Development of ICT Oriented Reproductive System Materials Learning Module for Training the High School Students' Information Literature Skill

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Article Info	Abstract
	The explosion of information that occurred due to advanced technology caused people to have information literacy skills. Information literacy skills are needed by students so that they are able to obtain accurate information from trusted sources. The purpose of this research was to develop the module and to find out the potential and to test the feasibility of the module in training information literacy to students. In this study, the Research and Development/R&D method based on Sugiyono's theory of 2015 version was used with modifications. The method sequentially included the potential and problem stages, initial information collection, module design, module validation by experts, module revision phase I, trial use of small-scale modules, revision of phase II modules, and large-scale module trials. The trial design used a pre-experimental design method in the form of a one-shot case study. The module trial was carried out at SMAN 3 Tegal involving 9 students of class XI-MIPA 1 and SMAN 14 Semarang involving 30 students of class XI-MIPA 2. The data collected includes data on students' perceptions of the information literacy content in the module and data on the module's ability to practice information literacy through tasks/activities on the module. Data were collected through questionnaires and instruments in the form of assignments in the module. The data were analyzed quantitatively using the formula for the percentage of qualitative criteria. The results showed that the developed module was suitable to be used regarding the material expert assessment results that reached 96.87%, while the assessment of media experts was 95.24%, and the assessment of biology teachers was 99.62%. In addition, the student assessment data was obtained stating that the module could be used as a learning resource. Based on the data analysis of the potential of the module in training students' information literacy, it could be seen that in the small-scale trial, a percentage of 85.49% was obtained with the criteria of highly eligible, while in the large-scale trial, the percentage of 77.41% was obtained with the criteria of eligible. Thus, it could be concluded that the developed module was eligible to be used and it was able to train students' information literacy. © 2023 Universitas Negeri Semarang

INTRODUCTION

Learning in the 21st century requires various abilities and skills that must be mastered by students. The Partnership for 21st Century Learning (P21, 2019) identified the competencies needed in the 21st century, namely communication, collaboration, critical thinking, and creativity. The ability that can hone some of these competencies is known as information literacy. Rachmawati (2017) stated that information literacy supports students in critical and creative thinking processes that are useful in understanding and assessing information. The American Library Association (ALA, 2000) defined information literacy as the ability needed by a person to be aware of when information is needed and the ability to find, evaluate, and use the information needed effectively.

In Indonesia, information literacy of the students is starting to be noticed along with the phenomenon of illiteracy and the low interest in reading in the community in which was a national problem (Mashuri, 2012). Based on Permendikbud data, the reading literacy activity index in Indonesia was still relatively low, at 37.32% (Puslitjakdikbud, 2019). Information literacy skills are very important for students as a consequence of the rapid advances in technology. However, in reality, in the learning process students still often find it difficult to filter the accurate information. It has been proven when the students get assignments and need additional information, they will use the existing literature without evaluating the truth of the information obtained and not paying attention to the source of the information. Based on observations at SMA Negeri 14 Semarang, teachers had implemented student-centered learning, that was the learning that focused on the students. The learning system required students to be active in finding information independently. Therefore, students would try to get information from various sources, not only that one from the teacher. Based on data obtained from interviews, the teachers had not socialized the importance of information literacy skills and had not directed the students to get accessed to the reliable sources in obtaining accurate information.

In implementing an independent learning process that trained information literacy, textbooks were needed which were used as a stimulant for the students to support these abilities. One of the textbooks that supported students in independent learning was the module. According to Parmin and Peniati (2012), one of the criteria in developing the module was to help students prepare for independent learning. This was supported by Asyhar (2012) that the module was a teaching material designed for independent study. According to Sirate and Ramadhana (2017), the module was one of the teaching materials which was in line with the characteristics of the 2013 curriculum. This curriculum directed the learning process to be able to actively involve students.

In compiling the module, innovation is needed to attract students to study the content of the module, so that learning objectives can be achieved. The innovation in question is developing modules by integrating other learning media. In this study, the module was developed by integrating ICT (Information and Communication Technology) through the presence of a simplified URL (Uniform Resource Locator) in the form of a QR Code (Quick Response Code). Sulistyowati (2018) stated that the main purpose of implementing ICT in education was to apply ICT equipment as a medium and methodology in the learning process. Patil (2012) assumed that ICT in innovative learning could produce active, collaborative, creative, integrative, and evaluative learning. Thus, the existence of ICT is very supportive of the learning process. For example, in exploring the good subject matter, such as literature and journals that could be obtained easily using ICT (Andriani, 2015). Learning by utilizing ICT was expected to be an attractive learning method and support students to be able to develop themselves in the digital era. According to Firmansyah and Hariyanto (2019), the novelty of QR Code-based teaching materials is a new technology that has not been widely used.

In general, biology is a subject that contains abstract concepts. Based on the results of interviews

with teachers of SMA Negeri 14 Semarang, the reproductive system was a material that was considered difficult for the students to learn. This was because students had difficulty in mastering the concept. The lack of students in mastering the concept was caused by the lack of supporting visualization, especially on the topic of ovulation mechanisms involving the hormone system. According to Hairy et al. (2018), the lack of mastery of the material was due to the lack of mastery of concepts and the existence of misconceptions. Likewise, according to Hamdi et al (2015), mastery of the material was very influential on learning achievement. In order for the concept to be visualized, ICT was needed. ICT-based learning supported the use of media to visualize these abstract concepts. With the visual representation of teaching materials could improve students' understanding (Mulyani, 2012). In addition, the presence of media in the module could increase students' motivation and interest in learning, so that students could easily understand the material in a fun learning situation (Nurrita, 2018). According to Supiandi and Yasinta (2018), complex and abstract subjects could be presented through multimedia, so students could easily master the material. Multimedia used can be in the form of video and animation.

In the preparation of the developed module, attention had been pointed to matters relating to the ease with which students understand the material. The media contained in the module had to be contextual, so that it could support students in understanding the material (Riwu et al., 2018). According to Rikizaputra et al. (2021), the use of modules as learning resources could help students understand abstract concepts to be more concrete and contextual, so that they were easy to understand. The module was a representation of the teacher's explanation in the classroom, so it had to include clear instructions (Rosdiana, 2017). In addition to attention to material, module design was also considered. The module was designed attractively so that students feel happy, did not get bored while studying, and could easily absorb the material which were being studied (Syahrial et al, 2019). Because, learning saturation was an obstacle for students in getting maximum results (Sari et al., 2020). In its design, the module was planned as a printed teaching material. However, in practice, the module wass used in the form of an e-module. This was due to the situation and conditions of the Covid-19 pandemic which required students to study online, so that the distribution of modules was carried out online.

Based on the description above, this study was aimed to develop an ICT-based module to train information literacy according to the 2014 BSNP standard. With the development of this module, it was expected to train students' information literacy skills according to the 2000 ACRL indicators.

RESEARCH METHOD

In this study, the 2015 version of Sugiyono's Research and Development/R&D method was used with some modifications. The procedures which were carried out included collecting information on potentials and problems, initial data collection, module design, module validation by experts, module revision phase I, trial use of small-scale modules, revision of phase II modules, and trials of using large-scale modules. The trial design in this study used a pre-experimental design method in the form of a one-shot case study. The small-scale trial of the module was conducted at SMAN 3 Tegal involving 9 students of class XI-MIPA 1, while the large-scale trial was conducted at SMAN 14 Semarang involving 30 students of class XI-MIPA 2.

The module eligibility instrument consisted of the validation questionnaires addressed to material experts, media experts, and biology teachers; as well as the module assessment questionnaires which were addressed to the students. Meanwhile, the potential instrument of the module in training information literacy consisted of the questionnaire on students' perceptions of the information literacy content in the module and the tasks/exercises in the module. The data analysis method used was quantitative. All data were measured using a Likert scale. After that, the data was converted in the form of percentages. To convert data in the form of percentages, the following formula was used.

$$\text{Percentage (\%)} = \frac{\text{The total score of assessment results}}{\text{Maximum score}} \times 100\%$$

Note: The maximum score was obtained from the product of the maximum score per indicator with the number of instrument items.

After obtaining the percentage, the data was then described through qualitative criteria. The qualitative criteria used referred to Arikunto (2016) with modified criteria. The qualitative criteria were presented in table 1.

Table 1. Table of qualitative criteria for validity according to material experts, media experts, and biology teachers (A); student assessments related to module content and student perception questionnaires about information literacy content in module (B); and the potential of the module in training information literacy through tasks/activities (C).

Percentage range	Module validation by materials experts, media experts, and biology teachers (A)	Information literacy content in the module according to students' perceptions (B)	Module potential in training information literacy through tasks/activities (C)
82% - 100%	Highly eligible	Excellent	Highly capable
63% - 81%	Eligible	Good	Capable
44% - 62%	Quite eligible	Quite good	Quite capable
25% - 43%	Poor	Poor	Incapable

RESULTS AND DISCUSSION

The following sections described the development of the module, the eligibility of the module, and the potential of the module in training students' information literacy obtained through research instruments.

Module Development

To produce a module that motivated its users and could train information literacy, the module was designed with the characteristics of using a simplified URL (Uniform Resource Locator) in the form of a QR Code (Quick Response Code) to access videos related to the material in the module. According to Firmansyah and Hariyanto (2019), the novelty of QR Code-based teaching materials was a new technology that had not been widely used. The advantages of this technology are the amount of information that can be obtained and the speed of accessing information. Several other characteristics are the module as self-instructional, that the module can be used independently (without depending on other parties). Second, the module is self-contained, that is, all required learning materials are contained in the module. Third, the module is adaptive, meaning that the module has high adaptability to science and technology.

Module development was based on the potential and problems obtained from the initial data. The potential that existed was that almost all students had used smartphones and the internet to find information related to the learning materials. Thus, learning by utilizing ICT was appropriate. Meanwhile, the problem found was that the students did not pay attention to the sources in finding information related to the learning materials. Thus, the development of the module as a stimulant for students to practice information literacy was appropriate.

Module Eligibility

The eligibility of the module was obtained from the validation instruments of material experts, media experts, and biology teachers, as well as student assessment questionnaires on the module. The instrument used referred to the 2014 BNSP indicators. In the questionnaire validation for the material expert, the components assessed included aspects of content eligibility, presentation eligibility, and language assessment. The results of module validation by material experts were presented in table 2.

Table 2. Validation by material experts

No.	Aspects of assessment	Score of assessment	Maximum score
1.	Eligibility of the contents	36	36
2.	Eligibility of the presentation	54	56
3.	Language assessment	34	36
Total score		124	128
Final percentage		96,87%	
Criteria		Highly eligible	

Based on the table above, the percentage of the results of the eligibility assessment of the module developed according to material experts was 96.87%, so the module was declared as very suitable to be used. In addition to the assessment using a validation questionnaire, suggestions and input were also given by the material experts. This suggestion included two things. The first suggestion referred to the aspect of language assessment which was aimed to clarify the material so that the students could easily understand the concept of the material, while the second suggestion referred to the aspect of presentation eligibility which was aimed to avoid ambiguity in the sentences written. According to Syahirah et al. (2020), the lack of affirmation on the material would lead to many interpretations, so affirmation in the sentence was needed. Thus, it was necessary to pay attention to the clarity of foreign terms and to emphasize important things in the material.

In the media expert's validation questionnaire, the components assessed included aspects of presentation eligibility, language assessment, and graphical eligibility. The results of module validation by media experts were shown in table 3.

Table 3. Validation by media experts

No.	Aspects of assessment	Score of assessment	Maximum score
1.	Presentation eligibility	26	28
2.	Language assessment	14	16
3.	Graphical eligibility	40	40
Total score		80	84
Final percentage		95,24%	
Criteria		Highly eligible	

Based on the table above, the percentage of the results of the eligibility assessment of the module developed according to media experts was 95.24%, so the module was declared as very suitable to be used. In addition to the assessment using a validation questionnaire, suggestions and input were also given by media experts. The first suggestion referred to the graphical eligibility aspect which was aimed at clarifying the QR Code scanning instructions in the module so that the students did not get confused when accessing the video via the QR Code listed in the module, while the second suggestion referred to the aspect of presentation eligibility which was aimed at pointing out the source of the image used. In the preparation of the module, the instructions for use had to be clearly arranged, because the module is one of the teaching materials designed for independent study. This is supported by Asyhar (2012) that the module was designed for independent learning by students. Therefore, the module had to be equipped with clear instructions for use. Independence is defined as a person's ability to do something without relying on others. According to Rosdiana et al. (2017), the module was a representation of the teacher's explanation in the classroom, so it had to include clear instructions. Thus, students' understanding of the instructions for using the module would affect their independence in optimizing the use of the module.

The module validation by a biology teacher was carried out by two teachers, who were a biology teacher at a high school in Tegal and a biology teacher at a high school in Semarang. In the validation questionnaire for the biology teacher, the components assessed included the aspects of content eligibility, presentation eligibility, language assessment, and graphical eligibility. The results of module validation by

biology teachers were presented in table 4.

Table 4. Validation by biology teacher

No.	Evaluator	Score the results of the assessment of each aspect				Percentage
		Content eligibility	Presentation eligibility	Language assessment	Graphics eligibility	
1.	Biology teacher 1st	32	68	20	12	100%
2.	Biologi teacher 2nd	32	67	20	12	99,24%
The maximum score of the content eligibility					32	
The maximum score of the presentation eligibility					68	
The maximum score for the language assessment					20	
The maximum score of graphical eligibility					12	
Final percentage average					99,62%	
Criteria					Highly eligible	

Based on the table above, the percentage of the results of the eligibility assessment of the module developed according to media experts was 95.24%, so the module was declared as very suitable to use. In addition to the assessment using a validation questionnaire, suggestions and input were also given by the two biology teachers. There were two suggestions that referred to the aspect of presentation eligibility. The difference was that the first suggestion mostly referred to the development of modules to make it easier in practicing the information literacy, while the second suggestion leant on the involvement of students to be more interactive during the learning process. The first suggestion included adding Indonesian-language journal references in the module, while the second suggestion was to provide assignments that involved teachers or families so that the students did not feel alone while studying. According to Gani et al. (2020), students' curiosity about the material being studied could be answered through activities to search for a lot of information. To make sure that the information could be easily understood, the process of processing information was carried out. The information processing process could not be carried out if the students did not understand the language used in the translated information. Therefore, the addition of Indonesian-language journal references in the module needed to be done to make it easier for students to understand the information.

Basically, in compiling and developing the module, the interactive and participatory aspects had been considered. This was strengthened by the description of the material and instructions in the module which contained elements of interaction with students. In addition, from the results of the validation of material experts and biology teachers at a high school in Tegal, the maximum points were obtained on this aspect. However, for a biology teacher at a high school in Semarang, the module was considered less interactive because it did not involve people around the students during the independent learning process. According to Khoirudin (2019), the criteria for a communicative module included the module's ability to invite students to be active and establish two-way communication. Thus, this was of particular concern in developing a more interactive module.

Apart from the validation from the biology teachers and experts, the student assessment of the module was also measured. The questionnaire had been done during small-scale and large-scale trials after students used the module. Based on the analysis of student assessment data in the small-scale trial, an average percentage of 80.04% was obtained, while in the large-scale trial the average percentage was 80.26%. In the comparison of small-scale and large-scale trials, the percentage increase was 0.22%. This increase was caused due to module revisions based on suggestions and input from students during small-scale trials before large-scale trials were carried out. This is supported by the statement by Saputra et al. (2020) that product revisions were carried out to improve the deficiencies found as well as to improve the quality of the products developed. Thus, based on the validation from the material experts, media experts, biology teachers, and students, it was considered that the ICT module developed was eligible to be used, although some improvements still needed to be done according to the suggestions and the input from the validators.

Module Potential in Training Information Literacy

To find out the students' perceptions towards the information literacy content in the module, an instrument in the form of a questionnaire was used. The questionnaire was filled out during small-scale and large-scale trials after the students finished using the module. The questionnaire used referred to the ACRL indicator in 2000. Data on the students' perceptions towards the information literacy content from the questionnaire instrument were shown in table 5.

Table 5. Data of the students' perceptions towards the information literacy content from the questionnaire instrument

Indicator	Sub Indicator	Percentage	
		Small scale trial	Large scall trial
1. Information-literate students summarize the main ideas which were drawn from the collected information.	a. Reading the text and choosing the main ideas.	80,56%	80,00%
	b. Restating textual concepts in their own words and selecting the data accurately.	80,56%	77,50%
2. Information-literate students articulate and apply the initial criteria to evaluate information and its sources.	a. Examining and comparing information from multiple sources sequentially to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias.	83,33%	81,67%
	b. Analyzing prejudice, fraud, and manipulation.	75,00%	81,67%
	c. Recognizing prejudice, fraud, or deception.	77,78%	80,00%
3. Information-literate students synthesize the main ideas to construct new concepts.	a. Utilizing computers and other technologies (e.g. spreadsheets, databases, multimedia, and audio or visual equipment) to study the interaction of ideas and other phenomena.	91,67%	85,83%
Average		81,48% (Good)	81,11% (Good)

Based on the data analysis above, the percentage of small-scale trials was 81.48% while the percentage of large-scale trials was 81.11% with good criteria. According to Arikunto (2016), the module was defined to be good if the percentage was in the range of 63%-81%. In addition, according to Amir and Kusuma (2018), the percentage of students' responses that had reached 70% was known to show a positive response from respondents. These data indicated that the information literacy content in the module had met the standards regarding the 2000 ACRL.

In addition to the quantitative data, qualitative data on the students' perceptions of journal articles in the module and students' impressions while browsing journals were also measured. Based on the qualitative data of the students' perceptions, it can be seen that the students felt that they had obtained usefulness and interesting experiences in learning the material. In applying information literacy, the students had difficulties in searching for information from journal article sources, that was when they found it challenging to

understand the contents of the article. Based on the research which was done by Silvana et al. (2017), many students were good at finding information, but some of the students did not understand about how to process information from these information sources. However, this could be overcome by the students' efforts in summarizing the main idea of the information. By understanding the main idea of the information, the students would find it easier to understand the essence of the information. In addition, efforts to regularly applying information literacy also supported students' understanding of information. This solution is supported by Kharizmi (2015), who stated that one of the efforts to improve information literacy was by getting used to the concrete literacy practices. From the description of the students' perception data that had been discussed, it could be concluded that the module had already contained information literacy which was in line with the 2000 ACRL standard.

Apart from using a questionnaire on the students' perceptions, the researcher also used an instrument in the form of tasks/activities that were integrated with the module to determine the module's potential in training information literacy. The instrument which was used to develop the tasks/activities in the module referred to the 2000 ACRL indicator. The potential data for the module in training information literacy obtained through tasks/activities were shown in table 6.

Table 6. Data on the potential modules in training information literacy through tasks/activities

Aspects of assessment	Indicator	Tasks in the module	Percentage	
			Small scale trial	Large scale trial
1. Ability to summarize ideas	• Information-literate students summarize the main ideas which were taken from the information collected.	• The task of "let's listen to it" units 1-5. • Task "let's explore" unit 6 (journal analysis).	96,91%	97,78%
2. Ability to choose the type of references	• Information-literate students articulate and apply initial criteria to evaluate information and its sources.	• Tasks "let's explore" units 3, 6, and 7	64,20%	44,44%
3. Ability to restate concepts	• Information-literate students summarize the main ideas drawn from the collected information. • Information-literate students articulate and apply initial criteria to evaluate information and its sources.	• The task of "let's explore" units 3 and 4. • The task of "reflection activities". • Task "let's explore" unit 7.	95,37%	90,00%
Average			85,49% (Highly capable)	77,41% (Capable)

Based on the data analysis of the potential of the module in training information literacy through tasks/activities in the small-scale trial, a percentage of 85.49% was obtained with the highly capable criteria, while in the large-scale trial the percentage was 77.41% with the capable criteria. According to Arikunto (2016), the module was considered to be able to train information literacy if the percentage was in the range of 82-100%. The data showed that the module was able to train the information literacy by referring to the 2000 ACRL standard.

In the aspect of the ability to summarize ideas, the students were highly capable to summarize the ideas based on the collected information. This condition was observed from the insignificant percentage difference between the ability to restate concepts and the ability to summarize the ideas. Meanwhile, the two

data were quite significant in terms of the ability to choose the types of references. Thus, the aspect of the ability to choose the types of references was the aspect with the lowest percentage, both for the small-scale trials and large-scale trials. Based on the quantitative data on the potential of the module in training the information literacy, which was adjusted to the qualitative data of students' perceptions of information literacy content, several factors could be analyzed that probably causing the low potential for the module in training the students to choose the types of references. These factors were described as follows.

1. The types of tasks/activities in the module were not uncommon for the students, because these types led to the information retrieval with demands to use accurate sources of information.
2. The module had not been maximally motivating students in choosing the journal articles as the right source of information.
3. The students were not used to using journal articles as a source of information.
4. The students mostly chose sources of information that were quick and easy to obtain.

In addition to these four factors, the level of students' awareness of information literacy activities also affected the percentage of the modules in training information literacy. According to Nurohman (2014), growing awareness of information literacy was not easy, because it was necessary to find the root of the problem and to take advantage of opportunities that supported and understood the obstacles that hinder the process.

In the activity of choosing the types of references, the students mostly chose the information which was easy to get as well as easy to obtain. The lack of students' attention to the selection of information sources was caused by the lack of direction during the information searching process. According to Nurohman (2014), guidance during ICT-based independent learning needed to be given, because the students needed guidance in accessing, selecting, and using information. While in this study, the students only received directions from the instructions for use from the module. This became the weakness during the process of implementing the module. However, on the other hand, there were also advantages, in which it was able to motivate the students in implementing the information literacy activities. This condition was proven from the qualitative data of the students' perceptions that considered if the module was able to make students felt challenged through the activities to search for the journal articles.

Based on research which was conducted by Puspaningrum and Gunansyah (2015), the use of teaching materials in the form of big books to improve students' information literacy gave good results with sufficient criteria. In addition, based on the research conducted by Muhajang and Pangestika (2018), the information literacy applied to the students had a positive effect on the effectiveness of independent learning. Thus, the use of the module as the independent learning in training information literacy was the right choice to be done.

To get the benefits of using the module in training information literacy on a broad scale, it is necessary to conduct new researches on the dissemination or dissemination stage. Thus, based on the potential data of the module in training information literacy, it could be concluded that the module was able to train information literacy according to the 2000 ACRL standard.

CONCLUSION

Based on the results of the study, it could be concluded that the ICT-oriented learning module that had developed was suitable to use as a student learning resource with textbook assessment standards according to the BSNP in 2014. The ICT-oriented learning module was also able to train information literacy to the students.

REFERENCES

America Library Association (ALA). 2000. Information Literacy Competency Standars for Higher Education. Diakses 28 Januari 2020. https://alair.ala.org/handle/11213/7668

Amir, Muhammad F. dan M. Darmawan Kusuma. 2018. Pengembangan Perangkat Pembelajaran Berbasis Masalah Kontekstual Untuk Meningkatkan Kemampuan Metakognisi Siswa Sekolah Dasar. *Journal of Medives,* 2(1): 117-128.

Andriani, Tuti. 2015. Sistem pembelajaran Berbasis Teknologi Informasi dan Komunikasi. *Jurnal Sosial Budaya*, 12(1): 129-150.

Arikunto, Suharsimi. 2016. *Prosedur Penelitian Suatu Pendekatan Praktik.* Jakarta: PT. Rhineka Cipta.

Association of College and Research Libraries (ACRL). 2000. Information Literacy Competency Standards for Higher Education. American Library Association.

Asyhar, Rayandra. 2012. *Kreatif Mengembangkan Media Pembelajaran*. Jakarta: Referensi (GP Press Group).

Firmansyah, G. dan D. Hariyanto. 2019. Penggunaan *QR Code* Pada Dunia Pendidikan: Penelitian Pengembangan Bahan Ajar. *Jurnal SPORTIF: Jurnal Pendidikan Pembelajaran*, 5(2): 265-278.

Gani, A.R. F., U. Zaimah, dan S. R. Wulandari. 2020. Studi Literatur Upaya Meningkatkan Literasi Informasi Siswa Pada Mata Pelajaran Biologi Selama Belajar Daring Efek Covid-19. *Bioilmi,* 6(2): 129-136.

Hamdi, A. Halim, dan K. Pontas. 2015. Pengembangan dan Penerapan Modul Pembelajaran Materi Teori Dasar Bentuk Muka Bumi Untuk Meningkatkan Kognitif Mahasiswa Pendidikan MIPA FKIP Unigha Singli. *Jurnal Pendidikan Sains Indonesia*, 3(2): 22-34

Hairy, M. R., Kusmiyati, dan M. Yamin. 2018. Analisis Penguasaan Konsep Materi Sistem Reproduksi Pada Siswa SMA Negeri di Kota Mataram. *Jurnal Pijar MIPA*, 13(2): 119-123.

Kharizmi, Muhammad. 2015. Kesulitan Sekolah Dasar dalam Meningkatkan Kemampuan Literasi. *Jupendas,* 2(2): 11-21.

Khoirudin, M. 2019. Pembelajaran Biologi Menggunakan *Problem Solving* Disertai Diagram Tree Untuk Memberdayakan Kemampuan Berpikir Logis dan Kemampuan Menafsirkan Siswa. *Indonesia J. Integr. Sci. Education (IJIS Edy)*, 1(1): 33-42.

Mashuri, Ilham. 2012. Implementasi Literasi Informasi di Sekolah. *Jurnal Kajian Informasi dan Pepustakaan (Pustakaloka),* 3(1): 61-72.

Muhajang, Tatang dan D. Pangestika. 2018. Pengaruh Literasi Informasi Terhadap Efektivitas Belajar Siswa. *Jurnal Ilmiah Pendidikan PEDAGONAL*, 2(2): 15-22.

Mulyani, Asep. 2012. Sistem Saraf Manusia dalam Tutorial CBI: Usaha Meningkatkan Keterampilan Generik Sains. *Jurnal Scientiae Educatia*, 1(1): 1-60.

Nurrita, Teni. 2018. Pengembangan Media Pembelajaran Untuk Meningkatkan Hasil Belajar Siswa. *Jurnal Misykat*, 3(1): 171-187.

Nurohman, Aris. 2014. Signifikansi Literasi Informasi (*Information Literacy)* dalam Dunia Pendidikan di Era Global. *Jurnal Kependidikan,* 2(1): 1-25.

Parmin dan E. Peniati. 2012. Pengembangan Modul Mata Kuliah Strategi Belajar Mengajar IPA Berbasis Hasil Penelitian Pembelajaran. *Jurnal Pendidikan IPA Indonesia*, 1(1): 8-15.

Partnership for 21st Century Learning (P21). 2019. *Framework for 21st Century Learning Definitions*. Diakses 3 Januari 2020. http://www.p21.org/our-work/p21-framework

Patil, Shreya Vinay. 2012. The Role of *ICT* in Educational Sector. *Lokavishkar International E-Journal*, 1(4): 91-98.

Pusat Penelitian Kebijakan Pendidikan dan Kebudayaan (Puslitjakdikbud). 2019. *Indeks Aktivitas Literasi Membaca 34 Provinsi*. Jakarta: Kementerian Pendidikan dan Kebudayaan.

Pusat Penelitian Kebijakan Pendidikan dan Kebudayaan (Puslitjakdikbud). 2019. *Indeks Aktivitas Literasi Membaca 34 Provinsi*. Jakarta: Kementerian Pendidikan dan Kebudayaan.

Puspaningrum, Riska D. dan G. Gunansyah. 2015. Pengaruh Penggunaan Media *Big Book* Terhadap Kemampuan Literasi Informasi Siswa Sekolah Dasar. JPGSD, 3(2): 175-184.

Rachmawati, Muljono, P., & Sitanggang, I. S. (2017). Designing of Web-Based Information Literacy Assessment System Perancangan Sistem Asesmen Literasi Informasi Berbasis Web. *Edulib*, 7(2), 46–59.

Rikizaputra, *et al.* 2021. Analisis *Effect Size* Pengaruh Modul Berbasis Saintifik Pada Pembelajaran IPA. *Lensa (Lentera Sains): Jurnal Pendidikan IPA*, 11(1): 38-46.

Rosdiana, J. Sapri, dan B. Sahono. 2017. Pengembangan Modul Akuntansi Untuk Meningkatkan Kemandirian dan Prestasi Belajar Siswa Kelas XII SMAN di Kota Bengkulu. *Jurnal Ilmiah Teknologi Pendidikan DIADIK*, 7(2): 78-86.

Saputra, K. R., I. P. S. Arsa, dan I. G. Ratnaya. 2020. Pengembangan Media Pembelajaran Pembangkit Listrik Tenaga Surya Pada Mata Kuliah Pembangkit Listrik di Program Studi S1 Pendidikan Teknik Elektro. *Jurnal Pendidikan Teknik Elektro Undiksha*, 9(3): 193-202.

Sari, P., F. I. Kholidin, M. D., dan Edmawati. 2020. Tingkat Kejenuhan Belajar Siswa Sekolah Menengah Pertama di Kota Bandar Lampung. *Journal of Guidance and Counseling Inspiration,* 1(1): 45-52.

Silvana, T., Fitriawati, dan E. Saepudin. Study About Ability of Information Literacy Among Junior High School Student. *Edulib*, 7(2): 17-28.

Sirate, S. F. S. dan R. Ramadhana. 2017. Pengembangan Modul Pembelajaran Berbasis Keterampilan Literasi. *Jurnal Inspiratif Pendidikan*, 6(2): 316-335.

Sugiyono. 2015. Metode Penelitian Pendidikan. Bandung: Penerbit Alfabeta.

Sulistyowati, Raya. 2018. Optimalisasi *Information, Communication and Technology (ICT)* dalam Meningkatkan Kompetensi Guru Bidang Keahlian Pemasaran di SMK Negeri Se-Surabaya. *Jurnal Widyaloka IKIP Widya Darma*, 5(1): 94-103.

Supiandi, M.I and Yasinta L. 2018. The Utilization of Information and Communication Technology (ICT) on Learning in the 21st Century. *Intenational Journal of Academic Research and Development*, 3(2): 869-875.

Syahirah, M., L. Anwar, dan B. Holiwarni. 2020. Pengembangan Modul Berbasis *STEM (Science, Technology, Engineering and Mathematics)* Pada Pokok Bahasan Elektrokimia. *Jurnal Pijar MIPA,* 15(4): 317-324.