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Effectiveness of instruction-based information literacy training on the readiness of lifelong learning and the students' information literacy ability

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Abstract

This research aims to study the effectiveness instruction-based literacy information training to improve the readiness of lifelong learning of secondary school students. In this study, 250 high school students from 10 schools in the Bandung area, Indonesia. Samples were randomly selected and put into the experimental and control groups. The results showed that instructional-based information literacy training could improve students' lifelong learning readiness and improve students' information literacy skills. Increased readiness for independent learning can be seen from the readiness to learn independently, the ability to overcome learning barriers, and the ability to respond to learning triggers. The improvement of information literacy skills is seen from the ability of students to search for information, assess the credibility of information, and use information to support their studies and learning assignments. The implication of this research is that the findings can be used by stakeholders from the curriculum, training implementers, and libraries in designing systems for smooth study and preparing individuals for community life. Information literacy is the main foundation to support other abilities.

Keywords: information literacy ability, lifelong learning readiness, literacy of information, training, library

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1. Introduction

Information literacy is a skill that must be possessed by individuals in order to survive in the current information era. Information literacy is the foundation for individuals to be able to learn new things throughout their lives in order to solve the problems at school, on campus and in society (Daris Hadianto et al., 2022; Lecea & Perez-Stable, 2019; O'Brien & Russell, 2012). One of the most significant roles in improving information literacy skills in educational institutions is the librarian. Librarians must be able to encourage students to have good information literacy skills so that they can become students who are able to learn for life. To achieve this, several researchers have analysed the need for information literacy that can be used to encourage learners to become lifelong learners. The definitions, standards and framework of information literacy for adults were formulated by the researcher and librarians. In general, information literacy has a core model, namely a model that develops formal literacy skills and non-formal information literacy (Argüelles, 2015; Khan & Idris, 2019).

This framework can be used by stakeholders to equip prospective library staff to be able to prepare students and increase readiness for lifelong learning. Information literacy teachers are indispensable for individuals. This is done in variety of institutions around the world, including the Society of Colleges, National Libraries and Universities (2011). The researcher who contributed to the role of information literacy is Carole Kuhlthau (2004). She changes the paradigm of information literacy that focuses on education. Librarians and educators must be able to work together on integrating information literacy instruction into educational processes and systems (Cruickshank, 2019; Deyrup, 2009; Dupuis, 2015). This can be done in the learning process, assignment and evaluation. Libraries are an important part of educational institutions because they support users who need guidance or training to find, evaluate and use information in order to complete their learning tasks at the institution.

This can also be done by public libraries in the community. Libraries can be centres of learning and become centres of lifelong individual empowerment. So, public libraries, in addition to providing traditional services, can also provide other services based on new technology in order to meet the needs of users (Daris Hadianto et al., 2021; Henry et al., 2015; Higgins et al., 2015). Libraries in educational institutions have an important role for students. Stakeholders can instil informal aspects of learning, provide broad and flexible learning opportunities and support independent learning. Some experts explain that lifelong learning is the ability to continuously increase one's capacity to adapt to change. This lifelong learning has the aim of preparing students to have independent learning skills to solve problems and foster a positive attitude towards the changes and demands they face. Lifelong learning skills will make students better prepared to face various obstacles and obstacles both in educational institutions and after entering the community because they have the skills to continue to learn and seek and use the information they need. Aspects of lifelong learning readiness include readiness to learn independently, overcome problems and respond to demands and changes faced by individuals (Hadianto et al., 2021a; Harkness et al., 2021; Khan & Idris, 2019).

Independent learning is learning that emphasises the role of students in taking responsibility for planning, implementing and developing their own learning abilities and outcomes (Henry, Glauner, Lefoe, 2015). Independent learners are learners who are able to find or solve problems with the ideas they find themselves, are able to select and assess credible information in solving problems and are able to choose the right learning method for themselves and evaluate it. The second aspect is students' problem-solving skills. The problem-solving skills are the abilities of students to solve their own problems without asking for help from others. This ability is owned by students if they have good information literacy skills. Students can identify, analyse and find the right solution for problems. The last aspect is the ability of students to adapt to demands and changes. Information literacy skills also have a very important role in equipping students with the ability to respond to demands and changes (Bruce et al., 2006; Bundy, 2002). Students with good information literacy

skills will be highly motivated when faced with higher demands or changes that require them to improve their competence. Students will rely on information literacy to respond to these demands and changes and continue to learn from the new information to adapt themselves to the demands and changes they face.

To improve lifelong learning skills, students must be able to manage the obstacles that come their way. Researchers have classified obstacles into three types, namely situational obstacles, institutional obstacles and dispositional obstacles. Situational obstacles are obstacles that arise from an individual's life situation at a certain time, such as time, financial and transportation obstacles. Institutional barriers are obstacles that arise from institutions related to practices that prevent students from participating in learning activities (Johnson, 2003; Lantz & Brage, 2006). Dispositional obstacles are obstacles that refer to students' attitudes and self-perceptions that result in them not wanting to participate in educational activities, for example, a poor educational background that causes a lack of learning motivation and self-confidence. Readiness in responding to demands and changes, including the ability to overcome these obstacles so as not to prevent individuals from adapting to demands and changes, information literacy skills have a role in helping students acquire new skills.

Readiness for lifelong learning is characterised by an individual's need to continue learning. It arises as an individual response to learning triggers or demands (Marfleet et al., 2005; Shane & Shane, 2005). Critical changes in individuals are signs that indicate their readiness to participate, such as getting a job, getting married, entering society and retiring. Individuals will learn something new when faced with intense decision-making, for example, choosing a career, choosing a place to study, choosing a life partner, choosing a place to live and planning for retirement. Individuals learn new things when faced with new situations. The library is a place that can be accessed by students and the community so that they are able to face new situations. Information literacy and learning are the foundations for every individual so that they are ready for lifelong learning. Libraries have a big role that not only provides answers to the problems faced but also provides the role of education in the construction of students' knowledge (McClaren, 2019; Neely-Sardon & Tignor, 2018). This can be done in collaboration with stakeholders and educators. Libraries are considered an educational component that can develop information literacy skills and encourage learners to engage in lifelong learning. Information literacy is the first step that students must possess because information literacy is the main factor that determines their success in lifelong learning, getting jobs and interpersonal communication skills in everyday life.

The application of information literacy can be used as a centre for lifelong learning by public libraries in Indonesia. A country is said to pay attention to literacy and education, one of which is seen in the existence of a library. Citing data from the Central Statistics Agency (BPS), Indonesia has 10,794 accredited libraries as of 2022. Of these, most libraries in the country are school libraries. The number reaches 8,662 libraries, equivalent to 80.24% of the total libraries in Indonesia. Indonesia also has 1,150 (10.65%) public libraries, 700 (6.48%) university/PT libraries, and 282 (2.61%) special libraries, all of which have been accredited. BPS defines an accredited library as having received formal recognition by the accreditation agency and having met the requirements to carry out library management activities. Libraries are windows of knowledge because they provide conditions that support lifelong learning (Subban, 2013).

Several studies investigating the level of information literacy in Indonesia revealed that most students in Indonesia have a fairly low level of information literacy (Henry et al., 2015; Mulyati & Hadianto, 2022; Seely et al., 2011). The reason is the limited information literacy training, limited infrastructure and the information literacy skills of librarians who do not meet the criteria. In other studies, several libraries in various countries have offered information literacy instruction in their institutional environment. Users who have a library with the programme have significantly higher information literacy skills compared to users who do not have the programme. Previous studies have shown that there are still limited stakeholders to develop information literacy programmes that

equip students to be able to prepare for lifelong learning. There is a lack of information training literature fsor library users to improve the learning readiness of students in Indonesia. Libraries are not actively involved in supporting information literacy. Most librarians and users assume that the library is only used for reading. This paradigm must not only change the role of libraries in addition to providing services passively, but also must actively provide information literacy programmes or instructions so that users get direction, have information literacy skills to find, evaluate and use the information obtained reliably (Swanson, 2005; Whitehurst, 2010; Whitworth, 2006). There is little research examining the effectiveness of instruction-based information literacy on the readiness of lifelong learning students in Indonesia. Therefore, the development of information literacy programmes in Indonesia needs attention from researchers, users, policymakers, librarians and educators. Therefore, through this study, researchers designed instruction-based information literacy training that can be applied to improve students' lifelong learning readiness in higher education. In addition to designing, the researchers also tested the design of instruction-based information literacy training on students' lifelong learning readiness. Therefore, researchers formulated the following research questions:

1) How does effectiveness of instruction-based information literacy training improve the readiness of lifelong learning students?
2) How does effectiveness of instruction-based information literacy training improve the student's information literacy skills?

2. Method and Materials

This study uses an experimental method with a pre-test–post-test design and a control group. The sample of this research is high school students from 10 schools in Bandung, Indonesia. They are active users of several libraries in Bandung, Indonesia, both in university libraries and in public libraries with proof of membership cards. The sampling technique was done randomly. The research participants were 250 students who were divided into 125 experimental groups and 125 control groups. The instruction-based information literacy training programme designed by the researcher was carried out for 8 weeks in the experimental group. Intervention was not given to the control group. Both groups went through the same test to test students' level of lifelong learning readiness. The researchers used the measuring instrument for lifelong learning readiness scale, information literacy skill level scale and instruction-based information literacy training design to train students' information literacy skills. The intervention instrument the researcher developed adopted the information literacy training used by the Society of College of Kuhlthau (2004). Adoption is done because the measurement of information literacy that was previously developed has international standards and is carried out in formal education. In addition, this training design also focuses on skills. Meanwhile, the researcher designed the measurement instrument himself by adjusting the intervention instrument. The instrument's validity test was carried out through expert judgment from six PhD-qualified information literacy experts and professors. The instrument reliability test was carried out through empirical tests conducted on 100 students. The results of the test show that the instrument developed by the researcher is valid and reliable to use.

Instruction-based information literacy training interventions are packaged into workshops which are divided into several parts, namely basic library skills, skills in assessing information skills needs, skills in selecting information sources, searching of information skills, skills in assessing information and skills in using references and ethics. Information literacy training content can be seen in Table 1. The information literacy training was held in 7 sessions per week for 2 months.

2.1. Lifelong learning readiness scale

The researcher adopted the lifelong learning readiness scale from Kungu (2010) and adapted it to the context of libraries in Indonesia. The reason for choosing the scale from Kungu (2010) is because it is comprehensive in measuring the readiness for lifelong learning. The readiness of lifelong

learning scale includes three aspects of readiness, namely readiness for independent learning, readiness to respond to learning activates and readiness to overcome obstacles. Each readiness item consists of 35 items of readiness for independent learning readiness, 27 items of readiness for responding to learning triggers and 20 items to overcome learning barriers. Reliability and validity tests were conducted on a sample of 200 students consisting of 100 girls and 100 boys. Researchers conducted confirmatory factor analysis on the questionnaire. The reliability test was carried out through Cronbach's alpha by producing a validity level of 90% on the independent learning readiness instrument, 88% of readiness to respond to learning triggers and 78% of readiness to conquer learning barriers. The total reliability of the test is 85%, and so it can be concluded that the instrument meets the criteria and is feasible to use.

2.2. Information literacy skills scale

Researcher adopted the information literacy skill scale from Jamali and Alizade (2013) to measure students' information literacy skills. The reliability scale was scored 0.93 and the validity test was confirmed from a sample of 200 students. The reliability test results are 0.89% using Cronbach's alpha. The selection of the skill scale is based on context aspects culture and infrastructure and measuring information skills from basic to advanced levels. This is in accordance with the purpose of this research which is to see the level of information literacy skills and to test the students' lifelong learning readiness. Instructional-based information literacy training content is designed by emphasising several important points which can be seen in Table 1.

Table 1

Information Literacy Skills Learning Content

Session	Skills	Aspect teaching	Tasks
1	Skills to carry out research	Skills of information literacy	Practical information literacy skills
		Essential library knowledge skills	Essential library skills for example search catalogue
2	Skills in analysing information needs	Knowledge of searching topics	Skills to identify key concepts and terms based on information needs
		Knowledge of information needs	Students are asked to determine the topic according to their needs
		Information needs skills	Students practice explaining topics and formulating discussion groups according to their needs
			Students are asked to analyse information they need
3	Skills to identify and select information sources	Knowledge of information source categories	Learners identify or select sources of information
		Knowledge of sources and access tools	Students identify or use search tools
		Knowledge of information structure	Explain of the science found
4	Internet skills and knowledge to be used as a resource	Knowledge of search tools	Explain the use of search engines
		Information of search strategy	Explanation of search strategy
		Information of Google search tools	Google search engine explanation
			Students practice finding information using the Google search engine
5	Skills in using databases and library search	Knowledge of searching with database	Training to use SID database (Indonesian database)
			Training to use to Elmnet database

			(Indonesian Database)
		Knowledge of library software	Students are asked to find books and related resources from library software (internal software)
			Learners are trained to find their information from the database
6	Skills in evaluating information sources	Knowledge of Information Evaluation	Explanation to students the criteria for evaluating information sources.
		Resource evaluation skills	Explanation of reasons must know the criteria for assessing and using sources of information
7	Skills using references	Knowledge of ethical issues in using source of information	Explanation of ethical issues in using source of information
		Knowledge of citations and bibliography	Learn the rules and policies regarding use of information
			Training for students of various bibliographic citation systems
			Students are asked to practice the APA and citation method

To examine the effectiveness of the instructional-based information literacy training design, the researcher gave an intervention to the experiment group and evaluated the pre-test and post-test in the experiment and control groups. Measurement of information literacy skills at the time of the pre-test was carried out using a questionnaire and analysed using statistical analysis of covariance (ANCOVA). ANCOVA is an analytical method that is considered reliable to measure the results of the effectiveness test of the information literacy training variable on the variable of lifelong learning readiness.

3. Results

The presentation of the data is based on the formulation of the research problem proposed. The results of the statistical significance test are described in Table 2.

Table 2

Readiness for Lifelong Learning on Pre-test and Post-test

Variable	Group	Pre-test		Post-test	
		$\bar{x}$	(SD)	$\bar{x}$	(SD)
Readiness to study independently	Experiment	2.30	(0.38)	3.15	(0.33)
	Control	2.45	(0.34)	2.36	(0.31)
Ability to overcome learning barriers	Experiment	2.11	(0.46)	2.82	(0.30)
	Control	2.25	(0.50)	2.30	(0.42)
Ability to respond to learning triggers	Experiment	2.26	(0.30)	2.95	(0.35)
	Control	2.34	(0.40)	2.20	(0.40)
Lifelong learning ability	Experiment	2.60	(0.45)	2.65	(0.40)
	Control	2.36	(0.35)	2.30	(0.30)

The information literacy training workshop in the experimental group was carried out in 8 sessions over a period of 2 months. Based on Table 2, this instruction-based information literacy training has a significant effect on the component of lifelong learning readiness. Based on Table 2, the experimental group had higher scores on almost all components of learning readiness throughout than the control group. So, it can be said that this information literacy training has a

significant impact on students' lifelong learning readiness. The increase in the independent learning component from each component was 0.85 in the independent learning component, 0.72 in the overcoming barrier component and 0.69 in responding to learning triggers.

The control group did not show a significant increase. Slight improvement was only seen in the ability to overcome learning barrier components. The increase in information literacy skills is shown in Table 3. Almost all aspects of students' information literacy skills after being given the intervention experienced a significant increase in the experimental group. These data indicate that this information literacy training also has a significant effect on information literacy students. Improvements in each component, namely 1.86 on the component of production and information dissemination, 1.86 on the component of information seeking, 1.78 on the component of need recognition, 1.56 on the component of basic skills, 1.50 on the component of selecting and finding information sources and 1.12 on the components of the skill of librarians. Improvement in information literacy skills did not occur in the control group. The formulation of the problem is answered in each sub-section. This literacy training has an impact on lifelong learning readiness with components of independent learning readiness, overcoming obstacles and responding to learning triggers.

3.1. Effectiveness of information literacy skills to improve self-learning readiness

Based on the results of the ANCOVA test, there was a significant difference in the average readiness scores in both groups showing a significant difference (F = 37.23, p = 0.000). Information literacy training has a significant effect on self-study readiness at a 95% reliability level. The average value in Table 4 shows that the readiness for independent learning increased after receiving the information literacy training intervention. The effect size is indicated by the partial eta-squared value compared to the Cohen guideline, with values (0.3 = small, 0.6 = medium and 0.9 = high effect). The average of the experimental group had a large effect size, with a value of 0.98. So it can be said that the instructional-based information literacy training intervention is able to improve the readiness for independent learning.

Table 3

Information Literacy Skills of Students

Variable	Group	Pre-test		Post-test	
		$\bar{x}$	(SD)	$\bar{x}$	(SD)
Awareness of information needs	Experiment	2.05	(0.78)	3.83	(0.45)
	Control	2.01	(0.60)	1.80	(0.65)
Ability to find and assess information sources	Experiment	2.12	(0.60)	3.56	(0.65)
	Control	1.80	(0.40)	2.15	(0.57)
Ability to find information	Experiment	1.50	(0.38)	1.70	(0.60)
	Control	1.50	(0.40)	1.80	(0.60)
Ability to produce and disseminate information	Experiment	2.14	(0.23)	3.90	(0.30)
	Control	1.36	(0.38)	1.76	(0.51)
Basic information literacy skills of students	Experiment	1.83	(0.65)	3.35	(0.42)
	Control	1.65	(0.41)	1.68	(0.58)
The ability and guidance of the librarian	Experiment	2.62	(0.61)	3.50	(0.56)
	Control	2.55	(0.61)	2.62	(0.58)

Table 4

Average Readiness of Students' Independent Learning

Group	$\bar{x}$	(SD)
Experiment	3.15	(0.10)
Control	2.30	(0.09)

3.2. Effectiveness of instruction-based information literacy training to improve the ability to overcome students' barriers

The ANCOVA test shows that the training of information literacy has a significant effect on the ability to overcome students' barriers. This can be proven by the significant difference between the both groups. The average readiness was obtained with a value $F = 9.89$ and $p = 0.005$ between both groups. This instruction-based information literacy has an effect on readiness to overcome obstacles at a 95% reliability level. Table 5 shows that this information literacy training intervention is effective to improve students' ability to overwhelmed obstacles.

3.3. Effectiveness of instruction-based information literacy training to improve the ability to respond to learners' learning triggers

The ANCOVA test shows that instruction-based information literacy training had no effect on the ability of students to respond to learning triggers ($F = 0.67$, $p = 0.45$) at a 95% reliability level. It can be said that the training of information literacy has not been effective in increasing the components of students' ability to respond to learning triggers. So, among the three components of students' lifelong learning readiness, training of information literacy is only not yet effective in improving students' ability to respond to learning triggers. However, the training of information literacy has a positive and significant impact on the ability to learn independently and the ability to overcome obstacles.

Table 5

Average Ability to Overcome Student Barriers

Group	$\bar{x}$	(SD)
Experiment	3.37	(2.09)
Control	1.89	(0.09)

3.4. Effectiveness of instruction-based information literacy training to improve learners' learning readiness ability

Based on research, information literacy skills training had an effect on students' learning readiness at the 95% reliability level with a value $F = 3.37$ and $p = 023$. Information literacy training has impacts on the several component of lifelong learning readiness, although it is not yet optimal on the components of students' ability to respond to learning triggers. So, this information literacy training, if carried out in the long term, can increase students' readiness for lifelong learning. These workshops can turn libraries into centres of lifelong learning.

3.5. Effectiveness instruction-based information literacy training to improve learners' information literacy skills

The ANCOVA test shows that information literacy training has a significant impact on the level of information literacy ability with a value of $p < 0.0001$ at a significance level of 0.05. This increase in information literacy skills proves that information literacy training is considered effective in improving students' information literacy skills. Improving students' information literacy skills proves that this literacy training is effective in improving students' information literacy skills. The improvement of information literacy skills can be seen in Table 6. The improvement of information literacy skills occurs in all of its components, including awareness of information needs, ability to find and evaluate information sources, ability to find information, ability to generate and disseminate information, basic literacy skills and librarian skills.

Table 6

Scores of Students' Information Literacy Skills

Component	Group	$\bar{x}$	(SD)
Awareness of information needs	Pre-test	1.80	(0.16)

	Post-test	4.80	(0.20)
Ability to find and assess information sources	Pre-test	1.10	(0.20)
	Post-test	3.61	(0.23)
Ability to find information	Pre-test	1.50	(0.16)
	Post-test	3.72	(0.20)
Ability to produce and disseminate information	Pre-test	1.67	(0.16)
	Post-test	3.91	(0.15)
Basic information literacy skills of students	Pre-test	1.87	(0.17)
	Post-test	3.46	(0.18)
The ability and guidance of the librarian	Pre-test	2.80	(0.15)
	Post-test	3.78	(0.20)

4. Discussion

The results of the study which prove that learning-based information literacy training can improve information literacy skills indicate that information literacy training is effective in improving students' information literacy skills. The increase was seen in the significant difference between the experimental and control groups. The opinion of students on the library that researchers found was that they considered the library as a place to read only. However, after participating in the information literacy training intervention, students consider that the library can be used as a means to provide training or services that optimise students' literacy skills (Piper & Tag, 2011; Schlesselman-Tarango, 2014). Learners can search for, assess and use information more optimally if they are directed and given training. This indicates that instruction-based information literacy training can be used by librarians or teachers. Teachers can integrate to encourage optimal information literacy skills when completing tasks. The results of this study are in accordance with previous studies which showed that students' information literacy in Indonesia is still low, resulting in their readiness to learn independently and other components (Al-Aufi et al., 2017; Bundy, 2002; Cope & Flanagan, 2013; Hadianto et al., 2021b). This is reinforced by the fact that there are still many students who cannot solve their own problems without the help of their teachers or parents. Students who have good information literacy skills can study independently so that they can achieve more optimal performance compared to students who do not have good information literacy skills (Lantz & Brage, 2006; Lupton, 2008).

The results showed that students' information literacy was still low due to those who were not trained in how to find, assess and use information by the school. Students are only provided with a library as a service, but it is not optimally used. This is in line with some literature which shows that libraries that have not been optimally served as services to improve information literacy skills. Instruction-based information literacy training interventions have a significant impact on readiness for lifelong learning. This is evidenced by the increased ability in the components of independent learning readiness, the ability to overcome obstacles and the ability to respond to learning triggers. This finding is in accordance with the results of previous studies that examined the relationship between information literacy skills and independent learning (Cruickshank, 2019; O'Brien & Russell, 2012; Špiranec & Pejova, 2010). This is reinforced by the opinions of students, namely they are not trained to search, assess, and use resources for assignments and others at school, but after receiving a workshop in the form of this information literacy training, students become aware of these materials, so that they can do it independently or can be said to be able to learn independently.

Another finding from this study is that instruction-based information literacy training can improve students' ability to overcome learning barriers or student participation. These barriers include limited time, access to information, ignorance or lack of knowledge. Through this information literacy training, students become able to use their time effectively because they are able to find, assess and use information sources effectively. In addition, students can increase their skills or capacity through independent learning using search engines or applications, so that students' skills

and abilities increase (Cuervo Sánchez et al., 2021; Schlesselman-Tarango, 2014; Shane & Shane, 2005; Swanson, 2005). This information literacy training can be carried out by educational institutions through libraries or integrated into the learning process by teachers. Optimising the role of this library has been done through previous research. The results show that libraries, both public libraries and those belonging to educational institutions, can support community education and lifelong learning, can become a means for the community and students to gain capacity, skills and increase information knowledge and individual literacy skills.

In this study, there is one component that is not significantly affected by this instruction-based information literacy training, namely ability to participate in learning. Based on the results of the researcher's analysis, these findings are related to the learning methods commonly accepted by students. Components of responding to triggers for participation in learning require sufficient critical thinking skills from students. Because most students do not have adequate critical thinking skills, this information literacy training has not had a significant effect on these components. Therefore, if the training programme is carried out for a long time and is routine, students will be accustomed and trained in their critical thinking skills (Cope & Flanagan, 2013; Erjavec & Volčič, 2010; Fitzpatrick & Meulemans, 2011). This is reinforced by phenomena in the field; there are still many teachers who use traditional methods that do not train students' critical thinking skills. There are still many teachers who only deliver material in one direction, without involving students to be optimally involved in the learning process or getting used to being involved in the problem-solving process presented by the teacher in the classroom. This is reinforced by several studies that examine the learning process in Indonesia. This is one of the causes of the lack of significant information literacy training on one component of lifelong learning readiness, namely the ability to respond to learning triggers or participation in class.

Findings regarding the students of information literacy skills, namely instructional-based information literacy training, have a significant effect on students' information literacy skills. The improvement of information literacy is marked by an increase in several elements, including the ability to identify information needs, find sources of information, assess information, produce and disseminate research results or information, skills in using search engines or other applications and the ability to use references and citations. This instructional-based information literacy training is practical, so it is easy for students to understand and follow. In addition, teachers can control so that students continue to be encouraged to use these information literacy skills (Lantz & Brage, 2006; Lupton, 2008; Marfleet et al., 2005). One of them is by providing materials or assignments that encourage students' information literacy skills. Overall, this instruction-based information literacy training has a good effect on students' learning readiness and information literacy skills. This result is influenced by several factors; first, the nature of the information training and the continuity of implementation so that students are optimally trained in their information literacy skills (Schlesselman-Tarango, 2014; Subban, 2013). There are several obstacles that researchers found that caused the students' information literacy skills to be low, including limited international language skills which made it difficult for them to use international databases and the lack of infrastructure in schools to support students' information literacy skills, for example, Internet services and hardware. Future studies will address the causes of low information literacy skills. These studies reinforce that students' information literacy skills not only enhance literacy information but also improve students' lifelong learning readiness.

5. Conclusion, Limitation, and Recommendation

Instruction-based information literacy training can improve students' lifelong learning readiness and information literacy skills. This is evidenced by the increase in several components of students, including the ability to learn independently and the ability to overcome learning barriers, although not too significant in the ability to respond to triggers for learning participation. Institutional libraries and public libraries can become centres of lifelong learning for students by optimising the role of libraries and by providing information literacy training designed by researchers.

Improving information literacy skills requires sufficient time, continuous systems and consistency. This can be done by various parties, including teachers, librarians and stakeholders. Based on the research findings, the researcher recommends several aspects concerning the implementation of activities to improve lifelong learning readiness and information literacy skills. Stakeholders must pay attention to information technology infrastructure; training programmes must be carried out continuously; and training must target skills that support lifelong learning readiness, such as independent learning, the ability to overcome obstacles and the ability to respond to learning triggers.

This study has several limitations, including the small sample size so that the possibility of variations in user characteristics from students is not optimal. Another limitation is that the workshop or training time is considered short enough so that the effect is not optimal. The measurements of the level of information literacy and lifelong learning readiness of learners are further limitations of this study. Qualitative data that are still not optimal are explored in this study. Based on these limitations, the researcher recommends future research. Future research should pay attention to the size of the sample and the ability of information literacy to be related to gender or the level of family economic status of students. In addition, researchers can design information training programmes by creating applications or search engines to improve students' information literacy skills.

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