

Overview of Information Literacy Proficiency among First Year Students of Biology Education Study Program in Universitas Tidar

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Abstract

Developments in all fields demand changes in learning, including at university level. Various skills for successful life in the future must be trained in students, including information literacy. This study aims to get an overview of students' information literacy proficiency based on their experience during high school, the main source of information ever used, and the students' perception of information literacy capacity. This study used a survey method, with an information literacy questionnaire distributed to 89 first-year students of the Biology Education Study Program, Universitas Tidar. The collected data were analyzed descriptively. Based on the results of the study it was found that students already had the experience of accessing information for completing assignments during high school. Information obtained by students is mainly obtained from Google and books. However, the use of Google as a search engine has not been directed towards finding quality sources. Students are still have low capacity in information literacy skills, especially those relating to the use of information effectively and ethically. The results of this study are expected to be the basis for establishing information literacy training programs in Biology Education Study Program Universitas Tidar, both integrated in the subjects and on their own.

1. INTRODUCTION

Changes and demands in the global economic era have encouraged educational institutions including higher education to review and reconsider the nature and composition of the curriculum. Teaching and learning at the undergraduate level have also become a concern, particularly on issues of curriculum design, development of higher-order thinking skills, and lifelong learning. The concept of lifelong learning in relation to information literacy connotes the cultivation of life skills to enable students to adapt to a constantly changing information society. The development of electronic information acquisition systems today is also increasingly complex and sophisticated, so students are expected to have the knowledge and skills needed to handle and manage information from various formats, criticizing

sources, and so on (Lawal, Underwood, & Stilwell, 2010).

Information literacy is a set of competencies that form the basis of academic courses, effective performance, active citizenship, and lifelong learning. The American Library Association's Presidential Committee (ALA) defines information literacy as the ability to recognize when information is needed, and then search, evaluate, and use information effectively when needed (American Library Association, 1989). Nowadays, rapid development of technology cause information that can be obtained is so abundant, but not all are reliable. Thus, each individual requires certain skills to manage the abundant information. With the proficiency of information literacy, a person will be able to do an efficient information search, think critically about information, choose a quality source

of information, and use information to achieve certain goals. The use of information literacy is related to problem solving and communication skills as part of a set of integrated skills that adults need to be able to engage effectively in all aspects of their lives. (Catts & Lau, 2008).

In addition to being the basis for lifelong learning, information literacy is also general in all disciplines, in any learning environment, and in any level of education. Information literacy allows students to master the learning content and extend it, becoming students who are able to direct and control their own learning processes. According to the Association of College and Research Libraries (ACRL), someone who has a proficiency of information literacy is able to: (1) determine the extent of information needed, (2) effectively and efficiently access information needed, (3) critically evaluate information and resources, and combine selected information into their basis of knowledge, (4) use information effectively to achieve certain goals, and (5) understand the economic, legal and social issues surrounding the use of information, and access and use information ethically and legally (Association of College and Research Libraries, 2016). Information literacy itself is the highest skill of the literacy continuum. This continuum starts from basic literacy skills, namely reading and writing, then continues to the ability to find information, and ends in the purpose of evaluating and applying information to solve certain problems. (Van Vuren & Henning, 2001).

The diversity of learning processes carried out at the secondary school level makes the proficiency of information literacy in students very varied. Research conducted by Bransford (2000) emphasizes that students enter the college level with initial abilities, diverse skills, beliefs, and concepts, and that diversity significantly influences how they respond, organize, and interpret the learning environment. In addition to basic knowledge in each subject area, other skills, especially information literacy, are also expected to be learned from elementary to secondary school level, after which they can be consolidated at the higher education. However, the uneven distribution of information literacy empowerment at the secondary school level has made students' abilities very diverse. Low level of information literacy is feared to hamper the learning process in universities that demand independent search of information.

In an era of community life that is increasingly focused on information, educational methods and practices must facilitate and enhance students' ability to utilize the abundance of information. The key of utilizing the power of information includes the ability to evaluate information, ensure its relevance, authenticity, and modernity. The process of evaluating information is a life skill that is very important to be the basis for

lifelong learning. Evaluation involves several components including metacognition, goals, personal dispositions, cognitive development, consideration, and decision making (Fitzgerald, 1999).

Because of the demands of life in the future that are increasingly high, the curriculum and learning process/lectures in the college environment should be adjusted to build awareness of students. In the biology education undergraduate program itself, information literacy skills are very important for students. The ability to find, understand, evaluate, and use information, both from scientific literature or from Web sources, is very important for a good understanding of a topic and for conducting research (Porter, 2005).

Training on information literacy skills should also be carried out continuously. This is because information literacy itself cannot be fully mastered in the first year, but is the result of development at every level of education (Van Vuren & Henning, 2001). Learning activities should be designed to teach students how to extract information through reliable sources such as research reports that have been studied, critically assess the accuracy of information sources, the authority of an information, and the breadth of information (Carpenter, Losoff, Kuglitsch, & Carpenter, 2018).

The importance of education reformation and restructuring of the learning process in universities including those related to information literacy programs are also put forward by Lawal et al. (2010) based on the review of a number of studies. Information literacy is important to strengthen student-centered learning, because it supports resource-based learning. Resource based learning itself cannot be succeed if students do not have the skills to handle information properly (Van Vuren & Henning, 2001).

In addition, information literacy is also important for students in relation to changes in the learning resources' formats. If in the past the learning resources were limited to books and printed sources, the digitization of learning resources such as those in the form of scientific publications, online sources, and electronic learning resources required students to have special skills and fluency in information technology. Based on a number of studies on the integration of information literacy teaching in the curriculum shows that students who master information literacy have better performance, which is evident from their high academic achievement (Chu, Yeung, & Chu, 2012).

To be able to implement a suitable information literacy training program in the university, an understanding of the initial information literacy proficiency is needed from the students. Accurate data about the proficiency of information literacy including the knowledge and experience they have will be very valuable in

mapping student competencies, as well as determining the type of assignments and the appropriate lecture process. To get the data, measurement of initial information literacy needs to be done, using a special measuring instrument.

A number of studies have examined ways of measuring information literacy in school and college students. The measuring instrument used for this purpose varies according to the aspects of information literacy that they want to disclose. One of the measuring instruments is the sumative rubric, which is used to measure the mastery of information literacy skills in a written literature review (Carpenter et al., 2018). In the rubric, students are classified as very proficient, adequate, and less proficient based on five indicators, namely contextualizing information, summarizing and synthesizing, cohesion of conclusion, representation of sources, and documentation of sources (citations and reference lists). There is also a measuring instrument in the form of tests such as Information Literacy Test (ILT) which contains web-based multiple-choice test items based on certain indicator standards (Cameron, Wise, & Lottridge, 2007). This test distinguishes students' mastery in two categories, namely proficient and advanced. Other methods of information literacy assessment use bibliographic analysis, quizzes and tests, self-assessment, portfolios, essays, observations, simulations, or a mixture of these methods. (Chu et al., 2012).

Other studies also use questionnaires to reveal the proficiency of information literacy. A questionnaire developed based on Information Literacy Competency Standards for Higher Education by American Library Association contains multiple choice questions to determine the level of information literacy in students (Beutelspacher, Henkel, & Schlögl, 2015). There were also questionnaires developed to reveal perceptions of information literacy for students by taking into account the experience of high school students (Ukpebor & Emojorho, 2012). This questionnaire is more suitable for students who are in transition from high school students to college.

Reviewing the strengths and weaknesses of each of these instruments, in this study a questionnaire was developed that adapted both types of questionnaires.

Based on the background that has been stated, the purpose of this study is to get an overview of information literacy proficiency of first semester students of the Biology Education Study Program at Universitas Tidar based on experience during high school level, the main source of information ever used, and the students' perception of information literacy capacity.

2. RESEARCH METHODS

This research is a survey research, which was conducted in August 2018. The research subjects were 1st semester students of the Biology Education Study Program, Universitas Tidar. To maximize data acquisition, data is collected in the study program socialization activities carried out before the first week of the lecture process. A total of 89 students filled out the questionnaires that have been distributed. The questionnaire used was the result of the researcher's development, which is adapted from Ukpebor & Emojorho (2012) and Beutelspacher, et al. (2015). The questions highlighted three aspects, namely the experience of learning information literacy at the high school level (3 questions), the main information sources used in completing assignments (1 question), and the perception of information literacy capacity (11 questions). Data were analyzed descriptively through the percentage of responses to questionnaire questions.

3. RESULTS AND DISCUSSION

Based on the questionnaires that have been distributed, data is obtained on the experience of learning information literacy at the high school level, the main information sources used in the completion of assignments, and the perception of information literacy capacity, each of which can be seen in Table 1, 2, and 3.

Table 1. Experience of Learning Information Literacy at the High School Level

No	Statements	Response	Percentage
1	Assignments during high school demanded me to seek information from the library and the internet.	Yes	96.63%
		No	3.37%
	Types of assignments that require the process of information search from the library and the internet:	○ Paper	61.80%
		○ Resume	19.10%
		○ Report	67.42%
○ Other	6.74%		
2	The teacher supports the use of libraries and the internet to obtain information.	Yes	97.75%
		No	2.25%
3	The teacher teaches how to find information from the library and the internet.	Yes	79.78%
		No	20.25%

Table 2. The Main Information Sources Used in the Completion of Assignments

No	Main Information Sources	Response	Percentage
1	Google	41	46.07%
2	Books	35	39.33%
3	Journals	2	2.25%
4	Encyclopedia	2	2.25%
5	Google Scholar	3	3.37%
6	Wikipedia	3	3.37%
7	No Response	3	3.37%
	Total	89	100%

Table 3. The Perception of Information Literacy Capacity

No	Statements	Percentage (%)					Σ
		SA	A	DA	SDA	NR	
1	I can access any resources with a number of assistance.	37.08	51.69	1.12	0.00	10.11	100
	Assistance provider:						
	o Subject teachers	58.43					
	o Librarian	22.47					
2	My high school provides facilities to access the internet.	62.92	30.34	1.12	1.12	4.49	100
	Facilities provided by the school						
	o Computer lab	38.20					
	o Wifi	85.39					
3	I can recognize what information I need when given assignments on a particular topic.	11.24	77.53	11.24	0.00	0.00	100
	I can find information that I need when given assignments on certain topics.	13.48	83.15	3.37	0.00	0.00	
	I can use various search engines to get the information I need.	52.81	39.33	2.25	0.00	5.62	
	Used search engines:						
5	o Google	93.26					
	o Yahoo	5.62					
	o Brainly	1.12					
6	I am used to and can download books / journals from the internet.	17.98	62.92	14.61	2.25	2.25	100
7	I am able to assess whether information was appropriate / inappropriate for me to use in completing a task.	25.84	60.67	2.25	0.00	11.24	100
8	I am able to use information effectively.	15.73	79.78	2.25	0.00	2.25	100
9	I know how to cite from a written source when using it in my writing.	17.98	64.04	8.99	1.12	7.87	100
	The ability to correctly mention the citation component from a written source:						
	o Able	0					
10	o Unable	100					
	I know what components are included when making references from a written source.	4.49	66.29	10.11	2.25	16.85	100
	The ability to correctly mention the reference component from a written source:						
o Able	6.74						
11	o Unable	93.26					
	Ability to correctly identify parts of a reference in the form of journal articles:						
	o Able	11.24					
	o Unable	88.76					

Notes:

SA : Strongly Agree
A : Agree
DA : Disagree
SDA : Strongly Disagree
NR : No Response

Based on the questionnaire responses, information was obtained that students were used to assignments that demanded information search through libraries and the internet. Based on 96.63% of students who stated this, the most type of assignment ever assigned to students was practice reports and papers, followed by summaries (resumes). These results indicate that students are actually know that certain tasks require independent information seeking. Previous studies that examined the perception of information literacy in students also showed that first-year students were aware of the differences between information seeking efforts at secondary schools and college level (Wilkes & Gurney, 2009). If at high school students have been accustomed to assignments that demand information search, the college years will be faced with better readiness. In addition, the types of assignments given in higher education are generally more varied and require better search skills and information processing.

Teacher's support for library and internet use in student's information retrieval is also relatively high (97.75%), as well as teacher's efforts to support the search for that information. As many as 79.78% of students stated that the teacher had taught how to access information from the internet and library. Based on these facts, teachers have indeed proven to play an important role in teaching information literacy skills to students. One of the most recommended methods for teaching high-level information literacy skills is through collaboration between teachers and school librarians. Through collaboration with teachers, librarians can ensure library resources are well integrated with the needs of the school curriculum system and provide good reference services (Chang et al., 2012).

Regarding the main source of information in completing assignments, the most commonly used sources were Google (46.07%) and books (39.33%). The high preference for Google is not surprising and is supported by many other studies that show that the majority of students use search engines to start searching for information. From the information retrieval process students also feel satisfied and get an experience. Google as a search engine does provide a large and wide selection of information sources. It was further stated that the use of Google as the main source of information turned out to also bring weaknesses, especially if students did not understand the criteria of a good or quality source of information to use (Ukpebor & Emojorho, 2012).

Journals, encyclopedias, Google Scholar, and Wikipedia are also used by students but still in very small numbers.

Student preferences that are still very low on journal articles indicate that students' insights into quality information sources are still inadequate. Information literacy skills also include the ability to distinguish between popular magazines, journals, and information found on websites; ability to distinguish between primary and secondary sources; and determine whether the information presented in a source is relevant and evidence based. Information literacy skills also include familiarity with reputable scientific and professional society publishers, as well as understanding how a literature is produced and disseminated (Thompson & Blankinship, 2015). Students who are the subject of research have proven to be still unfamiliar with journal articles, and probably still not being able to distinguish between reputable journal articles and articles posted on ordinary websites.

The description of students' perception of information literacy capacity can be seen in Table 3. Based on the information contained in the table, it is known that students claim to be able to access resources with assistance. Most assistance is obtained from subject teachers. Students stated that the facility to access information from the internet in the school environment was very good, as indicated by the high availability of wifi (85.39%). The high level of facilitation and access to the internet for students is certainly not surprising, because now everything has moved to the digital ways. All of us, including students, are digital immigrants to a world that is currently developing and become highly connected (Karvalics, 2014). The existence of a very affordable internet connection changes the way students interact, and of course also how they seek information.

Based on Table 3, students also stated that they could recognize and find information needed to complete certain assignments. For this purpose, they are used to use search engines, and the most search engines used are Google search. These results support previous findings that Google is the main source of students in seeking information. Apparently, the first step taken by a student after identifying what information is needed to complete the assignment is to look for it on the Google search engine, and then select the informations based on their needs.

Students also stated that they were used to download books or journals from the internet, assessing the feasibility of information, and using information effectively. However, the statements given by students seem to contradict the answers given in the confirmation questions, especially at points 9, 10, and 11. Students state that they already know how to cite and write references from written

sources. But the answer to the confirmation question revealed that 100% of students still could not properly mention the citation component. Likewise on confirmation number 10, only 6.74% of students can mention the written source reference component correctly. The ability to identify parts in a reference in the form of journal articles is also still low, i.e 11.24% of students who can identify correctly. Most students still cannot distinguish article titles from journal titles, and distinguish journal volumes from numbers. The low ability of students to identify components in journal articles including citations and references supports the findings in the previous section, that student preferences for journal articles as a source of information are still low.

Citing and writing the references appropriately is one aspect of information literacy, especially relating to the legal citing and use of information. The results showed that in this aspect, the ability of students in the first year was still very low. This finding is supported by the study results of Chu et al. (2012) that the ability to use resources appropriately and ethically is the weakest among students. Weak ability to cite and write a reference can lead the students to plagiarism. Actually students have known that to support their opinion they are allowed to use information from sources, by listing the author's name and detailing the source in the reference list clearly. However, what components must be included in order to be a good reference is still not known by students.

Scientific literacy skills are essential to have, including relating to scientific writing skills. Low information literacy skills will lead to low research ability, and ultimately hamper student success itself. At the tertiary level, scientific writing skills are needed in completing various tasks (e.g summaries, papers, essays, and reports), researching, and reporting the results of research in the form of a thesis or final project. All that can only be done if students have the ability to find and use primary sources properly. Thus, before they graduate, students have to master the basics of scientific writing and information literacy skills (Jerde & Taper, 2004; Brownell, Price, & Steinman, 2013).

Based on the results of research that has been obtained, it is clear that skills related to information literacy must be taught programmatically in lectures. There are several information literacy models that can be a teaching framework to accommodate information literacy competencies set by ACRL (Hart & Davids, 2010). For example, Kuhlthau's Information Search Model (ISM) model describes information search as a meaningful learning process from various phases, each of which has its own strategy. Based on the results of years of research, this model has been tested by researchers around the world and has been applied in various contexts, including the online environment (Kuhlthau, Heinström, & Todd, 2008). Kuhlthau assumes that

the purpose of information literacy education is to develop students' insights into the information handling process and how each phase is connected. This skill clearly cannot be achieved in just one or two training sessions; but a series of planned training programs. This goal may also be used as a project that must be achieved with a number of interrelated efforts.

In connection with learning in the online environment, lecturers in Biology Education Study Program of Universitas Tidar can take advantage of various available platforms such as E-Learning Untidar (*Elita*), Google Classroom, and so on. By utilizing the online learning environment, students will also be increasingly trained to use ICT to support learning and also improve their skills in finding, evaluating, and using various information sourced from the internet. Hart & Davids (2010) suggested that information literacy skills are best to be taught and trained in students through real work, which allows them to undergo their own processes in information literacy. Many studies have also indicated that in order to succeed, information literacy programs should be introduced as early as possible to students and reinforced as often as possible, with a variety of increasingly complex assignments. In this case, it is expected that the challenge to improve information literacy can be actively faced by lecturers and students in order to achieve mutual success.

4. CONCLUSIONS AND RECOMMENDATIONS

a. Conclusions

Based on the research findings, it can be concluded that:

- Students already have experience to access information for completing assignments during high school, for example to work on lab reports and papers.
- Information obtained by students is mainly obtained from Google and books. However, the use of Google as a search engine has not been directed at finding quality sources, such as journal articles and databases. Students also still use wikipedia and blogs as a source of information in the completion of assignments.
- New students who participated in this study still had a low capacity in information literacy skills, especially those relating to the use of information effectively and ethically. Most students still cannot cite and write a reference from a written source correctly.

b. Suggestions

Based on research findings, several things that can be suggested include the following.

- Measurement of student information literacy should be carried out on each new academic year, especially for new students who are in the transition phase of high school to university level.
- Measurement of student information literacy should be done continuously so that the development of student skills can be tracked properly.
- The process of learning/lecturing should be adjusted to accommodate the proficiency of information literacy for students.
- A good commitment is needed for the lecturers of the course to participate in monitoring the development of student information literacy, for example by checking the quality of the sources used in student assignments, the accuracy of students in citing and writing references, and so on.

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