1), but that students perceive the public library as a source of relevant information and support (Conclusion 6.2.1.4), the researcher recommends that public librarians visit local high schools on a regular basis, for instance at the start of the new school year to promote information resources at the local public library relevant to high school students, including a demonstration of selected licensed databases and the public library's online public access catalogue (OPAC). Such an outreach could establish a platform for further collaboration between the public library and local high schools.

6.3.2 Collaboration: The researcher is of the opinion that collaboration between the public library and high schools is the key to more effective high school student use of the licensed databases. The researcher therefore recommends that collaboration between public librarians and high school media specialists/teachers be investigated. Although this study concluded that significantly more high school students use the media centre than the public library when seeking information for

school assignments (Conclusion 6.2.1.2), school media centres and public libraries should view their roles as complementary, not competitive vis-à-vis effectively providing their users with organised access to information. It is therefore recommended that public libraries and media centres seek common ground to collaborate in order to effectively achieve this goal.

6.3.3 Teacher Resource Lists: This study concluded that the majority of high school students will use licensed databases if teachers specifically instruct them to do so (Conclusion 6.2.1.3). The researcher therefore recommends collaboration between public librarians and high school teachers as far as teacher/school assignment resource lists are concerned, in order to promote the use of licensed databases by high school students.

6.3.4 Licensed database training: Due to conclusions that specific academic information needs lead high school students to use licensed databases available through the public library to a more or lesser extent depending on the academic subject at hand (Conclusion 6.2.2.1 and 6.2.1.2), it is further recommended that the public library and high school media specialists/teachers collaborate on licensed database training to high school students, especially training regarding the use of licensed databases (such as EBSCOhost's Academic Search Complete) that are identified in this study as being rarely used by high school students and are therefore untapped mines of information for high school students.

6.3.5 Public libraries: Generation Y constitutes the future patronage of public libraries and as such public libraries should consider incorporating this generation's attributes, information preferences, information needs and digital information seeking behaviour (Conclusion 6.2.2.2) into library planning and services.

6.3.6 Promotion/Publicity: the public library system invests substantial funds in acquiring the rights to use licensed databases and digital libraries. This study concluded that only 1:10 high school students use licensed databases available through the public library (Conclusion 6.2.2.4). In order to receive improved returns on this

investment, the public library should consider promoting the licensed databases on a regular basis. Public libraries could for instance promote a specific licensed database on a monthly basis to tie in with specific monthly topics, such as Black History month during the month of February. Licensed databases available through the public library specialising in African American history, could therefore be promoted during the month of February by distributing posters, brochures and bumper stickers to library users and high school media centres/teachers, as well as creative promotion of specific licensed databases on the library website.

6.3.7 Digital Information Literacy (DIL) Instruction at high schools: the study conclusions indicate that although high school students receive some DIL instruction at the East Cobb high schools, the frequency of instruction varies from school to school. The researcher strongly recommends that Digital Information Literacy be instructed at all East Cobb high schools on a frequent basis, since the study findings indicate that students will use licensed databases more often if they receive regular instruction in the use of these databases (Conclusions 6.2.2.1-4; 6.2.3.1-2; 6.2.5.1-2). High school media specialists/teachers should therefore consider providing DIL instruction to high school students at frequent intervals to improve students' Digital Information Literacy skills, especially students' ability to evaluate the correctness and reliability of retrieved information (Conclusion 6.2.5.2). They should also provide high school students with the quarterly password to the licensed databases, in order for students to be able to access these databases remotely/from their homes. Furthermore, teachers could reinforce this training by incorporating licensed databases in their assignment resource lists and instructing and training students to use specific licensed databases.

6.3.8 Digital Information Literacy (DIL) Instruction at the public library: Due to the substantial investment in licensed databases, the public library should consider offering DIL training classes aimed at high school students to improve the use of the licensed databases available through the public library. DIL classes could tie

in with a selected monthly topic and could be promoted by obtaining promotional materials from digital library vendors. The public library could collaborate with local high schools by informing teachers/media specialists of upcoming classes and requesting promotional cooperation. Kuhlthau (2004: 163) stresses that this instruction should be more than locating, collecting and using resources during the information search process. Instruction should include the steps of reflecting, constructing and internalising information. Students need to learn and understand the critical stage of formulating a focused perspective from information explored, in order to advance successfully through the information search process. Collaboration between the public library and local high schools could even lead to public libraries offering DIL instruction using specific licensed databases that could be used for upcoming high school assignment topics and vice versa (Conclusions 6.2.2.1-4; 6.2.3.1-2; 6.2.5.1-2).

6.3.9 Digital library developers/vendors should cater to the information needs and information seeking behaviour of Generation Y students in order to be relevant to this generation. Based on the study conclusions relating to the information seeking behaviour of high school students (Conclusion 6.2.2.2), it is recommended that digital library designers investigate the feasibility of incorporating Generation Y digital information preferences and attributes into digital libraries such as Google-type simplified search boxes and interfaces, collaboration options, cutting-edge technology, more personalisation and gaming features and above all: time-saving search features. Generation Y students value education and have an enthusiasm for digital learning, but they are generally impatient and demand instant gratification. To be relevant to this generation, digital library and licensed database developers should provide search features and access to their databases that are as time-saving, simple and painless to use as Google search engine. Digital library/licensed database vendors should also promote the use of their databases more actively; for instance by sending promotional materials such as posters, brochures and bumper stickers to public

libraries and school media specialists who could in turn promote the use of these databases to their users.

6.3.10 Public library websites/blogs/wikis: based on the study findings relating to the information seeking traits of high school students (Conclusion 6.2.2.2), the researcher recommends that the public library consider creating a public library web page specifically for high school students/young adults, with its own “Teen” link from the library home page. Such a web page could differentiate between homework/school assignments and recommended/leisure reading. The researcher therefore recommends creating a separate homework web page listing licensed databases by school subjects/courses and promoting the databases in a creative manner. The web page could be graphically designed in creative colours, fonts and wording that would appeal to high school students. Creating homework blogs and/or wikis for students to collaborate with friends on school assignments could provide a further stimulus to improve high school student use of the licensed databases available through the public library.

6.3.11 Young Adult Advisory Board and Emerging Technology Advisory Group (ETAG): The public library system in Marietta, Georgia, established a Young Adult Advisory Board and an Emerging Technology Advisory Group (ETAG). One of their tasks is to recommend changes for redesigning the library home page and to incorporate cutting edge technology into the library website, as well as the latest search technologies such as a federated/metadata search feature, which will soon be available via the public library’s OPAC. These committees’ functions could be extended to include creative design and input into a young adult/teen homework web page that would appeal to Generation Y students. By including selected high school students on the Young Adult Advisory Board, this generation’s perspectives, preferences and information seeking traits (Conclusion 6.2.2.2) could be implemented by these initiatives.

6.4 STUDY CONCLUSION

The study findings and conclusions illuminate the fact that the information age is bringing about change, which has an impact on the high school student requiring information for school assignments and the public library offering access to the world of knowledge. Digital Information Literacy has become a critical skill for high school students who need to become discriminating readers and competent information evaluators in order to succeed academically and to prepare them for college.

Libraries may need to be reinvented and redesigned in order to create libraries that are compelling and relevant to Generation Y. The application of professional librarian skills will be tested in cyberspace, where the digital information needs of library users such as Generation Y students will become increasingly demanding. The public library's role will have to change to incorporate this generation's digital information seeking behaviour and preference for digital cutting edge technologies, into library planning, training, promotion and services in order to remain relevant to this generation in their quest for information. Public libraries will have to provide digital assistance, support and training to users of digital resources, to encourage high school students to go beyond the text book or search engine to licensed databases and develop into lifelong learners, critical thinkers, and effective users of information.

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APPENDIX A: PARENTAL CONSENT FORM

My signature below indicates that I have read the information provided and have decided to allow my child to participate in a study titled “High school students’ use of licensed databases and digital resources via public libraries in the East Cobb area of Atlanta, Georgia” to be conducted at my child’s school between the dates of April 1, 2008 and April 30, 2008. I understand that the principal agreed for the school to participate in this research project.

I understand the purpose of the research project will be: To determine the extent to which high school students use licensed databases and digital resources via public libraries in the East Cobb area, when requiring information for school assignments, and that my child will participate by completing an online questionnaire, which will take approximately 10-15 minutes to complete.

Potential benefits of the study are:

Improve student Information Literacy (i.e. knowing when/where to find the best information and the ability to evaluate the information).

Could contribute to improved student academic achievement.

Prepare students for college, by becoming life-long effective information users.

Potential for improved library and information services to high school students.

I agree to the following conditions with the understanding that I can withdraw my child from the study at any time should I choose to withdraw participation:

The identity of participants will be protected, since the researcher will not require a student’s name, only high school and grade. High school names will not be used in the research findings, only High School A, B, C, etc. There are no foreseeable inconveniences or risks involved to my child participating in the study. Participation in the study is voluntary and will not affect either student grades or placement decisions.

If further information is needed regarding the research study, you can contact:

Ansie Krige
4015 Palisades Main
Kennesaw GA 30144
678-355-9801
Libresearch07@yahoo.com

Signature Parent:

Date:

[Go to Questionnaire](#)

APPENDIX B: QUESTIONNAIRE

Welcome

Thank you for choosing to participate in this questionnaire. Participation in the survey is voluntary, your identity will be protected and you may withdraw from the survey at any time. The survey will take 10-15 minutes to complete. Please answer every question by selecting the most appropriate option.

1. Gender (Select one option)

Male (a)

Female (b)

2. What is your current grade level? (Select one option)

Freshman (a)

Sophomore (b)

Junior (c)

Senior (d)

3. Which High School do you attend? (Select one option)

High School A

High School B

High School C

High School D

4. Do you have any of the following? (Select one option per line)

	Yes	No
(a) Public Library Card	<input type="checkbox"/>	<input type="checkbox"/>
(b) Computer	<input type="checkbox"/>	<input type="checkbox"/>
(c) email address	<input type="checkbox"/>	<input type="checkbox"/>

5. What would be your first step when you have to find information for a school assignment? **(Please indicate on a 5 point scale from "Very likely" to "Not at all" what you would do)**

	Very Likely	Likely	Neutral	Maybe	Not at All
(a) Search in the online library catalogue	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) Search the Internet for information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) Search in GALILEO (at home or library)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) Ask a librarian to help you	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

find information

(e)Ask a teacher for a resource list on the topic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(f)Text Message or IM friends for advice

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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6. How often do you search for information for school projects at any of the following locations? **(Please indicate on a 5 point scale from "Very Often" to "Never" how often you use a specific location)**

Very Often Often Sometimes Rarely Never

(a)School Media Centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(b)Public Library	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(c)Home (online resources)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(d)Business Centre (e.g. Kinko's)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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7. Why would you visit the public library when you need information for school projects? (Please indicate on a 5 point scale from "Very likely" to "Not at All" how much that reason would apply to you)

	Very Likely	Likely	Neutral	Maybe	Not at All
(a) To find relevant books	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(b) Suggested by Teacher/parent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(c) High Speed Internet Access	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(d) Experienced reference support staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(e) Able to socialise/collaborate with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(f) Wireless access for laptops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(g) Access to online databases (Galileo, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(h) Convenience of location	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(i) Convenient hours of operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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8. Considering your academic courses (current, past and future), for which of the following will you use the public library's books/online resources? **(Please indicate on a 5 point scale from "Very Likely" to "Not at all" the likelihood that you will use the public library's resources for this type of course)**

Very Likely Likely Neutral Maybe Not at All

(a) English/Language Arts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) Mathematics:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) Science: (Anatomy, Biology, Chemistry, Physics, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) Social Studies: (History, Geography, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(e) Business: (Economy/Free Enterprise, Marketing Principles, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(f) Information Technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(g) Fine Arts: (History of Art, musical instrument guide)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

books, etc.)					
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9. Are you aware of the existence of the following online databases as a source of information for school projects? **(Select one option)**

	Yes	No
(a) GALILEO	<input type="checkbox"/>	<input type="checkbox"/>
(b) EBSCOhost	<input type="checkbox"/>	<input type="checkbox"/>
(c) Gale Literature Resource Center	<input type="checkbox"/>	<input type="checkbox"/>
(d) Gale Biography Resource Center	<input type="checkbox"/>	<input type="checkbox"/>
(e) Gale History Resource Center	<input type="checkbox"/>	<input type="checkbox"/>
(f) Gale Student Resource Center	<input type="checkbox"/>	<input type="checkbox"/>
(g) H.W. Wilson Biography	<input type="checkbox"/>	<input type="checkbox"/>
(h) LitFinder	<input type="checkbox"/>	<input type="checkbox"/>
(i) NetLibrary (eBooks)	<input type="checkbox"/>	<input type="checkbox"/>

10. How frequently do you use any of the following web-based resources to find information for school assignments? **(Indicate on a scale from 1 to 5 from "Very Often" to "Never")**

Very Often Often Occasionally Rarely Never

(a)Google	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(b)Wikipedia	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(c)Yahoo! Answers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(d)GoogleScholar	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(e)GALILEO	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(f)EBSCOhost (e.g. Journal Articles)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(g)Gale Databases	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(h)Wilson Biography	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(i)NetLibrary (eBooks)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

11. Considering your last experience with **GALILEO (loop all indicated as very often)**, how would you rate your overall experience on a 5 point scale from "Very Good" to "Very Poor"?

Very Good Good Average Poor Very Poor

(a)Ease of use	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(b)The relevancy of the	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

results

(c) Number of results returned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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(d) Getting assistance when needed

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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(e) Overall experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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12. Would you use an online database? (GALILEO, Gale, etc.) **(Please rate your response on a 5 point scale from "Very likely" to "Not at all")**

Very Likely Likely Neutral Maybe Not at all

(a) If it is recommended by the teacher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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(b) If it is recommended by the librarian

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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(c) If you are trained how to use it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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(d) If you know the information is

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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reliable

(e) If you can reduce the search time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(f) If the results are ranked in terms of relevance

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(g) If a federated search option is available (i.e. one search across all databases)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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13. Please rank which information source would be your first to third choice for school assignments on each of the following academic categories: **(Highlight source on the drop-down menu and use up or down arrow next to box to move the ranking)**

(a) English/Language Arts, Fine Arts or Music

Printed Books	<input type="button" value="^"/> <input type="button" value="v"/>
Online databases (GALILEO etc.)	
Internet Search Engines	

(b) Science, Mathematics or Information Technology

Printed Books	<input type="button" value="^"/>
Online databases (GALILEO etc.)	
Internet Search Engines	



(c) Social Studies: (History, Geography, Government, Current Issues, US & World Affairs and World Cultures)

- Printed Books
- Online databases (GALILEO, etc.)
- Internet Search Engines



14. To what extent do you agree with the following statements when requiring information for school assignments?

Strongly agree Somewhat agree Neutral Somewhat disagree Strongly disagree

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
(a) I would like to have a teacher resource list for assignments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(b) I first go to the Internet for information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(c) When I use the Internet I only look at the first few search results	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(d) I am aware of the online databases at	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

the public library for school projects

(e)I ask the librarian for the GALILEO password to access online databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(f)I only go to the public library if teachers instruct me to cite books for school projects

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(g)If I cannot find a printed copy of a book, I read the eBook online	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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15. When searching for information online for a new school project, which feeling do you **experience strongest when:** (Check one option for each action)

Satisfaction Confidence Anxiety Confusion Frustration

(a)Choosing a database or search engine for an information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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search					
(b)Defining your search term(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(c)Getting too many search results	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(d)Getting no search results	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(e)Repeating the search from database to database	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(f)Using the "Federated" search option (one search covering all databases)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(g)Asking a librarian for assistance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Please indicate how frequently you perform any of the following when working on school assignments? **(Indicate the frequency on a 5 point scale from "Always" to "Never")**

	Always	Mostly	Occasionally	Rarely	Never
(a) Plan the information search	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) Identify the information resources you will use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) Define your search terms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) Evaluate information for relevance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(e) Check the credentials (truth/reliability) of the author	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(f) Use various sources to check facts for correctness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(g) Reference/cite the online sources used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Which of the following factors would encourage you to use the online databases available via the public library more often? **(Please indicate on a 5 point scale from "Very Likely" to "Not at All")**

Very Likely Likely Neutral Maybe Not at All

(a)Public Library "homework web page" highlighting homework resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(b)Easy to follow database user instructions on the Public Library web page

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(c)Tutoring on how to use the databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(d)Resource list by academic subject

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(e)Option to email questions to an online librarian	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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(f)Teen blog for high school students to share information

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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18. How would you describe yourself? (Indicate on a 5 point scale from "Not at all" to "Excellent")

Not at all Poor Average Good Excellent

(a)Scholastic achiever	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b)Athlete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c)Library user/reader	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d)Information Literate(online resources)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(e)Technology savvy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Have you ever received instruction in the skill of "Digital Information Literacy" (How to use online databases and how to evaluate information)? **(Indicate on a 5 point scale from "Very Often" to "Never")**

Very Often Often Occasionally Rarely Never

(a)Media Centre (At School)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b)At School (Classroom/Teacher)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c)At the Public Library	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d)Online Tutor/User Guide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>