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September 2019

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Kavi, Raphael Kwame Mr; Anafo, Peter Mr.; Bugyei, Kwabena Asiedu Mr.; and Ofori, Yaw Mr., "Assessing the Information Literacy Skills Among Undergraduate Students at the University of Mines and Technology (UMaT), Tarkwa, Ghana" (2019). *Library Philosophy and Practice (e-journal)*. 2918.

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Assessing the information literacy skills among undergraduate students at the University of Mines and Technology (UMaT), Tarkwa, Ghana

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Abstract

Information literacy skills have become a topical issue in the academic lives of university students. It is a skill needed to be able to identify an information need, knowing the sources of information, effectively searching for information and ethically using information in this era of the information age. Various studies have observed that university students lack the basic skills needed to make them effectively search for academic information and how to apply them. This situation, if not checked, would negatively affect the academic lives of students. This paper, therefore, sought to examine the level of information literacy skills among incoming first-year undergraduate students of the University of Mines and Technology, Tarkwa so as to suggest ways of improving upon them. The level of information literacy skill, possession of basic information and communication technology (ICT) skills, awareness of various search strategies were examined by analyzing responses obtained from the administration of the questionnaire. It was found out that the majority of the students possessed basic ICT skills, however, their knowledge of various search strategies was low. Again, there was no course designed to introduce them to the acquisition of information retrieval skills. Various ways of improving information literacy skills among students have also been suggested.

Keywords: Information Literacy, Search strategy, Information Retrieval, Library Instruction

Introduction

Information literacy (IL) is a critical component of this information age. It is a term that is widely used across many disciplines and, in particular, the field of Library and Information Science. Undergraduate students in academic institutions are confronted with the daunting task of searching for information. They are faced with the challenges of finding information using various traditional and more advanced technological media. The large amount of information available in both print and electronic formats demand information literacy skills and competencies from these undergraduate students. Available research demonstrates that Information literacy is important and that university students' research skills improve when taught information literacy (Chevillotte, 2010).

A recent study conducted by the New Literacies Research Lab at the University of Connecticut shows that many students are well-versed in social media, but lack the necessary online research and critical reading abilities that help them succeed in school and in the workplace (DeNisco, 2015). Jacobson and Mark (2000) are also of the view, that many university students lack the critical thinking skills and the database searching proficiency necessary for fine-tuning their information searches. Previous researches also show that the information literacy level of many undergraduates and even postgraduates students is not up to standard for performing effective searches; in this regard they encounter difficulties in today's information-rich society (Chu & Law, 2008; Graham & Metaxas, 2003; Weiler, 2001).

Mackey and Jacobson (2004) were also of the view that students who are information literate are better equipped for today's multifaceted information environment than students who are not. A preliminary investigation conducted by the researchers revealed that there is no organized training in information literacy for students both at undergraduate and post graduate levels at the University of Mines and Technology. Apart from a one week orientation given to students when they arrive as freshmen, and sometimes lecturers arranging for a session with librarians to give tutorials to students on how to search for information, there is no provision for information literacy education as a major course to be studied in the university. It is for this reason that this study seeks to find out the information literacy levels of undergraduate students who have enrolled in the University.

The purpose of this paper is to determine information literacy skills and competencies among incoming first-year undergraduate students in higher learning institutions in Ghana with specific emphasis on University of Mines and Technology (UMaT), Tarkwa. The objectives of the study are to identify the type and formats of resources that undergraduate students are aware of, to determine whether the undergraduates are aware of search strategies for both print and electronic/online resources, to determine whether undergraduate students possess basic information and communication technology skills, to find out whether undergraduate students know information retrieval tools and their use and to determine whether students are aware of intellectual property and copyrighted materials and their ethical use.

Review of related literature

The Concept of Information Literacy

Information has become a very important resource in every sector of operation, and people rely on it for their functioning and livelihood. Al-Aufi and Al-Azri (2013) indicates that information resources are important for the progress of human civilization and advancement, as recent developments in information technology and communications have dramatically changed the way people access and use information. According to Oakleaf and Owen (2010), information literacy is an essential component of a successful academic career. Horton (2008) note that in the digital world and 21st century's global information society, IL is one of the literacies that encourage persons to perform competitively and productively. Excelsior College policy document concludes that providing a background in information literacy is a necessary requirement for all undergraduate students. This assertion is contained in the quotation below:

“In this age of information proliferation, students must acquire the necessary skill to understand and discern the wide range of content across all mediums. Students must be able to determine where to locate and effectively access information, critically evaluate the source and use the information within legal and ethical parameters” (Excelsior College, 2016)

Owusu-Ansah (2005) notes that an information literate student is able to:

- identify a specific focus for research/ assignment project;

- determine the nature, scope and depth of information needed;
- understand what kind of information is needed and why;
- determine specific tools to use for retrieval of required resources;
- formulate appropriate strategies for location and retrieval of those resources;
- develop checklists and skills for screening, evaluating and selecting resources;
- understand the process and requirements of scholarly communication;
- understand the role of citations and attribution in the communication of knowledge and
- properly present assembled, interpreted, or newly created information.

Doyle (1994), on his part, describes an Information literate person as one who:

- recognises that accurate and complete information is the basis for intelligent decision making;
- recognises the need for information;
- formulates questions based on information needs;
- identifies potential sources of information;
- accesses sources of information including computer-based and other technologies; evaluates information;
- organises information for practical application, integrates new information into an existing body of knowledge and
- uses information in critical thinking and problem solving.

It could be inferred that the two authorities, mentioned above, agree with the core principle that an information literate person should be able to determine when he needs information, where to get it, how to get it and how to use it.

Reitz (2004) sees IL as having the skills to recognize information needs, to understand how to organize library systems, to have knowledge of information resources that are provided by the library, to understand research methods, to evaluate technical information efficiency and to understand technology infrastructure and information in the context of society, politics and culture.

Baro, Edouware and Ubogu (2010) suggest that information literacy skills open the gateway of information to students and all information seekers and users across disciplines. It is a way of exposing users to the world of knowledge. It helps students know when information is required, how to locate, evaluate, organise, and effectively create, use, and communicate it. Hence, students who lack these skills experience delays and frustration when attempting to complete course-related work which requires research. Julien and Barker (2009) notes that students who mastered advanced information literacy skills had better performance in their academic grades.

It is clear from the foregoing discussions that cultivation of appropriate information literacy skills is pertinent to students' ability to search and use information effectively. Information literacy skills are not used solely for academic research but are also utilized in the students' inquiries related to their day to day activities (Head & Eisenberg, 2009 as cited by Duncan & Varcoe, 2012). Hence, Information literacy is important particularly in this age, because it allows us to cope by giving us the skills to know when we need information and where to locate it effectively and efficiently. It includes the technological skills needed to use the modern library as a gateway to information. It enables us to analyze and evaluate the information we find, thus giving us confidence in using that information to make a decision or create a product (ACRL, 2005 as cited by Baro & Fynemen, 2009).

Klomsri and Tedre (2016) describe two types of information literacy. These are digital, visual and media literacies on one hand and academic literacy on the other. They indicated that digital, visual and media literacies are related to one's ability to read, write and otherwise deal with digital sources effectively using ICT. Academic literacy, on the other hand, refers to information literacy within the academic context where people are expected to understand how to use resources such

as online databases, OPAC, journal articles as well as experts and authoritative bodies to obtain knowledge and achieve the academic responsibilities.

Importance of Information literacy skills to students

The importance of information literacy skills to all individuals and students in general cannot be overemphasized. Information literacy has become an important skill for students due to societal changes that have seen information become a valuable commodity, the need for graduates to become lifelong learners, and the recognition that information literacy is very essential for effective learning in higher education. Much of the discussion around this issue has arisen in recognition that we have entered an age where the quality and quantity of information needed to operate effectively in society and the workplace continue to increase. People must be abreast with the fast changing information technology and acquire this information literacy skill to act independently in this information rich environment (Baro, 2010).

Information literacy is critical to both lifelong learning and day-to-day activities. Lifelong learning incorporates both formal and informal education, ranging from basic education, tertiary education and adult education. The importance of IL in lifelong learning is highlighted by the ALA's IL standards on higher education which state that "Information literacy is a key component of, and contributor to, lifelong learning. Information literacy competence extends learning beyond formal classroom settings, and provides practice with self-directed investigations as individuals move into internships, first professional positions, and increasing responsibilities in all areas of life. As information literacy augments students "competence with evaluating, managing, and using information, it is now considered by several regional and discipline-based accreditation associations as a key outcome for college students" (ALA 2000, p. 4).

It has also been reported that information literacy helps to solve the problem of data smog (<http://www.ala.org/acrl/issues/infolit/overview/intro-old>). Data smog refers to the notion that too much information creates barrier to people's lives. This is as a result of the ever increasing mode of information technology that has caused increase in the production of information. Information literacy helps to overcome data smog because it helps the individual to determine information need, locate needed information, analyze the retrieve information and communicate information that have been retrieved.

To sum up, information literacy competencies would assist students to become independent and authentic learners rather than only dependent on their teachers or the notes or limited materials provided by them.

Methodology

Study Area

The study was limited to the first year undergraduate students of the University of Mines and Technology, Tarkwa who were admitted into 2016/17 academic year. The University of Mines and Technology (UMaT) started as the Tarkwa Technical Institute (TTI) on 3rd November, 1952 but was officially commissioned by the Government of Ghana, more precisely by His Excellency the Governor of the Gold Coast, Sir Charles Noble Arden Clarke, on 7th October, 1953. In 1961, the Government, upon the advocacy of the Ghana Chamber of Mines, refined the mission of TTI to incorporate the training of mining technicians and other middle level manpower for the country's mining and related industries. Accordingly, the name TTI was changed to Tarkwa School of Mines (TSM) to reflect the new mission.

With assistance, over the years, from the Canadian International Development Agency (CIDA), United Nations Development Programme (UNDP) and Gesellschaft fuer Technische Zusammenarbeit (GTZ), TSM upgraded and developed its academic facilities and staff to enhance its capacity for training highly qualified personnel for the growing mining and related industries in Ghana. In 1976, the Government recognised the capability of TSM and its strategic location at Tarkwa, which is at the centre of mining activities in the country. As this location gave TSM a special strength for mining education, TSM was affiliated to the Kwame Nkrumah University of Science and Technology (KNUST) as a faculty of the University so as to enable TSM offer degree, diploma and certificate programmes in mining and related fields.

The name TSM was changed to KNUST School of Mines (KNUSTSM), Tarkwa. The KNUSTSM, Tarkwa and the Kumasi School of Mines were merged to become the Institute of Mining and Mineral Engineering (IMME).

In 1988, a University Rationalization Committee (URC), commissioned by the Ministry of Education, recommended the development of the School and its conversion into a University. In

2000, the conversion of KNUSTSM into a University was again strongly recommended by Louis Berger Inc. in association with Kwame Asante and Associates in a report on partial commercialisation of KNUST.

In 2001, the Council of KNUST considered and approved proposals and recommendations of the Academic Board to merge the School of Mines at Kumasi and the School of Mines at Tarkwa into the Western University College of KNUST. Tarkwa.

On 3rd November, 2004, at exactly 11.35hrs GMT, the Parliament of the Republic of Ghana passed the bill on the University of Mines and Technology into an Act of Law. On the 11th of November, 2004, the President of Ghana gave the Presidential Assent and on the 12th of November, 2004 the University of Mines and Technology, Tarkwa Act 2004 (Act 677) was gazetted and thus, became a law (Anon, 2018).

Resources and Methods Used

The authors adopted the case study research design for this study. The case study design, according to Leedy and Omrod (2001), is a type of qualitative research in which in-depth data are gathered relative to a single individual, program, or event, for the purpose of learning more about an unknown or poorly understood situation. The method was deemed suitable for this study as it would enable a close examination of information literacy skills among incoming first year undergraduates in UMaT, Tarkwa. In order to achieve the objective of the study, both primary and secondary sources were used for the study. The primary sources of information consisted of data obtained from the administration of questionnaire while the secondary sources consisted of books, reports, related journal articles, UMaT internally generated bulletins and the internet.

The main instrument for data collection was questionnaires containing closed and open-ended questions, designed based on the objectives of the study. The UMaT Basic Statistics (2017) indicates that 542 students were admitted into the first year of the 2016/17 academic year. The simple random sampling technique was used to select 100 first year undergraduates representing approximately 18.5% of the total 542 students admitted, to whom sets of questionnaire were administered to solicit the needed information from them. The sample population was selected as they entered the University Library for studies. Saunders, Lewis and Thornhill (2012) opine that

in a situation of this nature the sample size selected is suitable to generalise the results for the whole population.

Out of the 100 sets of questionnaires administered, 84 sets, representing 84% were returned with useful responses. The data collected were analyzed using IBM SPSS Statistics version 24 and Microsoft Excel 2016. These softwares were used because they are regarded as appropriate for a research of this nature. Data analysis was univariate using descriptive statistics of frequencies and percentages presented in simple tables.

Results and Discussion

Use of the Library and its Importance

To be a competent information literate person it is important for one to acquaint himself with effective use of the library, be it electronic or manual, cannot be overemphasized. This is because libraries are embodiment of information in all formats: print, electronic, microforms, tapes, audio, video etc. In this regard the study sought to find out from the respondents if they had used a library in one way or the other in their lifetime. All the respondents 84(100%) responded in the affirmative. Again, 82(97.6%) alluded to the statement that the library was an important component of their studies in the university. Table 1 shows the responses on how important the library is as far as their studies are concerned as indicated by the respondents.

Table 1: Importance of the Library

Importance of Library	Frequency	Percentage (%)
Helps in research	73	86.9
Provides recreational information materials	5	6.0
Helps in providing information for my assignment	4	4.8
None of the above	2	2.4
Total	84	100.0

Source: Field survey

From Table 1 the majority 73(86.9%) indicated that the Library helps them in conducting research. 5(6.0%) saw the Library to be providing recreational information materials while 4(4.8%) saw the Library to be providing information for their assignments. On the hand 2 (2.4%) of the respondents indicated “none of the above” as their responses.

Knowledge of Variety of Information Formats

Knowing the variety of formats in which information can be carried, and understanding how information can be retrieved from them are of utmost importance for one to be a competent information literate person. This characteristic would enable one to search for information in any environment one finds oneself at any time. The study therefore sought to find out the level of knowledge of the major information formats among the respondents. Their responses indicated that all 84(100%) had knowledge about the two principal information formats: print and electronic.

Library Orientation

Library orientation is an essential ingredient if one is to become an information literate person. Library orientation or Library instruction may be described as programmes or sessions conducted by Faculty Librarians, and are designed to introduce students to the library’s wealth of resources and to strengthen their research skills. These programmes empower the students to become information literate persons. In this regard the study sought to establish if the respondents had attended a library orientation before. Their responses are as contained in Table 2.

Table 2: Attendance of Library Orientation

Attendance	Frequency	Percentage (%)
Yes	57	67.9
No	26	31.0
(Unanswered)	1	1.2
Total	84	100.0

Source: Field survey

The responses, as in Table 2 shows that 57(67.9%) had one time or the other attended library orientation while 26(31.0%) responded in the negative. 1(1.2%) declined to respond. This could

be interpreted to mean that there is quite a substantial number of students that needs to be introduced to library orientation to assist them to undertake effectively the research aspect of their studies.

When required to indicate where they first experienced library orientation, 38(45.2%) mentioned the secondary school, 25(29.8%) mentioned the university while 12(14.3%) mentioned the primary school. 5(6.0%) indicated the college while 4(4.8%) failed to answer. It could be construed that the majority, at least, 80(95.2%) had, in one way or the other, undergone library orientation in their school time. This is summarised in Table 3.

Table 3: Place of Library Orientation

Place of Orientation	Frequency	Percentage (%)
Primary School	12	14.3
Secondary School	38	45.2
College	5	6.0
University	25	29.8
(Unanswered)	4	4.8
Total	84	100.0

Source: Field survey

The object of the type of library instruction given determines how equipped the recipient would be with the skill needed to information literate. For this reason the respondents were presented with possible forms of library instruction from which to indicate which ones they had benefited from. Their responses are presented in Table 4 below:-

Table 4: Forms of Library Orientation

Form of Orientation	Frequency	Percentage (%)
How to do referencing in academic work	22	26.2
How to use library catalogues	14	16.7
How to search library databases	6	7.1
How to access information materials in the library	14	16.7
(Unanswered)	28	33.3
Total	84	100.0

Source: Field survey

From the responses in Table 4, 22(26.2%) indicated that they received instructions on how to do referencing in academic work while 14(16.7%) indicated that they received library instructions on how to use library catalogues. 6(7.1%) mentioned how to search library databases while 14(16.7%) mentioned how to access information materials in the library. 28(33.3%) however, could not give any response. This could be interpreted to mean that they lacked knowledge about the various forms of library orientation.

Computer Literacy and Conversance with Internet Use

In today`s information age era, one need to be computer literate in order to remain relevant in the world of information explosion. This is key to acquiring the skill required to be successful with information retrieval systems. Knowing and understanding the use of emerging technologies such as computers, laptops, iPhone, mobile phones, iPad, etc. are key to exploring the world of information. In this regard the respondents were asked to indicate whether they were computer literates or not. In their responses 77(91.7%) indicated that they had been trained in computing while 5(6.0%) answered in the negative. Again, 76(90.5%) responded that they had been trained in the use of Microsoft word applications while 4(4.8%) had been trained in Spreadsheets.

The internet has become a very important source of information in this era of information age. It was therefore not surprising when 78(92.9%) indicated that they used the internet to search for information among other things. One should therefore be conversant with the use of the internet if

he/she is to be a competent information literate person. The study therefore sought to determine how familiar the respondents were with the use of the internet. 81(96.4%) responded that they could effectively use the internet while 1(1.2%) responded in the negative. 2(2.4%) however declined to respond.

Evaluation of Information Found

As the internet is not controlled by any appointed individual or group, anybody, irrespective of academic, social, religious, ethnic or cultural background can put out any information on the internet for public readership and consumption. This assertion suggests and implies that, not every information found on the internet is authentic or credible. It is therefore imperative for an information literate person, and for that matter any information user or researcher, to critically evaluate any information obtained for its credibility, reliability, authoritativeness, authenticity, objectivity, accuracy and timeliness before use. The ability of one to evaluate information for its credibility and usability is a hallmark of information literate person. In this regard the study sought to ascertain from the respondents their level of knowledge of the various criteria for evaluating information sources and information resources. Their responses are summarised in Table 5 below.

Table 5: Criteria for Evaluating Information

Evaluation Criteria	Frequency	Percentage (%)
Timeliness	10	11.9
Authoritativeness	22	26.2
Accuracy	31	36.9
Credibility	2	2.4
I Don't Know	19	22.6
Total	84	100.0

Source: Field survey

From the responses obtained from the respondents it was revealed that while quite a good number knew of one criteria for evaluating information or the other, 19 of them representing 22.6% responded that they did not have knowledge about them. This, again, suggests that there is a large number of students that needs to be informed and introduced on criteria for evaluating information.

Search Strategy

A competent information literate person should be conversant with search strategy. A search strategy is an organised structure of key terms used to search a database. The search strategy combines the key concepts of search question so as to retrieve accurate results. In this regard the study sought to determine the knowledge of search strategy among the respondents. In their responses to the question as to whether they had heard of the term “search strategy”, 33(39.3%) responded in the affirmative while 50(59.5%) responded in the negative. They were again asked to choose from a list of definitions that best describes a search strategy. Their responses are contained in Table 6.

Table 6: Description of search Strategy

Definition	Frequency	Percentage (%)
A Manual describing a proper format for a research paper	3	3.6
A hand out explaining how to get books from other libraries	3	3.6
A list of books on specific topics	6	7.1
A plan of action that gives direction to your research	13	15.5
I Don't Know	8	9.5
(Unanswered)	51	60.7
Total	84	100.0

Source: Field survey

From the responses given in Table 6, 13(15.5%) got their answers correct. 51(60.7%) could not respond, with 8(9.5%) indicating that they did not know. It could therefore be deduced that their knowledge on search strategy is low.

Boolean Operators

Closely associated with search strategy is Boolean logic operators. Knowledge about Boolean logic operators, and how to use them when searching for information on a given topic is paramount to an information seeker or researcher. Information literate person should therefore be able to apply Boolean logic operators to conduct searches. These operators are AND, OR and NOT. They are used to combine/include or exclude/eliminate search terms in the course of searching databases. When required to indicate their knowledge about Boolean logic operators, 34(40.5%) responded that they had heard about them while 49(58.3%) responded that they had not heard about Boolean operators.

Again, the study sought to find out from the respondents what, in their opinion, the Boolean logic operators are used for. 33(39.3%) stated correctly that they were used to combine or exclude search terms in the course of searching databases. 3(3.6%) got their answers wrong while 48(57.1%) could not answer the question, an indication that they might be ignorant about the uses of Boolean logic operators.

This interpretation was somehow corroborated by the response given when they were asked to indicate which of the Boolean logic operators (AND, OR and NOT) would increase the number of items to be retrieved. Their responses are summarised in Table 7 below.

Table 7: Knowledge of Uses of Boolean Logic Operators

Boolean Operators	Frequency	Percentage (%)
AND	18	21.4
OR	10	11.9
NOT	4	4.8
I Don't Know	30	35.7
(Unanswered)	22	26.2
Total	84	100.0

Source: Field survey

From the responses obtained from the respondents, only 10(11.9%) could indicate correctly that the AND operator increases the number of items to be retrieved. 30(35.7%) indicated that they did

not know while 22(26.2%) could not answer the question at all. This suggests that their knowledge about the use of Boolean logic operators was low.

Ethical Use of Information

The use of information is very central to the entire activity of mankind. Even though the use of information in the life of any individual is indispensable it is associated with responsibility. According to Kwafua and Afful-Yeboah (2016) an information literate person should understand many of the economic, legal and social issues surrounding the use of information, and access and use information ethically and legally. In a question to the respondents regarding their awareness of the implications of using another author’s intellectual work without acknowledgement, 81(96.4%) responded in the affirmative while 2(2.4%) responded in the negative.

Again, 75(89.3%) knew that failure to give credit to a source is known as plagiarism, with the remaining 9(10.7%) not knowing the name given to it.

The study furthermore sought to test the respondents’ understanding of plagiarism by giving them a set of definitions from which to choose, one that best describes plagiarism. Their responses are summarised in Table 8.

Table 8: Meaning of Plagiarism

Definitions of Plagiarism	Frequency	Percentage (%)
Paraphrasing an author’s idea without acknowledging	41	48.8
Using an author’s exact words without giving credit	26	31.0
Unintentionally paraphrasing an author’s idea without mentioning the source	2	2.4
I do not know	14	16.7
(Unanswered)	1	1.2
Total	84	100.0

Source: Field survey

Information Literacy Course

Information literacy, for that matter being information literate, cannot be underestimated in the life of every university student. It is so vital that lack of it may lead to very disturbing moments for the student as far as conducting research is concerned. The University student's ability to independently search for information from various sources is very critical. This is because conducting, research which is a major activity of a university student, is closely associated with information search and use. For this reason it was enquired from the respondents if there was a course, in their course structure, being offered on information literacy. All the respondents responded in the negative.

In Information Literacy understanding the concepts of intellectual property and copyright is very important. This is because every new invention or information put out there is the intellectual output of another person and it must be acknowledged as such. Again, where necessary, permission must be sought from the copyright owner before use. Knowledge of intellectual property and copyright was sought from respondents, and their observations are summarised in Table 9.

Table 9: Knowledge of Copyright and Intellectual Property

Attendance	Frequency	Percentage (%)
Yes	69	82.1
No	14	16.7
(Unanswered)	1	1.2
Total	84	100.0

Source: Field survey

From Table 9 it was observed that majority 69 (82.1%) had knowledge about copyright and intellectual property. However 14(16.7%) indicated that they had no knowledge about the concepts.

Conclusion

The use of information is very central to the academic activities of university students. It is therefore imperative for Faculty and librarians to assess the information literacy levels of students

under their tutelage to inform their curricular content. It was found out from the study that the levels of information literacy among the first year students is low. The knowledge of the students on effective search strategies is below standard, and that calls for the need to address the problem. The results of the study is of several significance. As students, Faculty and Librarians, the study provides an insight into the concept of information literacy as a broad and useful area. The results of the study, again, provide an opportunity for Faculty to revise their content of their course delivery. Moreover, students should be, as much as possible, self-dependent in the course of seeking information.

Recommendations

To improve the information literacy skills of the students of the University of Mines and Technology the following recommendations are provided:

- The University should develop a course outline on Information Literacy to be included in the academic curricula that would aim at improving and sharpening the information literacy skills of the students.
- It is again recommended that the University Library should be resourced, in terms of personnel and equipment, to enable it to organise periodic information retrieval sessions for students.

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