The Value of Information Literacy Instructions in Academic settings: A Developing Country Perspective

Submitted by

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Certificate of the Supervisor

This is to certify that the thesis entitled "The Value of Information Literacy Instructions in Academic Settings: A Developing Country Perspective", submitted to the University of Dhaka for the M.Phil. degree in Information Science and Library Management is an original research work by Taslima Akter conducted under my guidance and supervision. The research study has not been submitted to any other university or institution for the award of any other degree or diploma.

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Declaration

I do hereby declare that the thesis entitled "The value of Information Literacy Instructions in Academic Settings: A Developing Country Perspective" submitted to the University of Dhaka, Bangladesh for the degree of Master of Philosophy (M.Phil.) in Information Science and Library Management is an original work done by me.

I do also declare that this thesis or any part of it has not been submitted to any other university/institution/organization for any other degree.

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……

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Dedication

This work is dedicated to my beloved Parents

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LIST OF ABBREVIATIONS

Acronyms	**Elaborations**
ALA	American Library Associations
ACRL	Association of College & Research Libraries
CD-ROM	Compact Disc-Read Only Memory
DU	University of Dhaka
e-Book	Electronic Book
EIL	Embedded Information Literacy
e-Journal	Electronic Journal
e-Resources	Electronic Resources
ESPC	Edmonton Social Planning Council
FLC	Faculty Learning Community
H	Hypothesis
IBM	International Business Machines Corporation
IL	Information Literacy
ILE	Information Literacy Education
ISBN	International Standard Book Number
IUB	Independent University, Bangladesh
K-W	Kruskal-Wallis
LIS	Library and Information Science
M.Phil.	Master of Philosophy
MOSAIC	Making Sense of Information in the Connected Age
M-W	Mann-Whitney
N	Number
OPAC	Online Public Access Catalogue
P	Probability

PC	Personal Computer
SALL	Stand-Alone Library Lecture
SD	Standard Deviation
SGFA	Subject Guides and Finding Aids
SPSS	Statistical Packages for Social Sciences
TEI	Technological Education Institute
URB	University Regulatory Body
WT	Web-based Tutorials
WWW	World Wide Web

Abstract

Information is increasing at a great speed where users, especially the university students get confused whether the information they get is the right one or not. New developments in education and technology are affecting user learning and leading to the emergence of information literacy. That is why the value of information literacy has become a burning question in every sector even more specifically in academic settings.

Purpose: The main aim of this study was to provide the value of information literacy instructions in educational systems in developing country perspective. The objectives were to: derive the perceptions of university students regarding IL skills; identify their IL skill levels; and test the derived value of information literacy through IL training.

Methods: This study method basically involves two data collection techniques. One is a comprehensive questionnaire and the other one is experimental research design. A comprehensive survey of questionnaires was conducted to examine the concepts and perceptions of IL by university students. An experimental study was conducted to identify the value of information literacy instructions through pre- and post-training sessions.

Results: The results showed that students had positive perceptions of information literacy. In experimental study, it was found that students' performed poorly in the pre-training session. But their success score in the post-training session improved significantly. All participating students agreed to the fact that IL instructions should be incorporated into academic curricula.

Keywords: Information Literacy, Value, University students, Academic curricula, Bangladesh.

Chapter-1

Introduction

1.1 Statement of the problem

Information literacy (IL) has become an important skill in today's age of information explosion. Information is increasing at a great speed where users, especially the university students are often get confused whether the information they get is the right one or not. Additionally, new developments in education and technology are affecting students' handling of various information resources. That is why information literacy has become a core skill in every sector, more specifically in academic settings. The rapid development of information technology to deal with the evolving information society, academic institutions in developing countries are beginning to teach information literacy skills to students so that they can gain information fluency to become productive and effective information users both in educational and work environments (Hannelore, 2002). Only information literate students can determine whether the new knowledge has an impact on their value system and can take steps to reconcile the difference. Thus, providing information literacy instructions to students in academic settings is of paramount importance.

1.2 The concept of Information Literacy (IL)

The term "information literacy" was first introduced by Paul Zurkowski in 1974. He described information literate persons are those who have the requisite skills of utilizing a wide range of information tools for providing information solution (Zurkowski, 1974). The term has now been extended with new definitions, substitute terminologies, rationalization, clarifications and justifications (Shoeb, 2011).

The United States National Forum on Information Literacy (2012) defined information literacy as the ability to determine when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.

American Library Association (ALA) Presidential Committee on Information Literacy formally defined information literacy (IL) as attributes of an individual, stating that "to be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information" (ALA, 1989).

Doyle (1992) defined information literacy as "the ability to access, evaluate and use information from a variety of sources." Postman (1990) described information literacy as a relationship between information and action that includes learning, decision-making and problem solving.

Skyline College defined IL skills as "….. the ability to find, evaluate, organize, use and communicate information in all its various formats, most notably in situations requiring decision making, problem solving or the acquisition of knowledge. It is a combination of research skills, critical thinking skills, computer technology skills, and communication skills" (Skyline College, 2011).

The Association of College & Research Libraries (2015) defined information literacy as a "set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued and the use of information in creating new knowledge and participating ethically in communities of learning"

According to the Philadelphia University (2021), information literacy refers to a set of characteristics that transform an ordinary student into a "wise information consumer" and "lifelong learner".

1.3 Basic Information Literacy Skills

Information literacy generally refers to a set of skills required to identify information sources, access information, evaluate it, and use it effectively, efficiently and ethically.

From the definitions of information literacy, some basic skills can be identified which can assist a person to become information literate one (Alexandria Proclamation, 2005).

These skills are:

1. understanding the basic information needs;
2. identifying the sources of information and locating that information;
3. evaluating and analyzing the located information;
4. organizing and synthesizing that information; and
5. interpreting the organized information to satisfy the need.

Those who have above mentioned skills can be called information literate persons. In developing countries, where educational standard is not at its expected level, information literacy can play a pivotal role in educating students on various information resources, where to start searching for information, how to access them, how to evaluate retrieved information, and so on.

1.4 Present (IL) Scenario

In a developing country perspective like Bangladesh, there is a lack of formal programs on IL in academic environments where students can obtain IL skills for effective information handling. Academic libraries can play the utmost role in implementing information literacy instructions in education system. But, in today's scenario, it is being noticed that the basic skills of information literacy are not being exercised not even at the tertiary level of education. In Bangladesh, some major university libraries have undertaken informal initiatives for their students, i.e. learning information search techniques, identifying and selecting the required information,

information access and retrieval, techniques for future use of information, knowledge gathering and sharing, orientation and informal training on using information (Shoeb, 2011), but these are not adequate. On the other hand, widespread adoption of IL by almost all the top-ranked universities globally focuses on several actions and strategies involving various information problem-solving programs, which are a combination of specific continuous skills and competencies (Doyle, 1992). Lack of such skills limits overall learning and success for any student.

1.5 Aim and objective of the study

The main aim of this present study was to identify the value of information literacy instructions in an educational setting in developing country perspective in Bangladesh. In addition, the more specific objectives were to ascertain the followings:

- to derive the perceptions of university students regarding IL skills;
- to identify the basic IL skill levels of the students; and
- to determine the derived value of information literacy instructions through an experiment with students to see the differences between pre- and post-literacy sessions.

1.6 Conclusion

Information literacy in academic settings is very important to make students information literate and to transform them to life-long learners. The basic information literacy skills needed to make the students information literate can be derived through IL education. By using those IL skills when consuming, evaluating or producing information, students develop competencies in both their academic and practical fields. In the 21st century, the production of unbound information in every nanosecond is increasing. In academia, to locate, retrieve, manipulate and interpret information for course assignments or research works, the exercise of IL instructions in academic settings is a must.

Chapter-2

Literature review

2.1 Introduction

This Chapter reviews the related literature on information literacy instructions in academic environments conducted worldwide. In Bangladesh, a few research studies have also been conducted on IL. Additionally, libraries have always played an important role in providing information literacy instructions and several studies have been conducted on this particular field.

2.2 Literature review-International

The studies on information literacy instructions in academic settings worldwide have been reviewed here:

In an early study, Moore (2002) conducted a research to clarify the basic knowledge of information literacy (IL) among a group of undergraduate and postgraduate students. This study focused on implementing and integrating information literacy instructions in academic curricula to enable students to plan and make the right decision to attain development goals at hand. In order to identify the current level of understanding and practicing of information literacy skills, this study made an empirical test regarding IL-oriented practices at different levels. According to the findings of the study, most of the students were not even aware of information literacy rather to practice IL skills. It was found that the present status of information literacy is not satisfactory and, therefore, information literacy education should be integrated into academic curricula to make the students information literate in academic settings and also in outside of certification so that students can take valuable tasks and make constructive decision in their work and practical life.

In the same year, Kasowitz-Scheer (2002) carried out a study to identify whether the information literacy instructions and skills in academic (especially in higher education) settings are making any difference. According to this study, information literacy instruction in an academic setting includes a variety of instructional approaches such as: a) course-related library instruction sessions; b) course-integrated projects; c) online tutorials; and d) stand-alone courses. The study consolidated some recommendations including: i) motivating students to learn information literacy skills; ii) assessing student mastery of IL concepts and skills; iii) training librarians to serve as instructors and instructional designs; iv) advocating the value of information literacy in an environment of competing literacies; and v) preparing students for business settings that demand a more specialized level of information fluency. If these recommendations can be incorporated and implemented into academic curricula, students can attain information literacy skills and thus utilize them in both academic and professional life.

Parker (2004) focused on "Making Sense of Information in the Connected Age (MOSAIC)", an online information literacy course, particularly on issues around assessment, online delivery and support, its use as a staff development tool and positive results of a recent survey. In the study, MOSAIC raised even more questions about information literacy, such as whether successful students can be represented as information literate persons. It was clearly observed from the survey results that those students who hold the skills achieved a high regard. Parker found that of the students surveyed, 76 percent students felt that information literacy will be effective and they will be able to use the skills.

Meldrum (2004) carried out a study where the main focus was to identify the role of information literacy while integrated into academic curricula to obtain basic information literacy skills through assessments and practices along with other taught subjects and courses. The research revealed that students who do not speak English attained special benefits from the basic information literacy instructions and elements of the courses. The study revealed that implementation of information literacy in both undergraduate and postgraduate levels had made substantial advancement in the

educational systems. Students at both levels were capable of doing their particular IL tasks effectively and were able to make their academic results progressive and impressive as well. The findings of this study support the collaboration between library and information literacy programs. Meldrum further added that collaboration between academic librarians and staff members involved with information literacy programs can enhance the IL skills of students in academic settings.

Koneru (2006) conducted a study to identify the current situation of information literacy in academic courses to provide a constructive approach. This study conducted surveys on locating, retrieving, organizing, evaluating and manipulating IL-related tasks to identify whether the students know about the stages of information literacy skills. This study proposed an information literacy model plan to make the information literacy course counted in academic settings and, thus, to make the students information literate in both academic and professional life. This study made an effective strategic plan to implement information literacy for life-long learning and development.

Loo (2006) provided a prototypical plan on developing information literacy (IL) instructions in academic curricula. This study focused on the stages of information literacy skills such as: a) identifying a particular problem; b) determining searching strategies; c) identifying the exact location and accessing the searched relevant information; d) using that information effectively; e) blending the searched information; and finally f) evaluating the overall effectiveness of the whole process of information literacy. These six stages of information literacy are the basic parameter to develop and maintain a good IL knowledge. According to the study results, these six parameters can play a vital role to make an IL course model to be integrated in the academic curricula for all types of students. This study revealed that with a view to making and combining information literacy course to the academic system, the authority should realize and make it count for the betterment of students not only in academic environment but outside of the learning institutions.

Bowler (2008) conducted a survey to assess the involvement of librarians with students to achieve information literacy (IL) skills. The study revealed that when

there was an involvement of the librarian with students in the classroom, the results of the information literacy instructions and skills of the students were found significant. On the other hand, the study found that there was merely little improvement when the librarians were in the academic classroom but not interacting with the students regarding IL skill practices. Thus, in order to develop and improve IL skills of the students, information literacy should be identified and taught in the classroom by highly trained IL specialists. Based on the findings of this paper, the concept of involvement of librarians in developing IL skills among students in the classrooms is essential for the implementation and development of information literacy instructions and skills in the academic curricula.

Limberg (2008) conducted a research in which the main focus was to examine the critical features of teaching information literacy with a view to understanding of how they support meaningful learning outcomes and what the implications of this understanding are for information literacy education. The findings of this study indicated that collaboration of students with teachers may help in developing effective learning and thus enhancing information literacy skills. The results of the study also revealed that IL skills may help students to develop research-based learning in their academic and practical fields. Finally, the findings reported that in order to get an extensive outcome in constructive education, the practice of information literacy skills in learning and researching is a must. It concluded that IL instructions in academic settings should be implemented from the early stage of childhood.

Harris (2008) brought out a unique perception in his research on information literacy by focusing on communities. According to this study, it is the only the communities that can help in developing basic skills of information literacy among the young generations. The communities may be in the sense of librarians and information professionals who can truly play great role in educating and improving the young learners of all types. The study results reinforce the fact that if the information literacy concept is brought out from the early stage in educational system, the future generation would be an information literate one who can make academic and professional life successful.

Singh (2008) emphasized on the process of information searching at time of problems at hand. This study wanted to discover how information literate persons think about an action and how they manipulate information with that action to attain satisfactory result. According to the study results, it was revealed that information literacy is necessary to develop and enhance skills among the people. In order to make aware of the importance of being information literate, information literacy programs should be taken into account to develop basic information literacy knowledge among the people. According to the findings, most people do not know about information literacy but they are interested in developing their literacy skills. The educational institutions should make all possible arrangements to develop and integrate IL literacy instructions in their academic curricula for a better education system.

Korobili (2009) investigated the information literacy skills of students at Technological Education Institute (TEI) of Thessaloniki, Greece. In this study, the author tried to identify whether the courses and seminars provided by the library make any difference to IL skills development. According to the study results, it was found that substantial percentage of students at the TEI had not even accomplished a single study on information literacy skills. The study added that they even do not know about many scientific sources available in the library. This study revealed that many students did not even attend any library seminars regarding information literacy courses or trainings. He further added that there is a big difference between students who attended information literacy courses and those who did not attend such events. Henceforth, it is very clear that information literacy instructions enable students to become more capable of defining and solving problems at hand and IL make them more competent.

Baro (2009) examined undergraduate students' level of awareness of information sources available in the university to know their level of digital literacy and to determine the different search strategies used by them. The study took a test among the undergraduate students to identify their information searching strategies. It was found that there is a significant difference in terms of searching between male and female students. The findings of the study showed that male students were far better in

using information literacy skills effectively than female students. According to the findings of the study, male students were more digitally literate; they utilized the internet facilities provided in the university library; and used different search engines and utilized CD-ROMs in the e-library section more than the female group.

Rehman and Alfaresi (2009) carried out a research to identify the degree of IL skills among the school students in Kuwait. It was found that there was a large gap between information literacy skills and the academic curricula. Most of the students do not know how to search a catalogue card, how to find out prospective information sources, how access and retrieve relevant information and how to manipulate information to satisfy their needs. The results also found that students even do not know how to effectively use the public or school libraries to determine various information sources to solve the problems at hand. According to the findings, many students had not borrowed a book or other reading resource from the libraries for more than even 13 weeks. The results also showed that high school students in Kuwait are lacking the basic information literacy skills. The study further added that Kuwaiti schools have a minimum level of IL course plan; however, it is not adequate in relation to students' IL skills development and making them information literate.

Resnis (2010) conducted a research regarding information literacy (IL) practices among students at Miami University, USA. The study formed information literacy practices with some features i.e., information searching process, preparing searched information, the differences of information literacy skill levels of students, and last but not the least how well the students imply the information literacy skills and instructions in the coursework. The study found both similarities and dissimilarities between the point of views of professors, librarians and the students regarding information literacy. The study added that the faculty should understand the importance of implementing information literacy instructions and the significance of the participation of the IL practices in academic settings. The study results concluded that both faculty members and the authority were willing to implement IL instructions into the academic coursework.

Dabbour (2010) conducted a research in Niger Delta University, Nigeria focusing on identifying the present scenario of information literacy practices among students, especially the undergraduates. This study focused on using library resources in printed and online formats and how students feel and take the concept of information literacy practices and skills in their learning environment. On identifying the use of library resources, the study found that only 22.3 percent of the students accessed internet either from home or dormitory. The study also focused on physical library use where about 80 percent of the students used library for study or recreation. In the survey, nearly 50 percent of the students used library computers to search library catalogue and library databases to check out library books and to find out online periodicals available in the library. It was found that 47.6 percent of students asked librarians for reference services. Attitudes of the students towards library instruction and information literacy were quite satisfactory according to the study results.

Hoyer (2010) in his study aimed at identifying information literacy concept according to the young generations' perspective. The study explored that information literacy in learning process is the central foundation for the young generations. The results of the study focused on providing IL guidelines for implementing information literacy in academic coursework. Hoyer found that the internship program for the young generation is important as it will make their literacy skills even stronger not only in academic sector but outside also. IL provides a framework to the youth to form their basic skills which will greatly put an impact in their future foundation. The findings of the study revealed that in Canada, the non-profit organization of Edmonton Social Planning Council (ESPC) recognized a well-proof constructive linkage of associations in the community which permits it to easily access to information competently; maintained a level of engrossment in the local issues which permits the youth to identify the effective sources of information. The results added that the ESPC also enable to learn techniques for effectively communicating with information implications in both inside and outside of the public sectors.

Martin (2011) explored a study on information literacy to discover and identify the different perceptions of information literacy among the learners. This study focused

on how learning process can be promoted through information literacy based on media education program. According to the findings of this study, most of the learners lack information literacy skills and they even do not know about the virtual learning procedures to overcome their basic digital ignorance.

Nicholson (2011) discovered two areas i.e. distance education and adult learning where librarians can play an important role to provide information literacy services and instructions. He found that information literacy instructions should be provided to institutional level for early education of information literacy skills of the students. A library with IL skilled personnel can provide effective literacy services to their students and thus play an important role in education. According to the study findings, it is the librarians who can make a great difference on achieving IL skills of the students. The study also stated that almost all educational institutions have a library with skilled librarians who may collaborate with the students in learning basic IL skills.

Wang (2011) carried out a study where the main focus was to provide a constructive model of information literacy for undergraduate students in order to enhance their IL skills. This study provided an IL integration model on the basis of practical experiences of postgraduate students who have already completed their academic life and experienced many issues at hand. For developing IL integration model, it identified some crucial characteristics for integrating information literacy skills in academic curricula. The model denotes three items i.e., the processes, people and resources. The IL integration model developed by Wang consists of five core inter-connected components i.e., curriculum analysis, IL learning outcome, contextualization and ongoing interaction, IL learning activities and IL assessment and evaluation.

Derakhshan (2011) carried out a study where the main purpose was to identify the academics' point of view in incorporating IL into the academic curricula. According to the study, awareness and knowledge are required for incorporating IL instructions into the syllabus in order to make information literate students so that they can effectively learn about IL skills and research strategies to make them lifelong learners.

He mentioned that many faculties do not perceive librarians as a partner to collaborate with and often they are not aware that librarians can help them to integrate information literacy into the curriculum. Librarians can make an impact on their student by providing their helping hand towards developing and implementing IL in academic environment to make their students information literate and skilled.

Zanin-Yost (2012) formulated a study focusing on developing a constructive and effective methodology to build up a model where information literacy education and instructions are supposed to be incorporated into central educational systems to explore and enhance the IL skills among the students especially in higher education. This method is supposed to build up cooperation between librarians and faculty to identify what skills should be incorporated to the education system which can make the students skilled and thus make their both education and outside life effective. According to the findings, students' responses regarding implementation of information literacy into academic syllabus were positive and the students responded that IL skills can produce even better results in terms of every discipline. This study emphasized on implementing IL instructions at the undergraduate level so that the students can make themselves information literate from the beginning.

Erich (2012) conducted a study focusing on the necessity of developing information literacy courses in academic syllabus to enforce the basic skills of information literacy among both students and employers. According to this study, librarians should be connected with information literacy programs to provide a helping hand to the teachers with a view to teaching the learners the basic information literacy skills. Information of all types, whether its traditional or online, should be constructed, processed and communicated effectively by the students and the employers so that they can make themselves information literate. This study analyzed various methods and resources supposed to be used in the field of information literacy instructions incorporated into academic curricula. Also, the study focused on the curriculum reformation in institutional settings as the world will be even harder to survive in competitive situations and the students and the employers must be information literate if they want to ensure their place in the employment marketplace. The study

recommended that librarians and information literacy initiatives should work together to enforce and foster the process of integrating information literacy into the academic courses.

Howard (2012) conducted a study focusing on introducing information literacy skills along with academic skills to emphasize the basic strategies of information literacy to be learned. This research revealed that in order to make a contribution to the life-long learning and educational development, integrating information literacy strategies into academic syllabus is needed. According to the survey result, it was clear that most of the students do not have even minimum idea about information literacy. Some students slightly know about information literacy but they do not practice it because of lack of proper training and literacy skills. The students thought that information literacy training and development programs are needed to introduce IL in academic curricula. Once IL strategies are incorporated into educational system as study course, there will be a great enhancement and development of information literate people capable of solving problems at hand and making constructive decision to satisfy their need with the results. According to the study results, the perceptions of the students were good regarding the necessity of being information literate and competent in all aspects of life.

Pinto (2012) carried out a research among Spanish university students who are studying history to understand their information literacy conception. The study found a high level of information literacy skills among history students and their subjective view of constructive relation with information literacy was good. According to the findings of this study, there was a large difference between information literacy of subjective knowledge and digital literacy among the students. The study added that history students of Spanish universities were aware of information literacy skills and perceptions of it but there were no technological advancements to stimulate the learning process of practicing information literacy. The study also suggested that if there is no digital literacy with subjective concept, there is no way of developing information literacy among the students of any discipline.

Thorne (2012) tried to outline many of the methods used by librarians to teach information literacy skills to undergraduate students. This study brought out some tools and methods of teaching information literacy instruction i.e., a) Stand-Alone Library Lecture (SALL); b) Subject Guides and Finding Aids (SGFA); c) Web-based Tutorials (WT); d) Embedding Information Literacy (EIL); and e) Library assignments. This research added that if an educational institution wants to develop information literacy courses into their curricula, academic librarians must collaborate with information literacy training programs to make a successful development and implementation into academic courses as one of the main subjects. In this case, universities, faculties and librarians should collaborate in developing information literacy instructions in academic curricula at both undergraduate and post-graduate levels.

Virkus (2012) in his research highlighted information literacy in the sense of policy and strategic perspective. The study mainly focused on revealing how people responded and what information literacy practices they exercise to develop their literacy skills. This study also wanted to identify the way of experience the people had during the process of information literacy skills development and how they can make a sense of information literacy skills. Before having information literacy knowledge, the people at first have to identify their instinct willpower of being information literate person. The findings of the study indicated that the people had a positive response regarding information literacy education. The results added that very few people merely practice information literacy skills in learning and searching but a huge number does not. Finally, the study provided a constructive model plan to introduce information literacy as a study course in educational settings and to make the people information literate.

Foo (2014) explored information literacy skills of secondary school students in Singapore to identify their knowledge about information literacy skills in terms of searching, assessing and manipulating information for the problems at hand. This study found that almost all types of libraries including school libraries were not used effectively due to lack of information seeking knowledge. The study organized an

experimental method on particular information-related tasks and the results showed that 50 percent of the respondents performed information literacy tasks very well. The study suggested that for skills related to information seeking strategies, location and access and information use, the types of schools, academic streams of study, and students' family background seemed to have significant influences.

Anderson (2016) carried out a study where the main aim was to identify how community colleges and libraries conceptualize and practice IL instructions in their educational systems and what skills and courses are being adopted to incorporate the information literacy skills. This study found out that the term "information literacy" is not only absent in the colleges' curricula but there was no consciousness about the importance of information literacy skills in both academic and professional life. This study recommended that IL instructions in the graduate level must be incorporated into the academic curricula as one of the main courses; there should be an orientation session on the basic information literacy skills and the fresher's must know how important it is to be information literate in this age of information explosion.

Anunobi (2016) conducted a study where it mainly aimed to identify what information literacy trends are there in Nigerian universities along with what challenges and opportunities of information literacy are raising for university students. The study focused on development of IL and lifelong learning of students by concentrating on the characteristics, content and conformity of IL. According to the study, university syllabus should be based on lifelong learning and students' empowerment so that students can attain competencies in all aspects and thus become life-time learner. According to the study results, the University Regulatory Body (URB) in Nigeria should focus on such type of education system to enable students identifying, accessing and effectively manipulating information. The study revealed that the education system in Nigerian universities is based on competitive learning and all the efforts for making students information literate have been taken in education system. The model plan of this study tried to identify whether there is a traditional learning method or there is an evolving learning system. This study worked on evolving

lifelong learning system where information literacy and the use of library are the foundations.

Ellis (2016) conducted a study in the UK universities to identify the percentage of information literacy being provided in the academic courses to students for developing their IL skills. The study result found that about 85.7 percent of universities are promoting information literacy whereas the degree of IL being provided varied comprehensively. The study found that less than six percent universities merely provide information literacy skills at academic level; 17.3 percent refers to a framework, 15.8 percent shows their IL policy and nine percent provides information on the students' assessment of IL skills. On the training of information literacy for providing information, 84.2 percent of the respondents provided the correct information according to the study. The study found that one of the most common methods of offering information literacy training is online tutorial. According to the overall discussions of the study, it included that the growth and implementation of information literacy in institutional websites and in providing training with online tutorials is not be up to the mark. The study suggested implementing online tutorials incorporation with information literacy skills to develop the academic coursework and to make the students IL literate.

Kearns (2017) in his research defined information literacy as literacy game to connect students through interactive information literacy tasks and practices. The main purpose of this study was to introduce students to the information literacy skills in order to make them information literate. Kearns used the term 'educational game' for information literacy and it was much more fun to learn and obtain IL skills. Librarians can play an important role in providing information literacy services and instructions to students through IL training and modeling literacy program in their academic curricula in future.

Whitver (2017) in his study focused on how a good and strong understanding can be built between the teachers and the students. According to the study, problems regarding reshaping the old perceptions of the actual role of the librarians from local level to the top-level might be upturned during the first semester. The author tried to

make collaboration between the undergraduate students and the first-time teachers. The study added that teachers-students collaboration is needed to support information literacy from the very beginning. The study also focused on forming a strong collaborative relationship between the librarians and the faculty. According to the study, librarians can make a good understanding with the first-time teachers in providing a clear and good perception among faculty-librarians relationship. Librarians thus can help in integrating and upholding information literacy practices in academic coursework. The study added that librarians can contribute to developing IL skills by working with the first-time teachers encouraging IL services and practices. Whitver tried to make building a collaborative relationship among the teachers and librarians in implementing and developing information literacy skills. The study claimed that where there are information literate librarians, there is information literate student. Whitver added that skilled library personnel can play a significant role in shaping the traditional teaching method to the advanced one. Finally, the study suggested that incorporating IL education in academic settings could be one of the advanced methods of learning.

Anandhalli (2018) identified the influence of IL skills on the academic performance of students. This study found that: a) on an average, more than 60% of the degree students are aware of information literacy skills; b) significant and positive strong relationship was observed among awareness level of sources, use level of sources and satisfaction level of information of degree students; c) the total contribution of three explanatory variables on academic achievement of students is found to be 25.3%. The study added that in order to develop and enhance both academic and professional achievements, to become information literate is a must in this competitive world. According to this study, the administrative and the librarians can together play a vital role to incorporate and develop information literacy courses in the academic settings.

2.3 Literature review- National

There have been some studies on information literacy in Bangladesh regarding various aspects of skills, trainings, tasks and instructions. These studies have been reviewed below:

Shoeb (2011) conducted a research regarding information literacy skills and made a survey on undergraduate business students of Independent University, Bangladesh (IUB) to identify if the students have the basic information literacy skills or not. The study found that there are gaps among the undergraduate business students regarding the basic literacy skills in terms of even solving basic information tasks. According to the findings, students mentioned that they have idea about information literacy but while answering they were not capable of doing basic information literacy tasks efficiently. In the study results, it was clear that only about one-fourth of the students were able to answer the IL-related questions correctly. According to the study results, the majority of respondents agreed and asked to introduce IL courses into their academic syllabus and course works.

Ferdows and Ahmed (2018) in their study tried to empirically explore the information skills of undergraduate students at the University of Dhaka. According to the study, students' information literacy skills were poor. The study found differences in information skills among respondents in terms of gender, age, possession of personal computers and computer and internet experience. The main reasons for these differences and the general failure in answering the task questions correctly are mostly attributed to: i) the absence of information literacy instruction within the university, ii) lack of online information resources and iii) inadequate information and communication technology facilities. The overall study results emphasized the implementation and development of information literacy (IL) instructions to be introduced as academic courses.

Ahmed and Yesmin (2019) investigated the information skills and competencies of the public university librarians in Bangladesh. The study identified the value of a brief training session to detect whether their information literacy skill improves or not. The study found that librarians did not have adequate knowledge of information skills; in fact, a major proportion of university librarians demonstrated inappropriate and

insufficient knowledge before the training. After the brief training, their performance score improved significantly in six out of 12 tasks. It was found that most of the public university librarians were well experienced in their job fields but in terms of basic information literacy skills, the results were not at all satisfactory level in the pre-training session rather the librarians were much better in the post-training session after they were trained and lectured on some particular information literacy tasks. Finally, the study concluded that the provision of systematic and regular training will improve the skill levels of professional librarians and it will positively affect their service outcomes.

Shoeb (2020) conducted a study to examine whether the different information literacy sessions regarding using of library resources and services and other research supports and trainings change students' perceptions and opinions regarding their own research practices or not. The study conducted pre-test and post-test training programs among a group of students to understand their point of view and skill levels on conducting online research practices not only on particular library resources but online resources as well. The survey consisted of twenty (20) problem statements which are relevant to their online information seeking and research behaviors. The study revealed that this type of training session enhanced learners' awareness towards research practice. The findings of the study identified that a pedagogic approach is needed to ensure these activities and assessments, which are relevant to the program to meet students' information needs. The study also recommended tiered-based curriculum approaches of research information, problem solving and literacy integration to improve basic skills of the freshman students.

2.4 Conclusion

Many empirical studies, case studies and surveys were carried out around the world on the need for information literacy instructions in academic settings. From the literature review, it is evident that librarians' engagement with students in providing IL training can boost students' learning motivation, course engagement and academic performance. With the attainment of necessary information literacy skills, students are expected to practice those skills in their academic and personal lives.

Chapter-3

Research Methodology

3.1 Introduction

This Chapter discusses the research methodology, data collection procedures and the techniques used for analyzing the data. In short, it describes:

- how this study was conducted;
- study population and how the respondents were chosen;
- the methods used for collecting data; and
- data analysis and interpretation.

3.2 Study Methods

This research was conducted under two main stages. Firstly, a questionnaire survey was conducted to obtain students' perceptions of information literacy skills. Secondly, an experimental study was conducted to ascertain the value of students' information literacy skills through some task-based questions. These methods are described below:

3.2.1 Survey Method

The survey method was conducted to acquire students' perceptions of information literacy skills. A structured questionnaire was designed and used to obtain data from the students.

3.2.1.1 Participants

The survey was conducted among the students of University of Dhaka. It was aimed at involving students from all the departments and faculties across the university. Due to Covid-19 pandemic, however, it was not possible to reach out to an adequate number of respondents. In total, 332 print questionnaires were distributed at different locations across the university campus i.e. departments, university library, students' residential hall and seminar libraries. The questionnaires were also distributed through Google Forms.

3.2.1.2 Questionnaire

The survey questionnaire (see Appendix 1) was designed with close-ended questions and five-point Likert scale items which include ratings from 1 – 'very poor' to 5 – 'very good'. The questionnaire consisted of four parts: 1) demographic information of the respondents such as gender, age, department and study level; 2) computer and internet proficiency; 3) library use; and 4) their perceptions of information literacy skills. In the information literacy skills section, questions were asked to understand students' perceptions of information literacy skills.

3.2.1.2 Data analysis instruments

The quantitative data collected through the questionnaire were analyzed using IBM® SPSS® Statistics. Microsoft Excel was also used to generate graphical presentations.

3.2.1.2.1 Mann-Whitney *U*-test

The Mann-Whitney *U*-test is used to identify the differences between two independent groups. Although these two groups are independent of each other but the variables of the groups may be dependent. It is a nonparametric test which is mostly appropriate for testing null hypothesis. In this study, Mann-Whitney *U*-test was used to find out the differences in perceptions of information literacy skills in terms of gender (two groups i.e. male vs. female) and study levels (which included two groups i.e. undergraduate vs. postgraduate students). The null hypothesis examined in this test is that there is no difference between these independent groups.

3.2.1.2.2 Kruskal-Wallis *H*-test

The Kruskal-Wallis *H* test is used to find the differences of in perception ratings by more than two independent groups. Basically, it is the expansion of the Mann-Whitney *U*-test to compare three or more independent groups. In this study, Kruskal-Wallis *H*-test was done to explore the differences in perception of information literacy skills in terms of age groups (i.e. 19-22 years; 23-25 years and 26-28 years). The null hypothesis tested is that there are no significant differences among these age groups.

3.2.2 Experimental Method

The experimental study was conducted to ascertain the value of information literacy instructions and to complement the survey results. A total number of 22 task-based questions were designed to identify the value of information literacy instructions in academic settings. The experimental study was divided into two sessions e.g., 1) before information literacy training; and 2) after-training session to show the significance of difference between these two sessions on IL skills-based tasks. Students were asked to respond to 22 task questions in the before-training session. At the end of this session, participants were given a brief training on information literacy skills. In the after-training session, the same 22 questions were repeated but not in the same order. The correct answer to a task question was scored as '1', whereas each wrong answer was coded as '0'. Thus, the highest attainable score for the task-based questions was '22' and lowest score was '0'. The before and after training scores from this experiment were analyzed to identify the significance of differences. The test tasks used for the experimental study are given in Appendix-2.

3.2.2.1 Participants

In order to conduct the experimental study, 28 participants were recruited from different departments of the University of Dhaka. The demographic profile of the study participants is given in Appendix 3.

3.2.2.2 Data analysis instrument

The data collected from experimental study were tested to see the difference in the correctness scores between the two test sessions.

3.2.2.2.1 The related *t*-test

The related *t*-test is a parametric statistical test which is used to identify the differences in repeated measures. In the experimental study, there were two test sessions i.e. before-training and after-training sessions. In order to identify the differences in scores between these two sessions, the related *t*-test was conducted.

3.2.2.2.2 Two-way mixed model ANOVA

The mixed ANOVA or two-way mixed analysis of variance compares the mean differences between groups that involve one related and one unrelated factor. A two-way mixed ANOVA is basically split into two factors i.e. one is 'within-subjects' factor and the rest one is a 'between-subjects' factor. In terms of correctness scores by gender, age and study level, the two-way mixed ANOVA was performed accordingly.

3.3 Conclusion

This Chapter discusses the methodology, data collection techniques and different statistical procedures that were used for data analysis of this research. The survey and experimental methods were used to assess IL perceptions and the value of information literacy skills, respectively. The next Chapter will describe the results of the survey and the experimental study on students' information literacy skills in an academic setting in Bangladesh.

Chapter-4

Results

4.1 Introduction

This Chapter discusses the results of the survey and the experimental method employed in this study. The data collected from the students using these techniques were analyzed to determine the value of information literacy instructions in academic settings.

4.2 Questionnaire survey

In the survey, data were collected through a questionnaire. Completed questionnaires were obtained from a total of 257 students and their perceptions regarding information literacy skills were gathered.

4.3 Experimental study

Data were also obtained from the experimental study with students. The experimental method was divided into two sessions: 1) before-training session; and 2) after-training session to show the significance of difference between these two sessions on some particular IL skills-based tasks.

4.4 Survey results

4.4.1 Analysis of demographic characteristics

In the survey questionnaire, the demographic section consisted of four items: i) gender; ii) age; iii) department; and iv) study level of the participants. The frequencies and percentages of these variables were given below:

a) Gender

Gender distribution of the respondents was important to identify the difference between IL-related perceptions by male and female students.

Table 4.1: Gender distribution and percentages of the respondents

Gender	Count	Percentage
Female	101	39.3%
Male	156	60.7%
Total	257	100%

Table 4.1 shows that 60.7% male and 39.3% female students accumulating a total 257 respondents who participated in the survey. It was a balanced participation with regard to male-female ratio in the tertiary level education in Bangladesh.

The graphical presentation of the respondents according to gender is shown in Figure 4.1.

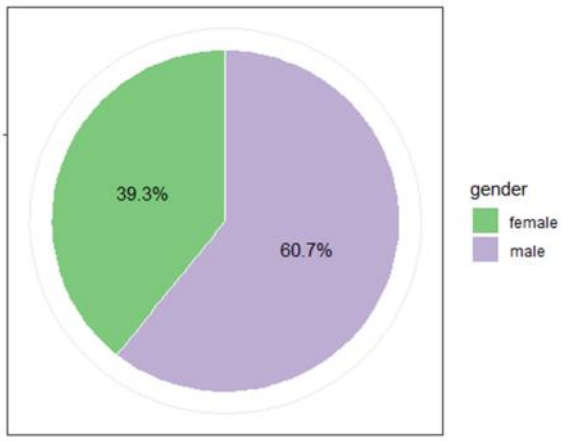

Figure 4.1: Gender distribution of the respondents

b) Age groups

Responding students' age was gathered as a scale item and was conveniently divided into three groups: 19-22 years; 23-25 years; and 26-28 years. The categorization of age into groups was needed to effectively differentiate the IL perception levels by these age groups. From Table 4.2, it is clearly shown that there were 101 female and 156 male respondents who took part in the questionnaire survey.

Table 4.2: Age groups and percentages of the respondents

Age group (years)	Female (freq.)	Male (freq.)	Female (percentage)	Male (percentage)	Total (Percentage)
19-22	46	67	45.5%	42.9%	43.9%
23-25	48	74	47.5%	47.5%	47.5%
26-28	7	15	7%	9.6%	8.6%
Total	**101**	**156**	**100%**	**100%**	**100%**

A graphical representation of the age distribution of the respondents is given below:

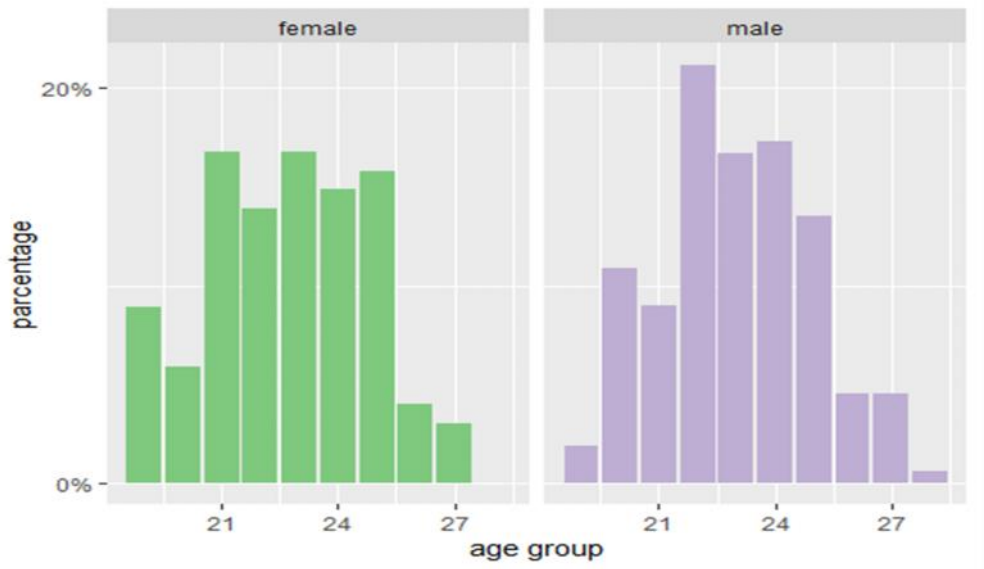

Figure 4.2: Age distribution of the respondents

c) Academic departments of the participants

In this study, attempts were made to reach out to a wider population of university students to ensure a fair participation and to gather their views regarding information literacy skills. Table 4.3 shows the faculty-wise distribution of the respondents where the highest number of the participants was from the Arts Faculty whereas the lowest number of participants was from the Law Faculty.

Table 4.3: Faculty-wise distribution of the respondents

Faculty	Frequency	%
Arts	56	21.8
Biological Sciences	22	8.6
Business Studies	23	8.9
Earth and Environmental Sciences	24	9.3
Institute of Education and Research	16	6.2
Law	9	3.5
Science	53	20.6
Social Sciences	54	21.0

d) Study level of the participants

The study level of the respondents was analyzed to identify the difference between undergraduate and postgraduate students regarding their perceptions of IL skills. Table 4.4 shows the study level of the respondents:

Table 4.4: Frequencies and percentages of study level of the respondents

Study level	Count	Percentage
Postgraduate	52	20.2%
Undergraduate	205	79.8%
Total	257	100%

Out of 257 respondents, 205 respondents were at the undergraduate level which represent 79.8% in percentage and 52 respondents were postgraduate students which is 20.2% in percentage. From Figure 4.3, it is found that 30.8% females and 69.2% males were undergraduate students while 41.5% females and 58.5% males were postgraduate students, respectively.

Figure 4.3 shows a graphical representation of the percentages of study level of the respondents.

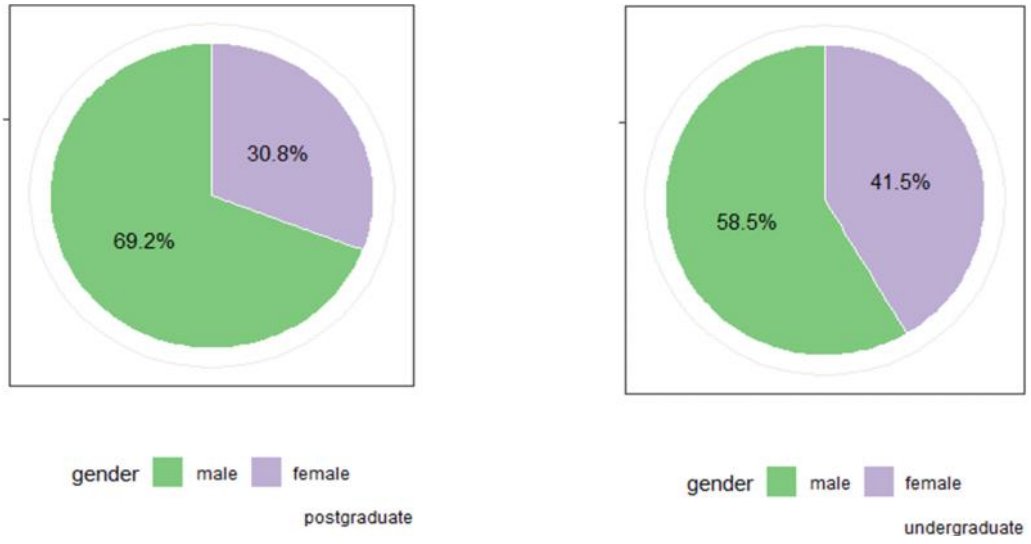

Figure 4.3: Study level of the participants

4.4.2 Computer and internet proficiency section

This section of the survey presents computer and internet proficiency levels of the study respondents.

a) Owning a personal computer (PC)

Respondents were asked whether they own a computer. From Table 4.5, it is found that 93.0% of the respondents owned a personal computer whereas 7.0% students did not own a computer.

Table 4.5: Distribution of the participants having a computer

Whether they own computer	Count	Percentage
No	18	**7.0%**
Yes	239	**93.0%**
Total	**257**	**100%**

A graphical representation of the respondents regarding owning a personal computer is shown in Figure 4.4:

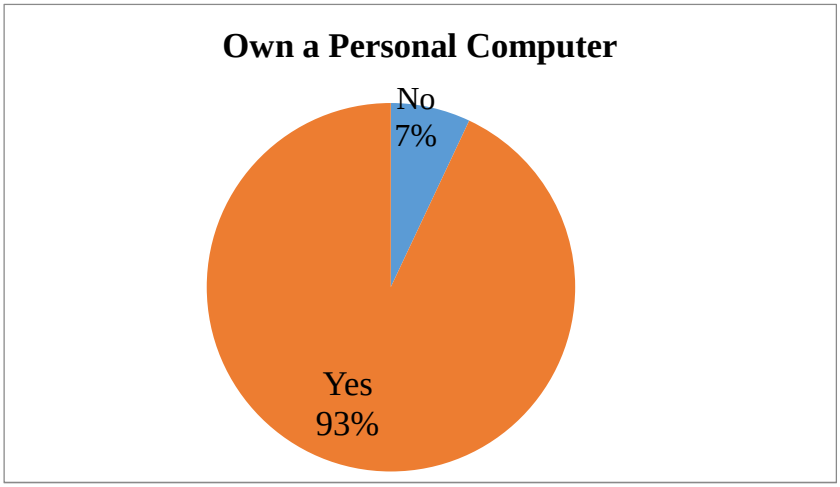

Figure 4.4: Percentage of owning a PC

b) Computer proficiency level

Basic computer proficiency involves having a good command over basic computer skills i.e. word processing, managing computer files, creating presentations, etc. The knowledge and ability to use computers and related technologies range from elementary use to computer programming and advanced problem-solving skills. Participating students were asked to self-report their perceived computer skill levels through the survey questionnaire.

Table 4.6: Frequencies and percentages of computer proficiency level

Computer proficiency level	Count	Percentage
Expert	13	5.1%
Above average	77	29.9%
Average	130	50.6%
Beginner	20	7.8%
Below average	17	6.6%
Total	257	100%

Table 4.6 shows that 50.6% respondents rated their proficiency to be average while only 5.1% respondents rated their proficiency as expert level. Further, 29.9%, 7.8%, 6.6% rated their skill to be above average, beginner and below average levels, respectively.

Figure 4.5 presents the graphical view of percentages of respondents by computer proficiency levels.

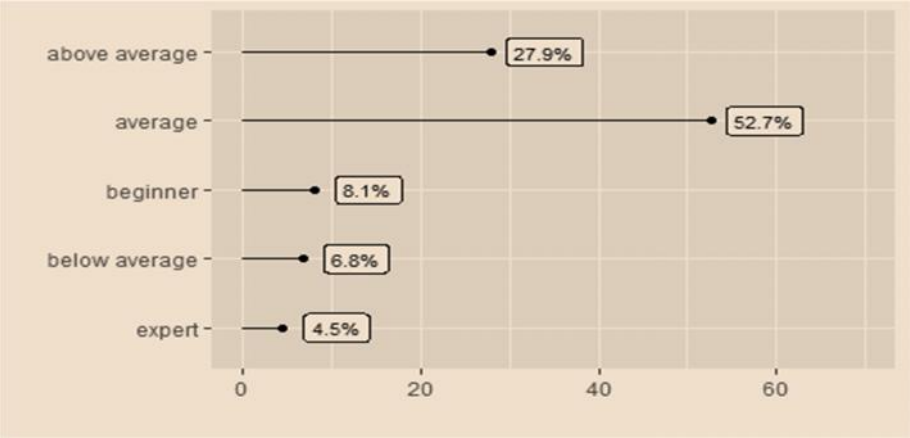

Figure 4.5: Computer proficiency level of the respondents

c) Internet access via computer or mobile devices

Respondents were asked to indicate whether they have access to internet. Table 4.7 indicates that all participating students had internet access.

Table 4.7: Frequencies and percentages of access to internet

Access to internet	Count	Percentage
No	-	-
Yes	257	**100.0%**
Total	**257**	**100%**

d) Internet usage frequency

In this section, participants were asked to point out the frequency of using internet by the participating students. Table 4.8 shows the frequency of the internet use by them.

Table 4.8: Frequencies and percentages of using internet of the respondents

Internet using frequency	Count	Percentage
2/3 time a day	163	63.4%
At least once a day	85	33.1%
At least 2/3 times a week	-	-
At least once a week	-	-
At least 2/3 times a month	-	-
At least once a month	-	-
Rarely	9	3.5%
Never	-	-
Total	257	100%

A graphical presentation of the internet usage frequency is provided in Figure 4.6 to show a clear picture of internet use by the respondents.

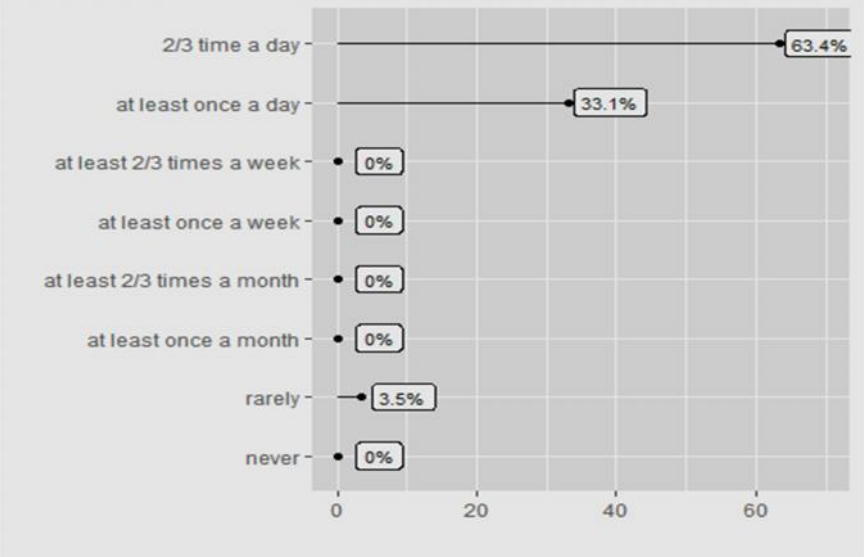

Figure 4.6: Frequency of internet usage of the respondents

Table 4.8 shows that out of 257 respondents, 163 used internet 2/3 time a day which is 63.4%, 85 respondents used internet at least once a day which is 33.1% and 9 respondents used internet rarely which is 3.5%. From this analysis, it is clear that most students accessed internet as a daily basis.

e) Rating on internet skill levels of the respondents

In this section, some particular internet-based questions given to the respondents to examine their skill levels of internet on a 5-point Likert scale. Table 4.9 presents students' ratings on questions related to internet access.

Table 4.9: Internet skill level of the respondents on particular internet-related activities

Internet-related task (Statements)	Very poor (1)	Poor (2)	Fair (3)	Good (4)	Very Good (5)	Mean	SD
Analyzing the search results	3 (1.2%)	3 (1.2%)	16 (6.2%)	88 (34.2%)	147 (57.2%)	4.45	0.76
Bookmarking a website	3 (1.2%)	3 (1.2%)	17 (6.6%)	88 (34.2%)	146 (56.8%)	4.44	0.77
Creating web pages with text, images and hyperlinks	3 (1.2%)	9 (3.5%)	23 (8.9%)	76 (29.6%)	146 (56.8%)	4.37	0.87
Internet skills	0 (0%)	6 (2.3%)	7 (2.7%)	93 (36.2%)	151 (58.8%)	4.51	0.67
Saving file to a local disk	3 (1.2%)	3 (1.2%)	17 (6.6%)	88 (34.2%)	146 (56.8%)	4.44	0.77
Sending or receiving emails	3 (1.2%)	3 (1.2%)	17 (6.6%)	79 (30.7%)	155 (60.3%)	4.49	0.77
Using search engine	3 (1.2%)	3 (1.2%)	17 (6.6%)	79 (30.7%)	155 (60.3%)	4.49	0.77
Using social networking sites e.g. Facebook	3 (1.2%)	3 (1.2%)	19 (7.4%)	80 (31.1%)	152 (59.1%)	4.46	0.78
Using video sharing service e.g. YouTube	3 (1.2%)	3 (1.2%)	23 (8.9%)	87 (33.9%)	141 (54.9%)	4.40	0.79
Working with email attachments	3 (1.2%)	3 (1.2%)	24 (9.3%)	86 (33.5%)	141 (54.9%)	4.40	0.79

Table 4.9 shows the frequencies and percentages of internet-related tasks. A total of 10 statements on this section were answered. The frequencies and percentages varied across statements and the mean values as well.

The highest mean value of 4.51 was obtained for the statement on internet skills and the lowest mean value was 4.37 for the statement regarding creating web pages with text, images and hyperlinks.

Hypotheses

With a view to identifying the difference between respondents' demographics and their perceptions of internet-related skills, the following null hypotheses are tested:

H1 There is no significant difference between male and female respondents regarding their opinions on performing internet-related tasks;

H2 There is no significant difference between respondents with different study levels in terms of their opinions on internet-related tasks; and

H3 There is no significant difference among various age groups in respect of their opinions on internet-related tasks.

Table 4.10: Participating respondents [*n*=257], Mann-Whitney test for opinions on internet-related tasks by gender

Internet-related tasks (Statements)	Gender	N	Mean rank	Some of ranks	Mann-Whitney *U*	Wilcoxon W	Z	Asymp. sig. (2-tailed)
Analyzing the search results	Male	156	144.21	14565.00	6342.000	18588.000	-3.003	.003*
	Female	101	119.15	18588.00				
Bookmarking a website	Male	156	144.82	14627.00	6280.000	18526.000	-3.116	.002*
	Female	101	118.76	18526.00				
Creating web pages with text images and hyperlinks	Male	156	146.78	14825.00	6082.000	18328.000	-3.472	.001*
	Female	101	117.49	18328.00				
Internet skills	Male	156	143.87	14531.00	6376.000	18622.000	-2.980	.003*
	Female	101	119.37	18622.00				
Saving file to a local disk	Male	156	144.82	14627.00	6280.000	18526.000	-3.116	.002*
	Female	101	118.76	18526.00				
Sending or receiving emails	Male	156	140.63	14204.00	6703.000	18949.000	-2.329	.020*
	Female	101	121.47	18949.00				
Using search engine	Male	156	140.63	14204.00	6703.000	18949.000	-2.329	.020*
	Female	101	121.47	18949.00				
Using social networking sites e.g. Facebook	Male	156	142.33	14375.00	6532.000	18778.000	-2.648	.008*
	Female	101	120.37	18778.00				
Using video sharing service e.g. YouTube	Male	156	148.04	14952.00	5955.000	18201.000	-3.705	.000*
	Female	101	116.67	18201.00				
Working with email attachments	Male	156	148.19	14967.00	5940.000	18186.000	-3.731	.000*
	Female	101	116.58	18186.00				

Note: *significant at $p < 0.05$.

Table 4.10 shows the results of Mann-Whitney test for differences between male and female respondents' perceptions of performing internet-related tasks. The results indicate that there were significant differences between male and female respondents on their views on performing all internet-related tasks and that is why the null hypothesis H1 is rejected.

Table 4.11: Participating respondents [*n*=257], Mann-Whitney test for opinions on internet-related tasks by study level

Internet-related tasks (Statements)	Study level	N	Mean rank	Some of ranks	Mann-Whitney *U*	Wilcoxon W	Z	Asymp. sig. (2-tailed)
Analyzing the search results	Undergraduate Postgraduate	205 52	129.82 125.77	26613.00 6540.00	5162.000	6540.000	-.399	.690
Bookmarking a website	Undergraduate Postgraduate	205 52	129.64 126.46	26577.00 6576.00	5198.000	6576.000	-.313	.754
Creating web pages with text images and hyperlinks	Undergraduate Postgraduate	205 52	128.88 129.46	26421.00 6732.00	5306.000	26421.000	-.056	.955
Internet skills	Undergraduate Postgraduate	205 52	128.33 131.64	26307.50 6845.50	5192.500	26307.500	-.332	.740
Saving file to a local disk	Undergraduate Postgraduate	205 52	129.07 128.71	26460.00 6693.00	5315.000	6693.000	-.036	.972
Sending or receiving emails	Undergraduate Postgraduate	205 52	130.70 122.31	26793.00 6360.00	4982.000	6360.000	-.839	.402
Using search engine	Undergraduate Postgraduate	205 52	130.70 122.31	26793.00 6360.00	4982.000	6360.000	-.839	.402
Using social networking sites e.g. Facebook	Undergraduate Postgraduate	205 52	129.66 126.38	26581.00 6572.00	5194.000	6572.000	-.325	.745
Using video sharing service e.g. YouTube	Undergraduate Postgraduate	205 52	128.71 130.15	26385.00 6768.00	5270.000	26385.000	-.141	.888
Working with email attachments	Undergraduate Postgraduate	205 52	128.10 132.57	26259.50 6893.50	5144.500	26259.500	-.434	.664

Note: *significant at $p < 0.05$.

Table 4.11 shows the results of Mann-Whitney test for differences between respondents belong to two study levels regarding their opinions on performing internet-related tasks. The results indicate that there were no significant difference between undergraduate and postgraduate students in terms of their opinions on internet-related tasks and that is why the null hypothesis H2 is accepted.

Table 4.12: Participating respondents [*n*=257], Kruskal-Wallis test for opinions on internet-related tasks by age group

Internet-related tasks (Statements)	Age group	N	Mean rank	Kruskal-Wallis *H*	df	Asymp. sig.
Analyzing the search results	19-22	113	140.42	6.207	2	.045*
	23-25	122	119.53			
	26-28	22	122.89			
Bookmarking a website	19-22	113	141.03	6.905	2	.032*
	23-25	122	118.83			
	26-28	22	123.61			
Creating web pages with text images and hyperlinks	19-22	113	143.00	9.503	2	.009*
	23-25	122	116.44			
	26-28	22	126.75			
Internet skills	19-22	205	138.48	6.648	2	.036*
	23-25	52	118.13			
	26-28		140.61			
Saving file to a local disk	19-22	113	141.03	7.338	2	.026*
	23-25	122	117.87			
	26-28	22	128.93			
Sending or receiving emails	19-22	113	136.85	3.071	2	.215
	23-25	122	123.48			
	26-28	22	119.32			
Using search engine	19-22	113	136.85	3.071	2	.215
	23-25	122	123.48			
	26-28	22	119.32			
Using social networking sites e.g. Facebook	19-22	113	138.54	4.515	2	.105
	23-25	122	120.61			
	26-28	22	126.52			
Using video sharing service e.g. YouTube	19-22	113	144.26	11.330	2	.003*
	23-25	122	115.14			
	26-28	22	127.50			
Working with email attachments	19-22	113	144.41	12.387	2	.002*
	23-25	122	114.02			
	26-28	22	132.91			

Note: *significant at $p < 0.05$.

Table 4.12 shows the results of Kruskal-Wallis *H* test for differences among respondents with different age groups regarding their opinions on performing internet-related tasks. The results depict that there were significant differences in terms of seven items regarding their opinions on performing internet-related tasks and that is why the null hypothesis H3 for these seven items is rejected. On the other hand, three tasks did not show any significant differences; as a result, the null hypothesis H3 for these items on performing internet-related tasks is accepted.

4.4.3 Analysis of Library using section

In the library use section, there were three questions e.g. i) frequency of library use by the participants; ii) reading resources used in the library by them; and iii) rating on knowledge of the different library tools.

a) Frequency of library use by the participants

Respondents were asked whether they use the university library and, if they do, how frequent they use the library.

Table.4.13: Frequencies and percentages of library usage of the respondents

Library use frequency	Count	Percentage
Most days	65	25.3%
At least 2/3 days a week	37	14.4%
At least once a week	6	2.3%
At least 2/3 times a month	27	10.5%
At least once a month	14	5.4%
Occasionally	58	22.6%
Rarely	38	14.8%
Never	12	4.7%
Total	**257**	**100%**

From Table 4.13, it can be said that out of 257 respondents, the highest percentage of students (25.3%) used library on ‘most days’ and the lowest percentage (2.3%) used the library ‘at least once a week’.

A graphical presentation of the frequency of library use by the participating students is provided in Figure 4.7.

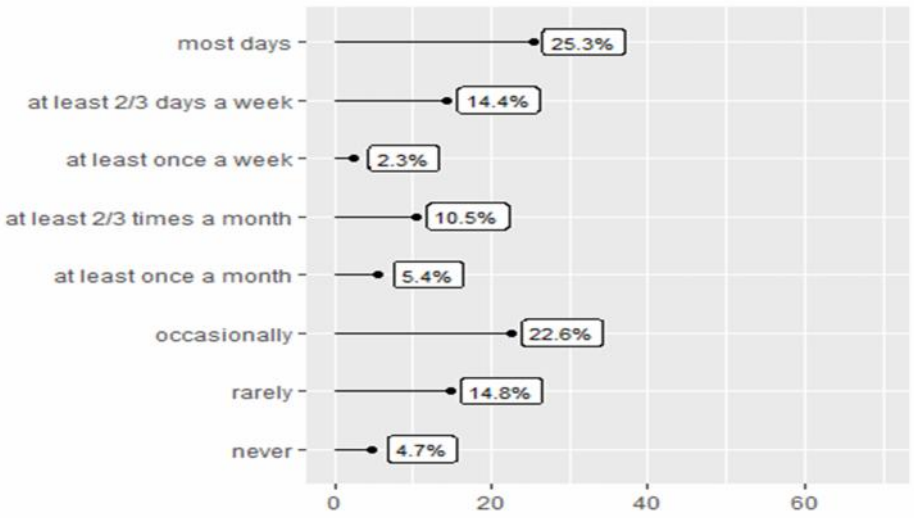

Figure 4.7: Frequency of library use by the participants

b) Reading resources used in the library by the respondents

The respondents were asked about the type of reading resources they usually use in the library. Table 4.14 shows the types of reading materials used by the participating students.

Table 4.14: Frequencies and percentages of materials used by the participants

Reading resources in library	Count	Percentage
Never used any resources	17	6.6%
Newspapers	56	21.8%
Online resources	45	17.5%
Printed books	124	48.2%
Reference materials	15	5.8%
Total	**257**	**100%**

Figure 4.8 presents the percentage of different library reading resources used by the respondents.

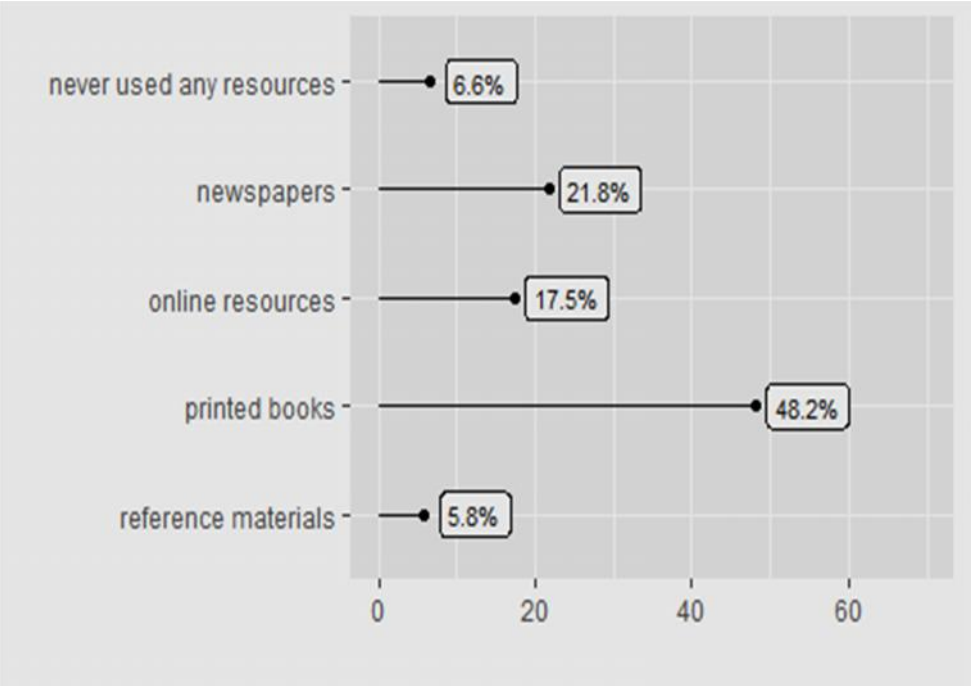

Figure 4.8: Percentage of reading resources used in the library by students

Table 4.14 shows that nearly half of the respondents used printed books in the library whereas 6.6% of the respondents never used any resources in the library. On the other hand, 21.8% of the participants used newspapers, 17.5% used online resources and only 5.8% of the respondents used reference materials in the library. From this analysis, it is clearly shown that the least used reading resource in the library was the reference materials and the highest used reading resource was printed books.

c) Rating on knowledge of different library tools

The respondents were asked to rate their knowledge about using different library tools on a 5-point Likert scale.

Table 4.15: Rating on distribution of knowledge of different library tools

Library tools	Very poor (1)	Poor (2)	Fair (3)	Good (4)	Very good (5)	Mean	SD
Institutional repository	4 (1.6%)	6 (2.3%)	28 (10.9%)	80 (31.1%)	139 (54.1%)	4.34	0.88
Library OPAC	3 (1.2%)	3 (1.2%)	19 (7.4%)	93 (36.2%)	139 (54.1%)	4.41	0.77
Library subscribed online resources	4 (1.6%)	4 (1.6%)	24 (9.3%)	85 (33.1%)	140 (54.5%)	4.37	0.82
Library website	3 (1.2%)	3 (1.2%)	19 (7.4%)	91 (35.4%)	141 (54.9%)	4.42	0.78
Remote gateway system	4 (1.6%)	4 (1.6%)	18 (7%)	89 (34.6%)	142 (55.3%)	4.40	0.81

Table 4.15 shows that in terms of using 'Institutional repository', 54.1% of the respondents rated their knowledge as very good; 31.1% rated as good; 10.9% rated as fair; 2.3% rated as poor; and 1.6% rated their knowledge level as very poor. The mean value of using 'Institutional repository' is 4.34. In terms of 'Library OPAC', 54.1% of the respondents rated their knowledge as very good; 36.2% rated their skills as good; 7.4% rated as fair; 1.2% rated as poor; and 1.2% rated it as very poor. The mean value of using 'Library OPAC' is 4.41. In terms of 'Library subscribed online resources', 54.5% of the respondents rated their knowledge as very good, 33.1% as good, 9.3% fair, 1.6% as poor and 1.6% as very poor. The mean value of using 'Library subscribed online resources' is 4.37. In terms of 'Library website', 54.5% of the respondents rated their knowledge as very good, 33.1% as good, 9.3% as fair, 1.6% as poor and 1.6% as very poor, respectively. The mean value of using 'Library website' is 4.42. In case of 'Remote gateway system', 55.3% of the respondents rated their knowledge as very good, 34.6% as good, 7% fair, 1.6% as poor and 1.6% as very poor. The mean value for knowledge about using 'Remote gateway system' is 4.40. It is clear that most respondents rated their knowledge levels on using library tools as

either 'very good' or 'good'. It indicates that the students are confident that they are able to use the library tools effectively.

Hypotheses

In order to identify the differences of respondents' demographic and individual views on using library tools, the following null hypotheses are tested:

H4 There is no significant difference between male and female respondents regarding their opinions on using library tools;

H5 There is no significant difference among respondents with different study level in terms of their opinions on using library tools; and

H6 There is no significant difference among various age groups in respect of their opinions on using library tools.

Table 4.16: Participating respondents [*n*=257], Mann-Whitney test for opinions on using library tools by gender

Library tools (Statements)	Gender	N	Mean rank	Some of ranks	Mann-Whitney *U*	Wilcoxon W	Z	Asymp. sig.(2tailed)
Institutional repository	Male	156	149.36	15085.50	5821.500	18067.500	-3.925	.000*
	Female	101	115.82	18067.50				
Library OPAC	Male	156	148.38	14986.00	5921.000	18167.000	-3.773	.000*
	Female	101	116.46	18167.00				
Library website	Male	156	147.45	14892.00	6015.000	18261.000	-3.601	.000*
	Female	101	117.06	18261.00				
Library subscribed online resources	Male	156	149.01	15050.50	5856.500	18102.500	-3.880	.000*
	Female	101	116.04	18102.50				
Remote gateway system	Male	156	147.19	14866.50	6040.500	18286.500	-3.553	.000*
	Female	101	117.22	18286.50				

Note: significant at $p < 0.05$.

Table 4.16 shows the results of Mann-Whitney *U* test for differences between male and female respondents' opinions on using library tools. The results indicate that there were significant differences between male and female respondents in their perceptions on using library tools and thus the null hypothesis H4 is rejected.

Table 4.17: Participating respondents [*n*=257], Mann-Whitney test for opinions on using library tools by study level

Library tools (Statements)	Study level	N	Mean rank	Some of ranks	Mann-Whitney *U*	Wilcoxon W	Z	Asymp. sig. (2-tailed)
Institutional repository	Undergraduate Postgraduate	205 52	128.96 129.15	26437.00 6716.00	5322.000	26437.000	-.019	.985
Library OPAC	Undergraduate Postgraduate	205 52	128.71 130.15	26385.00 6768.00	5270.000	26385.000	-.141	.888
Library website	Undergraduate Postgraduate	205 52	128.94 129.23	26433.00 6720.00	5318.000	26433.000	-.028	.978
Library subscribed online resources	Undergraduate Postgraduate	205 52	128.40 131.38	26321.00 6832.00	5206.000	26321.000	-.289	.772
Remote gateway system	Undergraduate Postgraduate	205 52	128.98 129.08	26441.00 6712.00	5326.000	26441.000	-.009	.992

Note: *significant at $p < 0.05$.

Table 4.17 shows the results of Mann-Whitney *U* test for differences between undergraduate and postgraduate students in terms of their opinions on using library tools. The results indicate that there were no significant differences among students in terms of study levels on their opinions of using library tools and, that is why, the null hypothesis H5 is accepted.

Table 4.18: Participating respondents [*n*=257], Kruskal-Wallis test for opinions on using library tools by age group

Library tools (Statements)	Age group	N	Mean rank	Kruskal-Wallis *H*	df	Asymp. sig.
Institutional repository	19-22	113	146.66	14.452	2	.001*
	23-25	122	113.64			
	26-28	22	123.43			
Library OPAC	19-22	113	144.58	11.839	2	.003*
	23-25	122	114.84			
	26-28	22	127.45			
Library website	19-22	113	145.24	12.936	2	.002*
	23-25	122	114.00			
	26-28	22	128.77			
Library subscribed online resources	19-22	113	143.65	10.403	2	.006*
	23-25	122	115.88			
	26-28	22	126.50			
Remote gateway system	19-22	113	143.41	10.045	2	.007*
	23-25	122	116.14			
	26-28	22	126.32			

Note: *significant at $p < 0.05$.

Table 4.18 illustrates the results of Kruskal-Wallis *H* test for differences among respondents from different age groups in terms of their opinions on using library tools. The results indicate that there were significant differences among different age groups in terms of their opinions on using library tools and, therefore, the null hypothesis H6 is rejected.

4.4.4 Information literacy skills section

Information literacy is defined as a set of capacities of people to: recognize their information needs; locate and evaluate the quality of information; store and retrieve information; make effective and ethical use of information, and apply information to meet the need at hand (The Information for All Programme, 2008). Based on the above definition, the respondents were asked to rate their information literacy skills to perform some particular IL-related tasks.

a) Rating information literacy skill of the respondents on particular tasks

The respondents rated their information literacy skills on a 5-point Likert scale. Table 4.18 shows the frequency and percentage of ratings on particular information literacy skills.

Table 4.19: Frequencies and percentages of respondent on performing IL-related tasks

Information literacy-related task	Very poor (1)	Poor (2)	Fair (3)	Good (4)	Very good (5)	Mean	SD
Defining information need for any specific problem	3 (1.2%)	8 (3.1%)	44 (17.1%)	116 (45.1%)	86 (33.5%)	4.07	.857
Identifying the key terms associated with the information need	3 (1.2%)	8 (3.1%)	51 (19.8%)	120 (46.7%)	75 (29.2%)	4.00	.850
Locating different types and formats of potential information sources	3 (1.2%)	8 (3.1%)	41 (16%)	141 (54.9%)	64 (24.9%)	4.00	.800
Formulating search strategies to locate the required information	3 (1.2%)	8 (3.1%)	38 (14.8%)	144 (56%)	64 (24.9%)	4.00	.793
Constructing advanced search queries to retrieve highly relevant items	3 (1.2%)	8 (3.1%)	42 (16.3%)	140 (54.5%)	64 (24.9%)	3.99	.803
Analyzing and the search results to look for relevant information	3 (1.2%)	8 (3.1%)	40 (15.6%)	139 (54.1%)	67 (26.1%)	4.01	.805
Comparing and assessing the information obtained from different sources	3 (1.2%)	8 (3.1%)	46 (17.9%)	133 (51.8%)	67 (26.1%)	3.98	.820
Verifying the authenticity and reliability of the information obtained	3 (1.2%)	8 (3.1%)	41 (16%)	141 (54.9%)	64 (24.9%)	4.00	.800
Managing and organizing the retrieved information for future use or reference	3 (1.2%)	8 (3.1%)	38 (14.8%)	143 (55.6%)	65 (25.3%)	4.01	.795
Using the information fairly and ethically abiding laws regulations and conventions	3 (1.2%)	8 (3.1%)	40 (15.6%)	141 (54.9%)	65 (25.3%)	4.00	.800
Interpreting or presenting the information accurately and appropriately	3 (1.2%)	8 (3.1%)	41 (16%)	141 (54.9%)	64 (24.9%)	3.99	.800
Overall rating of information literacy skill level	3 (1.2%)	3 (1.2%)	20 (7.8%)	130 (50.6%)	101 (39.3%)	4.26	.748

The particular tasks from the Table 4.19, on the basis of which the respondents rated their knowledge of information literacy skills, have been analyzed below respectively:

i) 'Defining information need for any specific problem'

In terms of information literacy skills, an information literate person should be able to define his/her information need for a specific problem.

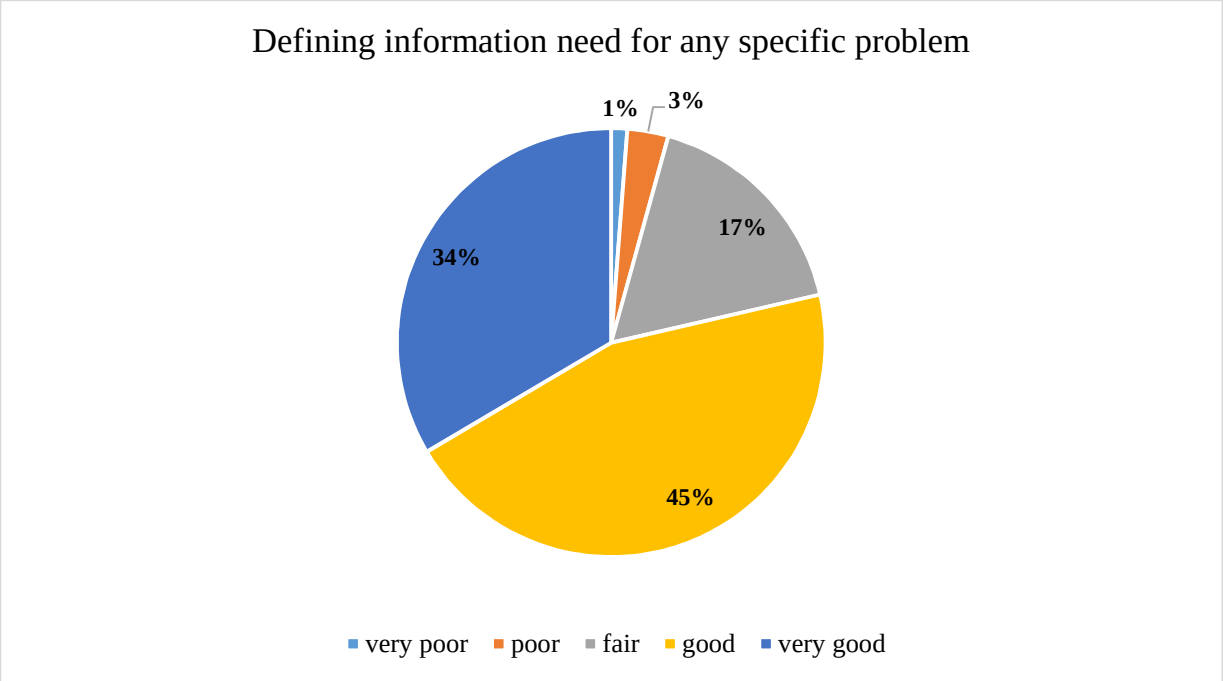

Figure 4.9: Ratings on 'defining information need for any specific problem'

From Figure 4.9, it is shown that on 'defining information need for any specific problem', 35.5% respondents rated their information literacy skill as very good, 45.1% as good, 17.1% as fair, 3.1% as poor and 1.2% as very poor, respectively.

ii) 'Identifying the key terms associated with the information need'

One has to identify the related terms which will make the actual searching process to be executed successfully.

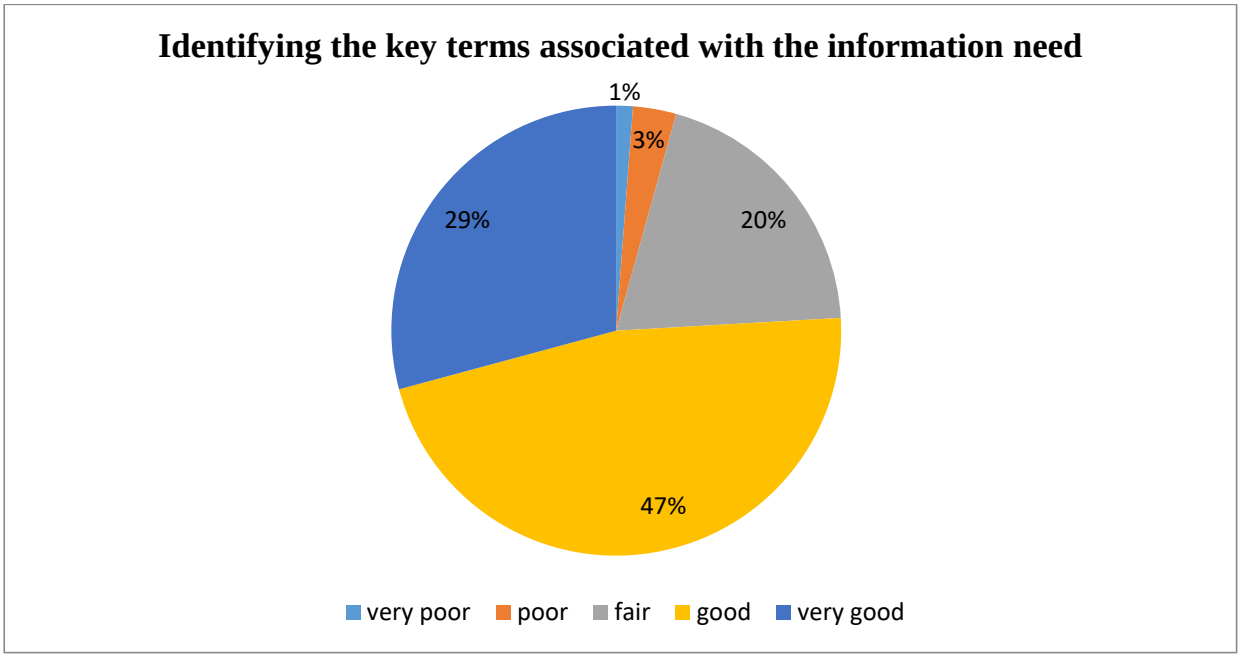

Figure 4.10: Ratings on 'Identifying key terms associated with the information need'

Figure 4.10 shows that 29.2% respondents rated their information literacy skill on identifying the key terms associated with an information need as very good whereas 46.7% rated their skill levels to be good, 19.8% as fair, 3.1% as poor and 1.2% of the respondents rated their skill to be as very poor level.

iii) 'Locating different types and formats of potential information sources'

In attaining this skill, one has to locate or identify various types and formats of potential information sources through which the required information can be effectively searched and retrieved.

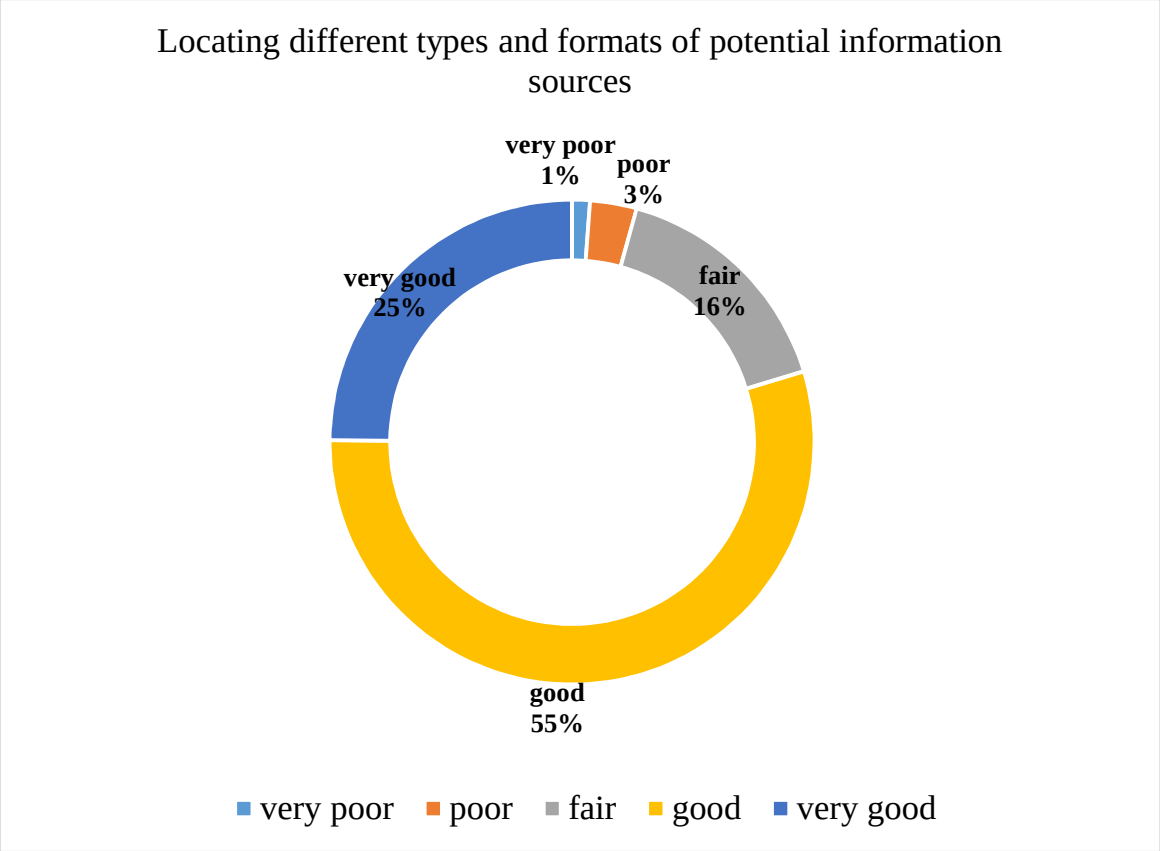

Figure 4.11: Ratings on 'Locating different types and formats of potential information sources'

From Figure 4.11, it is clear that 24.9% respondents rated their skill level to be very good whereas 54.9% as good, 16% as fair, 3.1% as poor and 1.2% as very poor in terms of locating different types and formats of potential information sources.

iv) 'Formulating search strategies to locate the required information'

After locating different types and formats of potential information sources, the next step is formulating search strategies in order to locate the required information. This means executing search process from different information sources to identify and retrieve needed information from the sources. Figure 4.13 presents the percentages of information literacy skill on formulating search strategies to locate the required information by the participating students.

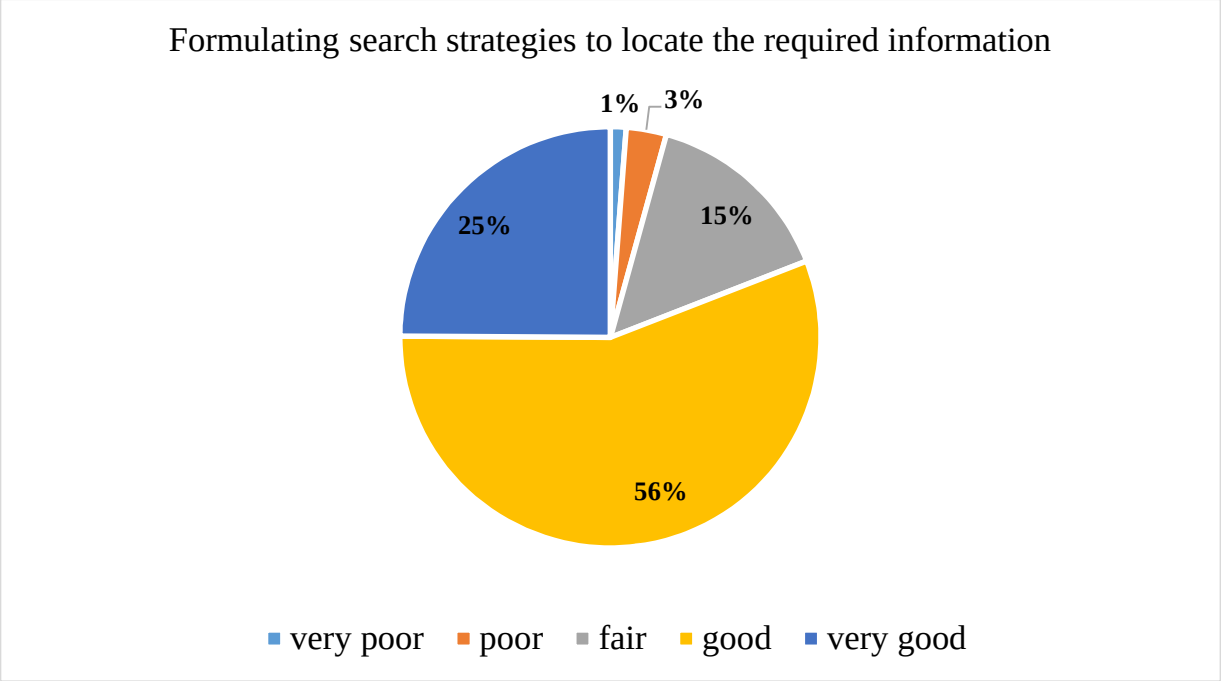

Figure 4.12: Ratings on 'Formulating search strategies to locate the required information'

Figure 4.12 shows that 24.9% respondents rated their skill level to be very good whereas 56% as good, 14.8% as fair, 3.1% as poor and 1.2% as very poor level on formulating search strategies to locate the required information from the located sources.

v) 'Constructing advanced search queries to retrieve highly relevant items'

Advanced search queries involves applying Boolean operators other search techniques such as phrase searching, truncation and proximity operations. These are advanced search operations to quickly retrieve the most relevant results.

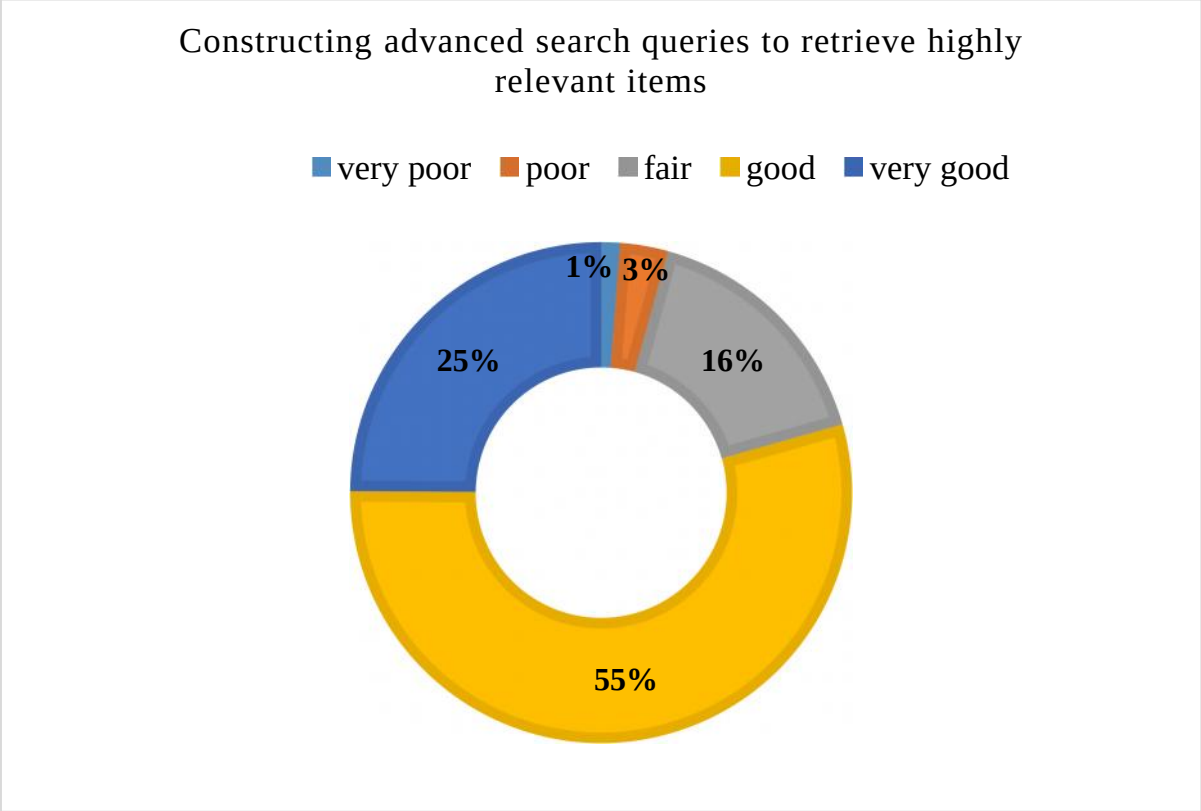

Figure 4.13: Ratings on 'Constructing advanced search queries to retrieve highly relevant items'

Figure 4.13 shows that 24.9% respondents rated their skill levels to be very good whereas 54.5% as good, 16.3% as fair, 3.1% as poor and 1.2% as very poor level respectively on constructing advanced search queries to retrieve highly relevant items from the search results.

vi) 'Analyzing the search results to look for relevant information'

In this stage after performing the search queries, the results have to be analyzed to identify the relevant information. Without identifying relevant information for a problem at hand, the information literacy process will not be completed.

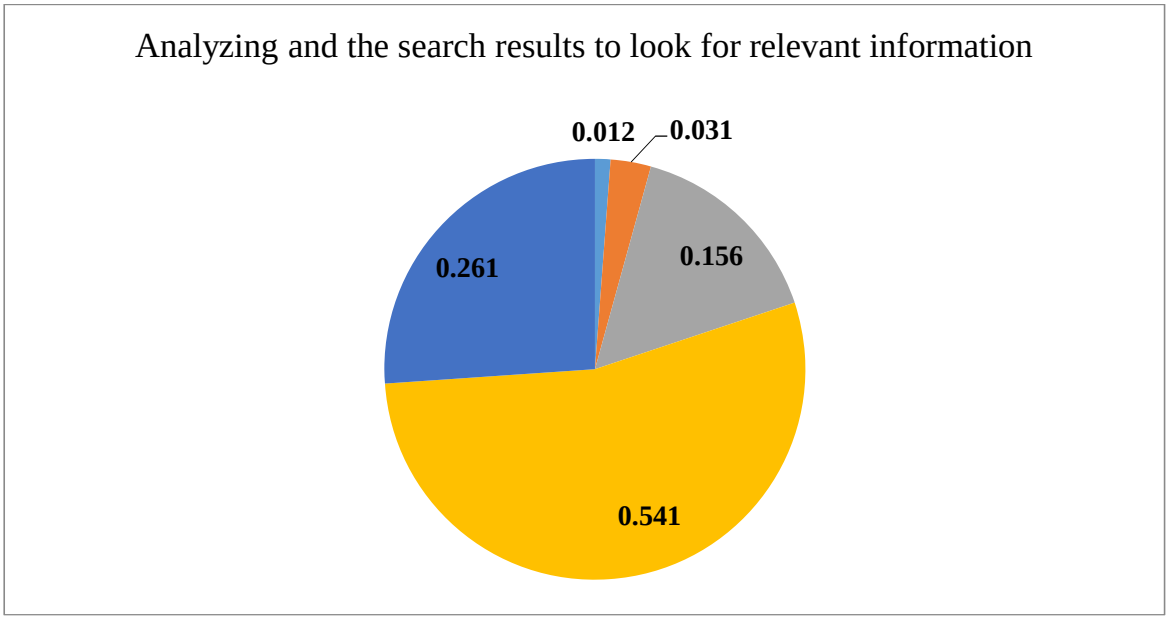

Figure 4.14: Ratings on 'Analyzing and the search results to look for relevant information'

From Figure 4.14, 26.1% respondents rated their skill level to be very good whereas 54.1% as good, 15.6% as fair, 3.1% as poor and 1.2% as very poor level respectively on 'Analyzing and the search results to look for relevant information'.

vii) 'Comparing and assessing the information obtained from different sources'

This skill involves comparing the searched results obtained from different information sources to be compared and assessed with relevancy to manipulate the searched results effectively to identify the most highly relevant results. Figure 4.16 represents the respondents' ratings on information skill regarding 'comparing and assessing the information obtained from different sources'.

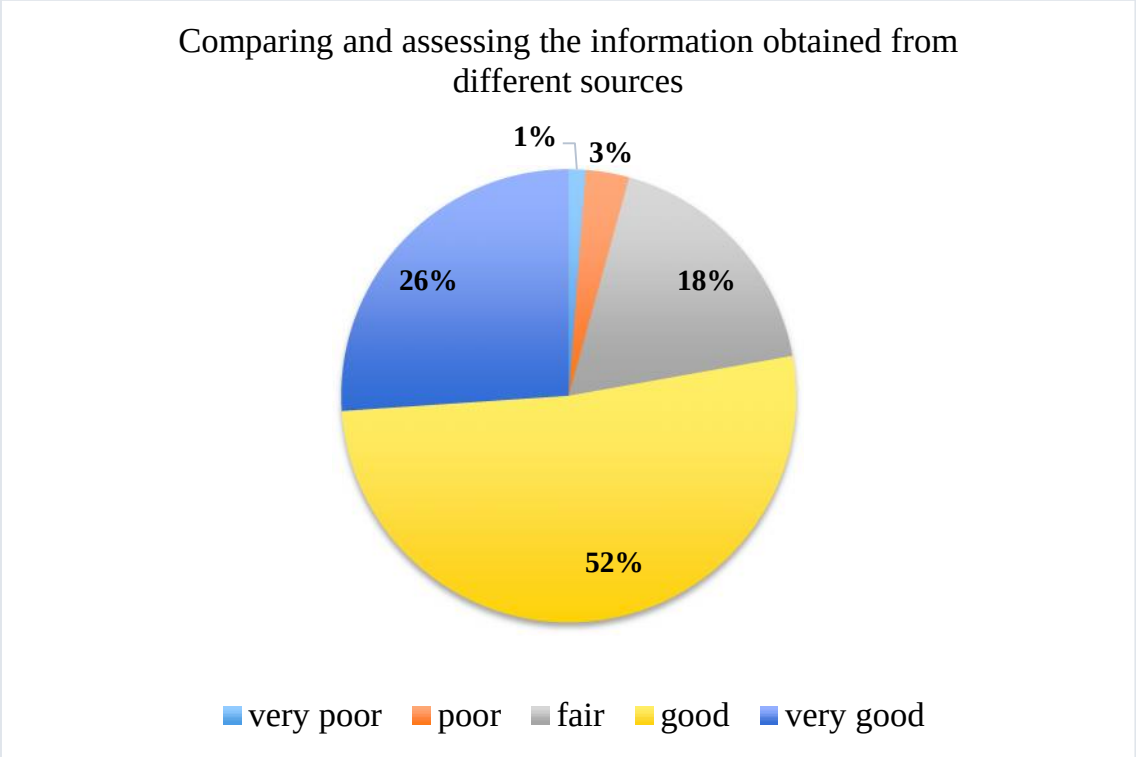

Figure 4.15: Ratings on 'Comparing and assessing the information obtained from different sources'

Figure 4.15 shows that 24.9% respondents rated their skill as very good whereas 54.5% as good, 16.3% as fair, 3.1% as poor and 1.2% as very poor levels respectively on skill levels regarding 'Comparing and assessing the information obtained from different sources'.

viii) 'Verifying the authenticity and reliability of the information obtained'

After comparing and assessing the information obtained from different sources, the next step is 'verifying the authenticity and reliability of the information obtained' from various information sources. The ratings on this particular information skill by the respondents are shown below:

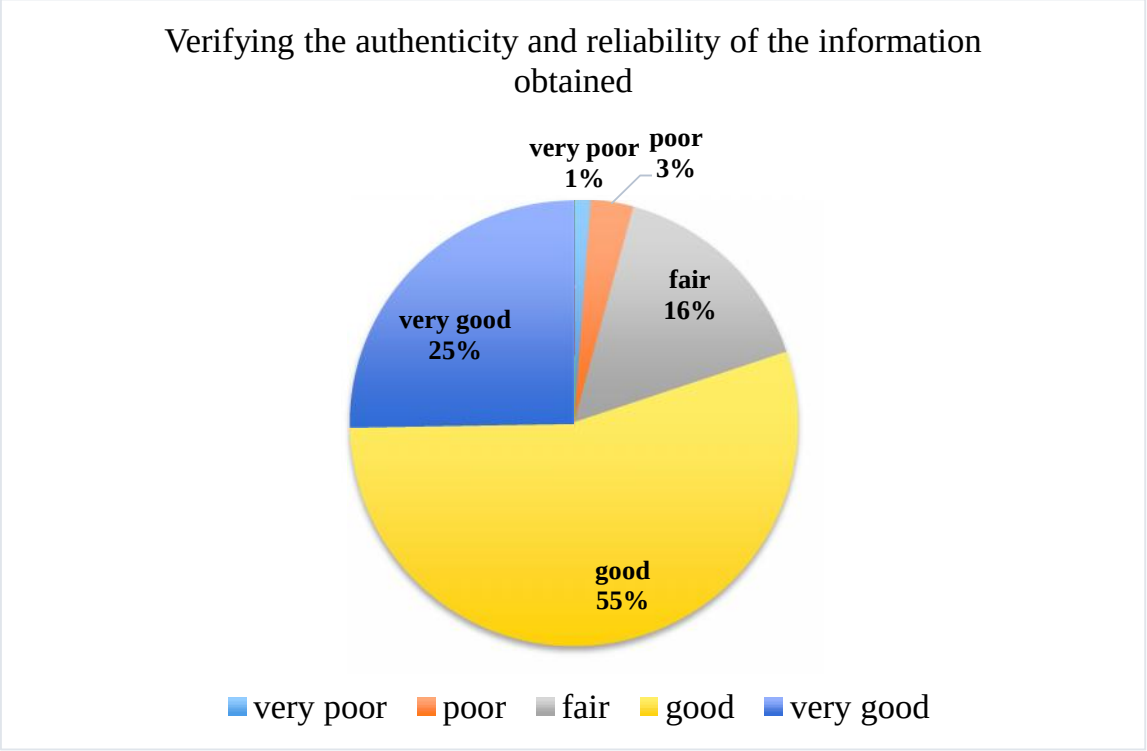

Figure 4.16: Ratings on 'Verifying the authenticity and reliability of the information obtained'

As shown in Figure 4.16, 25.3% respondents rated their skill as very good level whereas 54.9% as good, 15.6% as fair, 3.1% as poor and 1.2% as very poor level on performing this particular task 'Verifying the authenticity and reliability of the information obtained'.

ix) 'Managing and organizing the retrieved information for future use or reference'

Managing and organizing of that information retrieved from different sources is very important as the main purpose of the whole process of information literacy is to basically making that information count for future use and reference. This particular skill is one of the most important abilities in information literacy process. The participants also rated their skill on managing and organizing retrieved information for future use and reference very differently.

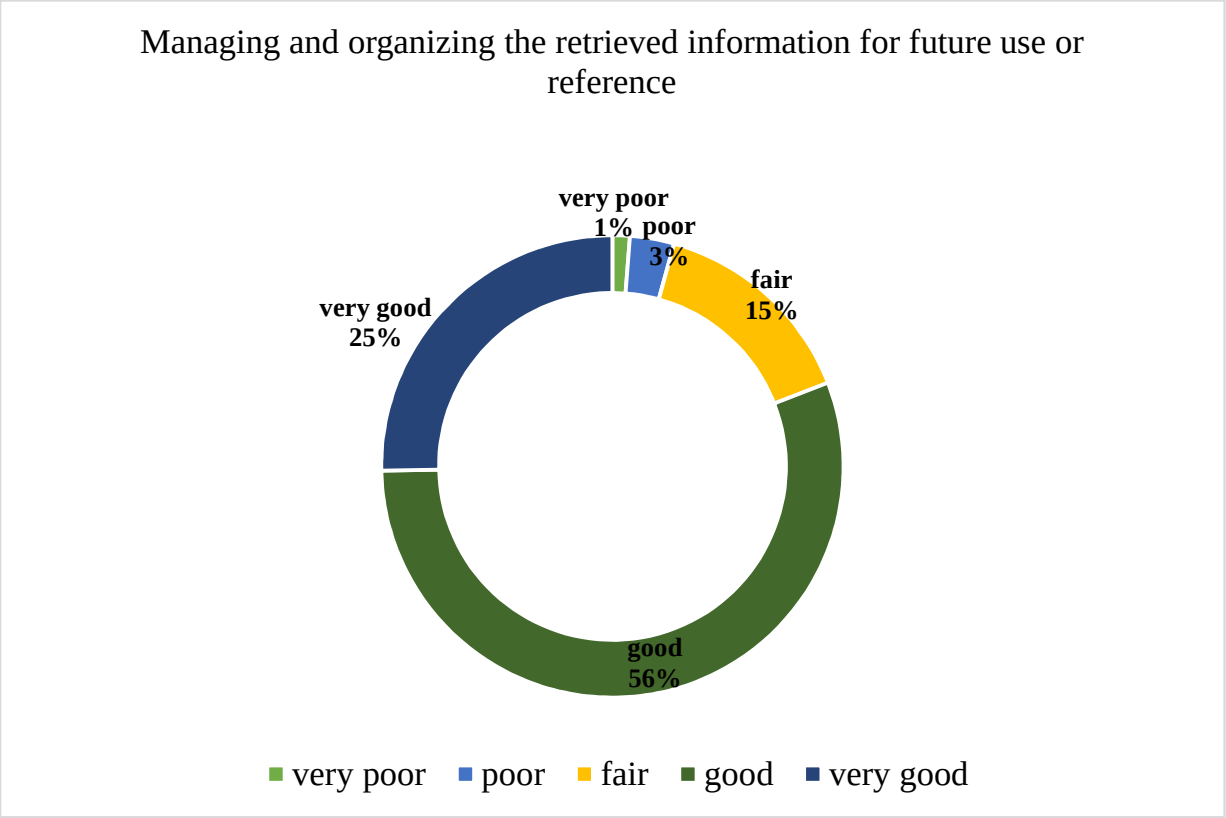

Figure 4.17: Ratings on managing and organizing retrieved information for future use or reference

From Figure 4.17, it is noticed that 25.3% respondents rated their skill as very good level whereas 54.9% as good, 15.6% as fair, 3.1% as poor and 1.2% as very poor on performing this particular task 'managing and organizing retrieved information for future use or reference'.

x) 'Using the information fairly and ethically abiding laws, regulations and conventions'

After the management and organization of retrieved information from different information sources, now it`s time to use that information to get a satisfactory result regarding the problem at hand obviously by maintaining laws and ethics. This is how the information literacy output reflects. The following figure has been presented reflecting the rating of the participants on using the information fairly and ethically abiding laws, regulations and conventions.

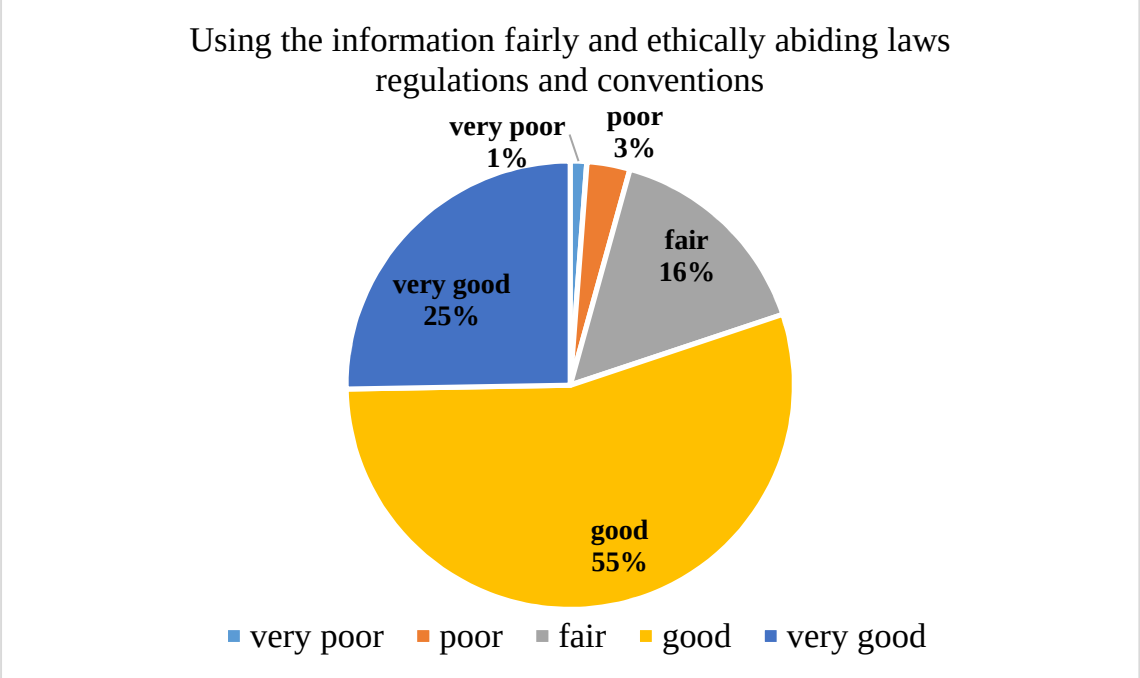

Figure 4.18: Ratings on 'Using the information fairly and ethically abiding laws, regulations and conventions'

Figure 4.18 shows that 24.9% respondents rated their skill as very good whereas 54.9% as good, 16% as fair, 3.1% as poor and 1.2% as very poor level respectively in performing this particular task of 'Using the information fairly and ethically abiding laws, regulations and conventions'.

xi) 'Interpreting/presenting the information accurately and appropriately'

This is the last step of the whole information literacy process needed to be information literate. The success of all the previous steps depends on this step which is interpreting or presenting the information accurately and appropriately for the defined problem at hand. The participants rated themselves on 5-point Likert scale on performing this task. The following figure is exactly showing that:

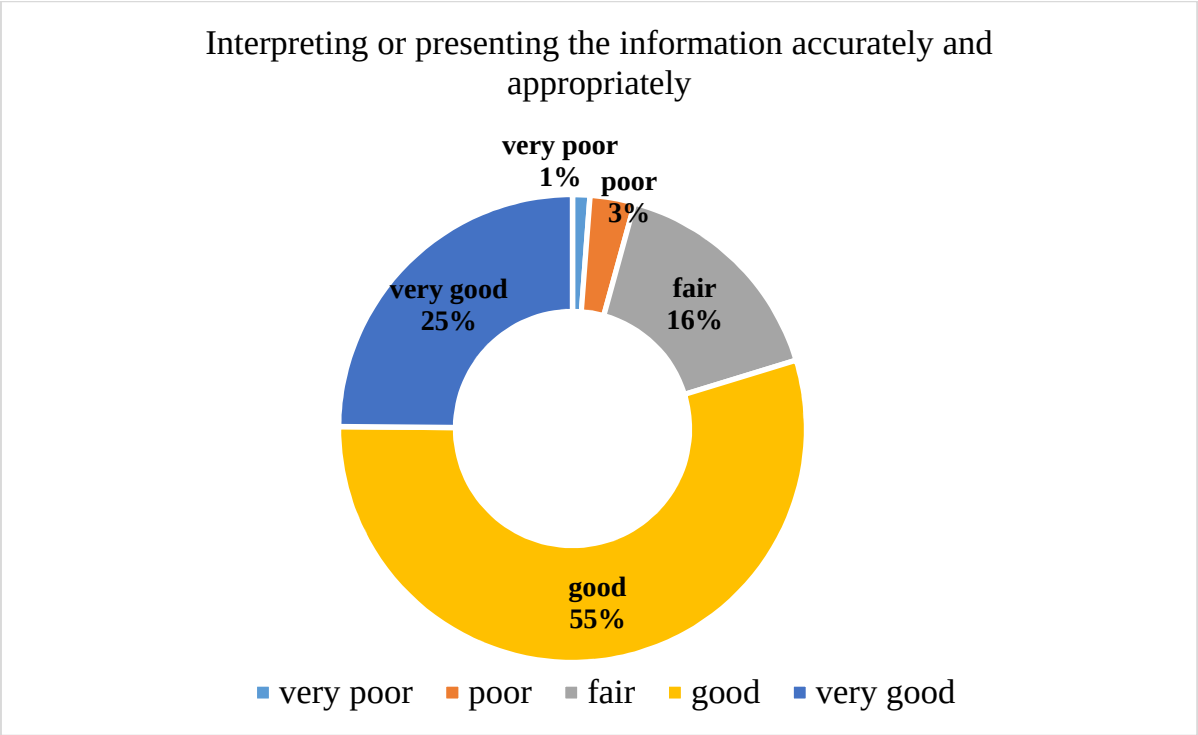

Figure 4.19: Ratings on 'Interpreting/presenting the information accurately and appropriately'

From Figure 4.19, it is observed that 25.3% respondents rated their skill as very good whereas 55.6% as good, 14.8% as fair, 3.1% as poor and 1.2% as very poor level in terms of information literacy skill on performing 'Interpreting or presenting the information accurately and appropriately.

xii) Overall ratings on information literacy skills

Participants were asked to rate their overall information literacy skill.

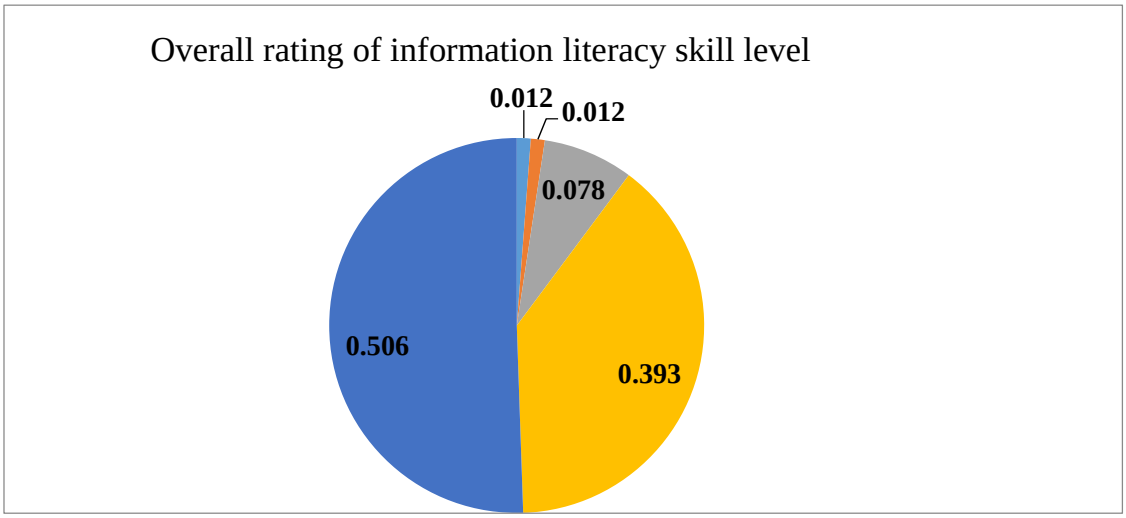

Figure 4.20: Overall ratings on information literacy skill levels

As shown in Figure 4.20, 50.6% of the respondents rated their overall information literacy skill as very good. Correspondingly 39.3% rated as good, 7.8% rated as fair, 1.2% rated as poor and 1.2% rated their overall skill level as very poor.

Hypotheses

With a view to determining the differences in terms of respondents' demographic and individual views on performing information literacy-related tasks, the following null hypotheses were tested:

H7 There is no significant difference between male and female respondents regarding their opinions on performing information literacy-related tasks;

H8 There is no significant difference among respondents with different study level in terms of their opinions on performing information literacy-related tasks; and

H9 There is no significant difference among various age groups in respect of their opinions on performing information literacy-related tasks.

Table 4.20: Participating respondents [*n*=257], Mann-Whitney test for opinions on performing information literacy-based tasks by gender

Information literacy-related tasks	Gender	N	Mean rank	Sum of ranks	Mann-Whitney *U*	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Defining information need for any specific problem	Male Female	156 101	130.99 127.71	13229.50 19923.50	7677.500	19923.500	-.370	.711
Identifying the key terms associated with the information need	Male Female	156 101	134.00 125.76	13534.00 19619.00	7373.000	19619.000	-.933	.351
Locating different types and formats of potential information sources	Male Female	156 101	134.96 125.14	13630.50 19522.50	7276.500	19522.500	-1.145	.252
Formulating search strategies to locate the required information	Male Female	156 101	133.89 125.84	13522.50 19630.50	7384.500	7384.500	-.945	.345
Constructing advanced search queries to retrieve highly relevant items	Male Female	156 101	135.31 124.91	13666.50 19486.50	7240.500	19486.500	-1.211	.226
Analyzing and the search results to look for relevant information	Male Female	156 101	133.37 126.17	13470.00 19683.00	7437.000	19683.000	-.837	.403
Comparing and assessing the information obtained from different sources	Male Female	156 101	135.50 124.79	13686.00 19467.00	7221.000	19467.000	-1.233	.218
Verifying the authenticity and reliability of the information obtained	Male Female	156 101	134.19 125.64	13553.00 19600.00	7354.000	19600.000	-.997	.319
Managing and organizing the retrieved information for future use or reference	Male Female	156 101	133.48 126.10	13481.00 19672.00	7426.000	19672.000	-.864	.388
Using the information fairly and ethically abiding laws regulations and conventions	Male Female	156 101	134.19 125.64	13553.00 19600.00	7354.000	19600.000	-.997	.319
Interpreting or presenting the information accurately and appropriately	Male Female	156 101	134.96 125.14	13630.50 19522.50	7276.500	19522.500	-1.145	.252
Overall rating of information literacy skill level	Male Female	156 101	150.20 115.28	15170.00 17983.00	5737.000	17983.000	-4.089	.000*

Note: *significant at $p < 0.05$.

Table 4.21: Participating respondents [*n*=257], Mann-Whitney test for opinions on performing information literacy-based tasks by study level

Information literacy-related tasks	Study level	N	Mean rank	Sum of ranks	Mann-Whiteney *U*	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Defining information need for any specific problem	Undergraduate Postgraduate	205 52	129.68 126.33	26584.00 6569.00	5191.000	6569.000	-.312	.755
Identifying the key terms associated with the information need	Undergraduate Postgraduate	205 52	128.16 132.33	26272.00 6881.00	5157.000	26272.000	-.388	.698
Locating different types and formats of potential information sources	Undergraduate Postgraduate	205 52	127.92 133.26	26223.50 6929.50	5108.500	26223.500	-.512	.608
Formulating search strategies to locate the required information	Undergraduate Postgraduate	205 52	128.15 132.37	26270.00 6883.00	5155.000	26270.000	-.407	.684
Constructing advanced search queries to retrieve highly relevant items	Undergraduate Postgraduate	205 52	127.84 133.56	26208.00 6945.00	5093.000	26208.000	-.547	.584
Analyzing and the search results to look for relevant information	Undergraduate Postgraduate	205 52	128.27 131.89	26294.50 6858.50	5179.500	26294.500	-.347	.729
Comparing and assessing the information obtained from different sources	Undergraduate Postgraduate	205 52	127.81 133.68	26201.50 6951.50	5086.500	26201.500	--.556	.578
Verifying the authenticity and reliability of the information obtained	Undergraduate Postgraduate	205 52	128.09 132.61	26257.50 6895.50	5142.500	26257.500	-.434	.664
Managing and organizing the retrieved information for future use or reference	Undergraduate Postgraduate	205 52	128.24 132.01	26288.50 6864.50	5173.500	26288.500	-.364	.716
Using the information fairly and ethically abiding laws regulations and conventions	Undergraduate Postgraduate	205 52	128.09 132.61	26257.50 6895.50	5142.500	26257.500	-.434	.664
Interpreting or presenting the information accurately and appropriately	Undergraduate Postgraduate	205 52	127.92 133.26	26223.50 6929.50	5108.500	26223.500	-.512	.608
Overall rating of information literacy skill level	Undergraduate Postgraduate	205 52	127.02 136.82	26038.50 7114.50	4923.500	26038.500	-.944	.345

Note: *significant at $p < 0.05$.

Table 4.22: Participating respondents [*n*=257], Kruskal-Wallis test for opinions on performing information literacy-based tasks by age group

Information literacy-related tasks	Age group (years)	N	Mean rank	Kruskal-Wallis *H*	df	Asymp. Sig.
Defining information need for any specific problem	19-22	113	134.40	1.270	2	.530
	23-25	122	124.27			
	26-28	22	127.45			
Identifying the key terms associated with the information need	19-22	113	136.48	3.013	2	.222
	23-25	122	121.15			
	26-28	22	134.09			
Locating different types and formats of potential information sources	19-22	113	137.77	4.385	2	.112
	23-25	122	119.81			
	26-28	22	134.93			
Formulating search strategies to locate the required information	19-22	113	136.84	3.496	2	.174
	23-25	122	120.86			
	26-28	22	133.91			
Constructing advanced search queries to retrieve highly relevant items	19-22	113	138.08	4.703	2	.095
	23-25	122	119.46			
	26-28	22	135.27			
Analyzing and the search results to look for relevant information	19-22	113	136.26	2.934	2	.231
	23-25	122	121.48			
	26-28	22	133.43			
Comparing and assessing the information obtained from different sources	19-22	113	138.12	4.665	2	.097
	23-25	122	119.39			
	26-28	22	135.48			
Verifying the authenticity and reliability of the information obtained	19-22	113	137.06	3.674	2	.195
	23-25	122	120.60			
	26-28	22	134.20			
Managing and organizing the retrieved information for future use or reference	19-22	113	136.44	3.122	2	.210
	23-25	122	121.30			
	26-28	22	133.52			
Using the information fairly and ethically abiding laws regulations and conventions	19-22	113	137.06	3.674	2	.159
	23-25	122	120.60			
	26-28	22	134.20			
Interpreting or presenting the information accurately and appropriately	19-22	113	137.77	4.385	2	.112
	23-25	122	119.81			
	26-28	22	134.93			
Overall rating of information literacy skill level	19-22	113	149.10	22.569	2	.000*
	23-25	122	108.29			
	26-28	22	140.59			

Note: *significant at $p < 0.05$.

Table 4.20 depicts the results of Mann-Whitney *U* test for differences between male and female respondents' opinions on performing information literacy-based tasks. The results indicate that there were no significant difference between male and female respondents on performing information literacy-based tasks except one item on overall rating of information literacy skill level and that is why the null hypothesis H7 for eleven items is accepted and for one item the null hypothesis H7 is rejected.

Table 4.21 shows the results of Mann-Whitney *U* test for differences between undergraduate and postgraduate students regarding their opinions on performing information literacy based tasks. The results showed that there were no significant differences between respondents with different study levels in terms of their opinions on performing information literacy based tasks and that is why the null hypothesis H8 for all of the ten items is accepted.

Table 4.22 indicates the results of Kruskal-Wallis *H* test for differences among respondents with different age groups regarding their opinions on performing information literacy based tasks. The results show that there were no significant differences among the respondents in terms of the twelve items regarding their opinions on performing information literacy based tasks except one item. Therefore, the null hypothesis H9 for the eleven items is accepted and the null hypothesis H9 for rest one item is rejected.

b) Participants' opinion on 'whether information literacy is required for achieving academic success or not'

In this section, all respondents agreed that information literacy skills are required for attaining academic success. This indicates the overwhelming value of information literacy instructions in academic settings.

4.5 Empirical study analysis

An experimental study was conducted with a group of 28 participants to acquire the value of information literacy in performing different literacy-based tasks. The experiment was divided into two sessions (before-training and after-training). Each test session was carried out with 22 task-based questions, where in the second session, the same questions were repeated but without maintaining the same order to make participants think and answer differently. The first session was executed to identify the initial correctness score before conducting any sort of training. Session two was conducted after a brief training to find out the value of information literacy instructions. The participants in the experimental study were the students from various departments of Dhaka University.

A brief questionnaire was designed to obtain data from the experimental study which consisted of demographic questions and 22 information skill tasks. The demographic questions include age, department, gender and the study level. At the beginning (before-training session), the questionnaires were distributed to the participants to identify their initial information literacy skills.

At the end of the first session, participants were trained and lectured for about 30 minutes. Participants were given a brief training on various information literacy skills including information sources, search strategy formulation and search techniques.

Table 4.23: Demographic characteristics of participating students (n = 28)

	Frequency	%
Age group	18	64.29
20-22 years		
23-25 years	10	35.71
Faculty		
Arts	12	42.86
Biological Sciences	2	7.14
Business Studies	1	3.57
Earth and Environmental Sciences	2	7.14
Institute of Education and Research	2	7.14
Law	1	3.57
Science	1	3.57
Social Sciences	7	25
Gender		
Female	6	21.43
Male	22	78.57
Study level		
Postgraduate	9	32.14
Undergraduate	19	67.86

As shown in Table 4.24, participants' age was grouped into two-year interval (e.g. 20–22 years and 23-25 years) for analysis. Likewise, departments were grouped into their respective faculties. The study level was divided into two groups (e.g. undergraduate and postgraduate). Answers to information literacy skill questions were transformed into scores by giving 1 for correct answer and 0 for incorrect answer. For the purpose of analyzing the data, tests were conducted to examine the normality and homogeneity of total scores obtained by age, gender and study level. These tests indicated that the data are normally distributed and are reasonably homogeneous. Thus, a number of parametric statistical tests were carried out. The related t-test was used to examine the differences in correctness scores between before and after training sessions. For all statistical tests, the significance level was set at $p < 0.05$.

Table 4.24: Frequencies and percentages of correct answers through tasks

	Before training		After training		
Test tasks	Correct	%	Correct	%	Sig. (2-tailed)
Task-1	7	25.00	13	46.43	0.163
Task-2	3	10.71	10	35.71	0.058
Task-3	7	25.00	15	53.57	0.055
Task-4	2	7.14	6	21.43	0.252
Task-5	7	25.00	17	60.71	0.015*
Task-6	6	21.43	16	57.14	0.014*
Task-7	12	42.86	22	78.57	0.014*
Task-8	5	17.86	13	46.43	0.045*
Task-9	11	39.29	14	50.00	0.591
Task-10	12	42.86	18	64.29	0.18
Task-11	11	39.29	15	53.57	0.421
Task-12	6	21.43	16	57.14	0.014*
Task-13	9	32.14	16	57.14	0.107
Task-14	8	28.57	18	64.29	0.016*
Task-15	10	35.71	20	71.43	0.016*
Task-16	9	32.14	16	57.14	0.107
Task-17	8	28.57	17	60.71	0.032*
Task-18	7	25.00	20	71.43	0.001*
Task-19	10	35.71	17	60.71	0.109
Task-20	8	28.57	17	60.71	0.032*
Task-21	10	35.71	18	64.29	0.061
Task-22	7	25.00	18	64.29	0.007*
Overall		28.41		57.14	

Note: *$p < 0.05$ by related *t*-test, between pre- and post-training sessions.

From Table 4.24, this is shown that the average percentage of correct answers in the before-training session was 28.41. On the contrary, the average percentage of correct answers in the after-training session was 57.14. In the before-training test, a comparatively high percentages of correct answers were recorded for Task-7 (42.86%), Task -10 (42.86%), Task-9 (39.29%), Task-11 (39.29%), Task-15 (35.71%), Task-19 (35.71%) and Task-21 (35.71%); although the percentages for correct answers were considerably low for Task-4 (92.86%), Task-2 (89.29%), Task-8

(82.14%), Task-6 (78.57%), Task-12 (78.57%), Task-1 (75%), Task-3 (75%), Task-5 (75%), Task-18 (75%) and Task-22 (75%). In a whole, more than half of the respondents which is 71.59% answered incorrectly to these literacy tasks. Particularly, 92.86% gave incorrect answer when asked about the Boolean operators used for online searching; 89.29% answered incorrectly to the question of explaining what primary information contains; 82.14% answered incorrectly on to look for journal articles on a given subject, what is the best source to be used.

In the after-training survey, a relatively high percentage of correct answers were noticed for Task-7 (78.57%), Task-15 (71.43%), Task-18 (71.43%), Task-10 (64.29%), Task-14 (64.29%), Task-21 (64.29%) and Task-22 (64.29%); although the percentages for correct answers were considerably still low for Task-4 (21.43%), Task-2 (35.71%), Task-1 (46.43%), Task-8 (46.43%). The results of related t-test found that there were significant differences in terms of task scores for Task-5, Task-6, Task-7, Task-8, Task-12, Task-14, Task-15, Task-17, Task-18, Task-20, Task-22, Task-18 and Task-22.

4.5.1 Two-way mixed model ANOVA

The two-way mixed model ANOVA was conducted to compare the differences in performance scores between before and after IL sessions in terms of students' gender, age and study level groups. Age, gender and study level were between subject factors while the test sessions were within subject factors.

Hypotheses

With a view to determining the differences in students' demographics in terms of their correctness scores in test tasks on information literacy (see Appendix-2) the following null hypotheses were tested:

H10 There is no significant difference between male and female students regarding their correctness scores on information literacy tasks in pre- and post-training sessions;

H11 There is no significant difference between age groups in respect of their performance scores on information literacy tasks in the test sessions; and

H12 There is no significant difference between age groups in terms of success scores in performing tasks in before and after training sessions.

4.5.1.1 Gender

The results of two-way mixed model ANOVA is shown in Table 4.25.

Table 4.25: Summary of two-way mixed ANOVA for gender differences

Source of variance	Sums of squares	df	Mean square	F-ratio	Sig.
Between-subjects factor	2925.12	1	2925.12	514.11	.000*
Between subjects error	147.93	26	5.69		
Within-subjects factor	342.01	1	342.01	160.28	.000*
Within subjects error	55.48	26	2.13		
Interaction	2.58	1	2.58	1.21	.282

Note: *significant at $p < 0.05$.

The two-way mixed ANOVA results showed that there was significant difference in correctness score F (1, 26) = 160.28, $p < .001$ between test sessions. The correctness score of after IL training was significantly higher (M = 9.86, SE = .36, 95% CI [9.12, 10.60]) than before training session (M = 7.75, SE = .69, 95% CI [6.34, 9.17]). There were significant difference between male and female groups (see detailed results in Appendix-4) and, therefore, the null hypothesis H10 is rejected.

4.5.1.2 Age

To show the significant difference between age groups, a separate two way-mixed ANOVA was run. There were two different age groups i.e. 20-22 years and 23-25 years. The results of two-way mixed model ANOVA is shown in Table 4.26.

Table 4.26: Summary of two-way mixed ANOVA for age differences

Source of variance	Sums of squares	df	Mean square	F-ratio	Sig.
Between-subjects factor	4584.60	1	4584.60	629.19	.000*
Between subjects error	189.45	26	7.29		
Within-subjects factor	505.81	1	505.81	228.03	.000*
Within subjects error	57.67	26	2.22		
Interaction	.38	1	.38	.17	.682

Note: *significant at $p < 0.05$.

The two-way mixed ANOVA results showed that there was significant difference in correctness score F (1, 26) = 228.03, p <.001 between test sessions. The correctness score of after IL training was significantly higher (M = 12.58, SE = .46, 95% CI [11.64, 13.52]) than before training session (M = 6.31, SE = .40, 95% CI [5.48, 7.13]). There were significant difference between age groups (see detailed results in Appendix-5) and, therefore, the null hypothesis H10 is rejected.

4.5.1.3 Study level

The results of two-way mixed model ANOVA is shown in Table 4.27.

Table 4.27: Summary of two-way mixed ANOVA for study level differences

Source of variance	Sums of squares	df	Mean square	F-ratio	Sig.
Between-subjects factor	4389.02	1	4389.02	605.98	.000*
Between subjects error	188.32	26	7.24		
Within-subjects factor	475.11	1	475.11	215.33	.000*
Within subjects error	57.37	26	2.21		
Interaction	.69	1	.69	.31	.582

Note: *significant at $p < 0.05$.

The two-way mixed ANOVA results showed that there was significant difference in correctness score F (1, 26) = 215.33, $p < .001$ between test sessions. The correctness score of after IL training was significantly higher (M = 12.60, SE = .47, 95% CI [11.64, 13.56]) than before training session (M = 6.36, SE = .41, 95% CI [5.52, 7.20]). There were significant differences between study levels (see detailed results in Appendix-6) and, therefore, the null hypothesis H10 is rejected.

Chapter-5
Discussion and Conclusion

5.1 Survey study

This study focused on examining the value of information literacy skills in academic settings. As a part of this study, a survey was conducted with a group of 257 students from the University of Dhaka. Among them, 60.7% were males and 39.3% were females. It was a balanced participation with regard to male-female ratio in the tertiary-level education in Bangladesh. There were 79.8% undergraduate students and 20.2% postgraduate students from different departments of the University of Dhaka who took part in this survey.

In the computer and internet proficiency section, it was found that the vast majority of the respondents (93.0%) owned a personal computer. Regarding computer proficiency level, nearly half of the respondents rated their proficiency to be average whereas only about 5% respondents rated their proficiency level to be expert. In terms of internet access, it was evident that all respondents had internet access. The students accessed internet either via mobile phones or their personal computers.

In terms of using library and library resources, 25.3% of the students participated in the survey answered that they used the library on “most days”. In case of using library resources, 48.2% of the respondents used printed books in the library whereas 6.6% of the respondents never used any resources from the library. On the other hand, 21.8% of the participants used newspapers, 17.5% used online resources and only 5.8% of the respondents used reference materials in the library.

In terms of information literacy skills on performing particular literacy-based tasks, 29.2% respondents rated their information literacy skill on identifying the key terms associated with an information need as very good whereas 1.2% of the respondents rated their skill as very poor level; 24.9% respondents rated their skill level to be as very good.

Advanced search queries such as using Boolean operators (AND, OR and NOT) are required to retrieve highly relevant information. In the case of formulating advanced

queries as an information literacy task, 24.9% respondents rated their skill to be as very good whereas 1.2% rated it as very poor.

Without identifying relevant information sources for a problem at hand, the information search process will not be completed. It was found that 26.1% of respondents rated their skill level as very good in this regard.

Managing and organizing information retrieved from different sources are requisite skills for future use of information. Nearly a quarter of the respondents rated their skill as very good level whereas 3.1% rated themselves as poor on performing this particular task 'managing and organizing retrieved information for future use or reference'.

After the management and organization of retrieved information from different information sources, it is important to get a satisfactory result regarding the problem at hand by maintaining ethical guidelines for information use. On this regard, 54.9% of the participating students rated themselves as good on performing this particular task of 'using the information fairly and ethically abiding laws, regulations and conventions'.

The result of an overall rating of information literacy skills, 50.6% of the respondents rated their information literacy skill as very good. Correspondingly, 39.3% rated the skill levels as good, 7.8% rated as fair, 1.2% rated as poor and 1.2% rated their skill level as very poor.

This survey provided the perceptions data of the respondents on information literacy skill-based tasks on a 5 point Likert-scale. To determine the significant difference in terms of gender, study level and age group of the respondents regarding their perceptions of information literacy skills, Mann-Whitney *U* and Kruskal-Wallis tests were carried out. For gender and study level, Mann-Whitney test was done. For age difference in perceptions of students, Kruskal-Wallis test was conducted. The results of these tests indicate that there were no significant differences in terms of study level, but the differences were significant with regard to overall rating on information skills in terms of gender and age groups.

5.2 Experimental study

Comparing the demographic characteristics, it was revealed that the majority of the experimental participants were males and undergraduate students. All the respondents were students of the University of Dhaka from various departments. An analysis of the percentages of correct/incorrect answers given by the participants in before- and after-training sessions was conducted. It was found that participants had a relatively lower correct score for all the tasks in the before-training session. Then participants showed a higher percentage of correct answers across tasks in the after-training session". The highest number of the correct answers in after-training session was commendable and it is there clearly evident that the IL training given to them were effectively worthy and developed their literacy skill level to a great extent. The first session was executed among the 28 respondents to identify their correctness score regarding some particular information literacy tasks without any briefing or training so that their initial success score could be achieved. Session two was conducted to find out the after value with a precise and informative conversation and briefing to the participants.

The average percentage of correct answers in the before-training session was 28.41%, on the contrary, the average percentage of correct answers in the after-training session was 57.14%. In the before-training survey, a comparatively high percentage of correct answers were noticed for Task-7, Task-10, Task-9, Task-11, Task-15, Task-19 and Task-21. Particularly, 92.86% gave incorrect answer when asked about the Boolean operators used for online searching; 89.29% answered incorrectly to the question of explaining what primary information contains; 82.14% answered incorrectly on to look for journal articles on a given subject, what is the best source to be used.

In the after-training survey, a relatively high percentage of correct answers were noticed for Task-7, Task-15, Task-18, Task-10, Task-14, Task-21 and Task-22. The results of related *t*-test found that there were significant differences in the correctness scores for 11 out of 22 tasks. The results of two-mixed ANOVA also found significant differences between pre and pro-training sessions in terms of gender, age and study levels.

5.3 Possible suggestions

- Based on the findings and review of literature, the value of information literacy skills is repeatedly emphasized. It can be recommended that the students should develop information literacy skills to enhance their academic achievements.
- The authorities of all tertiary-level educational institutions should be aware of the importance of information literacy education and the positive impact that it can bring to their students to achieve competency in both their educational and practical life.
- There are massive scopes of developing academic syllabus in terms of incorporating information literacy courses in academic curricula and the faculty should take care of that as it is high time.
- The collaboration of libraries with information literacy for developing IL skills among the students with the help of providing training on how to use library resources effectively to obtain relevant information should be taken into consideration.

5.4 Study limitations

There is nothing perfect and every research problem has some limitations and, on that note, this study had also some limitations. The survey questionnaire contained the questions in English; it cannot be safely assumed that all participating students fully and accurately understood the intended meanings as English is not their first language. Additionally, there could be a gap between knowledge and correctness scores in the experimental sessions. Further research is needed to investigate what are the kinds of information-related tasks that the students perform and how they search for such information in their real life. Finally, although a substantial effort was made to include various aspects of information skills as task questions, further studies may be needed to investigate other aspects of information skills that were not included in this study.

5.5 Conclusion

Attaining information literacy skill is a must in today's world. Everywhere it is all about information. But, without proper information literacy skills, information is no more information; it becomes misinformation or disinformation. We are living in information era, where our day-to-day activities are dependent on the right use of information. Human being needs information to resolve their day-to-day problems and to accomplish their necessary tasks at hand. Information is the lifeblood of human activities. Earlier studies repeatedly showed strong positive correlations between students' achievement and their information literacy skills. The ability to use information effectively and wisely is undoubtedly crucial to their success in higher education.

In the present study, an attempt was made to study the value of information literacy skill in developing country perspective in Bangladesh. This study found that information literacy skill can bring about value to academic success of the students. It is, therefore, increasingly important to incorporate information literacy skills among students for better performance of their academic achievements (Anandhali, 2018). Hence, the academia and the library should collaborate and should provide all the necessary resources, facilities and IL training to enhance information skills of the students. Finally, based on the findings of this study, it can be concluded that the implementation of information literacy education into academic syllabus may greatly help to make students information literate so that they can make their future not only educational but practical life as well very strong and competent. Librarians can play a vital role in this case. The level of integration also does impact students' information literacy development: when information literacy is embedded consciously and accentuated as an intensive element of the course, students' enactments empirically improve.

The collaboration of libraries with information literacy for developing IL skills among students with the help of providing training on how to use library resources effectively to obtain relevant information should be taken into count. This research, similar to many earlier studies conducted in other countries, recognizes the value of information

literacy training in an academic setting in Bangladesh. However, there is very little activity on the part of university libraries or academic staff to teach information skills to students through IL training. The findings of this research would provide some insightful guidelines to university management, policy makers, and those concerned to introduce the IL training sessions and programs in Bangladesh at the university level.

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Appendix: 1

Questionnaire:
"The value of Information Literacy Instructions in Academic Settings: A Developing Country Perspective"

1. Personal information

a) Gender: Male/Female

b) Age: _____ (in years)

c) Department: _____

d) Study level: Undergraduate/postgraduate Year/Semester: _____

2. Computer and internet proficiency

a) Do you own a computer? Yes/No

b) If no, do you use any other computer (e.g. departmental lab, hall, library, etc.)? Yes/No

c) How would you rate your computer proficiency level?

☐ None ☐ Beginner
☐ Below average ☐ Average
☐ Above average ☐ Expert

d)Do you have access to internet either via computer or mobile devices (e.g. smartphone)? Yes/No

e) How frequently do you access internet?

☐ Never ☐ 2/3 time a day
☐ At least once a day ☐ At least 2/3 times a week
☐ At least once a week ☐ At least 2/3 times a month
☐ At least once a month ☐ Occasionally/rarely

f) How would you rate your internet skill level to perform the following tasks?

Internet skills	Very poor	Poor	Fair	Good	Very good
Using search engine (e.g. Google)					
Analyzing the search results					
Saving file to a local disk					
Bookmarking a website					
Sending/receiving emails					
Working with email attachments					
Using social networking sites (e.g. Facebook)					
Using video sharing service (e.g. YouTube)					
Creating web pages with text, images and hyperlinks					

3. <u>Library use</u>

a) Do you use the university library? Yes/No

b) How frequently do you use the university library?

☐ Most days ☐ At least 2/3 days a week
☐ At least once a week ☐ At least 2/3 times a month
☐ At least once a month ☐ Occasionally
☐ Rarely ☐ Never

c) If you use the library, what kind of reading resources do you generally consult?

☐ Printed books ☐ Journals/periodical
☐ Newspapers ☐ Online resources (e.g. e-book, e-journal)
☐ Reference materials ☐ Never used any resources

d) How would you rate your knowledge about following library tools?

Library tools	Very poor	Poor	Fair	Good	Very good
Library website					
Library OPAC (e.g. online catalogue)					
Library subscribed online resources (e.g. e-journal)					
Institutional repository (e.g. digital archive)					
Remote gateway system (e.g. off-campus access)					

e) Have you ever attended any library instruction/orientation class? Yes/No

4. <u>Information literacy skills</u>

Information literacy is defined as *a set of capacities of people to: recognize their information needs; locate and evaluate the quality of information; store and retrieve information; make effective and ethical use of information, and apply information to meet the need at hand (The Information for All Programme, 2008).*

a) Based on the above definition, how would you rate your information literacy skills to perform the following tasks?

Information literacy skills	Very poor	Poor	Fair	Good	Very good
Defining information need for any specific problem					
Identifying the key terms associated with the information need					
Locating different types and formats of potential information sources (e.g. prints and online resources)					

Information literacy skills	Very poor	Poor	Fair	Good	Very good
Formulating search strategies to locate the required information					
Constructing advanced search queries to retrieve highly relevant items					
Analyzing and the search results to look for relevant information					
Comparing and assessing the information obtained from different sources					
Verifying the authenticity and reliability of the information obtained					
Managing and organizing the retrieved information for future use/reference					
Using the information fairly and ethically abiding laws, regulations and conventions					
Interpreting/presenting the information accurately and appropriately					

b) Overall, how would you rate your information literacy skill level?

☐ None ☐ Very poor
☐ Poor ☐ Fair
☐ Good ☐ Very good

c) Do you think information literacy skills are required for achieving academic success? Yes/No

d) If yes, how do think these competencies can be integrated into course curricula?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Thank you so much for your participation in the survey.

Appendix: 2

Demographic Information

a. Study level: Undergraduate/Postgraduate Year/Semester: _____

b. Department: _____

c. Gender: Male/Female

d. Age: _____ (in years)

Information Literacy Skills (তথ্য সাক্ষরতা দক্ষতা):

1. Have you heard the term 'information literacy' before? (আপনি আগে কখনো 'তথ্য সাক্ষরতা' শব্দটি শুনেছেন কি?)

---

2. If yes, how would you describe information literacy? (যদি শুনে থাকেন, তাহলে কিভাবে আপনি তথ্য সাক্ষরতাকে সজ্ঞায়িত করবেন?)

---

3. What major tool is used to locate a book in the library? (গ্রন্থাগারে একটি বই খুঁজে পেতে কোন প্রধান সরঞ্জামটি ব্যবহার করা হয়?)

---

4. Can you explain what primary information contains? (প্রাথমিক তথ্যে কি রয়েছে তা কি ব্যাখ্যা করতে পারবেন?)

---

5. What is a scholarly article? (স্কলারলি/পান্ডিত্যপূর্ণ আর্টিক্যাল বলতে কি বোঝায়?)

---

6. What are the Boolean operators used for online searching (অনলাইন সার্চিং-এ ব্যবহৃত বুলিয়ান অপারেটর্স কি?)

---

7. What is a call number used for in a library? (গ্রন্থাগারে কল নম্বর কেন ব্যবহৃত হয়?)

---

8. What is plagiarism and how it can be avoided? (প্লেইজারিজম কি এবং এটি কিভাবে এড়ানো যায়?)

---

9. Do you know what peer review process involves? (পিয়ার রিভিউ প্রক্রিয়ায় কি জড়িত সেটি কি আপনি জানেন?)

---

10. To look for journal articles on a given subject, what is the best source to be used? (একটি বিষয়ে সাময়িকী প্রবন্ধ খোঁজার জন্য সর্বোত্তম উৎসটি কি?)

---

11. What does an in-text citation generally contain? (একটি ইন-টেক্সট সাইটেশনে সাধারণত কি থাকে?)

---

12. In a reference section of a library, what type of materials could be found? (একটি লাইব্রেরির রেফারেন্স শাখায় কি ধরনের সামগ্রী পাওয়া যায়?)

---

13. What kind of information is generally obtained from an encyclopedia? (একটি বিশ্বকোষ থেকে সাধারণত কি ধরনের তথ্য পাওয়া যায়?)

---

14. If you want to go to a new place you don't know about, which information sources may help you out? (আপনি যদি এমন কোন অচেনা জায়গায় যেতে চান যা সম্পর্কে আপনি জানেন না, তাহলে তথ্যের কোন উৎসগুলো আপনাকে সহায়তা করতে পারে?)

---

15. What does a full-text database contain? (একটি ফুল-টেক্সট ড্যাটাবেসে কি থাকে?)

---

16. How can you find out quickly what a book is about? (আপনি কিভাবে একটি বইয়ের বিষয়বস্তু সম্পর্কে দ্রুত জানতে পারবেন?)

---

17. What is misinformation and what can be done about it? (ভুল তথ্য কি এবং এটি সম্পর্কে কি করা যেতে পারে?)

---

18. What does ISBN refer to? (আইএসবিএন কি নির্দেশ করে?)

---

19. What is an abstract and how does it help? (সারসংক্ষেপ কি এবং এটি কিভাবে সাহায্য করে?)

---

20. Can you name a citation style commonly used in academic writing? (আপনি কি এমন একটি সাইটেশান স্টাইলের নাম বলতে পারবেন যা একাডেমিক লেখায় সচরাচর ব্যবহৃত হয়?)

---

21. How would you evaluate the reliability of an information source? (একটি তথ্যের উৎসের বিশ্বাসযোগ্যতা আপনি কিভাবে মূল্যায়ন করবেন)?

---

22. Can you explain the advantages of online resources over print publications? (মুদ্রিত প্রকাশনার চেয়ে অনলাইন রিসোর্স এর সুবিধাগুলো আপনি কি ব্যাখ্যা করতে পারবেন?)

---

23. If you find a good article on a given topic, how would you find more articles related to your topic? (একটি বিষয়ের উপর আপনি যদি ভালো একটি প্রবন্ধ খুজেঁ পান তাহলে একই বিষয় সম্পর্কিত আর ও প্রবন্ধ খুজেঁ পাওয়ার উপায় কি?)

---

24. What is the most appropriate procedure for referencing other works in your own written assignment? (আপনার লিখিত অ্যাসাইনমেন্টে অন্যান্য কাজের উল্লেখ করার সর্বোত্তম পদ্ধতিটি কি?)

---

25. If you think that the implementation of information literacy instruction in academic curricula is important, then why? (আপনি যদি মনে করেন প্রাতিষ্ঠানিক শিক্ষায় তথ্য সাক্ষরতা নির্দেশনা কার্যকর করা গুরুত্বপূর্ণ, তবে কেন?)

Thank you so much for your valuable time and cooperation.

Appendix: 3

Demographic Characteristics of the participants in experimental section

Participant	Department	Study Level	Age Group (in years)	Gender
1	Management of Information Systems	Undergraduate	20-22	Female
2	Institute of Education and Research	Undergraduate	20-22	Male
3	Islamic Studies	Postgraduate	23-25	Male
4	Institute of Education and Research	Postgraduate	23-25	Female
5	Law	Undergraduate	23-25	Male
6	Banking and Insurance	Undergraduate	20-22	Male
7	Disaster Management	Postgraduate	20-22	Male
8	Islamic Studies	Undergraduate	20-22	Male
9	Disaster Management	Postgraduate	20-22	Female
10	Environment Studies	Undergraduate	23-25	Male
11	Bangla	Undergraduate	20-22	Male
12	Islamic History and Culture	Undergraduate	20-22	Female
13	Urdu	Undergraduate	20-22	Male
14	Sociology	Postgraduate	23-25	Male
15	Sociology	Undergraduate	20-22	Male
16	History	Undergraduate	23-25	Male
17	Social Welfare	Postgraduate	23-25	Male

18	Economics	Undergraduate	20-22	Female
19	English	Postgraduate	23-25	Male
20	Finance	Undergraduate	20-22	Male
21	Applied Statistics	Undergraduate	20-22	Male
22	Pharmacy	Undergraduate	20-22	Male
23	Philosophy	Postgraduate	23-25	Female
24	Information Science and Library Management	Undergraduate	20-22	Male
25	Physics	Undergraduate	20-22	Male
26	Geography and Environment	Postgraduate	23-25	Male
27	Marketing	Undergraduate	20-22	Male
28	Bangla	Undergraduate	20-22	Male

Appendix: 4

Two-way ANOVA for Gender Differences

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
session	Pillai's Trace	.860	160.284[b]	1.000	26.000	.000
	Wilks' Lambda	.140	160.284[b]	1.000	26.000	.000
	Hotelling's Trace	6.165	160.284[b]	1.000	26.000	.000
	Roy's Largest Root	6.165	160.284[b]	1.000	26.000	.000
session * gender	Pillai's Trace	.044	1.207[b]	1.000	26.000	.282
	Wilks' Lambda	.956	1.207[b]	1.000	26.000	.282
	Hotelling's Trace	.046	1.207[b]	1.000	26.000	.282
	Roy's Largest Root	.046	1.207[b]	1.000	26.000	.282

a. Design: Intercept + gender
Within Subjects Design: session

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
session	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + gender
Within Subjects Design: session

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
session	Sphericity Assumed	342.005	1	342.005	160.284	.000
	Greenhouse-Geisser	342.005	1.000	342.005	160.284	.000
	Huynh-Feldt	342.005	1.000	342.005	160.284	.000
	Lower-bound	342.005	1.000	342.005	160.284	.000
session * gender	Sphericity Assumed	2.576	1	2.576	1.207	.282
	Greenhouse-Geisser	2.576	1.000	2.576	1.207	.282
	Huynh-Feldt	2.576	1.000	2.576	1.207	.282
	Lower-bound	2.576	1.000	2.576	1.207	.282
Error(session)	Sphericity Assumed	55.477	26	2.134		
	Greenhouse-Geisser	55.477	26.000	2.134		
	Huynh-Feldt	55.477	26.000	2.134		
	Lower-bound	55.477	26.000	2.134		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	session	Type III Sum of Squares	df	Mean Square	F	Sig.
session	Linear	342.005	1	342.005	160.284	.000
session * gender	Linear	2.576	1	2.576	1.207	.282
Error(session)	Linear	55.477	26	2.134		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	2925.122	1	2925.122	514.110	.000
gender	42.122	1	42.122	7.403	.011
Error	147.932	26	5.690		

2. session

Measure: MEASURE_1

session	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	5.795	.446	4.880	6.711
2	11.818	.465	10.862	12.774

3. gender

Measure: MEASURE_1

gender	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Female	7.750	.689	6.335	9.165
Male	9.864	.360	9.124	10.603

4. gender * session

Measure: MEASURE_1

gender	session	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Female	1	5.000	.790	3.376	6.624
	2	10.500	.825	8.805	12.195
Male	1	6.591	.412	5.743	7.439
	2	13.136	.431	12.251	14.022

Appendix: 5

Two-way ANOVA for Age Differences

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
session	Pillai's Trace	.898	228.031[b]	1.000	26.000	.000
	Wilks' Lambda	.102	228.031[b]	1.000	26.000	.000
	Hotelling's Trace	8.770	228.031[b]	1.000	26.000	.000
	Roy's Largest Root	8.770	228.031[b]	1.000	26.000	.000
session * age_groups	Pillai's Trace	.007	.172[b]	1.000	26.000	.682
	Wilks' Lambda	.993	.172[b]	1.000	26.000	.682
	Hotelling's Trace	.007	.172[b]	1.000	26.000	.682
	Roy's Largest Root	.007	.172[b]	1.000	26.000	.682

a. Design: Intercept + age_groups

Within Subjects Design: session

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
session	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + age_groups

Within Subjects Design: session

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
session	Sphericity Assumed	505.810	1	505.810	228.031	.000
	Greenhouse-Geisser	505.810	1.000	505.810	228.031	.000
	Huynh-Feldt	505.810	1.000	505.810	228.031	.000
	Lower-bound	505.810	1.000	505.810	228.031	.000
session * age_groups	Sphericity Assumed	.381	1	.381	.172	.682
	Greenhouse-Geisser	.381	1.000	.381	.172	.682
	Huynh-Feldt	.381	1.000	.381	.172	.682
	Lower-bound	.381	1.000	.381	.172	.682
Error(session)	Sphericity Assumed	57.672	26	2.218		
	Greenhouse-Geisser	57.672	26.000	2.218		
	Huynh-Feldt	57.672	26.000	2.218		
	Lower-bound	57.672	26.000	2.218		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	session	Type III Sum of Squares	df	Mean Square	F	Sig.
session	Linear	505.810	1	505.810	228.031	.000
session * age_groups	Linear	.381	1	.381	.172	.682
Error(session)	Linear	57.672	26	2.218		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	4584.604	1	4584.604	629.188	.000
age_groups	.604	1	.604	.083	.776
Error	189.450	26	7.287		

2. session

Measure: MEASURE_1

session	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	6.306	.402	5.478	7.133
2	12.578	.456	11.641	13.515

3. age_groups

Measure: MEASURE_1

age_groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
20-22 years	9.333	.450	8.409	10.258
23-25 years	9.550	.604	8.309	10.791

4. age_groups * session

Measure: MEASURE_1

age_groups	session	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
20-22 years	1	6.111	.481	5.122	7.100
	2	12.556	.545	11.436	13.675
23-25 years	1	6.500	.645	5.174	7.826
	2	12.600	.731	11.098	14.102

Appendix: 6

Two-way ANOVA for Study Level Differences

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
session	Pillai's Trace	.892	215.327[b]	1.000	26.000	.000
	Wilks' Lambda	.108	215.327[b]	1.000	26.000	.000
	Hotelling's Trace	8.282	215.327[b]	1.000	26.000	.000
	Roy's Largest Root	8.282	215.327[b]	1.000	26.000	.000
session * study_level	Pillai's Trace	.012	.311[b]	1.000	26.000	.582
	Wilks' Lambda	.988	.311[b]	1.000	26.000	.582
	Hotelling's Trace	.012	.311[b]	1.000	26.000	.582
	Roy's Largest Root	.012	.311[b]	1.000	26.000	.582

a. Design: Intercept + study_level

Within Subjects Design: session

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
session	1.000	.000	0	.	1.000	1.000	1.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + study_level

Within Subjects Design: session

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
session	Sphericity Assumed	475.114	1	475.114	215.327	.000
	Greenhouse-Geisser	475.114	1.000	475.114	215.327	.000
	Huynh-Feldt	475.114	1.000	475.114	215.327	.000
	Lower-bound	475.114	1.000	475.114	215.327	.000
session * study_level	Sphericity Assumed	.685	1	.685	.311	.582
	Greenhouse-Geisser	.685	1.000	.685	.311	.582
	Huynh-Feldt	.685	1.000	.685	.311	.582
	Lower-bound	.685	1.000	.685	.311	.582
Error(session)	Sphericity Assumed	57.368	26	2.206		
	Greenhouse-Geisser	57.368	26.000	2.206		
	Huynh-Feldt	57.368	26.000	2.206		
	Lower-bound	57.368	26.000	2.206		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	session	Type III Sum of Squares	df	Mean Square	F	Sig.
session	Linear	475.114	1	475.114	215.327	.000
session * study_level	Linear	.685	1	.685	.311	.582
Error(session)	Linear	57.368	26	2.206		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	4389.023	1	4389.023	605.975	.000
study_level	1.738	1	1.738	.240	.628
Error	188.316	26	7.243		

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
9.478	.385	8.687	10.270

2. session

Measure: MEASURE_1

session	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	6.360	.410	5.516	7.203
2	12.596	.467	11.636	13.557

3. study_level

Measure: MEASURE_1

study_level	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Postgraduate	9.667	.634	8.363	10.971
Undergraduate	9.289	.437	8.392	10.187

4. study_level * session

Measure: MEASURE_1

study_level	session	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Postgraduate	1	6.667	.676	5.277	8.056
	2	12.667	.770	11.084	14.249
Undergraduate	1	6.053	.465	5.096	7.009
	2	12.526	.530	11.437	13.616