

# INFORMATION LITERACY LEVEL OF THE FIRST-YEAR UNDERGRADUATE STUDENTS IN THE FACULTY OF TECHNOLOGY, UNIVERSITY OF SRI JAYEWARDENEPURA, SRI LANKA

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## ABSTRACT

*A measure of success in today's technologically smart information era is that an individual can evaluate, manage and communicate information retrieved from any media, be it electronic, human or even print it. Towards this end, universities are having formal information literacy courses for the benefit of incoming undergraduates. In order to design such courses it is necessary to evaluate the knowledge with which a student enters the university. This study is an attempt to assess the basic information literacy level of incoming undergraduate students entering the Faculty of Technology in the University of Sri Jayewardenepura, Sri Lanka in 2017. The research was designed based on the ALA information literacy competency standards for higher education. Data was collected using a quantitative survey strategy using a questionnaire. Sample was conveniently selected at the first lecture on information literacy and sixty four students who attended as the first group of the first lecture were given the questionnaire. Results reveal that although the majority of the students can describe what information literacy is, students are not much capable of determining the nature and extent of the information needed. However, the survey revealed that students had a better ability to retrieve and search information. Results further revealed the ability to ethically use of information is not at an appropriate level. Despite the mean mark being 54.38 for the overall literacy level which is slightly better, it is proved that the skills related to information literacy are lower. Therefore, the recommendation is to conduct formal information literacy courses with practical classes.*

## KEYWORDS

Information literacy, ALA standards, undergraduates

## INTRODUCTION OF THE STUDY

Today's one of the challenges which universities and higher education institutions face all over the world is producing graduates who will fit the knowledge economy. Criticisms arise whether higher education systems address emerging requirements through their learning processes as most of the graduates are not critical, analytical and creative thinkers, sufficiently attuned to the need for ever learning skills (Aulich 1990 as cited in (Candy 1995). Ever learning or learning throughout life or lifelong learning is one of the skills covered under information literacy, which is "central to achieving both personal empowerment and economic development" (Bruce 2004, 8). Therefore, information literacy is an essential component for the twenty-first century higher education (Bruce 2004, 8). Universities and higher education institutions set their goals to turn out higher education in developing the characteristics that support learning throughout life through information literacy.

Information literacy is "a set of abilities requiring students to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (American Library Association 2000), which adopts for the study to measure the level of information literacy of students. Information literacy enables learners to master content and extend their investigations, becoming more self-directed, and assuming greater control over their own learning. Information literacy forms the basis for lifelong learning common to all disciplines.

Information literacy skill level of undergraduates is often studied in theoretical and empirical bases in various contexts; different subject disciplines, cultural settings and various aspects (Maughan 2001; Ranaweera 2008; Baro and Fyneman 2009; Seneviratne and Wickramasinghe 2010; Salisbury and Karasmanis 2011; Abdelrahman, Jwaifell, and El-Subhien 2014; Kimani and Onyancha 2015; Nierenberg and Fjeldbu 2015; Hughes, Hall, and Pozzi 2017). However, with the rapid development of the information and communication technologies, the information milieu turns into increasingly complex and the information literacy skills of students will not be constant over time. Also, the same studies may not be relevant in different contexts. According to the literature review, there has been very little effort to measure information literacy level of freshmen a new subject discipline like Technology a theoretical perspective. Due to the non-availability of such specific studies, especially in Sri Lanka, the current research aims to fill this gap investigating entry level information literacy of undergraduate students in the Faculty of Technology in the University of Sri Jayewardenepura, Sri Lanka, with the aim of developing future information literacy programs.

## BACKGROUND OF THE STUDY

The basic idea of information literacy has emerged with the advent of information technologies in the early 1970s (Bruce 2004) and the term 'information literacy' was first set up in 1974 by Paul Zurkowski, who was the former president of the United States Information Industries Association (Kimani and Onyancha 2015). In general,

information literacy is the awareness of how to find and use information that facilitates learning in the tertiary environment (Lupton, 2008 as cited in (Salisbury and Karasmanis 2011). This means the information literacy concept is imperative in higher education.

### • INFORMATION LITERACY IN HIGHER EDUCATION

According to (Bruce 2004), information literacy has “become recognized as the critical literacy for the twenty-first century (p. 8)”, it is needed that students should leave tertiary education with information literacy and skills appropriate to the information age (Hepworth 1999). Moreover, “developing lifelong learners is central to the mission of higher education institutions like universities” ((Baro and Fyneman 2009), p. 663) since the graduates contribute much for the future of the society. Therefore, the undergraduates should be information literate since it “is a natural extension of the concept of literacy in our information society, and information literacy education is the catalyst required to transform the information society of today into the learning society of tomorrow” (Bruce 2004, 8).

Although higher education believes that the students should gain all imperative learnings at the university, it is clear that “students cannot learn everything they need to know in their field of study in a few years in the universities” (Baro and Fyneman 2009, 660) because university education is mainly to encourage students to achieve knowledge, skills and attitudes related to particular subject areas. (Ranaweera 2008) shows traditionally higher education assumes that the students will gain information literacy skills automatically by themselves. Therefore, it is important to ensure that graduates have the intellectual abilities of problem solving and critical thinking, and constructing a framework on how to learn. “In the university environment information literacy is like other fundamental capabilities that support learning and need to be developed early in the first year of study” (Salisbury and Karasmanis 2011, 43) because information literacy and learnings in the university are entwined with one another.

However, information literacy should be inculcated among students through higher education since “irrespective of the disciplinary stream, each and every student should be able to access, use and communicate information in an innovative manner” (Ranaweera 2008, 6). Therefore, the information literacy curriculum plays a major role in the higher education. This concept has further been emphasized by (Kimani and Onyancha 2015) through their study on “Information literacy skills among incoming first-year undergraduate students at the Catholic University of Eastern Africa in Kenya”. They recommends that information literacy should be integrated as a mandatory course into the university curriculum for all incoming first-years and the policies should be reviewed associated to the training in information literacy concerning lifelong learning, as espoused by the university. The responsibility in implementing specifically suited information literacy education in universities should be taken by the library professionals with the support of

academic and administrative staff and it is further affirmed in the study conducted by (Mittermeyer and Quirion 2003) making prominent the role of university libraries in the development and promotion of information literacy.

Therefore, it is apparent that current research can contribute to initiating a successful information literacy education in a university in Sri Lanka to be well-suited as it measures the entry-level skill level of the students.

### • INFORMATION LITERACY SKILLS OF UNIVERSITY STUDENTS

Present-day university students experience growing complexity of the technological environment with propagating plenteous information resources. Therefore, they have to deal with a “diverse, abundant information choices in their academic activities and in their personal lives” (American Library Association 2000, 2). These information choices come through an unbreakable array mostly via novel information & communication technologies and they consist of variety of unfiltered formats with multiple media, such as graphical, aural and textual. This uncertain quality and expanding quantity of information create huge challenges about its authenticity, validity and reliability as well as in evaluating and understanding them for individuals. It is therefore imperative to have complementary cluster of abilities to use information efficiently and effectively for students' to successfully fulfill their information needs (American Library Association 2000). Having information literacy skills is one of the solutions for this challenge since it equips graduates with the critical thinking skills vital to become independent lifelong learners (Baro and Fyneman 2009).

In this information age, university learning process is progressively based on the capacity to grasp with information and to apply it in problem solving and critical thinking as well. As (Baro and Fyneman 2009) featured “learning to learn, learning to transform information into new knowledge and new knowledge into applications become more important today than memorizing specific information” (p. 664). Therefore, universities need a paradigm shifts towards information literacy skills with the ability to:

- determine the extent of information needed
- access the needed information effectively and efficiently
- evaluate information and its sources critically
- incorporate selected information into one's knowledge base
- use information effectively to accomplish a specific purpose
- understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally ((American Library Association 2000, 2), p. 2-3)

Information literacy skills should be possessed by undergraduate students irrespective of the subject or of the medium in which it is conveyed (Candy, 2002 as cited in (Baro and Fyneman 2009). Several researchers have shown the inevitability

in endorsing information literacy skills in university students (Mittermeyer and Quirion 2003) and assessing information literacy skills of undergraduates (Seneviratne and Wickramasinghe 2010).

(Hepworth 1999) has conducted a study to determine the strengths and weaknesses in terms of information literacy and related skills of Nanyang Technological University students. In 2015, (Nierenberg and Fjeldbu 2015) have conducted a study aiming to document first-year undergraduate students' information literacy skills at a typical university college in Norway and another research has investigated the information literacy skills and competencies among incoming first-year undergraduate students at the Catholic University of Eastern Africa (CUEA), Kenya (Kimani and Onyancha 2015). Within these studies the parallel result reveal that majority of students have limited skills in information literacy which students should possess when they joined the university and they still have much to learn about information literacy (Nierenberg and Fjeldbu 2015) (Nierenberg and Fjeldbu 2015).

Furthermore, (Maughan 2001) reveals through a series of studies conducted during 1994-1999 at the University of California-Berkeley the median score for information literacy competencies of graduates in five of the eight groups was a failing score. According to the study done by the Department of Library and Information Studies of the University of Botswana to determine the level of integration of information literacy within its academic programs revealed that most of the students were ill-equipped with requisite information literacy skills such as ability to identify, locate, review, select, and apply information needed for their studies and in the work environment (Mutula, Wamukoya, and Zulu 2004). A survey to measure the entry-level information literacy skills of first year health sciences students at La Trobe University conducted by (Salisbury and Karasmanis 2011) has reached the conclusion that they were not skilled in information literacy to meet the needs of first year research requirements. Moreover, it is pointed out that information literacy skills are not mastered by the students who major in English Language at Al-Hussein Bin Talal University (Abdelrahman, Jwaifell, and El-Subhieen 2014). Alternatively, some of the students are not able to understand the importance of having information literacy skills for their career (Baro and Fyneman 2009; Abdelrahman, Jwaifell, and El-Subhieen 2014).

Now it is apparent that a large number of studies have been conducted to measure the information literacy skills of the university students across the world. However, all those studies reveal inadequacy of information literacy skills among university students regardless their subject disciplines and the year of study at universities. Moreover, most of the authors assure the necessity of integrating information literacy competencies into the university curriculum (Hepworth 1999; Maughan 2001; Mittermeyer and Quirion 2003; Seneviratne and Wickramasinghe 2010) since it has been proved that university students are ill-literate in information practice. Therefore, this study fills the gap of measuring the entry-level information literacy

skills of university students in newly introduced Technology subject stream in Sri Lankan context.

### • INFORMATION LITERACY AND INFORMATION TECHNOLOGY SKILLS

Information literacy is a distinct and broader area of competence which is necessary to develop some technology skills for information literate individuals. According to a report from the National Research Council (1999), information literacy's focuses on content, communication, analysis, information searching, and evaluation that come under the concept of "fluency with technology" which further cover applying problem-solving and critical thinking to using technology (American Library Association 2000). Moreover, as (American Library Association 2000) shows:

Information literacy, on the other hand, is an intellectual framework for understanding, finding, evaluating, and using information—activities which may be accomplished in part by fluency with information technology, in part by sound investigative methods, but most important, through critical discernment and reasoning (3).

Presently, people are experiencing their fifth and most intense technological revolution era (Munkittrick 2011). According to the Hewlett Packard estimates (2015), there will be one trillion devices connected to the Internet constantly recording and sharing information (Munkittrick 2011). It is clear that in such a situation "information literacy is conceivably the foundation for learning in our contemporary environment of continuous technological change" (Bruce 2004, 8). Simultaneously, students in universities are more technology savvy and always using their mobile devices with Internet connected for all purposes. Therefore, it could be believed that students with sound fluency with technology may perform as much literate individuals.

Conversely, (Adam and Wood 2006), in their study on utilization of information and communication technologies in African libraries, reveal among other factors on ill-usage of technology, the problem of lack of information literacy. Also, (Baro and Fyneman 2009) have shown that lack of information literacy is partly the cause of underutilization of existing information and communication technologies and information resources. It is clear that information literacy skills and technology skills are also interrelated and it is a prominent feature to be considered in researching.

### • STUDENTS AT THE FACULTY OF TECHNOLOGY

Sri Lankan education system has newly introduced a Technology subject stream in 2013 for Advanced Level students with objectives to:

- create science scholars from the higher education to suit the demand in the current job market
- provide the students with the technical skills needed for day to day life

- generate the skills within the students to find technical solutions for real world problems
- develop the skills suitable for the job market within the students
- direct the students towards the professional education according to the national professional qualifications structure (Ministry of Education 2017).

The first batch of students in the Technology stream faced the Advanced Level examination in 2015 and entered universities in 2017. The study is aimed at the students who entered the Faculty of Technology in the University of Sri Jayewardenepura. The strategy of the Faculty of Technology in the University of Sri Jayewardenepura is "to harness the talents of the youth to capture the advantage of relevant emerging technologies to drive the economy by providing an education that encompasses competencies to satisfy the needs of the society" (University of Sri Jayewardenepura 2017, 1). It is apparent that the students enrolled to the Faculty of Technology are in the lead in fluency with information technology than students in other subject streams. While the Technology students' fluency in information technology are important in being information literate, the fluency in information literacy is beneficial to effective use of information and communication technology (Bruce 2004; Adam and Wood 2006; Baro and Fyneman 2009). Therefore, it is worthwhile to investigate the information literacy level of the students in the Faculty of Technology before initiating the information literacy courses there.

#### • THEORETICAL PERSPECTIVES OF THE STUDY

There exist key models and standards for information literacy in the educational settings. All these models and the standards consider the working definition of the information literacy and draw aspects of it to be useful to educators across the world in communicating the character of information literacy for curriculum design and evaluation, for staff development, and for assessing students (Bruce 2004). There are three models and two sets of standards which are suited for this era;

- Eisenberg and Berkowitz' Big6 information skills (Eisenberg and Berkowitz, 1990)
- Doyles' attributes of an information literate person (Doyle, 1992)
- Bruce's seven faces of information literacy (Bruce, 1997)
- The information literacy standards for student learning (ALA and AECT, 1998)
- The ALA information literacy competency standards for higher education (ALA, 2000)

(as cited in (Bruce 2004, 3)

Among these, newly developed ALA information literacy competency standards for higher education provide a complete framework to assess the information literacy level of individuals. The competencies presented through that framework outline the process by which faculty, librarians and others locate specific indicators that identify a student as information literate (American Library Association 2000, 5).

However, a little found in the literature applying this to university settings (Maughan 2001; Abdelrahman, Jwaifell, and El-Subhieen 2014) specifically in a developing country context like Sri Lanka. Therefore, it is imperative to adapt this framework to examine the extent to which undergraduates in the Faculty of Technology in the University of Sri Jayewardenepura meet these standards. Although, five standards are formed in the framework, the current study adapted three important standards as the base to measure the students' basic information literacy level.

#### • RESEARCH PROBLEM

One of the measures of success on the main pillars of the university education; teaching, learning and research today, is how well one can recognize the need, access, evaluate and appropriately and ethically use information that come through electronic, human or print media within this technological environment. Simultaneously, the new entrants to universities belong to the Net generation who are accepting new technology from where a vast array of information comes and more technically facile than the former generations. Therefore, the universities all over the world have taken efforts to implement information literacy education within universities. However, they have not made sufficient efforts to assess the prior skill levels at the commencement of information literacy courses. Understanding student prior knowledge provides a foundation on which to introduce appropriate learning activities during the courses. Therefore, there is a need to evaluate what type of information literacy skills new comers bring to universities to initiate the courses successfully. Although the most of the studies have been conducted on assessing basic information literacy level of university students by various researchers in various aspects all over the world, there is a knowledge gap with assessing entrant level information literacy skills of the students enrolled to the Faculty of Technology as they have already studied ICT as a subject at the school level and gained the knowledge which is supportive to be information literate and vice versa. Therefore, the current study focuses the basic information literacy level of the undergraduate students at the Faculty of Technology in the University of Sri Jayewardenepura, Sri Lanka before commencing the formal information literacy course for them. The study further suggests the best approaches to Information Literacy instruction in the first year at the Technology Faculty.

#### • PURPOSE OF THE STUDY

The purpose of this research was to examine the information literacy skills already possess by the first year students at the Faculty of Technology in the University of Sri Jayewardenepura.

The specific objectives of the study are:

1. To examine the students' awareness on information literacy concept.
2. To determine the nature and extent information needed.

3. To examine the students' ability to access needed information effectively and efficiently.
4. To examine the students' ability to use information correctly & ethically

### RESEARCH DESIGN

Research design was based on the ALA information literacy competency standards for higher education to assess the level of information literacy of an individual. The study was conducted using quantitative methods and adopted a survey strategy through a questionnaire as a mean of collecting data according to the ALA framework standards. Only the first year undergraduate students, joining to the Faculty of Technology of the University of Sri Jayewardenepura, were targeted in this study. The first-year undergraduate students were the preferred population since they would have just moved from schools and purpose of this study was to examine their information literacy skill level; and they had not yet been exposed to the university's information literacy programs. The size of the population was the total number of new entrants to the Faculty of Technology in the year 2017, which was 300. Sample was purposely selected at the initial lectures on information literacy. Sixty four students attended to the first lecture were taken as the sample for the study.

The questionnaire consisting of 15 questions was developed to gather data. The items of the questionnaire are based on the main three information literacy competency standards for higher education framework and those skills were linked to variables, awareness of information literacy concepts, knowledge about their information needs, ability to locate, evaluate and use information properly. Questions were drawn from pretested questionnaires (Maughan 2001; Abdelrahman, Jwaifell, and El-Subhieen 2014) used for earlier surveys. Table 1 presents the format of the questionnaire.

**Table 1:** Format of the questionnaire

| Objective  | No of Questions | Description  |
|--|-----------------|--|
| 1. Information literacy concept                          | 01              | Clause which best describe the information literacy concept  |
| 2. Nature and extent information needed                  | 06              | Identifying key concepts Combining concepts<br>Variety of types of information (formats, purposes) |
| 3. Access needed information effectively and efficiently | 05              | Use of various information sources<br>Use of information retrieval systems<br>Searching strategies |
| 4. Use information correctly & ethically                 | 03              | When referencing needed<br>Basic idea about plagiarism   |

The survey was conducted in the first semester on 2017/February. To maximize the response rate, data were collected using a pencil and paper questionnaire administered during lecture hours allocated for information literacy maintaining the transparency without having any personal details of students. A total of 64 usable responses were collected and data were analyzed using SPSS version 20 to present the descriptive analysis.

### FINDINGS OF THE STUDY

Findings are based on 64 responses. No demographic information was collected from the respondents.

### INFORMATION LITERACY CONCEPT IDENTIFICATION

First they were tested to get an idea about their knowledge on information literacy concept using a single question which was to find the best simple description of information literacy. Sixty one out of sixty four (61/64) have correctly answered the question. It reveals that more than 95% of the respondents have a basic idea about the information literacy concept to describe what information literacy is.

### NATURE AND EXTENT INFORMATION NEEDED

Six questions were included to determine the nature and extent of the information needed; whether they articulate the information need, identify key concepts, combine the concepts and identify the variety of information sources and formats as given in the framework. Table 2 summarizes the descriptive statistics of the marks obtained for those questions.

**Table 2:** Descriptive statistics of the marks obtained for the questions on the nature and extent information needed

|                    |       |
|--------------------|-------|
| Mean               | 39.32 |
| Median             | 33.33 |
| Mode               | 33.33 |
| Standard Deviation | 16.09 |
| Range              | 83.33 |
| Minimum            | 0.00  |
| Maximum            | 83.33 |

According to the Table 2, Minimum mark is 0 and the maximum mark is 83. Most frequently obtained mark by students is 33.33 (mode) and the mean mark is 39.32 which is below 50. It means that the respondents are in a lower level in determining the nature and extent of the information needed articulating the need and identifying a variety of types and formats of potential sources for information. This

may be because, the students may not have skills on information literacy gained at their schools or anywhere, though they have a basic idea what information literacy is.

### ABILITY TO ACCESS INFORMATION EFFECTIVELY & EFFICIENTLY

Five questions were formulated to assess the students' ability on selecting the most appropriate investigative methods or information retrieval systems for accessing the needed information, constructing and implementing effectively designed search strategies, retrieving information online or in person using a variety of methods and refining the search strategies if necessary. Marks obtained for those questions out of 100 were descriptively analyzed and presents in Table 3.

**Table 3:** Descriptive statistics of the marks obtained for the questions on the ability to access information effectively and efficiently

|                    |        |
|--------------------|--------|
| Mean               | 64.38  |
| Median             | 60.00  |
| Mode               | 60.00  |
| Standard Deviation | 19.01  |
| Range              | 80.00  |
| Minimum            | 20.00  |
| Maximum            | 100.00 |

As shown in the Table 3, the mean mark is 64.38 and the most frequently obtained mark is 60 (mode) and the median is also 60. It discloses that most of the students have obtained marks around 60 by correctly answering at least 3 questions out of five. The results reveal that the ability on accessing information standard has been achieved by the students at a good level. Students' ability on information retrieval and searching strategies are seemed to be better. This may be because they are technology savvy entered to the Technology Faculty and always be with their mobile devices in searching things. Therefore, they may have gained these skills automatically by practice.

### ABILITY TO USE INFORMATION CORRECTLY & ETHICALLY

Three questions were included to assess the ability to use information ethically. Those were;

1. Use of the abstract of an article
2. Acknowledgement for others work
3. Brief idea about the plagiarism.

**Table 4:** summarizes the answers provided for above three questions.

| Question No | No. of correct answers | Percentage of the correct answers |
|-------------|------------------------|-----------------------------------|
| Q1          | 51                     | 79.7%                             |
| Q2          | 28                     | 43.8%                             |

|    |    |       |
|----|----|-------|
| Q3 | 25 | 39.1% |
|----|----|-------|

Table 4 shows that majority of the students (79.7%) have a better knowledge about the use of the abstract of an article. However, their familiarity in referencing or acknowledgement for others' work and the idea about the plagiarism is low. Only 43.8% of the students have an idea to acknowledge others work and only a few 39.1% knew about the plagiarism. Therefore, results reveal that the ability to ethically use information is poor in the incoming undergraduates of the Technology faculty.

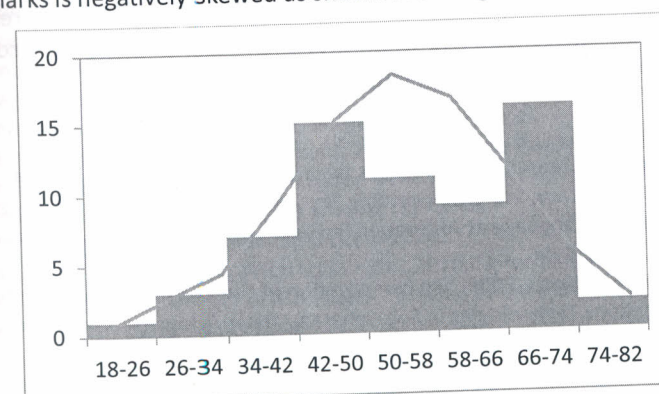
### OVERALL INFORMATION LITERACY LEVEL OF STUDENTS

Total marks obtained for 15 questions covered by three ALA standards on nature and extent information needed, ability to access information effectively & efficiently and ability to use information correctly & ethically were analyses to provide an overall information literacy level of the students.

**Table 5:** Descriptive statistics of the total marks obtained for the questionnaire

| Min   | Max   | Mean  | Std Dev | Mode  | Median |
|-------|-------|-------|---------|-------|--------|
| 20.00 | 80.00 | 54.38 | 12.41   | 46.67 | 53.33  |

Table 5 shows that the minimum mark obtained for the questionnaire is 20 and the maximum mark is 80. The mean mark is 54.38 and the median mark is 53.33 and the most frequently obtained mark (mode) is 46.67. Although the mean and the median are somewhat closer values, mode is lower than those and it presents that the distribution of data is left skewed. It is apparent that the normal distribution for the total marks is negatively skewed as shown in the Figure 1.



**Figure 1:** Histogram and the normal curve for total marks

This graph shows the histogram and the normal curve of total scores of the information literacy questionnaire. The shape is slightly skewed left and it demonstrates only a few students who scored lower than everyone else.

### CONCLUSIONS AND RECOMMENDATIONS

Total 64 students responded and demographic information was not collected. Among all respondents 95.3% of the students can describe the basic concept of information literacy.

Results reveal that that the respondents are in a lower level in determining the nature and extent of the information needed articulating the need and identifying a variety of types and formats of potential sources for information. The mean mark obtained is 39.32. However, the ability on accessing information standard has been achieved by the students at a good level. Students' ability on information retrieval and searching strategies are seemed to be better since the mean, median and the mode of the marks are 60. Simultaneously, results reveal that the ability to ethically use information is not in a standard level among the students since only 43.8% of the students are knowledgeable to acknowledge for others work and only a few (39.1%) can describe what plagiarism is though the majority of the students (79.7%) have a better knowledge about the use of the abstract of an article.

The mean of the total marks obtained for the entire questionnaire is 54.38, the median is 53.33 and the mode is 46.67. It reveals that the total information literacy level of the students is in a middle level, not much good or not much bad. It can be concluded that the ALA standards are achieved by the new coming students to the Faculty of Technology, University of Sri Jayewardenepura up to a certain level.

Since results revealed that the students are lack of information literacy related skills, recommendation can be made to conduct formal information literacy courses with hands on experiences for the students.

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