Tadris: Jurnal Keguruan dan Ilmu Tarbiyah 7 (2): 221-239 (2022)
DOI: 10.24042/tadris.v7i2.11226

TADRIS: JURNAL KEGURUAN DAN ILMU TARBIYAH
(Tadris: Journal of Education and Teacher Training)
P-ISSN: 2301-7562 | E-ISSN: 2579-7964
ejournal.radenintan.ac.id/index.php/tadris/index

The Integrated E-LKPD Development with SQ4R Learning Strategy to Train Students' Metacognition Ability

Nisa Nur Hasna, Novi Ratna Dewi*
Department of Integrated Science Education, Universitas Negeri Semarang, Indonesia

Article History:
Received: January 19th, 2022
Revised: August 1st, 2022
Accepted: September 29th, 2022
Published: December 29th, 2022

Keywords:
Development research,
E-LKPD SQ4R,
Metacognition

***Correspondence Address:**
noviratnadewi@mail.unnes.ac.id

Abstract: This research is stimulated by the low metacognitive ability of students in Indonesia. The real impact of students' low metacognitive ability is that they are unable to monitor themselves and do not know the nature of their learning goals. The use of the integrated E-LKPD (e-worksheet) with SQ4R learning strategies (Survey, Question, Read, Recite, Reflect, Review) has the potential to be an alternative choice to train students' metacognitive ability. This study aims to determine the validity of the product, and product characteristics as well as to train the metacognition ability's profile of each student. This type of research is development research with the 4D model development. The integrated E-LKPD with SQ4R strategy has the characteristics; integrated with SQ4R strategy, train metacognitive abilities, attractive E-LKPD, flexible E-LKPD, interactive E-LKPD, and E-LKPD includes general requirements for LKPD. The results of the study prove that the integrated E-LKPD with the SQ4R strategy is valid with an average V index of 0.95 in the material aspect and 0.94 in the media aspect with the V table of 0.87. The results of the MAI questionnaire obtain a metacognitive profile of 85.25 with well-developed metacognition criteria. Thus, the developed E-LKPD has been tested to be valid and, therefore, can be used to train students' metacognitive ability.

INTRODUCTION

In the current 21st century era, science and technology education is experiencing very rapid development, including in Indonesia (Praherdhiono et al., 2018; Saputra et al., 2021). The impact of this change also affects the learning process which involves educators and students (Astiningsih & Partana, 2020). Learning in the global era requires students to have various abilities to be able to prepare themselves to become successful individuals in their lives. Important skills are still relevant to the four pillars of life which include learning to know, learning to do, learning to be and learning to live together (Maskur et al., 2020; Permana & Chamisijatin, 2019; van Laar et al., 2017; Worrell et al., 2015). Each of these four principles contains specific skills that need to be empowered in learning activities, including critical thinking, problem solving, metacognition, communication, collaboration, innovation and creation, information literacy, and other various skills (Ahmad & Yunus, 2019; Karatas & Arpaci, 2021; Laar et al., 2020; Reyna et al., 2018). This is in accordance with the education system in Indonesia which uses the 2013 Curriculum as a reference. Constitution Number 54 of 2013 in graduate competency standards (SKL) mentions that new aspects of knowledge that must be

raised in learning is metacognition (Lestari et al., 2019). It is a part of the ability to represent, monitor and control ongoing cognitive processes that helps us perform many tasks, both when acting alone and when working with others (Heyes et al., 2020). Metacognition ability is used by students to see how cognitive activities such as remembering, learning, and problem solving can be conducted effectively (N R Dewi et al., 2021).

The efforts to train the students' metacognitive ability have been carried out, some of which include training in scientific reflective journal writing, through conceptual learning with metacognitive regulation strategies and increasing students' self-efficacy through metacognitive strategies. It is in line with several previous studies that have been done, such as a study conducted by Septina et al., (2018) related to science reflective journal writing by JAS approach to train students metacognitive ability. Amal & Mahmudi's research (2020) also focuses on enhancing students' self-efficacy through metacognitive strategies in learning mathematics to train students' metacognition skills. Then, in the research of Lestari et al., (2019), it examines the open-ended learning approach to train students' metacognitive abilities, while in Abu Bakar & Ismail's research (2020), it concerns on a conceptual of redesign of active learning with metacognitive regulation strategy to improve students' metacognitive abilities.

In fact, the research to train students' metacognitive abilities actually have been carried out in previous studies, but there are still many students with low metacognitive abilities (Ku & Ho, 2010). Dewi's research (2017) points out that the teachers at SMPN 2 Boja are still lack information about metacognition. It then has the direct impact to the students' metacognitive abilities which are also less good. The low metacognitive ability possessed by students causes students not to be able to monitor themselves and do not know their learning goals. The data obtained by the researcher during the practice of teaching experience at SMP Negeri 27 Semarang and also during pre-research observations show that there has been no attempt to train the metacognitive abilities of students there.

Muijselaar et al (2017) states that metacognition strategies are closely related to reading skills and achievements, so that it is very important to use them in investigating metacognitive abilities and students' reading abilities by which they can easily understand the reading material they are studying. Advanced readers tend to use their metacognitive strategies to improve reading skills in their learning. One of the learning strategies that can be used to train metacognition skills is the Survey, Question, Read, Recite, Reflect, Review (SQ4R) learning strategy. Başar & Gürbüz (2017) stated that most learning activities in schools are carried out by reading. Therefore, it can be the basis for learning. This SQ4R strategy consists of six steps, namely Survey, Question, Read, Recite, Reflect and Review (Herwanis et al., 2021; Safaruddin et al., 2018). First, surveying is an activity before reading a text by communicating through reading text, by reading the title and predicting information that will be read, reading the introduction and closing, and seeing any visual aids such as pictures, graphics, or illustrations (Rojabi, 2020). Second, in the question stage, Students ask themselves questions about the reading material they have presented before reading it. Questions can be made in several ways by using the question words as who, when, where, why, how (Fitriani & Suhardi, 2019). Third, in the reading step, the students were active in reading, finding the meaning of difficult words and looking for the answers to the questions (Larasati et al., 2018). Fourth, the recite step, students can retell using their own words while answering questions that have been made previously and making

summaries (N. P. V. F. Dewi et al., 2019). Fifth, the reflect stage is a reflection on the subject matter by being given instructions to provide actual examples of relevant reading materials. Students make correlations between their notes and their lives to help them easily remember the answers they have made in the previous step (Hikmawati et al., 2014). Sixth, at the review stage, in this step, the teacher gives the opportunity to the students to review what has been learned in the previous step. The forms presented in the material vary from enriching vocabulary, writing summaries, identifying difficult vocabulary, finding meaning in words, or presenting students' understanding of text (Khusniyah & Lustyantie, 2017). This SQ4R learning strategy is integrated into a Student Worksheet (LKPD).

This research produces a product in the form of E-LKPD. The development of the E-LKPD was taken considering the current pandemic conditions (Hidayah et al., 2020). The impact of the Covid-19 pandemic on education has made learning to be done online, but in reality on the ground, there are still many LKPD used in the form of printed LKPD (Hidayanti et al., 2017). E-LKPD can make it easier for students in the process which can be done flexibly through the website. Research on the development of integrated E-LKPD with the SQ4R learning strategy on the material of the human circulatory system is carried out in an effort to train students' metacognitive abilities.

METHOD

This type of research is a development research with a 4D model development (Define, Design, Develop and Dessiminate which was developed) by Thiagarajan et al., (1974), but in this study only reached the develop stage. This is due to the limited time and learning carried out online because of pandemic conditions, so that the stages include define, design and develop. The development of design in this study can be seen in Figure 1.

The research was carried out at SMP N 27 Semarang Central Java. The research subjects in this case were the students and experts, namely: 1) Material experts as many as five experts and media experts as many as five experts, 2) There are the 26 students in class VIII E of SMP Negeri 27 Semarang in the trial stage.

The research procedure carried out in the development process is in the form of problem analysis with observation and literature study, followed by the E-LKPD design stage. The development stage carried out includes (1) Expert appraisal is a technique to validate or assess the feasibility of product designs. The valid E-LKPD is then tested on students. (2) Development testing is a product design test activity on the real target subject.

Data collection techniques were done by a means of observation and distributing questionnaires. The research data were obtained from the results of the validity by expert validation, the results of the student response questionnaires and the results of filling out the metacognition awareness questionnaire (MAI questionnaire). The validity research data were analyzed using the AIken's V calculation formula, while the metacognitive characteristics and profile data were analyzed using a percentage descriptive technique. E-LKPD is declarated to be valid if Vcount = Vtable (Arikunto, 2013). The value of Vtable with the number of validators (n)=5 and the highest validity rating score (c)=4 is 0.87. The value of this coefficient ranges from 0 to 1, where 1 indicates perfect concordance between the judges with respect to the evaluated content (Díaz et al., 2021).

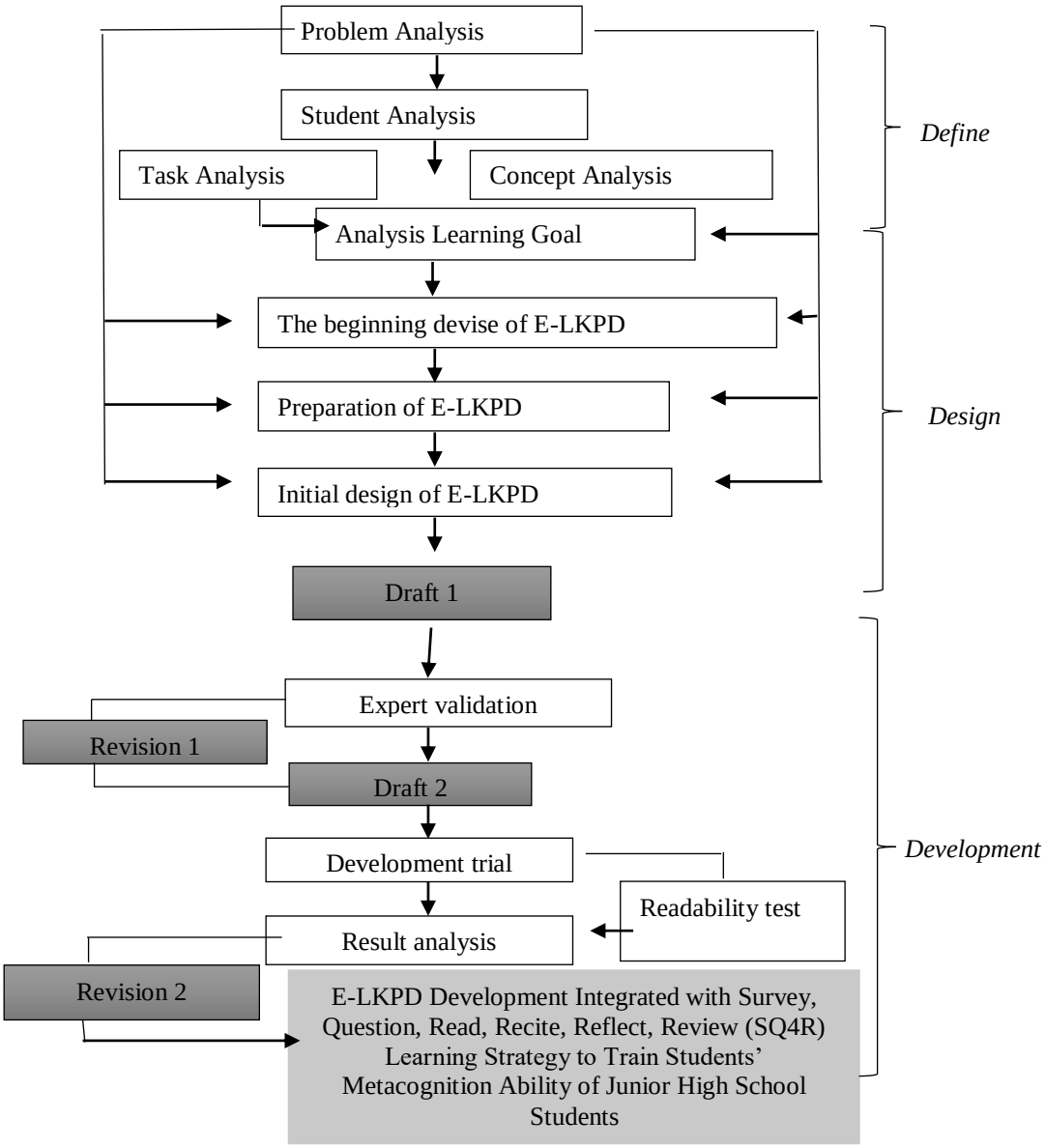

Figure 1. Development Design (Modified from Thiagarajan et al. (1974))

RESULT AND DISCUSSION

From the data of the literature study show that the metacognitive ability of Indonesian students is still low. Even, based on observations at SMPN 27 Semarang, from information obtained that there is no data on metacognitive abilities and efforts to develop metacognitive abilities there. As an alternative choice to deal with such problems, the integrated E-LKPD with SQ4R learning strategy was chosen because it was considered as the most relevant to the 2013 Curriculum to train the students' metacognitive ability. For more detail, the Integrated E-LKPD with SQ4R Learning Strategy can be opened at the following link.

Table 1. Link the Product Integrated E-LKPD with SQ4R Learning Strategy

No	Name	URL
1	E-LKPD 01: Components of Blood	https://www.liveworksheets.com/fs2260793ux
2	E-LKPD 02: Components of Blood	https://www.liveworksheets.com/in2253133vo
3	E-LKPD 03: Heart and Blood Vessels	https://www.liveworksheets.com/hx2278362yy
4	E-LKPD 04: Disorders and Abnormalities in the Human Circulatory System	https://www.liveworksheets.com/xz2338192yb

The products that are developed have been validated and assessed by the experts including material experts and media experts. Based on the validity test process with material experts and media experts, as well as the results of student responses, it was stated that the integrated E-LKPD with SQ4R learning strategy was valid and ready to be used to train students' metacognitive abilities. The results of the assessment are shown in the Table 2 and Table 3.

Table 2. Validity Test Results of Integrated E-LKPD with SQ4R Learning Strategy on Material Aspects

Rated Aspect	V	Criteria
Contents	0.95	Valid
Presentation	0.98	Valid
Language	0.88	Valid
Metacognitive ability	0.97	Valid

Table 3. Data on the Validity of the Integrated E-LKPD with SQ4R Learning Strategy on the Media Aspect

Rated aspect	V	Criteria
Contents	0.93	Valid
Presentation	0.97	Valid
Graphic	0.90	Valid

Desc: V= Average

Table 2 and Table 3 show that the average value of index V for each indicator is 0.95 and 0.94 respectively, with valid criteria. Integrated E-LKPD with SQ4R learning strategy is valid because the value of V_{count} is greater than V_{table} in terms of material with an average index V of 0.95 (Emzir, 2011). Before being tested, teaching materials must be validated. Design validation is a product design assessment process that is carried out by giving an assessment based on rational thinking.

The validation of material experts in this development research was carried out by two science lecturers at the State University of Semarang and three science teachers at SMPN 27 Semarang. The validator stated that the E-LKPD was very well prepared and ready to be used. It was in accordance with the learning objectives and the SQ4R strategy and the coverage of the material in general was good and complete, but it was needed to add special material for the parts of the heart and their functions and differences in arteries and veins as well. Regarding suggestions for adding material, it has been accommodated by adding the material. The validity of media experts is validated by five media expert validators. The media expert validators in this development research were carried out by the two science lecturers at the State University of Semarang, one science teacher and two ICT teachers.

The validator stated that the integrated E-LKPD with SQ4R learning strategy in terms of media was good in choosing clear colors and fonts, all materials and media were also interactive. There are some suggestions from the validator as the pictures need to be corrected/replaced with a bigger revolution, English needs to be italicized, word writing (above, below, in the area, here, into, etc.) should be separated. These suggestions were then accommodated and revised again. This is in line with Dewi & Akhlis's research (2016) which states that each input from the validator is recapitulated into one, evaluated and then looked for solutions for improvement. Meanwhile, student assessment focuses on student responses to the characteristics of the E-LKPD, as shown in Table 4.

Table 4. Results of Student Responses to E-LKPD

No.	Rated Aspect	Percentage (%)	Criteria
1.	The information in the *E*-LKPD gave me new knowledge	89.42	Very Good
2.	The assignments in the *E*-LKPD helped me in understanding the material	79.80	Good
3.	Examples of applying the material according to daily life day	88.46	Very Good

No.	Rated Aspect	Percentage (%)	Criteria
4.	*E*-LKPD allows me to understand and examine the reading material well	87.5	Very Good
5.	*E*-LKPD allows me to conclude the content of the material I am studying	85.57	Very Good
6.	*E*-LKPD makes it easy for me to study anywhere and anytime	91.34	Very Good
7.	The appearance of the pictures and colors of the *E*-LKPD is interesting so that it makes me interested in reading it	95.19	Very Good
8.	The contents in the *E*-LKPD are presented clearly	83.65	Very Good
9.	The supporting images in the *E*-LKPD are attractive	90.38	Very Good
10.	The type and size of the letters in the *E*-LKPD are comfortable to read	94.23	Very Good
11.	The language used in general in the *E*-LKPD is easy to understand	89.42	Very Good
12.	Instructions for using *E*-LKPD are easy to understand	87.50	Very Good
13.	The terms used in the *E*-LKPD easily understandable	92.30	Very Good
14	sentences exist on *the E*-LKPD understandable	80.76	Good
15.	Contents (material) in *E*-LKPD raise accuracy/my honesty/tenacity in learning	93.30	Very Good
16.	The content (material) in the *E*-LKPD encourages me to think	96.15	Very Good

As presented in Table 3, it shows the results of the student responses to the integrated E-LKPD with SQ4R learning strategy. The results of student responses show an average achievement of 89.06% with very good criteria. This means that the student's response is in accordance with the characteristics of the E-LKPD.

Characteristics are distinctive traits (certain dispositions) that distinguish someone or something from others (KBBI, 2016). Characteristics of E-LKPD mean the characteristics possessed by E-LKPD. The Integrated E-LKPD with SQ4R Strategy is an application-based E-LKPD that can be accessed on the website integrated with the SQ4R strategy steps. This E-LKPD was developed by using the liveworksheets application. It can be accessed online via www.liveworksheets.com.

The characteristics of the integrated E-LKPD with SQ4R learning strategy are: (1) the E-LKPD integrated with the SQ4R strategy, (2) the E-LKPD can train students' metacognitive abilities, (3) the E-LKPD is attractive, (4) the E-LKPD is flexible, (5) E-LKPD is interactive, (6) E-LKPD includes general LKPD requirements. The characteristic data were taken from the validity of the E-LKPD and student response questionnaires to the characteristics of integrated E-LKPD with SQ4R strategy. The results of student responses can be seen fully in Table 3.

The characteristic 1 is that E-LKPD is integrated with the SQ4R learning strategy. E-LKPD includes the steps of the SQ4R learning strategy. SQ4R aims to develop students' cognitive by reading with the full understanding and concentration. Rahayu et al (2019) argues that one strategy that has been proven effective as a reading strategy to develop students' metacognition is SQ4R. Validity data on indicator 3 on material expert validation are namely about the integrated E-LKPD with SQ4R strategy obtained an index V of 0.93 with valid criteria. This is because the E-LKPD fulfills the steps of the SQ4R learning strategy.

The steps of the SQ4R learning strategy include Survey, Question, Read, Recite, Reflect and Review. (1) In the survey stage, students carry out pre-reading activities by reading the titles and subtitles on the learning material. After that, students write it down into the diagram that has been provided previously on the E-LKPD in the survey stage. (2) In question stage, students make a question from the title and main idea they got from the previous step. Students write down at least three

questions regarding of related material, (3) in the read stage, students carry out reading activities carefully to find answers to questions they have made previously. Students can write down words or sentences that they have not understood before for later. They look for the answer. (4) In reciting stage, students write down the answers given (note-discuss together). Through this recite step, the teacher assigns students to state the answers to the questions that have been compiled and write them down into the columns that are already available in the E-LKPD. (5) In the reflect stage, students can make correlations between notes (summaries) that have been written with relevant actual events in order to make it easier to remember the answers they have made in the previous step. (6) In the review stage, questions are presented as evaluation materials for students. The students then look at and correct the answer they answered before. This is in accordance with the research of Suardani et al., (2013) which states that a review is a thorough review, namely by asking students to look back and compare their writing with the actual reading material. If there are errors, students can correct their writing according to the contents of the answer. The student response data regarding SQ4R are found in indicators number 1, 2, 3, 4, 5 with the percentage of each achievement being 89.42%; 79.80%; 88.46%; 87.5%; 85.57%. Indicator 2 has good response criteria. While indicators shown in 1, 3, 4 and 5 have very good response criteria. This means that the characteristic 1, which is about the SQ4R strategy, can already meet the characteristics of the developed E-LKPD. These characteristics can be seen in the stages of the SQ4R strategy in E-LKPD, namely the survey, question, read, recite, reflect, review stages. The example of the integrated characteristics of SQ4R in E-LKPD can be seen in Figure 2.

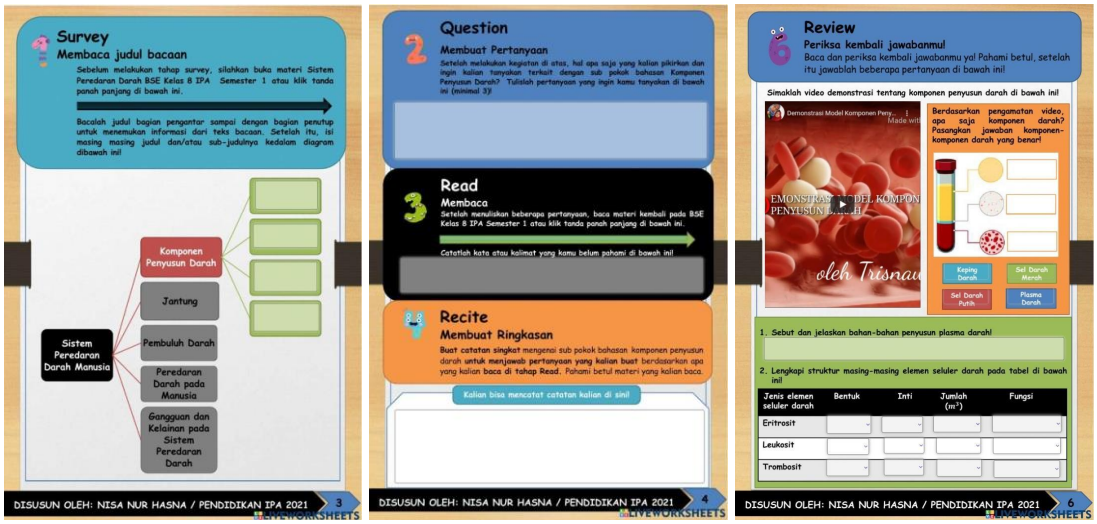

Figure 2. Example of Integrated Characteristics of SQ4R Strategy in E-LKPD

In the characteristic 2, it shows that E-LKPD contains metacognitive indicators. This is due to train students' metacognitive skills through the integrated E-LKPD with SQ4R learning strategy. This metacognitive ability is important for students so that they can understand and monitor their thinking activities. Each person's metacognitive process will be different according to their abilities. Students who can build their metacognitive abilities are going to provide knowledge about self-awareness to better understand the concept of thinking in the material they want to learn (Ummayah & Dewi, 2021). Validity data on indicators 12 and 13 regarding metacognitive ability obtain V index of 1

and 0.93 with valid criteria. This is because the integrated E-LKPD with SQ4R learning strategy contains indicators of metacognitive ability, comprising of: (1) Cognitive-declarative knowledge and procedural-conditional knowledge), (2) Cognitive regulation (planning, information management strategy, comprehension monitoring, debugging strategy, evaluation). These metacognitive indicators are then integrated with the SQ4R strategy measures.

A learning through incorporating metacognitive indicators is called as student-centered. Ames (1992) interprets the term learning as an activity that focuses on the condition and interest of the learner (learner-centered). The term “learning” is used to replace the term "teaching" which is more of a teacher-centered activity. The learning is something that is deliberately designed to support the internal learning process within the individual. Student response data regarding metacognitive abilities are found in indicators number 15 and 16 with a percentage of 93.30 % and 96.15 %, respectively with very good criteria. This is also in accordance with the metacognitive profile of students in grade 8E obtained from filling out the MAI questionnaire with an average result of 80.61 % with well-developed metacognition criteria. This characteristic can be highlighted from the implementation of metacognition indicators in all stages of SQ4R, for instance, at the survey or investigation and question stages (according to planning indicators and conditional knowledge). An example of the survey and question stages in the E-LKPD can be seen in Figure 3.

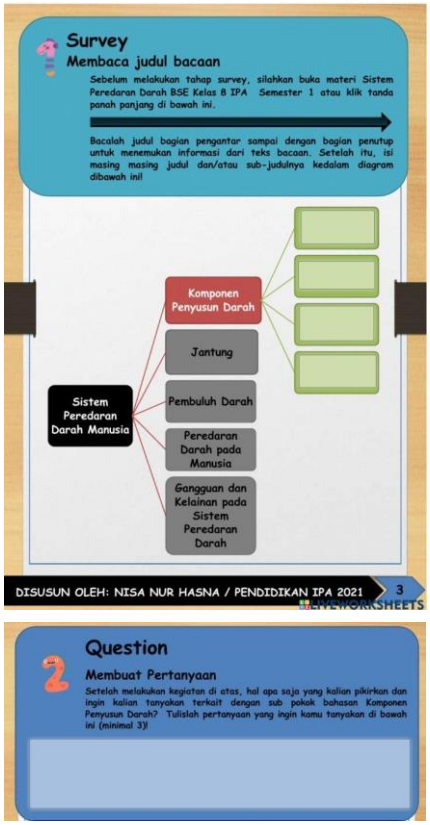

Figure 3. The Example of Integrated Characteristics of Metacognitive Indicators

The characteristic 3 is an attractive E-LKPD. Validity data from media expert validation is found in indicator number 1, 9 with an index V of 0.93 and 0.87 with valid criteria. Student response data to the supporting images of the E-LKPD obtained a percentage of 90.38 % with very good criteria. This is because the integrated E-LKPD with SQ4R strategy meets interesting aspects with the following criteria: there are pictures supporting the E-LKPD, the writing used is easy to read, the E-LKPD is interactive, there are pictures supporting the E-LKPD added so that it is not monotonous and makes students more active, understand the material they are studying and choosing an attractive background color as well. This is in accordance with the research of Hidayanti et al. (2017) which describes that LKPD designs made with contrasting colors and attractive images can attract the attention of students. The writing used is easy to read as evidenced

by the student response data regarding the type and size of the letters on the E-LKPD, which is comfortable to read, obtaining a percentage of 94.23 % with very good criteria. Interactive E-LKPD means that they are mutually taking action, interrelationships, and mutually active. The definition of interactive, according to Warsita, (2008), is related to two-way communication. The student response questionnaire data regarding the interactive E-LKPD is shown in indicator 5 in which each obtains the percentage of 85.57 % with very good criteria. This is because E-LKPD meets the criteria for communication components in interactive multimedia (computer-based) within which there is a relationship between humans (as product users) and computers (as software/applications) (Warsita, 2008). This is in accordance with the developed E-LKPD carried out by each student in which each individual participates in learning process.

The Characteristic 4 E-LKPD is flexible. Validation data regarding these characteristics are contained in the validity of media experts on indicators 5 and 6, each of which obtains an index V of 1 with valid criteria. Student response data on this characteristic is found in indicator 6, obtaining a percentage of 91.35 % with very good criteria. This is because the integrated E-LKPD with SQ4R learning strategy meets the flexible criteria in which it can be opened on any web, from a computer, notebook or smartphone; E-LKPD can be accessed at any time not limited by time; and E-LKPD can be accessed by both teachers and students. In the Nemeth & Bibok's research (2021), the word "Flexibility" means to be flexible, easy to bend; easy and quick to adjust. Liveworksheets is an application that can be used to create interactive online material and Student Worksheets (LKPD) that can be accessed in various web browsers, so that they can also be accessed via computers, notebooks or smartphones, and be accessed at any time because there is no time limit. Liveworksheets also are able to be accessed by educators and students. An example of these characteristics in the SQ4R integrated E-LKPD can be seen in Figure 4.

Figure 4. E-LKPD can be Accessed through Various Electronic Devices

The characteristic 5 is that E-LKPD is interactive. Validation data on interactive E-LKPD is found in indicator number 7 with an index V of 0.93 with valid criteria. Student response data regarding these characteristics are found in indicator number 7. Student response questionnaire data regarding interactive E-LKPD is in indicator 5, each obtaining a percentage of 85.57 % with very good criteria. This is because liveworksheets as an application for making E-LKPD have

features which make it interactive. Liveworksheets can display material in the form of videos, mp3, images, and other interesting symbols that can add interesting contents. Educators can create worksheets actively on live worksheets. Students can work on various forms of questions such as multiple choice, drop-down options, open-ended questions, check boxes, matchmaking by drawing lines, drag and drop questions and other forms according to the creativity of the maker (Fauzi et al., 2021). An example of these characteristics in the SQ4R integrated E-LKPD can be seen in Figure 5.

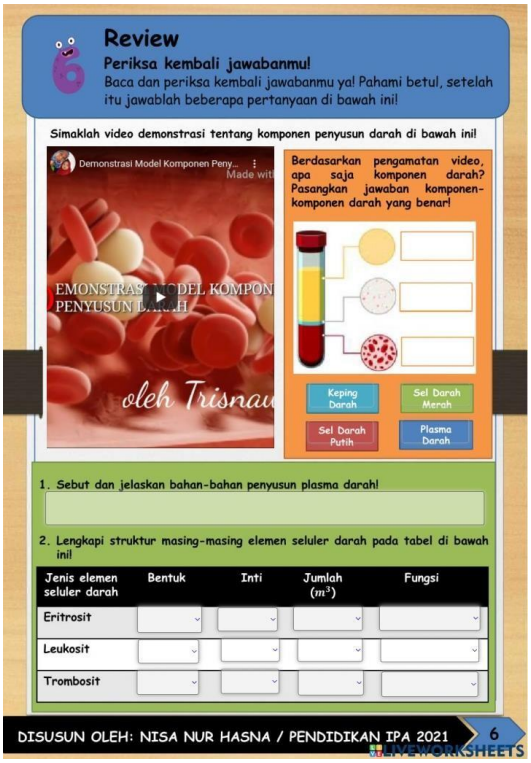

Figure 5. SQ4R integrated E-LKPD is attractive and interactive

The characteristic 6 is E-LKPD, including LKPD requirements as well. Student response data regarding the E-LKPD requirements are listed in the entire statement on the Student Response Questionnaire Sheet on the Integrated E-LKPD Characteristics of the SQ4R Strategy with a percentage gain of 89.06 % with very good criteria. Validity data on E-LKPD including LKPD requirements by material expert validation is found in indicator 4 with an index V of 0.93 with valid criteria. This is because the integrated E-LKPD with SQ4R strategy includes LKPD requirements according to National Education Standard Agent (BNSP) dan Darmojo & Kaligis (1993), which include didactic, constructive and technical requirements: (1) Didactic requirements, related to the fulfillment of the principles of effective learning in an LKPD, include: conformity with the core competency and basic competency, correctness of concepts, emphasis on learning strategies used; (2) Constructive requirements, related to language, include: identity in LKPD, use of appropriate sentences and language, LKPD providing a space for students to write answers, and having learning objectives; (3) Technical requirements, related to writing based on established rules, include: LKPD appearance, consistency of writing, use of appropriate images. Student response data is contained in Table 4 of Student Response Results to E-LKPD.

Participants' metacognition profile data was obtained after the trial phase. Metacognition profiles were gained from the participants' metacognitive awareness questionnairesheets or Metacognitive Awareness Inventory (MAI) questionnaire. The measurement scale that will be used in this study to determine the answer scores from the MAI questionnaire respondents is to use the Guttman scale. The Guttman scale is a scale used to obtain firm answers from respondents in which there are only two intervals such as “agree-disagree”; "Yes-No"; "True-False"; and others (Maulida et al., 2018). The data analysis technique in this study used the calculation of students' metacognition awareness in the form of an MAI questionnaire that had been filled out and analyzed by counting the number of "Yes" answers from each student's

answer. These results were then converted into specific categories.

The calculation of the percentage of students' metacognition awareness based on the results of the MAI questionnaire obtained a total score, then a metacognition category classification was carried out based on Amnah (2014) namely metacognition did not develop, metacognition began to develop, metacognition developed well and metacognition developed very well. The results of the metacognition awareness questionnaire analysis are shown in Figure 6.

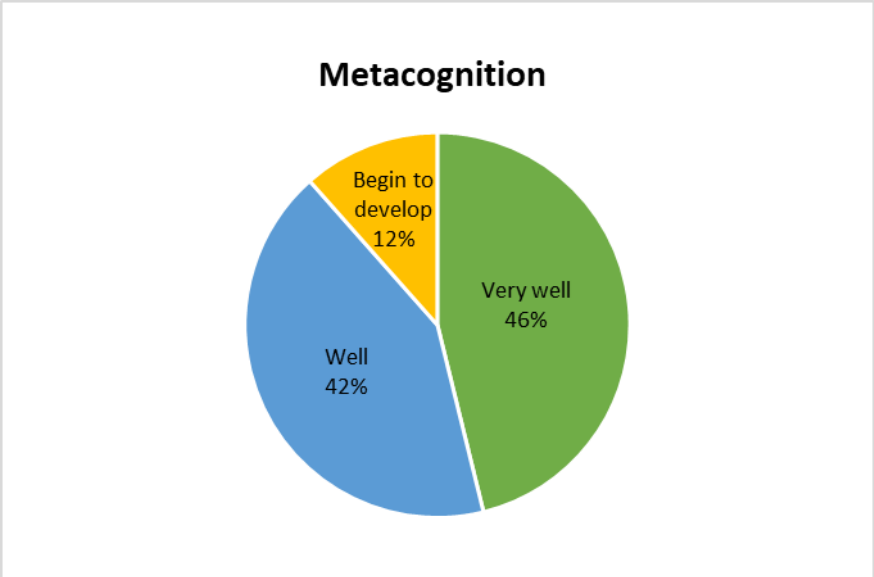

Figure 6. Percentage of the Metacognition Profile of Learners based on the Results of the Metacognition Awareness Questionnaire (MAI Questionnaire)

Figure 6 shows the highest percentage level of metacognition awareness owned by metacognitive students who developed very well as much as 46 %, well developed metacognition owned by 42 % and the lowest percentage owned by students with the metacognition profile category starting to develop which was 12 %. Learners with very well developed metacognition means that they have used their metacognitive abilities regularly to regulate their own learning thinking processes. Learners with well-developed metacognition means that they are able to understand their way of thinking, aware as thinkers, and can distinguish the elaboration of input and output from the thinking process. Learners are able to regulate thought processes and are able to learn independently. Learners with metacognitive abilities begin to develop, meaning that they are able to determine how to think about something. Students are motivated by providing support for their way of thinking. Meanwhile, students with metacognitive abilities do not develop meaning they do not use their metacognitive abilities in thinking. Students are not able to separate what they think from how they think and do not have a good plan in learning process.

Keibler's research (2014) points out that students who have a metacognitive awareness have the potential to develop their metacognitive abilities in thinking if stimulated and given direction. The data on the average metacognition profile based on the MAI questionnaire showed that the 8E grade students of SMPN 27 Semarang had good metacognitive awareness. It can be assumed that the students' internal metacognition ability is good, in which it is influenced by external

factors and by educators as well. The percentage of metacognition profile for each indicator can be seen in Figure 7.

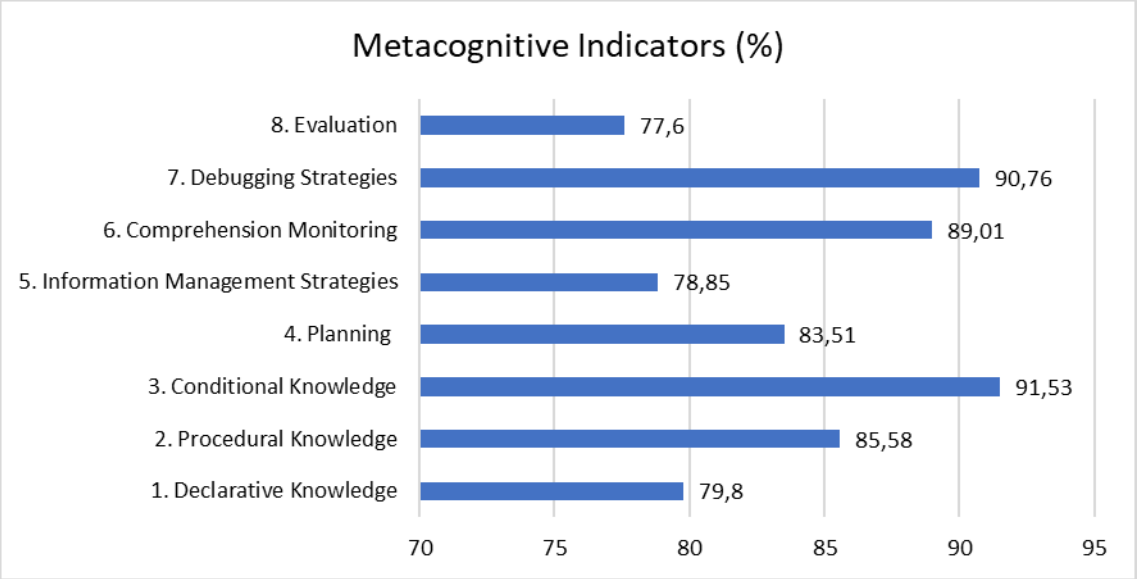

Figure 7. Results of Achieving Metacognition Indicators based on the Results of the Metacognition Awareness Questionnaire (MAI Questionnaire)

Figure 7 shows the results of the metacognition profile of students on each indicator. From all indicators, the average metacognitive profile of students is 84.57 % with well-developed metacognition criteria. The highest metacognition profile is in indicator 7, namely conditional knowledge of 91.53 %. Then, the lowest metacognition profile is at indicator 8, namely evaluation of 77.60 %. The highest percentage of metacognitive profile indicators was obtained by Conditional Knowledge by a percentage of 91.53 % with very well developed metacognition criteria. This indicator includes statement items 15, 18, 26, 29, 35. Conditional knowledge is closely related to procedural knowledge. It requires procedural knowledge as a milestone as a result of the time required or when the time is right to use the learning strategies (Schraw & Dennison, 1994). Students who choose "Yes" on this indicator, namely with metacognitive abilities in the form of conditional knowledge that has developed well. They have reasons for when a strategy to solve problems is used. Conditional knowledge is knowledge about when to use a procedure, skill, or strategy and when not to use it, why the procedure works and under what conditions, and why one procedure is better than another. In the application of the E-LKPD, the conditional knowledge indicator is at the survey and question stage by which students are required to be able to provide an organized general description of a material and lead to a systematic mindset and then it can be known when they can write it down into a question that is at this stage questions.

Indicator 8 is evaluation which is the indicator with the lowest MAI questionnaire results compared to the other indicators. The evaluation indicators include statement items of 7, 19, 24, 36, 38, 50. The percentage achievement of the MAI questionnaire on this indicator is 77.60 %. Evaluation is the ability of students to evaluate the effectiveness of their learning strategies, whether they will change their learning strategies, end learning activities or even give up on circumstances (Sukowati et al., 2016). The reason why this indicator is the

lowest indicator is because the contents of MAI items of 7, 19, 24, 36, 38, 50 are self-review and students have not been able to do what is contained in these items. The percentage of each item on the evaluation indicator is 80.8 %; 92.3 %; 69.23 %; 73.07 %, 80.8 % and 69.23 %. The student who chooses "Yes" on the item means that he can ask himself about several things, such as knowing how well he is doing and completing assignments, whether he has achieved certain targets in his studies, can learn as much as he can after completing the task, can summarize the material that has been learned, can consider answer options if faced with a problem. In the application of the E-LKPD evaluation indicators are at the review stage by being given questions as evaluation material for students so students can carry out activities as mentioned in the previous sentence. Meanwhile, the percentage of the MAI questionnaire items can be seen in Table 5.

Table 5. The Percentage of the MAI questionnaire items

No.	Statement	(%)
1.	I regularly understand myself to study science.	92.3
2.	I considered my answer before I answered.	100
3.	I try to use the learning strategies that I did in the past.	84.61
4.	I set the pace in studying to have enough time.	76.92
5.	I understand when I have to act and interact efficiently when facing a problem both at school and at home.	88.5
6.	I study (read) first before I do the assignment.	88.5
7.	I know how good I am after taking the test.	80.77
8.	I always plan to study to achieve certain targets.	80.77
9.	I try to dig deeper when I find information that is important in learning.	96.15
10.	I know the type of information I need to study.	92.3
11.	I ask myself if I consider all the options when I'm solving a problem.	84.61
12.	I am good at organizing information.	65.38
13.	I focus myself when there is important information.	100
14.	I have a specific goal for each learning strategy I use.	88.5
15.	I study best when I already know something about the material I am going to study.	92.3
16.	I know what my teachers expect me to learn.	84.61
17.	I am good at remembering information.	65.38
18.	I use different learning strategies depending on my learning situation.	96.15
19.	I think of the easiest way to complete a task.	92.3
20.	I can control my study well.	61.54
21.	I periodically recheck my learning achievement journal so that it can help me to improve further.	76.92
22.	I ask myself questions about the material before I start.	69.23
23.	I thought of several ways to solve the problem and chose the best one.	96.15
24.	I summarize what I have learned after I finish..	69.23
25.	I ask other people for help when I don't understand something.	88.46
26.	I can motivate myself to study when I need to.	96.15
27.	I am aware of what strategies I use when I study.	88.5
28.	I know the learning strategies I use are useful.	92.3
29.	I take advantage of my strengths to compensate for my weaknesses.	76.92
30.	I like getting new information.	88.5
31.	I made an example of my own so I could better understand the material.	80.77
32.	I can make decisions when I am faced with a problem.	92.3
33.	The learning strategy that I use is useful for me.	96.15
34.	I try to understand the material when I study.	96.15
35.	I know a study strategy that works for me.	84.61
36.	I ask myself if I have reached a certain goal in my study.	73.07
37.	I draw or make diagrams to help me understand as I study.	26.92
38.	I ask myself if I have considered my options when solving a problem.	80.77
39.	I try to translate the new information using my own words.	92.3
40.	I keep trying when I don't understand the material I'm studying.	92.3

No.	Statement	(%)
41.	I use the organizational structure of the text to help me learn.	53.85
42.	I read the instructions carefully before I start the task.	88.50
43.	I ask myself what I read with what I already know.	100
44.	I thought back to my answer when I was confused.	100
45.	I manage my time to reach a certain target.	84.61
46.	I enjoy studying certain material when I like it.	88.5
47.	I learn little by little when studying a material.	88.5
48.	I only focus on the important points in learning, rather than the more detailed things.	61.53
49.	I ask myself the question of how well I do when I learn something new.	80.77
50.	I ask myself if I study as much as I can after I finish an assignment.	69.23
51.	I stopped and tried to find out information that was not clear while studying.	84.61
52.	I stop and reread when I am confused about the material/reading material I am reading.	88.5

The highest percentage of the MAI questionnaire items is occupied by items 2, 13, 43 and 44 with a maximum percentage of 100 %, while the lowest achievement percentage is occupied by item number 37, which is 26.92 %. An example of a complete MAI questionnaire statement can be seen in Appendix 19. The results indicated that all students made statements in points 2, 13, 43, and 44 in learning, namely "I consider my answers before I answer", "I focus on me when there is important information", "I ask myself what I read with what I already know" and "I rethink my answer when I am confused". Meanwhile, item 37, namely "I draw or make diagrams to help me understand when I study" has the lowest percentage. Students who choose the answer "Yes" make statements on these items. This is in accordance with the research of Aswadi et al (2018) making diagrams or graphs can roughly train students' procedural and conditional abilities. Hardiyanti et al (2021) research also stated that the use of diagrams can help improve students' metacognitive skills. Meanwhile, students who choose the answer "No" does not mean they do not understand learning using diagrams, but some students prefer to fill in the diagram directly in the integrated E-LKPD with SQ4R learning strategy because they still have difficulty in compiling the diagram directly.

The comparison of the results of previous studies with the novelty of the product above is quoted from several studies, including: the research done by (Junina et al., 2020) related to the effect of discovery learning-based worksheet on students' metacognition skills and learning outcomes, and (Yanti et al., 2019) research on the effectiveness of students' worksheets based on multi-representation in improving students' metacognition skills in static electricity. Both of research get the result that the use of LKPD can improve students' metacognition ability. However, research on electronic worksheets is still rarely found. Thus, as the novelty of the product, this research is integrated with the SQ4R learning strategy. Integrated E-LKPD with SQ4R Learning Strategy to train metacognitive ability has characteristics; (1) E-LKPD is integrated with SQ4R strategy, (2) E-LKPD can train metacognition skills, (3) E-LKPD is interesting, (4) E-LKPD is flexible, (5) E-LKPD is interactive, (6) E-LKPD includes general requirements for LKPD.

CONCLUSION

Based on the results of the study, it is concluded that Integrated E-LKPD with SQ4R Learning Strategy is valid to train the students' metacognitive abilities. Integrated E-LKPD with SQ4R Learning Strategy to train metacognitive ability has characteristics; (1) E-LKPD is integrated with SQ4R strategy, (2) E-LKPD can train metacognition skills, (3) E-LKPD is interesting, (4) E-LKPD is flexible, (5) E-LKPD is interactive, (6) E-LKPD includes general requirements for LKPD.

The metacognitive ability profile of students based on the MAI questionnaire shows the percentage of 46.15 % in the very well developed category; 42.3 % developed well and 11.54 % started to develop. This shows that the use of the integrated E-LKPD with the SQ4R strategy is able to train the students' metacognitive abilities in which this E-LKPD has never existed before. This is a new innovation that can be applied in learning, especially in online learning.

Based on the research that has been carried out, there are several suggestions that can be considered for further research, those of which are that organizing students before learning should be done carefully and prepare several backup plans to anticipate obstacles outside planning for implementing the learning activities. It requires better condition of students, so they can be on-cam when learning. Then, it needs sufficient time in doing learning by using the integrated E-LKPD with SQ4R learning strategy to train students' metacognitive abilities.

REFERENCES

Ahmad, M. A. K. B. A., & Yunus, M. M. (2019). A collaborative learning intervention module to improve speaking fluency. International Journal of Scientific and Technology Research, 8(12), 1834–1838.

Amal, M. F., & Mahmudi, A. (2020). Enhancing students' self-efficacy through metacognitive strategies in learning mathematics. Journal of Physics: Conference Series, 1613(1), 012061. https://doi.org/10.1088/1742-6596/1613/1/012061

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. Journal of Educational Psychology, 84(3), 261–271. https://doi.org/10.1037/0022-0663.84.3.261

Amnah, S. (2014). Profil kesadaran dan strategi metakognisi mahasiswa baru pendidikan biologi fakultas keguruan dan ilmu pendidikan Universitas Islam Riau Pekanbaru. Jurnal Pendidikan IPA Indonesia, 3(1), 22–27.

Arikunto, S. (2013). Dasar-dasar evaluasi pendidikan. Bumi Aksara.

Astiningsih, A. D., & Partana, C. F. (2020). Using android media for chemistry learning construction of motivation and metacognition ability. International Journal of Instruction, 13(1), 279–294. https://doi.org/10.29333/iji.2020.13119a

Aswadi, R., Fadiawati, N., & Abdurrahman. (2018). Meningkatkan kemampuan metakognisi siswa pada pembelajaran fisika menggunakan lembar kerja siswa berbasis inkuiri terbimbing. Jurnal Inovasi Dan Pembelajaran Fisika, 5(1), 43–54.

Bakar, M. A. A., & Ismail, N. (2020). Mathematical instructional: A conceptual of redesign of active learning with metacognitive regulation strategy. International Journal of Instruction, 13(3), 633–648. https://doi.org/10.29333/iji.2020.13343a

Başar Assoc, M., & Gürbüz, M. (2017). Effect of the SQ4R technique on the reading comprehension of elementary school 4th grade elementary school students. In International Journal of Instruction (Vol. 10, Issue 2).

Darmojo, H., & Kaligis, enny R. . (1993). Pendidikan IPA 2. Debdikbud.

Dewi, N. P. V. F., Ganing, N. N., & Negara, I. G. A. O. (2019). Pengaruh model pembelajaran survey, question, read, recite, review, reflect berbantuan media teks cerita rakyat terhadap kompetensi membaca pemahaman mata pelajaran Bahasa Indonesia. International Journal of Elementary Education, 3(3), 233–

242. https://doi.org/10.23887/ijee.v3i3.19403

Dewi, N R, Listiaji, P., Savitri, E. N., & Yanitama, A. (2021). Testing on a diagnostic test-based science metacognition assessment tool using moodle. Unnes Science Education Journal, 10(3), 168–173. https://doi.org/10.15294/usej.v10i3.52015

Dewi, Novi Ratna, & Akhlis, I. (2016). Pengembangan perangkat pembelajaran IPA berbasis pendidikan multikultural menggunakan permainan untuk mengembangkan karakter siswa. Unnes Science Education Journal, 5(1), 1098–1108.

Dewi, Novi Ratna, Wibowo, W. A., Savitri, E. N., & Dewi, N. R. (2017). The analysis of science learning sources reviewed from the metacognitive ability of the vii grade the students of SMP Negeri 2 Boja. Unnes Science Education Journal, 6(2), 1635–1641.

Díaz, J., Muñoz, D., Muñoz, J., Ibáñez, S. J., & Martínez, V. G. (2021). Design and validation of an observational instrument for final actions in Padel. Revista Internacional de Medicina y Ciencias de La Actividad Fisica y Del Deporte, 21(81), 197–210. https://doi.org/10.15366/RIMCAFD2021.81.013

Emzir, A. D. (2011). Metodologi penelitian kualitatif. Rajawali Pers.

Fauzi, A., Rahmatih, A. N., Indraswati, D., & Sobri, M. (2021). Penggunaan situs liveworksheets untuk mengembangkan LKPD interaktif di sekolah dasar. Mitra Mahajana: Jurnal Pengabdian Masyarakat, 2(3), 232–240. https://doi.org/10.37478/mahajana.v2i3.1277

Fitriani, O., & Suhardi, S. (2019). The effectiveness of PQ4R (preview, question, read, reflect, recite, review) in reading comprehension skill. 6th International Conference on Educational Research and Innovation (ICERI 2018), 523–526. https://doi.org/10.2991/iceri-18.2019.52

Hardiyanti, W., Hidayati, Y., Puspita Hadi, W., & Rosidi, I. (2021). Pengaruh penggunaan diagram roundhouse terhadap keterampilan metakognisi siswa. LENSA (Lentera Sains): Jurnal Pendidikan IPA, 11(1), 21–30. https://doi.org/10.24929/lensa.v11i1.119

Herwanis, D., Zakaria, R., Renaldi, A., & Sari, I. (2021). The comparison between Sq5R and fix–up strategy in reading comprehension for EFL secondary level learners. Journal of Languages and Language Teaching, 9(3), 336–343. https://doi.org/10.33394/jollt.v9i3.3845

Heyes, C., Bang, D., Shea, N., Frith, C. D., & Fleming, S. M. (2020). Knowing ourselves together: The cultural origins of metacognition. Trends in Cognitive Sciences, 24(5), 349–362. https://doi.org/10.1016/j.tics.2020.02.007

Hidayah, A. N., Hariati Winingsih, P., & Fitri Amalia, A. (2020). Development of physics e-LKPD (electronic worksheets) using 3d pageflip based on problem based learning on balancing and rotation dynamics. Jurnal Ilmiah Pendidikan Fisika, 7(2), 36–42. https://doi.org/https://doi.org/10.30738/cjipf.v7i2.9091

Hidayanti, R., Sowiyah, S., & Pargito, P. (2017). Pengembangan lembar kegiatan peserta didik (LKPD) berbasis inkuiri terbimbing. Pedagogi: Jurnal Pendidikan Dasar, 5(12), 1–11.

Hikmawati, V. Y., Rustaman, N. Y., & Saefudin, S. (2014). Efektivitas

SQ5R terhadap pengetahuan konseptual dan retensi siswa SMA pada pembelajaran sistem reproduksi manusia. Jurnal Pengajaran Matematika Dan Ilmu Pengetahuan Alam, 19(2), 199–205. https://doi.org/10.18269/jpmipa.v19i2.461

Junina, I., Halim, A., & Mahidin. (2020). The effect of discovery learning-based worksheet on students' metacognition skill and learning outcomes. Journal of Physics: Conference Series, 1460(1), 012100. https://doi.org/10.1088/1742-6596/1460/1/012100

Karatas, K., & Arpaci, I. (2021). The role of self-directed learning, metacognition, and 21st century skills predicting the readiness for online learning. Contemporary Educational Technology, 13(3), 1–13. https://doi.org/10.30935/cedtech/10786

KBBI. (2016). KBBI.

Keibler, V. (2013). Are students ready to be the creatives we need? finding an emergent theory for student original thinking using metacognitive awareness. In Robert Morris University. Robert Morris University.

Khusniyah, N. L., & Lustyantie, N. (2017). Improving english reading comprehension ability through survey, questions, read, record, recite, review strategy (SQ4R). English Language Teaching, 10(12), 202–211. https://doi.org/10.5539/elt.v10n12p202

Ku, K. Y. L., & Ho, I. T. (2010). Metacognitive strategies that enhance critical thinking. Metacognition and Learning, 5(3), 251–267. https://doi.org/10.1007/s11409-010-9060-6

Laar, E. van, van Deursen, A. J. A. M., van Dijk, J. A. G. M., & de Haan, J. (2020). Determinants of 21st-century skills and 21st-century digital skills for workers: A systematic literature review. SAGE Open, 10(1), 1–14. https://doi.org/10.1177/2158244019900176

Larasati, S. V., Rais, A. D., & Elyono, D. (2018). Improving students' reading comprehension by using survey, question, read, recite, and review (SQ3R) method. English Education, 6(2), 239. https://doi.org/10.20961/eed.v6i2.35952

Lestari, W., Fatinatus, S., & Layliyyah, R. (2019). Pendekatan open-ended terhadap kemampuan metakognitif siswa. At-Ta'lim: Jurnal Pendidikan, 5(2), 184–197. https://doi.org/https://doi.org/10.36835/attalim.v5i2.263

Maskur, R., Sumarno, Rahmawati, Y., Pradana, K., Syazali, M., Septian, A., & Palupi, E. K. (2020). The effectiveness of problem based learning and aptitude treatment interaction in improving mathematical creative thinking skills on curriculum 2013. European Journal of Educational Research, 9(1), 375–383. https://doi.org/10.12973/eu-jer.9.1.375

Maulida, N., Anra, H., & Pratiwi, H. S. (2018). Aplikasi pembelajaran interaktif pengenalan hewan pada anak usia dini. Jurnal Sistem Dan Teknologi Informasi (JustIN), 6(1), 28–33. https://doi.org/10.26418/justin.v6i1.23726

Muijselaar, M. M. L., Swart, N. M., Steenbeek-Planting, E. G., Droop, M., Verhoeven, L., & de Jong, P. F. (2017). Developmental relations between reading comprehension and reading strategies. Scientific Studies of Reading, 21(3), 194–209. https://doi.org/10.1080/10888438.20

17.1278763

Nemeth, E., & Bibok, K. (2022). Pragmatics and the flexibility of word meaning. In Pragmatics and the Flexibility of Word Meaning. Brill. https://doi.org/10.1163/9780585474267

Permana, F. H., & Chamisijatin, L. (2019). Project-based learning through edmodo: Improving critical thinking and histology concepts. Biosfer, 12(1), 58–69. https://doi.org/10.21009/biosferjpb.v12n1.58-69

Praherdhiono, H., Adi, E. P., & Devita, R. N. (2018). Understanding of digital learning sources with the heutagogy approach using the k-means and naive bayes methods. 4th International Conference on Education and Technology, ICET 2018, 23–27. https://doi.org/10.1109/ICEAT.2018.8693929

Rahayu, S., Zulianto, S., & Nur, Y. (2019). Penerapan strategi SQ4R dalam meningkatkan kemampuan membaca pemahaman siswa kelas IV SDN I Bolano Kabupaten Parigi Motong. Bahasantodea, 5(4), 77–87.

Reyna, J., Hanham, J., & Meier, P. (2018). The Internet explosion, digital media principles and implications to communicate effectively in the digital space. E-Learning and Digital Media, 15(1), 36–52. https://doi.org/10.1177/2042753018754361

Rojabi, A. R. (2020). Exploiting SQ4R cooperative learning method to enhance efl students' reading comprehension. Edulingua: Jurnal Linguistiks Terapan Dan Pendidikan Bahasa Inggris, 7(1), 1–12. https://doi.org/10.34001/edulingua.v7i1.1160

Safaruddin, S., Nurhastuti, N., Fatmawati, F., Silitonga, E. C., & Z, M. (2018). Efektivitas metode survey, question, read, recite, reflect, review (SQ4R) dalam meningkatkan keterampilan membaca pemahaman untuk anak berkesulitan belajar. Jurnal Pendidikan Kebutuhan Khusus, 2(2), 1–5. https://doi.org/10.24036/jpkk.v2i2.315

Saputra, N., Nugroho, R., Aisyah, H., & Karneli, O. (2021). Digital skill during covid-19: Effects of digital leadership and digital collaboration. Jurnal Aplikasi Manajemen, 19(2), 272–281. https://doi.org/10.21776/ub.jam.2021.019.02.04

Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. Contemporary Educational Psychology, 19(4), 460–475. https://doi.org/10.1006/ceps.1994.1033

Septina, E. P., Marianti, A., & Widiatningrum, T. (2018). The use of science reflective journal writing by jas approach to train students metacognitive ability. Journal of Biology Education, 7(3), 244–252. https://doi.org/10.15294/jbe.v7i3.24260

Suardani, N. M., Marhaeni, I. N., & Lasmawan, I. W. (2013). Pengaruh model pembelajaran kooperatif tipe jigsaw terhadap hasil belajar IPS dengan kovariabel motivasi berprestasi pada siswa kelas V SDN 1 Semarapura Tengah. Jurnal Pendidikan Dasar Ganesha, 3(1), 1–9.

Sukowati, D., Rusilowati, A., & Sugianto. (2016). Analisis kemampuan literasi sains dan metakogntif peserta didik. Physics Communication, 1(1), 16–22.

Thiagarajan, Semmel, D. S., & Semmel, M. I. (1974). Instructional development for training teachers of exceptional children. Indiana University.

Ummayah, F. F. D., & Dewi, N. R.

(2021). Analysis of students metacognition ability through problem based learning assisted by worksheets on environmental pollution material. Journal of Environmental and Science Education, 1(2), 32–40. https://doi.org/10.15294/jese.v1i2.45773

van Laar, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M., & de Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. Computers in Human Behavior, 72, 577–588. https://doi.org/10.1016/j.chb.2017.03.010

Warsita, B. (2008). Teknologi pembelajaran landasan dan aplikasinya. Rineka Cipta.

Worrell, B., Brand, C., & Repenning, A. (2015). Collaboration and computational thinking: A classroom structure. Proceedings of IEEE Symposium on Visual Languages and Human-Centric Computing, VL/HCC, 2015, 183–187. https://doi.org/10.1109/VLHCC.2015.7357215

Yanti, H., Distrik, I. W., & Rosidin, U. (2019). The effectiveness of students' worksheets based on multi-representation in improving students' metacognition skills in static electricity. Journal of Physics: Conference Series, 1155(1). https://doi.org/10.1088/1742-6596/1155/1/012083