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### The Influence of the SQ4R Learning Model with Digital Schoolbooks on Students' Understanding of Biology Concepts

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Article Information	ABSTRACT			
Submit: 06 – 04 – 2023 Received: 08 – 05 – 2023 Published: 11 – 05 – 2023	Rendahnya pemahaman konsep dapat disebabkan karena proses pembelajaran belum maksimal yang membuat siswa tidak aktif, belum mampu berpikir mandiri, lebih praktis mencari jawaban di internet, serta tidak mampu mengutarakan apa yang telah dipelajarinya. Buku Sekolah Digital sebagai media dan model pembelajaran <i>Survey, Question, Read, Reflection and Review</i> (SQ4R) merupakan salah satu alternatif yang dapat mengaktifkan siswa serta memudahkan mengingat konsep sehingga pembelajaran lebih bermakna. Tujuan penelitian ini untuk mendeskripsikan pengaruh model pembelajaran SQ4R dengan buku sekolah digital terhadap pemahaman konsep biologi siswa kelas VII di Ponpes Madrasah Tsanawiyah Nurussa'adah Sangkulirang. Penelitian ini termasuk quasi eksperimen dengan <i>pretest-posttest control group design.</i> Populasi penelitian yaitu siswa kelas VII, dengan teknik <i>cluster random sampling</i> yang menghasilkan kelas VII.B sebagai kelas experimen dan kelas VII.A sebagai kelas kontrol. Hasil analisis data menunjukkan terdapat pengaruh model pembelajaran <i>SQ4R</i> dengan buku sekolah digital terhadap pemahaman konsep biologi siswa kelas VII Di Ponpes Madrasah Tsanawiyah Nurussa'adah Sangkulirang.			
Publishor	Konsep Siswa. ABSTRACT			
Publisher Program Studi Pendidikan Biologi, Fakultas Sains dan Teknologi, UIN Walisongo Semarang	<b>ABSTRACT</b> The low understanding of concepts can be caused because the learning process is not maximized which makes students inactive, unable to think independently, more practical to find answers on the internet, and unable to express what they have learned. Digital School Books as a medium and learning model Survey, Question, Read, Reflection and Review (SQ4R) is an alternative that can activate students and make it easier to remember concepts so that learning is more meaningful. The purpose of this study was to describe the effect of the SQ4R learning model with digital school books on students' understanding of biology concepts in class VII at the Madrasah Tsanawiyah Nurussa'adah Sangkulirang Islamic Boarding School. This research is a quasi-experimental study with a pretest-posttest control group design. The study population was students of class VII, using cluster random sampling technique			

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which produced class VII.B as the experimental class and class VII.A as the control class. The results of the data analysis showed that there was an influence of the SQ4R learning model with digital school books on the understanding of biology concepts for class VII students at the Madrasah Tsanawiyah Nurussa'adah Sangkulirang Islamic Boarding School. **Keywords**: Digital School Books; SQ4R Model; Students' Understanding of Concepts

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#### INTRODUCTION

Education is a conscious effort in carrying out teaching, training or guidance activities with the aim of students being able to think, act scientifically or change behavior towards student maturity. The application of education is the implementation of education by carrying out teaching and learning activities, where teachers have an important role, so teachers need to improve their skills continuously. Teachers must also be able to transfer knowledge according to the material taught and be able to make students understand the material well. In addition to the teacher, students also need to understand the material received from the teacher and construct the concept themselves so that it is meaningful to themselves. Constructivism makes passive students active participants in the learning process (Khalid &; Azeem, 2012).

Obstacles in teaching and learning activities in general in schools are teachers lack of mastery of the material, lack of understanding of learning models / strategies, difficulty using media, teachers also have difficulty approaching students individually. In teaching and learning activities, students also find low interest in reading, lack of interest and motivation to learn, the learning process is too monotonous, and other obstacles that cause learning activities not to take place optimally. These obstacles need to be minimized so that the learning process can take place in a fun and meaningful way for students. Teachers who have professional, pedagogic, social, and personality competencies are needed to make teaching and learning activities interesting, fun, and meaningful for students, so that they are expected to improve students' thought processes. In addition, teacher skills in using the right learning models and strategies are also needed, so that the learning process takes place pleasantly. The right learning model or strategy and applied with the right steps will lead students to understand a concept, and can reveal special or general characteristics of a concept, and can explain the relationship between concepts well (Selvia, 2018: 18).

Based on the results of observations and interview activities that have been carried out on teachers of Biology subjects, that the obstacles experienced during teaching and learning activities are that students are more interested in games, students do not understand the material taught, students' reading interest is lacking, doing assignments as long as they are completed so that learning is not carried out optimally. This is because, among others, the role of teachers as facilitators is not carried out properly, the use of media is still less attractive, and the use of

inappropriate and less varied learning models / strategies that cause students to have no learning motivation and are not interested in learning. Another obstacle, learning that is usually applied in schools, namely teacher-centered learning or teacher-centered, causes students to play less active role during learning activities. Students are more silent and sit, not focused on listening to what is conveyed by the teacher. Even though the requirements for a complete understanding of concepts students must be able to interpret, classify, explain, compare, give examples, summarize, and conclude the material. This is interesting for researchers to apply a model that is expected to improve students' understanding of concepts in learning biology, namely the SQ4R model.

Model SQ4R stands for Survey, Question, Read, Reflect, Recite and Review comes from English which means checking or investigating, asking, reading, giving examples, communicating (discussion), and reviewing again. By applying the steps of the SQ4R model, it is expected to increase students' understanding of concepts and solve the problem of student disinterest in participating in teaching and learning activities in class. Hasanah, et al., (2013) stated that the SQ4R model improved metacognition awareness and cognitive learning outcomes of students in MTsN Rukoh Banda Aceh. This encourages researchers to apply this model in biology learning in equivalent schools to solve different problems. Thus, the SQ4R model is expected to increase motivation, curiosity, interaction or participation in teaching and learning activities. Students' curiosity can also be anticipated by providing opportunities and motivating them to read hard.

Indonesian children are low in terms of interest in reading, this is reinforced by Saepudin (2015, 271) Indonesian children are still low in terms of interest in reading compared to developing countries even in the Asean region. Because children usually prefer gadgets to books, either during recess or in doing activities such as eating, doing tasks, and other things. Interest in reading does not grow by itself, besides there must be an intention from within oneself, there is also the role of other people such as teachers in cultivating someone's interest in reading. This is in accordance with Dalman's statement (2013, 145) that a person's interest in reading will not grow by itself but there needs to be encouragement from others so that children become aroused to read, and this is also inseparable from the quantity of reading and the guality of reading. If students read a lot, then more knowledge is gained. These expectations are what teachers want for their students to develop their interest in reading. In today's digital age where the use of gadgets is more and students are more interested in using them, it is necessary to use these gadgets to make students interested in reading and grow their interest in reading. One of the things that can be done is to take advantage of digital school book applications that students can read through their gadgets or cellphones. The hope is that the concept of the material can be read at any time by students so that they more easily understand the subject matter learned in teaching and learning activities in class. At Ponpes Madrasah Tsanawiyah Nurussa'adah Sangkulirang when this research was carried out the learning process was carried out according to research procedures, where students were given the freedom to use their mobile phones or androids that had digital school book applications installed, so that researchers more easily applied the learning steps set.

Understanding is one of the six categories of grouping (taxonomy) of educational objectives on cognitive aspects. Bloom's taxonomy groups cognitive goal goals into palatable categories that include recognition, understanding, application, analysis, synthesis and evaluation. Comprehension is the ability to explain knowledge or information that has been known in one's own words. In this case students are expected to translate or re-mention what has been heard in their own words (Susanto, 2015: 27).

The SQ4R model assisted by the Digital School Book application as this research has never been applied in schools even in Madrasah Tsanawiyyah Nurusa'adah Sangkulirang. So that the results of this study have their own differences and characteristics from previous studies on the SQ4R model. With this, it is hoped that students can be motivated in cultivating an interest in reading so that they can understand well the concept of biological material. In addition, students are expected to be easier to organize their learning methods and can improve their understanding of concepts after the application of the SQ4R model assisted by digital school books. The purpose of this study is to describe the influence of the SQ4R learning model with digital school books on the understanding of the concepts of grade VII students at Ponpes MTS Nurusa'adah Sangkulirang in biology subjects.

### METHODE

This research is a research and development (R&D) study. This study developed STEM-PjBL learning tools on respiratory system material, which includes syllabi, lesson plans, teaching materials, student worksheets, and evaluation instruments. The research steps refer to Borg, W.R. & Gall (1989) which consists of 10 steps, namely: (1) Potential and problems, (2) Data collection, (3) Product design, (4) Design validation, (5) Design revision, (6) Product trials, (7) Product revision, (8) Trial use, (9) Product revision and (10) Mass production. However, this research only reached the product revision stage.

This type of research is quasi-experimental using pretest-posttest control group design. This study was conducted to describe the influence of the Survey, Question, Read, Recite, and Review learning model with digital school books on the understanding of biological concepts of grade VII students of Madrasah Tsanawiyah Nurusa'adah Sangkulirang. The study was conducted from May 2021 to June 2021. This research was conducted at Ponpes MTS Nurusa'adah Sangkulirang which is located at JI. Sangkulirang, RT, East Kutai Regency, East Kalimantan Zip Code 75384. The population in this study was all students of grade VII Ponpes MTS Nurusa'adah Sangkulirang while the sample in this study was class VII.A as a treatment class with learning using the Survey, Question, Read, Reflection, Recite,

and Review model with digital school books, and class VII.B as a control class with learning commonly applied in schools.

Description:

Q1 = Pretest value of experimental group (before treatment)

Q2 = Posttest value of experimental group (after treatment)

Q3 = Pretest value of control group

Q4 = Posttest value of control group

X = Treatment given

Data collection techniques are carried out by observation, documentation, and tests consisting of pretests conducted before the implementation of learning, which aims to measure students' initial abilities in learning biology and posttests carried out after the implementation of learning with the aim of knowing students' understanding of concepts. The test questions used in this study are description questions. Test instruments in the form of description questions that must meet the requirements for making tests in the form of validity and reliability of the instrument. The results obtained are analyzed descriptively through calculations using the formula:

$$NP = \frac{R}{SM} \times 100$$

Description:

NP = Value sought:

R = Raw value that learners get

SM = The ideal maximum score of the concept comprehension test

100 = Fixed number

Determination of understanding criteria as listed in Table 1.

Table 1. Concept Understanding Criteria			
Nilai	Criteria		
85 – 100	Excellent		
75 – 84	Good		
50 – 74	Enough		
40 – 55	Less		
0 – 39	Bad		
(0	ouroo: Solvia 2019 72)		

(Source: Selvia, 2018, 73).

The description of the formula Normalized Gain (N-Gain) is:  $N - Gain/Indeks Gain = \frac{skor \ posttest - skorpretest}{skormaksimal - skorpretest}$ 

Terms of interpretation of the above formula in table 2.

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Table 2. Interpretation of Gain Normalization			
Classification			
Low			
Keep			
High			
ource: Hake, 1998)			
	Classification Low Keep		

reprotection of Coin Normalizati -----

Observation data in the form of student response data, student activities and learning implementation sheets in this study were analyzed using data analysis techniques through steps (a) Finding the maximum score from the observation instrument, (b) Summing the raw score obtained from observation, and (c) Finding the percentage of observation results with the following formula.

 $NP = \frac{R \; (Earned \; Score)}{SM \; (Maximal \; Score)} \times 100$ 

Data in the form of numbers from calculations and measurements are processed by adding and compared with the expected amount so that results are obtained.

Table 3. Percentage Attainment Categorization				
Mastery Level	Category			
86 – 100 %	Excellent			
76 – 85 %	Good			
60 – 75 %	Enough			
55 – 59 %	Less			
≤ 54 %	Bad			

Table 2 Baraantage Attainment Categorization

(Source: Selvia, 2018, 74).

Research data before analysis is carried out, assumption tests are carried out which include: (a) Normality Test, data normality tests are carried out to determine whether the data obtained is normally distributed or not. For data analysis using SPSS. (b) Homogeneity Test (Test F), the purpose of the homogeneity test is to find out whether the pair of classes to be tested for difference has homogeneous or heterogeneous variance which is further used SPSS analysis, as a basis in determining the type to be used for hypothesis testing. With the condition: If F count < 0.05, it means homogeneous, If F count > 0.05, it means it is not homogeneous, If F count < 0.05, then Ho is accepted, meaning the population is said to be homogeneous and if F count > 0.05, then Ho is rejected, meaning the population is said to be inhomogeneous.

Hypothesis testing, according to the purpose of this study is to test the effect of the SQ4R learning model with Digital School Book application media in biology learning, on students' understanding of concepts. To test the average difference of a variable between the treatment class and the control class, a Statistical Product and Service Solution (SPSS) was used with Independent Sample Test t test analysis. Hypothesis testing, according to the purpose of this study is to test the effect of the SQ4R learning model with Digital School Book application media in biology learning,

on students' understanding of concepts. To test the average difference of a variable between the treatment class and the control class, a Statistical Product and Service Solution (SPSS) was used with Independent Sample Test t test analysis.

The Independent Sample t-Test was used to see the difference in dependent variables between the treatment class using the SQ4R learning model with the Digital School Book application media and the control class. Data analysis is carried out with the help of Statistical Product and Service Solution (SPSS). As for if manually the t-test formula used is:

$$t = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2} \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

Information::

- $\overline{X_1}$  = Average sample of the treatment group (experiment)
- $\overline{X_2}$  = Sample mean of the control group
- $S_1$  = Standard deviation of the treatment group (experiment)
- $S_2$  = Standard deviation of the control group
- $n_1$  = Number of samples of the treatment group (experiment)
- $n_2$  = Number of control group samples

## **RESULTS AND DISCUSSION**

### **Research Results**

The research data after analysis is described as follows: The normality test is used to determine whether the data to be tested is normally distributed or not, which is evidenced by a significance value of > 0.05. The normality test in this study used the Shapiro-Wilk Test.

	Shapiro-Wilk		
Information	Statistic	Df	Sig.
Pretest Treatment	0.207	16	0.097
Posttest Treatment	0.195	16	0.682
Pretest Control	0.137	16	0.270
Posttest Control	0.111	16	0.901

 Table 4. SPSS Output Results Data Normality Test Concept Understanding

Based on the interpretation of the Normality test that if the value is 0.05< the results of the Shapiro-Wilk test then the research data is normally distributed. It is based on the table above that the results of the Shapiro-Wilk test are all normally distributed data. The homogeneity test uses the Homogeneity of Variance test on One-way Anova. The data can be said to be homogeneous if the siginity value is > 0.05.

 Table 5. SPSS Output Results Homogeneity Test Student Concept Understanding

	D(1	110	<u>.</u>
Levene	Dfl	df2	Sig.
Statistic			
0.573	1	30	0.455

Rahman Subandi et al. – The Influence of the SQ4R Learning Model with Digital Schoolbooks on Students' Understanding of Biology Concepts Based on table 5, it can be seen that the Sig. value of the treatment class and control class values shows the number 0.455 which means that the value is more than 0.05, so it is concluded that the data has homogeneous variance. The fulfillment of the nature of normality and homogeneity in the data, the next test used is the t test, precisely the Independent Sample t Test. The Independent Sample t Test aims to see any differences. If the value of sig. (2-tailed) < 0.05 then the hypothesis is proven, meaning that H0 is rejected and Ha is accepted. Conversely, if the value of sig. (2-tailed) > 0.05 then H0 is accepted and Ha is rejected.

	t-test for equality means						
	Т	Df	Sig (2- tailed)	Mean- differences	Std. Error differences	95% Co Interval Differen	
						Lower	Upper
Equal Variances assumed	4.177	30	0.000	11.813	2.828	6.037	17.588
Equal Variances not assumed	4.177	28.527	0.000	11.813	2.828	6.024	17.601

Table 6. SPSS Output Results Test t data Concept Understanding

Purnomo (2017: 184) stated that before the two-average difference test was carried out, a homogeneity test was carried out, meaning that if the variants are the same, the t test uses the Equal Variances Assumend value (assumed the same variance) and if different variants use the Equal Variances Not Assumed value (assumed different variants). It is known that the data has homogeneous variance, so from table 6 above it is known that the value of sig. (2-tailed) on Equal Variances Assumed is 0.000. This means the value of sig. (2-tailed) the data is less than 0.05. So the hypothesis of this study is proven which means that H0 is rejected and Ha is accepted. When viewed from the comparison of tcount and ttabel values, it can be seen from the table that the tcount obtained is 4.177. While ttabel refers to the formula ( $\alpha$ /2); (df) where based on the table above it is known that df this data is 30 while the  $\alpha$  used is 0.05 means ( $\alpha$ /2) is (0.05/2) equal to 0.025;30. So the ttable obtained is 2.042. This means tcount > ttable so that it can be said that H0 is rejected and Ha is accepted.

The Normality Gain or N-Gain test aims to see the effectiveness of using a particular method or treatment.

Table TTT Call Tool Toolate Concept Chaolotanaing Data				
	Treatment Class	Control Class		
	N-Gain score (%)	N-Gain score (%)		
Average	48.94	34.82		
At least	19.61	5.88		
Maximum	70	54.55		

Table 7. N-Gain Test Results Concept Understanding Data

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Table 7 shows that the average N-Gain for the control class was 34.82% including the ineffective category. While for the experimental class, the N-Gain value of 48.94% is included in the less effective category. Although the category was less effective, there was an increase of 14.12%, this shows that there is a difference between the control class and the treatment class.

# Discussion

Students in the experimental class were comfortable with using the SQ4R model because the process they did was different from the process they were used to. There is a difference in the scores of students in the experimental class with the control class, where experimental class students have a higher average increase compared to the scores of control class students. This suggests that the SQ4R model with digital schoolbooks affects students' understanding of concepts. This is by Rivan's statement (2017, 43) that the SQ4R model can improve student learning outcomes whereas the SQ4R model is a model that can make students active and will indirectly facilitate students in understanding the lesson. The difference with the results of this study is that in this study SQ4R is combined with digital school books so that biology materials, especially ecosystems taught to students, are more interesting, thus increasing their interest in learning which results in increasing their understanding of concepts.

Understanding of concepts measured in this study is obtained through the results of analysis of student answers based on essay questions that are packaged following the level of difficulty of the questions from the level of understanding (C1) to creation (C6). The results showed that in the experimental class students were able to answer existing concept understanding questions with an average of the criteria for correct or complete answer scores, even though there were still students who entered the criteria for giving incomplete answers. It can be explained that experimental classes with the SQ4R model assisted by digital schoolbooks have better results compared to classes using conventional models. That means that the SQ4R measures are effective at activating students and improving their concentration in studying biological material.

Amir (2014, 126) stated that the SQ4R model can make students more independent in constructing knowledge, because its application trains students to actively use students' way of thinking, when applied together with digital school books, the learning process becomes more interesting for students. The use of SQ4R with digital schoolbooks in learning can help students find concepts in the teaching material being studied so that students can gain an understanding of concepts with their way of thinking. This can overcome problems that often occur in schools, namely students who can memorize a concept but cannot apply a concept in solving problems because of the teacher's habit of directly giving a concept by default without explaining how the concept is formed. When concepts are obtained easily and enjoyably, students can construct their concepts so that they become more meaningful.

Ecosystem material at the time of this study has a lot of text, meaning that to understand the material it is necessary to read the text well and organized so that the terms and concepts contained in the material can be understood well. To understand the text well, it takes an application of special techniques in understanding material with a lot of text like the material. The SQ4R model (Survey, Question, Read, Recite, and Review) is a choice of learning model or way of studying text (reading), especially those contained in books, articles, or other reading sources specifically to understand the content of the text. SQ4R is a learning model that has a more directed syntax and is almost the same as the steps of the scientific method. This is what supports students to better understand a concept because they try to construct the existing material. This is by Septia (2019, 96) that with this model students can more independently search for the necessary information, after studying can summarize points so that it can facilitate understanding of concepts.

This research also, with the help of the Digital School Book application media as a supporting reading resource for students, especially in carrying out the Survey, Question, and Read stages in the SQ4R learning model helps students understand the Ecosystem material being studied. Digital School Book application media is used to help students find reading resources related to the material. The use of the Digital School Book application makes students more interested and motivated to get reading resources because previously students were only faced with conventional printed books that were not digital like those in the Digital School Book application. Along with the application of the SQ4R learning model which emphasizes the active reading process to construct a material concept, the Digital School Book application media helps students by providing various reading resources that are by the material they want, so that in this study it is evidenced by the average value of student concept understanding that increases after running the SQ4R learning model assisted by Digital School Book application media. The use of the Digital School Book application makes students more interested and motivated to get reading resources because previously students were only faced with conventional printed books that were not digital like those in the Digital School Book application. Along with the application of the SQ4R learning model which emphasizes the active reading process to construct a material concept, the Digital School Book application media helps students by providing various reading resources that are by the material they want, so that in this study it is evidenced by the average value of student concept understanding that increases after running the SQ4R learning model assisted by Digital School Book application media. Accordance with Megawati (2020, 8) who stated that the SQ4R model can improve teaching techniques in reading comprehension and students also get good grades after applying the SQ4R model which means that the SQ4R model affects students' reading ability, especially combined with digital school books as this study.

Learning activities With this SQ4R model, students are also encouraged to be active in learning activities in an organized manner and have focus power with the hope of increasing understanding of concepts. It can also be seen based on the results of learning observations that students follow learning more actively because they feel satisfied and motivated to master the subject matter (attachment). Such learning activities make it possible to be able to improve student learning outcomes. It is also stated by Klita Julianti (2014) that the application of the SQ4R model can increase curiosity because this model has the advantage of having clear steps that make it easier for students to understand the text of the material, requires students to be active learners and directed directly at the essence of the subject matter, making students understand and remember the material for a long time and can increase student activeness and engagement during learning activities.

## CONCLUSIONS AND SUGGESTIONS

Based on the results of research and data analysis as well as the discussion conducted by this study, it can be concluded that the ability to understand concepts during the dick class pretest obtained an average value of 47.12 and a post-test value of 66.62 while the treatment class obtained a pretest value of 57.37 and a post-test value of 78.34. Based on these results, there is an influence of the SQ4R learning model with Digital School Books on students' understanding of concepts in the MTS Nurussa'adah Sangkulirang.

The SQ4R learning model combined with school digital books is recommended for teachers to be used according to the subject matter, to train creativity and the ability to construct knowledge so that students' understanding of concepts can increase. Furthermore, researchers can be used as a reference, especially completing school digital book materials with more complete subjects to be combined with this SQ4R learning model.

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