The Correlation of Metacognitive Skills and Learning Results Toward Students' Retention of Biology Learning: Students Learning Only to Pass Examinations

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Abstract

This research was conducted in order to uncover the correlation of metacognitive skills and learning results toward students' cognitive retention at the implementation of SQ3R integrated with RQA, SQ3R, RQA and conventional learning. This descriptive-correlational research was conducted twice. The research population was all students of class XI Senior High Schools in Malang in the 2017/2018 academic year. The first research samples were the students of class XI Science 2, and 3 of Senior High School 5 Malang as well as Class XI Science 1, and 3 of Senior High School 9. The second research samples were the students of class XI Science 3, and 4 of Senior High School 5 Malang as well as class XI Science 2, and 3 of Senior High School 9. The results of the correlation regression analysis showed a correlation between metacognitive skills and learning results toward students' retention at the implementation of the RQA learning model. There was no correlation found related to the implementation of SQ3R integrated with RQA, SQ3R, and conventional learning. The factor that might have caused this phenomena to occur is students learning only in order to pass the examination.

Keywords: conventional learning, learning results, metacognitive skills, retention, RQA, SQ3R.

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Introduction

Meaningful learning is an important goal of education because it is oriented on the empowerment of the students' potential, which includes cognitive, affective, and psychomotor aspects. Corebima (2006) stated that the results of a meaningful learning were believed meaningful, both associated with the cognitive, affective and psychomotor aspects.

Cognitive learning results become meaningful when the knowledge gained is not easily lost. This is related to the students' retention. Retention is the ability to store information that has been learned (Santrock, 2007; Tapilow & Wawan, 2008). Bjork and Bjork (1996) revealed that the retention of learning results included the amount of knowledge and learning experiences that were still remembered by the students after a certain period of time.

Students' learning results and retention have a correlation with metacognitive skills, and retention of learning results is an implication of metacognitive skills (Hitipeuw, 2009). Metacognitive skills are related to attention, memory, problem solving, social awareness and some variations are related to self-control and self-instruction (Flavell, 1993; O'Malley & Chamot, 1990; O'Neil & Brown, 1997). Dawson (2008), Kayashima and Inaba (2003), and Wellman (1985) revealed that metacognitive skills also led to higher-level thinking processes, involving the active control of cognitive processes in learning.

Previous research examining the positive correlation between metacognitive skills and learning results reported metacognitive skills as having a positive correlation with learning results. Nurisya, Corebima, and Rohman (2017) reported that metacognitive skills had a contribution of 72.6% with the regression equation $Y = 0.323X1 + 58.250$ toward students' learning results at the implementation of PBL learning model. Similar research results were reported by Fauziyah (2013), who stated that metacognitive skills contributed as much as 32.5% toward students' learning results at the implementation of TPS learning model. Previous research examined the positive correlation between metacognitive skills and retention with a contribution of 35.9% in the regression equation $Y = 0.659X + 37.942$. Another research examining the correlation between metacognitive skills and retention was also reported by Fauziyah (2013). Through the implementation of Think Pair Share (TPS) learning model, Fauziyah reported a significant correlation between metacognitive skills and retention; with metacognitive skills contributing 46.1% toward retention with a correlation coefficient of .679 with regression equation $Y = 0.834X + 11.078$.

The empowerment of metacognitive skills should be performed by using a cooperative learning model that is able to develop the students' thinking skills and active participation to mold students into independent individuals who can evaluate their own strengths and weaknesses during the learning process. According to Green (n. d., as cited in Corebima, 2007), cooperative learning empowers students' metacognitive development. The learning model which is able to empower the students' thinking skills is SQ3R, RQA, and SQ3R integrated with RQA learning models.

There have been many research studies that have investigated the correlation between metacognitive skills and learning results and others, but none that have investigated a correlation between metacognitive skills and learning results toward students' retention. Therefore, research with multiple linear regression should be conducted.

The aim of this current research is to determine the correlation between metacognitive skills and learning results toward students' retention through the implementation of SQ3R, RQA, SQ3R integrated with RQA, and conventional learning.

Methodology

This research was a correlational research, conducted at Senior High School 5 Malang and Senior High School 9 Malang during the 2016/2017 academic year. The research was conducted twice at the same schools. The samples used in this dual research differed, and were selected based on the results of a placement test. The first research was conducted from March until June, and the second research was conducted from August until October. This research data were analyzed twice.

The population of this research were all students of class XI of Senior High Schools in Malang during the 2017/2018 academic year. The samples used in the first research were students of class XI Science 2, and Science 3 of Senior High School 5 Malang, and consisted of 32 students; as well as class XI Science 1, and Science 3 of Senior High School 9, also consisting of 32 students. The samples used in the second research were the students of class XI Science 3, and Science 4 of Senior High School 5 Malang, and consisted of 32 students; as well as class XI Science 2, and Science 3 of Senior High School 9, consisting of 33 students. The sampling technique used was simple random sampling.

The learning devices used in this research included the syllabus, lesson plans (RPP), student worksheet (LKS), tests, a metacognitive skills rubric and a retention rubric. The data in Research 1 and Research 2 were analyzed using multiple linear regression. The effective contributions between the two equations as well as that of each predictor were compared. The data were analyzed with the assistance of SPSS for Windows 23 software and performed at a significance level of 5%.

Results

Data of Research 1

A summary of the results of ANOVA related to the correlation between metacognitive skills and learning results toward students' retention at the implementation of SQ3R integrated with RQA, SQ3R, and RQA learning models, as well as conventional learning in the first research are presented in Tables 1-6.

Table 1. Summary of Anova related to Correlation between metacognitive Skills and Learning Results toward Students' Retention in RQA integrated with SQ3R Learning

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	209,099	2	104,550	1,334	.278[b]
	Residual	2350,502	30	78,350		
	Total	2559,601	32			

The results of ANOVA in Table 1 show that the significance value is .278. Based on the Anova results, it is seen that metacognitive skills and learning results do not have a correlation with students' retention.

Table 2. Summary of Anova related to Correlation between metacognitive Skills and Learning Results toward Students' Retention in SQ3R Learning.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	268,873	2	134,436	2,210	.128[b]
	Residual	1763,841	29	60,822		
	Total	2032,714	31			

The results of ANOVA in Table 2 show that the significance value is .128. Based on the Anova results, it is seen that metacognitive skills and learning results do not have a correlation with students' retention.

Table 3. Summary of Anova related to Correlation between metacognitive Skills and Learning Results toward Students' Retention in RQA Learning.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1299,372	2	649,686	7,367	.003[b]
	Residual	2557,400	29	88,186		
	Total	3856,772	31			

Table 4. Summary of Regression Equation Coefficient Analysis in RQA Learning

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	24,556	12,333		1,991	.056
	MetaRQA1	1,513	.564	1,363	2,683	.012
	HBRQA1	-1,053	.604	-.886	-1,744	.092

Table 5. Regression Summary of Correlation between metacognitive Skills and Learning Results toward Students' Retention in RQA Learning.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.580[a]	.337	.291	9.39075

The results of ANOVA in Tables 3, 4 and 5 show that the significance value is .003, and the correlation coefficient (R) is .580 having a contribution value (R^2) of .337 with regression equation $Y = 1{,}513\ X_1 - 1{,}053\ X_2 + 24{,}556$. This shows that metacognitive skills and learning results have a correlation with students' retention.

Table 6. Summary of Anova related to Correlation between metacognitive Skills and Learning Results toward Students' Retention in conventional Learning.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	246,797	2	123,399	2,498	.100[b]
	Residual	1383,134	28	49,398		
	Total	1629,931	30			

The results of ANOVA in Table 6 show that the significance value is .100. This shows that metacognitive skills and learning results do not have a correlation with students' retention.

Data of Research 2

The results of ANOVA related to correlation between metacognitive skills and learning results toward students' retention at the implementation of SQ3R integrated with RQA, SQ3R, and RQA learning models, as well as conventional learning in the second research are presented in Tables 7-10.

Table 7. Summary of Anova related to Correlation between metacognitive Skills and Learning Results toward Students' Retention in the SQ3R integrated with RQA Learning.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	364,039	2	182,020	2,424	.104[b]
	Residual	2477,944	33	75,089		
	Total	2841,983	35			

The results of ANOVA in Table 7 show that the significance value is .104. Based on the Anova results, it is seen that metacognitive skills and learning results do not have a correlation with students' retention.

Table 8. Summary of Anova related to Correlation between metacognitive Skills and Learning Results toward Students' Retention in SQ3R Learning.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	73,748	2	36,874	.304	.740[b]
	Residual	3634,168	30	121,139		
	Total	3707,916	32			

The results of ANOVA in Table 8 show that the significance value is .740. Based on the Anova results, it is seen that metacognitive skills and learning results do not have a correlation with students' retention.

Table 9. Summary of Anova related to Correlation between metacognitive Skills and Learning Results toward Students' Retention in RQA Learning.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	414,268	2	207,134	1,014	.375[b]
	Residual	6335,425	31	204,369		
	Total	6749,693	33			

The results of ANOVA in Table 9 show that the significance value is .375. Based on the Anova results, it is seen that metacognitive skills and learning results do not have a correlation with students' retention.

Table 10. Summary of Anova related to Correlation between metacognitive Skills and Learning Results toward Students' Retention in conventional Learning.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	28,478	2	14,239	.196	.823[b]
	Residual	2106,944	29	72,653		
	Total	2135,422	31			

The results of ANOVA in Table 10 show that the significance value is .823. Based on the Anova results, it is seen that metacognitive skills and learning results do not have a correlation with students' retention.

Discussion and Conclusion

The results of this research indicate that there is a correlation between metacognitive skills and cognitive learning results toward the students' retention at the implementation of the RQA learning model. However, there was no correlation found between metacognitive skills and learning results toward the students' retention at the implementation of SQ3R integrated with RQA, and SQ3R learning models, as well as for conventional learning.

The results of this research are almost entirely not in line with previous research findings. Bahri (2010) reported that metacognitive skills had a significant correlation with learning results and retention at the implementation of PBL, and PBL integrated with RQA learning models, as well as for conventional learning. Another research reported by Basith (2010) showed that metacognitive skills had a significant correlation with learning results for the implementation of TPS and Jigsaw learning models. Zen (2010) reported metacognitive skills as having a correlation with cognitive learning results at the implementation of inquiry learning model. Muhiddin (2012) showed that metacognitive skills had a correlation with students' retention at the implementation of PBL integrated with Jigsaw learning model.

Metacognitive skills correlate with learning results and retention because, basically, metacognitive skills place emphasis on the awareness of thinking about thinking (Bogdan, 2000; Flavell, Miller, & Miller, 1991). This skill affects the students' thinking skills, which indirectly affects the students' cognitive achievement and their ability to store information that has been studied, which is known as retention (Arends, 1998). Coutinho (2007) stated that students who had good metacognitive skills would have a high learning achievement because metacognitive skills were believed to play a particular role in a variety of cognitive activities including understanding, communication, attention, retention *(memory)* and problem solving (Howard, 2004). Thus, it shows that metacognitive skills have a correlation with students' learning results and retention.

The results of the current research shows that students' retention of learning material that has been learned is very low, because the knowledge they had learned is not stored in their long-term memory; it is only stored in their short-term memory. The short-term memory functions as a temporary storage area that has limited capacity to store the knowledge that has been learned. As a result, the *display* or information previously obtained is very fragile, and without repetition, the knowledge will be lost (Atkinson & Shiffrin, 1968). It will be different when such knowledge is transferred to the *long-term memory.* The students will be able to recall the learning material already learned, because this memory can store significantly more information, and students will remember it when later needed. This knowledge can be remembered through the repetition of the learning material obtained. This is consistent with the statement of Dahar (1991), in that one of the phases in the *learning act* is retention stage, in which new knowledge obtained must be transferred from short-term memory into long-term memory, through *rehearsal, practice*, elaboration and other means. When students have information stored in their long-term memory, they can access past records in order to solve current problems (Sanjaya, 2008).

Moreover, another reason might be down to weak memory (simply forgotten). Since the period of retention was as long as two weeks, and maybe the students' initial knowledge has been replaced with other new information obtained, so that the recall of knowledge already learned decreased. This would be in line with Woodworth, as cited in Winkel (2004), who

stated that the symptoms of forgetting were caused by memory traces which remain unused, and are then lost over time. As a result, new information will replace the old information. Anderson (1995), Ellis and Hunt (1993), Slavin (1993), and Sternberg (2006) revealed that one important reason people forgot was interference. Interference occurs when information is mixed or shifted with other information. Because of interference it is difficult to remember knowledge (Lahey, 2007; Winkel, 2004).

A factor that might cause this to happen, based on the findings in the field, is that students only learn when they have examinations, and do so only in order to pass the exam. However, students do not continue to learn once the exam has finished. This phenomenon is common in learning activities. Corebima (2016) revealed that the learning is conducted by referring to the main reference, which is that the students should pass the exam. The students strive by all means to be able to answer the exam questions and to pass the exam. The results of various surveys indicate that the quality of education in Indonesia is still low (Tola, 2008). The research results of *Puspendik Balitbang Depdiknas* in 2004, about the basic ability of students in terms of reading, writing, and arithmetic (*calistung*) in 200 schools of 13 districts in some provinces in Indonesia show that most students are in the category of not competent (2004). Meanwhile, one of the factors that plays an important role in academic achievement is patterns of learning. Gustian (2002) revealed that if the students learned with a regular pattern each day, they would achieve better learning compared to learning without a regular pattern and only learn at particular time deemed necessary.

There is a correlation between metacognitive skills and learning results toward students' retention at the implementation of RQA learning model. The significance value is .003 and the correlation coefficient (R) is .580 with a contribution value (R^2) .337 with the regression equation is Y = 1,513 X_1- 1,053 X_2 + 24,556. This research study's results are almost entirely inconsistent with those of previous research findings, because basically metacognitive skills have a correlation with learning results and retention. The students' retention capacity was found to be very low, as the previously obtained knowledge is not stored in *long term* memory but only stored in the *short term* memory. A factor that may be the cause to this phenomena are that the students only learned when facing their examinations, so only in order to pass the exam, but then the students stopped learning when the exams were over.

Notes

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