The Supports of JiRQA Learning on Biology Students' Achievement in Multi-Ethnical Classroom

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ABSTRACT

The purpose of this quasi-experimental research was to reveal the JiRQA learning supports on biology students' achievement in the multi-ethnical classroom in higher education. The research sample was included 125 students consisting of the ethnics of Dayak, Javanese, and Malay. The achievement data were obtained from the pretest and posttest using an essay test and analyzed by using ANCOVA at the level of significance 5%, followed by LSD test. The analysis results show that the achievement in JiRQA learning is 30.91% higher and significantly different from that of conventional learning. The achievement of Dayak ethnic students is 20.30% higher from the Javanese ethnic and 19.53% from Malay ethnic. The achievement among ethnics in JiRQA learning was not significantly different, but significantly different in conventional learning. Therefore, JiRQA learning has the accommodate biology students' achievement in the multi-ethnical classroom.

Introduction

Higher education has an important role in assessing or evaluating students' achievement for helping students to achieve successful performances (Gunes, Katircioglu & Yilmaz, 2015; Ramalingam, Ramalingam & Chinnavan, 2014; Sabtiawan, Yuanita & Rahayu, 2019). The achievement assessment is done so that the students could understand the concept that they study. The achievement assessment has a contribution to the students' intelligence development in shaping a better life. The achievements of students have significantly enhanced since assessment for learning practices have become positioned as a fundamental aspect of classroom routines (Alanazi, 2017).

The achievements are one factors affecting the education quality and the successes in learning (Gloria, Sudarmin, Wiyanto & Indriyanti, 2019; Suratno, Wahono, Chang, Retnowati & Yushardi, 2020). The students who have good achievements will be able to solve various problems faced in everyday life in the community, family, and school (college). The research by Lestari, Ristanto & Miarsyah, (2019) revealed that achievement is related to students' ability to use the conceptual understanding and necessary for the learning process because learning is always faced with various problem-solving situations. The achievement can make students' cognitive skill and academic performance become higher as well as become goals of long-term success (Alves & Ramnarain, 2013; Gomes, Martins, & Almeida, 2017; Herlanti, Mardiati, Wahyuningtyas, Mahardini, Iqbal & Sofyan, 2017; Phillipson &

Phillipson, 2012). Thus, the achievement enhancement should be done at every level of education, especially at the higher education level, so that the students can solve the problems they encounter.

The achievement enhancement in every level of higher education is continually encouraged, but various problems with low achievement were still found, especially in biology education students (Gao, 2014; Purnawan, 2018; Semilarski, Laius & Rannikmäe, 2019). The preliminary researches result at STKIP Persada Khatulistiwa also showed that the average biology students' achievement in the zoology lecture was as much as 60.98 and still in enough category. Also, some students still considered that zoology lecture required memorization and had a lot of jargon so that the students found it difficult to understand the concepts.

These problems might have been because the learning process was still dominated by the lecturers (teacher-centered) instead of student-centered one (Oh, Maeng & Son, 2020), the students tended to be passive (Añino, Merino, Miyara, Perassi, Ravera, Pita & Waigandt, 2014; Çepni & Keleş, 2006), and the lecturers did not give many opportunities to students to discover knowledge through their learning experience including reading. The lecture teaching method was commonly used by most biology teachers does not offer students the opportunity to actively participate and does not promote meaningful learning of biological concepts (Oghenevwede, 2019). The learning activities conducted had not been able to produce innovative learning (Bustami & Corebima, 2017). In fact, according to Bustami (2017), innovative learning can better enhance active involvement and collaboration, and self-directed learning. Innovative learning will be able to shift the paradigm of education, from teacher centered-learning to student centered-learning, or from a behavioristic approach to constructivist approach (Bustami & Corebima, 2017).

The constructivist learning approach has an important role in enhancing achievement (Ozfidan, Cavlazoglu, Burlbaw & Aydin, 2017). The constructivist approach will be able to make the students actively construct their knowledge in the classroom based on their experiences to develop the learning process (Bara & Xhomara, 2020). Through the constructivist approach, the students are given the freedom to express their opinions and thoughts, and the students are trained to think, to solve a problem, to be independent, to be creative, and to be responsible for their rational thinking. The constructivist approach characteristics are expected can encourage biology students to enhance their achievement related to the learning material.

Another factor that contributes to achievement is ethnicity. Indonesia is one of the countries which has the largest cultural and ethnic diversity (Bustami, Corebima, Suarsini & Ibrohim, 2017). The cultural and ethnic diversity in Indonesia can be seen from one of the provinces in West Kalimantan. The preliminary survey results indicated that West Kalimantan had heterogeneous ethnicities, including ethnics Dayak, Malay, Javanese, Chinese, Flores, Sundanese, Bugis, Bataks, Padang, Madurese, and so on. Ethnic groups of Dayak, Malay, and Javanese are ethnic groups the majority when compared with other ethnic groups, and ethnics Dayak is indigenous in West Kalimantan (Wicaksono & *Nakagoshi*, 2012).

Ethnic diversity can stimulate students' creativity, reduce the feeling of ethnic identification, and will support equitable opportunities and academic achievement for all students. Ethnic diversity acknowledges heterogeneity and values diverse groups of students as a resource for education (Diette, & Oyelere, 2014; Terenzini, Cabrera, Colbeck, Bjorklund & Parente, 2001; Thorjussen & Sisjord, 2019). According to Alsubaie (2015), classrooms are becoming increasingly multicultural, and this leads to new challenges for teachers. However, ethnic diversity also affects social interaction among different ethnic groups students and finally has an impact on increased educational achievement (Aronson, & Laughter, 2016; Yusof, Abdullah & Ahmad, 2014).

The existence of ethnic influence on student achievement is due to each ethnicity having different characters. The characters' diversity in each ethnic classroom can lead to an effect on achievement in all students, especially biology students. Several kinds of research have revealed that the character of each ethnic group may affect students' achievement (Maasawet, 2009; Maestri, 2017; Najib, 2012; Nishina, Lewis, Bellmore & Witkow, 2019). Therefore, it is necessary to integrate

multiethnic education in the constructivist approach as an effort to enhance the biology students' achievement.

One of the learning strategies that can integrate multiethnic education in the constructivist approach is cooperative learning strategy (Hossain, Tarmizi & Ayub, 2012; Sharan, 2015), including the JiRQA learning strategy (Bustami et al., 2017). The JiRQA learning strategy is the result of the combination between the syntaxes of Jigsaw and Reading Questioning Answering (RQA) learning strategy, with seven steps as follows: (1) delivering the learning topic, (2) forming heterogeneous home groups, (3) forming the expert groups (4) Reading, Questioning, Answering activities in expert groups, (5) discussion activities in expert groups (6) discussion activities and peer tutors in home groups, and (7) giving quizzes and group rewards, and giving homework, which is, reading and making a summary of the learning material (Bustami, & Corebima, 2017).

Stages of cooperative learning on JiRQA learning such as activities of discussing, summarizing, reading, making questions, and answering questions can affect student achievement (Abed, Sameer, Kasim & Othman, 2020; Bustami, 2017; Gull & Shehzad, 2015). JiRQA learning also can strengthen relationships between students is interaction. Interaction between diverse students, especially in the multi-ethnical classroom will make students able to understand knowledge together and affect student achievement so supports biology students' achievement in the multi-ethnical classroom. This research aim was to reveal the JiRQA learning supports on biology students' achievement in the multi-ethnical classroom in higher education. This research is very suitable to help students who have multi-ethnic backgrounds in enhancing students' achievement.

Methods

This research was conducted in the even semester of the 2015/2016 academic year through a factorial quasi-experiment. This research was a pretest-posttest non-equivalent control group design of two factors (2 x 3). The first factor was kind of learning strategy (consisting of two learning: JiRQA learning and conventional learning). The second factor was ethnics of students consisting of three ethnics of Dayak, Malay, and Javanese. The learning type and ethnicity were the independent variables while the achievement was the dependent variable.

This research was conducted at STKIP Persada Khatulistiwa Sintang, West Kalimantan, Indonesia. This research population was all the students of biology education study program with a total of 586 students. The samples were the students who were taking zoology lecture with a total number of 125 students. The samples consisted of three ethnics, namely Dayak ethnics (49 students), Malay ethnics (37 students), and Javanese ethnics (39 students). Each ethnic groups of students are randomly and mixed distributed to the classrooms and divided into four classes namely two experimental classes and two control classes. The experimental class samples were taken by using a simple random sampling technique based on their academic equality level obtained from the placement test. The placement test results showed that the probability value was 0.897 or greater than the alpha was 0.05. Thus, it can be concluded that all samples had equal academic ability (homogeneous).

The instruments used to measure the biology students' achievement were an essay test with 10 question items. The essay test was developed based on the indicators of Bloom's taxonomy revised by Anderson & Khrathwohl (2001), namely remembering, understanding, applying, analyzing, evaluating, and creating. The achievement instrument had been validated by the expert team (content and construct validation) and tried out (empirical validation). The validation of content and construct by three teams namely two Profesor from the State University of Malang experts at animal material and assessment, and one zoology lecturer from STKIP Persada Khatulistiwa. The empirical validation results indicated that all items were valid and reliable (range value of product-moment between 0.341 and 0.719 and Cronbach alpha between 0.825 - 0.846), thus the achievement test's all items were appropriate to be used in the experimental research.

The achievement data were collected by giving an essay test to all the research samples. The achievement data were obtained from the pretest and posttest. The procedure of the data collection was:

(1) at the beginning of the semester (pretest activity), the students answered the essay test given by the lecturer; (2) at the end of the pretest activity, the students were asked to return the essay test; (3) after that, the treatments were done for 10 consecutive and consistent meetings (the regression test results: alpha (α) > 0.05) both on the JiRQA learning classroom and conventional learning classroom; all treatments were carried out by the researcher; the materials being learned is related in zoology material with 10 phylum including the phylum Protozoa, Porifera, Coelenterate, Platyhelminthes, Nemathelminths, Annelida, Arthropoda, Mollusca, Echinodermata, and Cordata; (4) at the semester end (posttest activity), the students answered the same essay as the pretest. The biology students' achievement assessment was based on the score of each question and the achievement rubric score (score 0-4) adopted from Hart (1994). The obtained scores were then converted to the score (range 0-100). The achievement scores were then summarized and analyzed.

The first data analyze was done for the descriptive analysis to know the mean score and range of achievement categories of each research variable (Table 1). After that, the prerequisite tests (normality and homogeneity tests) were performed. The prerequisite test results, both the pretest and the posttest for each strategy was normally and homogeneously distributed (value: p> 0.05) so that it could have proceeded to inferential statistical analysis. Inferential statistical analysis was performed by using analysis of covariance (ANCOVA) at a 5% significance level (value: p<0.05), then it was continued with the Least Significant Difference (LSD) test. All data analyses were assisted with SPSS version 16.

Table 1

Categories Range Average Score of Achievement

No	Range	Categories
1	80 – 100	Very good
2	70 – 79	Good
3	60 – 69	Enough
4	50 – 59	Poor
5	≤ 49	Very poor

Findings

Based on the descriptive analysis results, the achievement means scores of pretests in learning groups and ethnic groups were very poorly categorized. The pretest averages score in the JiRQA learning groups were 30.42 and the conventional learning groups were 31.23. The pretest averages score in Dayak ethnic groups were 30.70. Malay ethnic groups were 30.43 and Java ethnic groups were 31.33. While the posttest student's achievement averages score in JiRQA learning is categorized as good, which were 71.42, and the posttest average score in conventional learning is categorized as poor, which were 55.33. The posttest averages score in three ethnic groups was enough categorized (Table 2).

The descriptive analysis results (Table 2) also show that the achievement mean scores of the three ethnic groups in the JiRQA learning strategy had a higher enhancement than that of the three ethnic groups in the conventional learning. The mean scores enhancement of achievement of Dayak ethnic groups was higher than that of those in the Javanese and Malay ethnic groups, although still in the same category is enough category.

Table 2

Summary of the Pretest and Posttest Mean Score of Biology Students' Achievement

Learning	Group	N^a	Pretest Mean	Category	Posttest Mean	Category	Increase
JiRQA	Experiment	64	30.42	very Poor	71.42	good	134.78
Conventional	Control	61	31.23	very Poor	55.33	poor	77.15
Total	Dayak	49	30.70	very Poor	67.07	enough	118.42
	Malay	37	30.43	very Poor	60.53	enough	98.12
	Javanese	39	31.33	very Poor	62.07	enough	98.89

Note N^a = Number of Students

The ANCOVA results related to the effect of the strategy, ethnics, and interaction between strategy and ethnics on the biology students' achievement can be seen in Table 3. The ANCOVA results in Table 3 show that the strategy (p: 0.000) and ethnics (p: 0.002) have a significant effect on biology achievement (value: $p < 0.05$), while the interaction between strategy and ethnicity did not have a significant effect on biology achievement (p: 0.173>0.05). The ANCOVA results in the learning strategy show that there were differences in the biology students' achievement between the two learning strategies. The JiRQA learning strategy had a corrected achievement mean score was 57.63% higher and significantly different from conventional learning.

Table 3

Summary of the ANCOVA Test Results of Multiethnic Students Achievement

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	12445.335^a	6	2074.222	32.218	.000
Intercept	18635.282	1	18635.282	289.451	.000
Pre-achievement	3207.828	1	3207.828	49.825	.000
Strategy	8614.738	1	8614.738	133.808	.000
Ethnics	884.211	2	442.106	6.867	.002
Strategy * Ethnics	228.983	2	114.492	1.778	.173
Error	7597.017	118	64.382		
Total	517302.000	125			
Corrected Total	20042.352	124			

Table 4

Summary of the Corrected Mean Score of Achievement and LSD Test on Ethnic

Ethnicity	Mean score		Difference	Achieve Cor	LSD notation
	Pre-Achievement	Post-Achievement			
Malay	30.434	60.530	30.096	60.527	a
Javanese	31.331	62.074	30.743	61.034	a
Dayak	30.698	67.049	36.351	66.227	b

The LSD results in Table 4 show that there was a difference in the biology students' achievement in each ethnicity. The difference results in the percentage increase of the corrected ethnicity mean score shows that the Dayak ethnic groups were significantly different and 20.30% higher than the Javanese ethnic group and 19.53% higher than the Malay ethnic group.

Table 5

Summary of Corrected Achievement Mean score and LSD Notation on the Interaction between Strategy and Ethnicity

Strategy	Ethnicity	Average Value		Difference	Cor value	Notation LSD	
		X Achieve	Y Achieve				
Conventional	Malay	29.825	50.823	20.99	50.906	a	
	Java	31.908	53.235	21.33	52.608	a	
	Dayak	31.839	60.779	28.94	59.676		b
JiRQA	Java	30.782	70.470	39.69	70.001		c
	Malay	31.077	70.777	39.70	70.149		c
	Dayak	29.688	72.596	42.91	72.779		c

Related to the interaction between strategy and ethnicity, although it was proved to have no significant effect on achievement, it could be continued with LSD test to determine the mean score differences of the combination group of strategy and ethnicity. The LSD results (Table 5) show that there was not any difference in the biology students' achievement in the combination group of JiRQA learning strategy with Dayak, Javanese, and Malay ethnic groups. However, the biology student's achievement in the combination group of conventional learning with Dayak ethnic was significantly different from that in the combination group of conventional learning with Javanese and Malay ethnic groups, with the corrected different percentage of the combination group mean score of conventional learning and Dayak ethnic group was 24.05% from the Javanese ethnic group and 20.49% from the Malay ethnic group. This proves that JiRQA learning can accommodate biology student achievement in the multi-ethnic classroom.

Discussion

The descriptive analysis results show that there was an increase in the mean of posttest achievement score for both learning strategies although the increase was relatively different. The increased percentage of the mean achievement score in the JiRQA learning strategy was 134.78% and the increased percentage in conventional learning was 77.15%. The increase was because the learning strategy had been correctly implemented by the learning syntax used. According to Sihwinedar (2015), the learning strategy that is correctly implemented could create a conducive learning atmosphere, to provide the learning experiences that could be the basis for the students' intelligence development.

The differences in the increase of achievement in each learning strategy group can be seen from the ANCOVA results. The ANCOVA results show that there was a difference in the achievement increase between the JiRQA learning strategy and conventional learning. The JiRQA learning strategy group had a higher increase percentage in the corrected mean achievement score than the conventional learning group.

This research findings were in line with the research results conducted by Amedu (2015) Al-Salkhi (2015), Berlyana & Purwaningsih (2019), and Juweto (2015) that the Jigsaw learning strategy has a significant effect on achievement. Another research conducted by Bahtiar (2014), also reported that the achievement in the RQA learning strategy was better and significantly different from that in conventional learning strategy. That the JiRQA learning strategy has a better effect on achievement than conventional learning does because the JiRQA learning strategy has more advantages than conventional learning.

The JiRQA learning strategy advantages lie in the characteristics of each stage of the JiRQA learning strategy. The JiRQA learning stages direct the students to form small groups of 4-6 students. Each member of the group is responsible for being an "expert" on one part of the assigned material. The existence of an expert group in the JiRQA learning process can encourage the students to master the

material being studied. According to Bustami (2017), the JiRQA learning strategy provides an opportunity for the students to become "experts" so that it makes students try to master learning material assigned to him.

The JiRQA learning strategy stages can "force" the students in the expert group to read the material in their part. The reading process will expand students' cognition through their thinking ability. Bustami & Corebima (2017), and Zubaidah Mahanal Sholihah Rosyida & Kurniawati (2019) revealed that reading habits had a strong correlation with academic success. Furthermore, Corebima (2009) revealed that the students who are forced to read could increase by almost 100% of their understanding of the learning material.

JiRQA learning strategy is cooperative learning which the emphasis on peer reinforcement for positive and also provides the opportunity for each expert group to tutor the other members of the group about the material which is not their part (homegroup) (Bustami, Wahyuni, Syafruddin, Marsela & Nur, 2021; Van Ryzin, Roseth & Biglan, 2020). The peer tutoring activity enables the students to exchange information in the learning activities so that they can obtain the same learning experience and ultimately will form a conceptual understanding which is quite similar. Peer tutoring activity can encourage the formation of cognitive elaboration among biology students. According to Slavin (1995), peer tutoring activity is supported by cognitive elaboration theory, that is, if the information should stay in the memory and associated with the previous information, the students should be seen in the cognitive restructuring or elaboration activity on the material being studied.

Besides, the JiRQA learning strategy also emphasizes the responsibility of each group member to master the material on their parts by summarizing, asking questions, and answering the substantial questions by themselves (Bustami, Wahyuni, Syafruddin, Marsela & Nur, 2021; Hariyadi, Corebima, Zubaidah & Ibrohim, 2018). This activity encourages biology students to have the curiosity to understand the material being studied. Finally, giving rewards for the best group is a very positive thing because each member of the group contributes a score to their groups so that all members of the group should try to understand the material learned (Slavin, 1995).

JiRQA learning strategy advantages are not found in the conventional learning process. The conventional learning process tends to be one direction and more dominated by the teacher (teacher centered), as a result, the students become less active and less creative. The research by Ekoningtyas (2013) revealed that the learning process which does not involve learners actively and creatively in the learning process makes the students forget the concepts easily. Such a learning process will certainly produce low achievement of the biology students.

The ANCOVA results related to the effect of ethnics on the achievement showed that ethnics had a significant effect on the achievement of biology students. It means that there was a difference in the average of the achievement score increase among Dayak, Malay, and Javanese ethnicities. These research results are in line with the previous research conducted by Maasawet (2009) which implemented cooperative learning strategy of "Snowballing and Number Head Together (NHT)" to Javanese, Bugis, Banjar, and Kutai ethnic students. The research shows that ethnic has a significant effect on students' achievement. The research by Rocha & Nascimento (2019) revealed that the achievement gaps between ethnic groups have been observed in countries with heterogeneous populations.

The LSD results show that the corrected achievement mean score in Dayak ethnic groups was significantly different and 20.30% higher than that of the Javanese ethnic groups and 19.53% higher than that of Malay ethnic groups. These results mean that the Dayak ethnic group could enhance the biology students' achievement better than the Javanese and Malay ethnic groups. The increase in the achievement of Dayak ethnic biology students cannot be separated from their values of characters. The character values of Dayak ethnic such as tenacity, motivation, and discipline could affect biology students' achievement. The character values of Dayak ethnic were seen from the preliminary survey results which described that Dayak ethnicity had tenacity in completing the lecture and did not arrive late (discipline). According to Ibrahim (2009), Dayak ethnic is a native who certainly has a friendly attitude, honesty, cooperation high spirit, and great respect for guests.

As residents, Dayak ethnic groups had confidence in the learning process. This confidence made the Dayak ethnic students braver and more proactive in having discussion activities. It allowed them to cooperate more easily, to complement each other, and strengthen the conceptual understanding of biological material. Bustami (2017) revealed that Dayak ethnic students could cooperate in a problem-solving activity. Thus, the Dayak ethnic characters made biology students able to enhance achievement better.

The ANCOVA results related to the effect of the interaction between strategy and ethnicity show that the interaction between strategy and ethnicity did not have a significant effect on the biology students' achievement. This research results were not in line with the research conducted by Maasawet, (2009) implementing cooperative learning "Snowballing and Number Head Together (NHT)". The research found that the interaction between strategy and ethnicity had a significant effect on the achievement learning results of junior high school students in Samarinda. The difference between this research results and the previous research results was because the characteristics of the strategies and ethnicity used in the previous research were different from those used in this research. The research results were also different.

Although it did not show any significant effect, it was continued to the LSD test to reveal the differences in the achievement of each combination group between strategy and ethnicity. The LSD results show that the corrected biology achievement mean score in the combination groups of the JiRQA learning strategy with Javanese, Dayak, and Malay ethnic groups was not significantly different. However, in the combination group of conventional learning with Dayak, Javanese, and Malay ethnic groups, there was a significant difference in the mean biology achievement biology score with the percentage difference rate of the corrected mean score of the combination of conventional learning and Dayak ethnic group was 24.05% higher than the Javanese ethnic and 20.49% higher than the Malay ethnic. These results indicated that the JiRQA learning strategy group could be enhancing the biology achievement in multiethnic students than the conventional learning classroom. Furthermore, the JiRQA learning strategy could be equalizing each ethnic biology achievement.

The achievement in the combination group of JiRQA learning strategy with all the three ethnics was equal because the JiRQA learning strategy could accommodate each ethnicity characteristics. The JiRQA learning strategy implementation was able to make the students work together in multiethnic groups without differentiating any ethnics. Their cooperation within the group to achieve a common goal could increase the students' motivation (Juweto, 2015). Motivation always determines the intensity of the students' learning efforts, so that motivation serves as an encouragement for the students' academic achievement.

The learning process with the JiRQA learning strategy allowed every ethnic to read, summarize (resume), create questions, and answer questions about the learning material by themselves. This activity requires the multiethnic students to be responsible for the tasks assigned to them. Thus, it can affect the multiethnic students' achievement. Similarly, Marthina, Gunowibowo & Djalil (2013), also revealed that Jigsaw cooperative learning could help students to be more enthusiastic and responsible for learning so that it helps them to understand the learning material better.

JiRQA learning strategy required the students from every ethnic to submit the tasks in the form of a resume on time. Submitting assignments on time can encourage students to have a disciplined character. Discipline character may affect the multiethnic students' achievement. Tu'u (2004) revealed that discipline in schools is a dominant factor that affects students' learning achievement. Furthermore, Najib (2012) said that students who have a disciplined character will be more successful than those who did not have discipline character.

Peer tutoring activities in the JiRQA learning strategy can encourage multiethnic students to have very high self-esteem or confidence. The confidence that is formed from peer tutor activities will make the multiethnic students braver to deliver the learning material and will eventually affect their achievement. This is in line with what is expressed by Najib (2012) that self-confidence could affect the students' learning achievement.

Conclusion and Implications

Based on the data analysis and discussion results, it can be concluded that: (1) strategy affects biology students' achievement. The increase of the corrected achievement mean score in the JiRQA learning strategy is higher and significantly different from that in conventional learning, (2) ethnicity affects the biology students' achievement. The corrected achievement mean score increase of Dayak ethnic groups is higher and significantly different from that of Javanese and Malay ethnic groups, (3) the interaction between strategy and ethnicity does not affect the biology students' achievement. The biology students' achievement in the combination groups of JiRQA learning with Dayak, Malay, and Javanese ethnic groups was not significantly different, but the biology students' achievement in the combination groups of conventional learning with Javanese, Malay and Javanese ethnic groups was significantly different. Thus, JiRQA learning has the accommodate biology students' achievement in the multi-ethnical classroom.

Recommendation

Based on the research and discussion results, the author recommends that the cooperative learning strategy, especially the JiRQA learning strategy, be implemented at every level of education as an effort to enhance the achievement of the students who have multiethnic backgrounds. Furthermore, lecturers and researchers need to conduct similar research by implementing the JiRQA learning strategy to measure other variables related to achievement, such as retention.

Acknowledgements

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Appendix
The Achievement Scoring Rubric

The Achievement Scoring Rubric refers to Hart (1994)

Test Questions Example	Answers	Rubric	Score
Euglena sp. is one of the lowest levels of invertebrate animals. Some experts group put these animals into the *Plantae* (plants) group, but in general they can be grouped into the Animalia (animal) group, namely included in the Protozoa Phylum. **Question:** Explain why anyone grouped *Euglena sp.* into groups of plants?	In the body of *Euglena sp.*, there are chloroplast grains that green in color, causing its body to be green. Chloroplast granules function to carry out the photosynthesis process which is plant characteristic. This is what causes *Euglena sp.* to enter the plant groups	Correct and complete answer. • Able to analyze the body components of *Euglena sp.* which are plants characteristic such as chloroplasts. • Describe the characteristics of chloroplast granules. • Mention the photosynthesis process. • Linking chloroplast granules with photosynthesis.	4
		Correct and less complete answers. • Able to analyze the body components of *Euglena sp.* which are plants characteristic such as chloroplasts. • Describe the characteristics of chloroplast granules • Mention the photosynthesis process.	3
		Correct and incomplete answers. • Able to analyze the body components of *Euglena sp.* which are plants characteristic such as chloroplasts. • Describe the characteristics of chloroplast granules.	2
		Correct and very incomplete answer • Able to analyze the body components of *Euglena sp.* which are plants characteristic such as chloroplasts.	1
		A wrong answer or no answer	0