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The Effect of the RQANI Model on Biology Students' Self-Efficacy in Ternate, North Maluku, Indonesia

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Abstract: Preliminary studies show that teachers did not present biology topics in context or linked them to Islamic values. **Objective:** The purpose of this study was to identify the effect of the RQANI model on the self-efficacy of biology students in Ternate City, North Maluku, Indonesia. **Methods:** The present study was a quasi-experimental study with a non-equivalent control group design. The study population contained all students from the Department of Biology Education in the city of Ternate, North Maluku, Indonesia. The sample consisted of 120 biology education students from IAIN Ternate and STIKIP Kie Raha, the city of Ternate, North Maluku. The data were collected through survey and observation. Data analysis involved descriptive and inferential statistics. **Findings:** The study results showed that the RQANI learning model had an effect on biology students' self-efficacy. **Conclusion:** RQANI learning model had an effect on biology students' self-efficacy

Keywords: Biologi students', learning model, RQANI, self-efficacy.

Abstrak: *Studi pendahuluan menunjukkan bahwa penyajian konsep biologi yang dikaitkan secara kontekstual dengan kehidupan sehari-hari dan pengintegrasian dengan nilai-nilai Islam masih kurang diimplementasikan.* ***Tujuan:*** *Tujuan dari penelitian ini adalah untuk mengidentifikasi pengaruh model RQANI terhadap Self-Efficacy Mahasiswa Biologi di Kota Ternate, Maluku Utara, Indonesia.* ***Metode:*** *Penelitian ini merupakan penelitian quasy eksperiment dengan desain Nonequivalent Control Group Design. Populasi penelitian merupakan seluruh mahasiswa pendidikan biologi di Kota Ternate, Maluku Utara, Indonesia. Sampel penelitian terdiri dari 120 mahasiswa pendidikan biologi di IAIN Ternate dan STIKIP Kie Raha, Kota Ternate, Maluku Utara. Instrumen yang digunakan adalah instrumen untuk mengukur self-efficacy mahasiswa melalui angket dan lembar observasi. Selanjutnya, data penelitian dianalisis dengan menggunakan analisis deskriptif dan inferensial.* ***Temuan:*** *Berdasarkan hasil penelitian dan analisis data, maka dapat disimpulkan bahwa terdapat pengaruh model pembelajaran RQANI terhadap self-efficacy mahasiswa biologi.* ***Kesimpulan:*** *terdapat pengaruh model pembelajaran RQANI terhadap self-efficacy mahasiswa biologi.*

Kata kunci: *Mahasiswa Biologi, Model Pembelajaran, RQANI, self-efficacy.*

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INTRODUCTION

Self-efficacy is a psychological attribute that needs to be formed through the educational process at tertiary institutions. It is important not only to shape professional maturity but also to shape student character (Faiz, 2015). Self-efficacy is a person's confidence in their skills and using them to accomplish specific work behaviors (Cai et al., 2021). Individual self-efficacy depends on the environment and cognitive conditions surrounding them (Badrun et al., 2022). Someone with self-efficacy always desires to advance and develop (Dari & Putro, 2021). With self-efficacy, individuals can assess their ability and competition to perform tasks, achieve goals, and overcome obstacles (Kamsurya et al, 2022). When self-efficacy is high, learners can use specific responses to gain reinforcement and be always ready and alert when solving problems. Conversely, learners with low self-efficacy tend to feel anxious and unresponsive (Pajares & Miller, 1994; Elias & Loomis, 2002). Educators must change their learning strategies and techniques to increase student self-efficacy (Bandura, 2006; Schunk & Pajares, 2002).

The serious problem that the Indonesian government is currently facing is the education system, which is still oriented towards cognitive development and mastery of concepts/theories and pays little attention to the development of affectivity, empathy and feelings (Sahroni, 2017). Indonesian educational practices tend to focus on the development of cognitive aspects, ignoring soft skills and character building that affect the development of positive values in students (Setiawati, 2017). Social phenomena such as fights, drug use, depression, cheating, truancy serve as a mirror for teachers and educational observers that character education is important. Character building and self-efficacy improvement can be realized through learning processes at all levels of education. In interview sessions, several biology lecturers from *IAIN* (Public Islamic Institute) Ternate, STKIP KIE Raha Ternate and *UIN* (Public Islamic University) Alauddin Makassar admitted that they did not teach science and biology thoroughly. Therefore, a learning model based on the integration of Islamic values is necessary to avoid these social deviations.

Based on observations and interviews with a group of students from the Biology Department at IAIN Ternate, STKIP KIE Raha Ternate and UIN Alauddin Makassar, it is known that biology lessons at the university have not integrated Islamic values. In other words, learning ends in the cognitive domain, where students have to study abstract, solid, and difficult-to-understand theories on biology. Also, they have not found any material presentation contextually related to daily life or Islamic values. These educational practices certainly affect student character formation and self-efficacy.

Self-efficacy is a person's belief in their ability to perform and be responsible for a task (Atoum & Momani, 2018). Self-efficacy is not innate or a trait inherent in every student, but is acquired through learning activities (Sahara et al., 2017). Learning experience also contributes to maintaining individual effectiveness (Flores, 2015). Students who believe in their abilities can increase their motivation to study simultaneously. Self-efficacy affects effort and persistence in interpreting tasks (Lunenburg, 2011). Self-efficacy is an important predictor of academic success, affecting student academic performance and retention (Honicke & Broadbent, 2016; Rooiji et al., 2017).

An effective learning process can provide a solid framework to improve the quality of science education, foster students' critical and creative thinking, and encourage student participation in science classes (Tastan et al., 2018; Amin et al., 2017). Self-efficacy is required to produce graduates with good competence (Kurt et al., 2014). Educators play an important role in improving classroom management by encouraging students to complete tasks that challenge logical thinking and employing meaningful and effective

models of learning (Cardenas & Cerado, 2016; Amin et al., 2020). Keeping students engaged in meaningful learning environments can enable them to improve their ability to practice science sustainably. Such a learning process may affect students' motivation and self-efficacy (Osborne & Collins, 2001).

In a science classroom that integrates Islamic values, students showed higher cognitive learning outcomes than those taught with conventional learning (Purwati et al., 2018). In addition, a study by Fayuni et al. (2020) found that millennial students can complete artificial projects and report very well on their meaningful learning activities by being more grateful for all of God's creation on earth. A study conducted by Fitriani & Fibriana (2020) reports that students' religious character scores in the "very good" category after learning using the Islamic values-integrated instructional materials. Likewise, their critical thinking skills are also high.

Instructional materials are integrated with the process experience. Therefore, it is necessary to change the teaching mindset, assuming that students are not passive but active subjects who can build their understanding through interaction with their learning experiences (Azhar et al., 2015). Education effectively controls student behavior, spiritual anomalies, and moral suprematism (Gani, 2019). Integrating Islamic values and science into the classroom is also important for developing knowledge and ethical character (Fahyuni et al., 2020). Character is a combination of attributes, patterns of attitudes and behavior to elevate one's identity and differentiate between every individual (Damon & Gregory, 2003). Cognitive and affective integration can be achieved by creating an environment that allows everyone to experience satisfying achievement standards. Educators need to be aware of the importance of integrating cognitive and affective domains (Dunkel et al., 2018).

Integrating Islamic values into the classroom through Problem-Based Learning can increase the enthusiasm or motivation of students in learning, as well as provide opportunities for them to solve learning problems scientifically and more meaningfully (Anshori, 2021). The formation of the spiritual culture of students is one of the factors that determine the success of learning (Rusakova et al., 2017). This learning process creates a sense of sincerity and seriousness in students, especially when facing various life problems. Problem-based learning integrated with Islamic values has implications for improving the quality of learning outcomes (Ramadhani et al, 2019). Integrating science and religion must be implemented in an interdisciplinary integrated curriculum (Nasir et al, 2020). Student character can be shaped through education. Character education holds a higher meaningful position, where students better understand (cognitive domain) what is right, have positive values (affective domain), and have the will to complete tasks (psychomotor domain) (Khilmiyah et al. al., 2020).

The integration of science education and religious values should be developed so that students can fully and comprehensively understand natural phenomena (Belzen, 2019). During the knowledge acquisition process, the integration of science and religion plays a role in determining the results of theoretical knowledge and practical experience of nature about the oneness of God and its significance in everyday life (Soni & Klinar, 2010; Hong & Handal, 2020). Integrating Islamic values into learning implementation plans will make it easier for educators to build students' character because Islamic values can be implemented in every step of learning (Listyono et al., 2018).

Research related to implementing the RQANI learning model in biology classrooms is rarely reported. Several previous studies implemented the integration of science and Islamic values but focused more on measuring character and thinking skills. Meanwhile, studies related to self-efficacy are still rare. RQANI learning model offers students the

opportunity to actively participate in learning, develop knowledge, build understanding, deepen existing knowledge and understanding, and integrate Islamic knowledge and understanding from Al-Quran and Al-Hadith (Amin et al., 2022). We believe the RQANI model can overcome problems in biology classrooms and improve student self-efficacy. This study aimed to identify the RQANI model's effect on the self-efficacy of biology students in Ternate City, North Maluku, Indonesia. The results of this study should contribute to improving the quality of learning in the industrial age 4.0 and society age 5.0.

▪ METHODS

Participants

The study population contained all students from the Department of Biology Education in Ternate, North Maluku, Indonesia. The sample consisted of 120 biology education students from IAIN Ternate and STIKIP Kie Raha, the city of Ternate, North Maluku. The investigation was conducted in the odd semester of the 2020/2021 academic year, between August 2020 and February 2021. The study participants had undergone an equivalence test to prove that they were at the same level of academic ability.

Research Design and Procedures

The present study was a quasi-experimental with a non-equivalent control group design (Sugiyono, 2012). There were two treatment groups in this study, who received a pre-test, treatment, and post-test. The experimental group learned using RQANI, while the control group studied conventionally (without RQANI). The research procedures consisted of the following stages: (1) conducting a preliminary study to identify students' initial condition. At this stage, observation and interview with the course professor were conducted. A placement test was distributed to participants; (2) conducting a pretest for the control and experimental students; (3) implementing RQANI in the experimental class and conventional learning in the control class. There were 14 learning sessions; (4) distributing a post-test to participants; (5) recapitulating the research data and conducting data analysis; (6) writing the research report. The RQANI syntax consists of reading, questioning, answering, elaboration, and integration (Amin et al., 2022). Table 2 contains a detailed description of the RQANI syntax.

Table 1. The RQANI Syntax

Syntax	Learning Activities	
	Lecturer	**Student**
Phase 1 *Reading*	1. Motivates students 2. Delivers the learning objectives 3. Provides students with the opportunity to read relevant literature	1. Pays attention to the lecturer's motivational session 2. Takes notes on the learning objectives delivered by the lecturer 3. Reads relevant literature about the topic being discussed
Phase 2 *Questioning*	Provides opportunities for students to make questions and ask questions related to the topic being discussed in the classroom	Creates and ask questions related to the topic being discussed in the classroom
Phase 3 *Answering*	Provide opportunities for students to answer questions related to the topic being discussed in the classroom	Provides effective answers to the questions being discussed in the classroom

Syntax	Learning Activities	
	Lecturer	Student
Phase 4 *Elaboration*	Facilitates students to work together in groups to understand what they are studying, to discuss difficult-to-understand material with their classmates, and to solve problems related to everyday life	Works together in groups to understand what has been studied, discusses difficult-to-understand material with classmates, and solves problems related to everyday life
Phase 5 *Integration*	1. Provides students with an opportunity to work with their peers or group partners to find verses from the Holy Al-Quran and Al-Hadith that are consistent with the material being studied and write them in their respective notebooks. 2. Summarize the material that has been studied.	1. Works with their peers or group partners to find verses from the Holy Al-Quran and Al-Hadith consistent with the material being studied and write them in the notebooks. 2. Pays attention to the lesson and summarizes the material that has been studied.

(Source: Amin et al., 2022)

Instruments

Non-test instruments, namely a questionnaire and observation sheets were used to measure participants' self-efficacy. Bandura (1997) explains that self-efficacy consists of three dimensions: magnitude, strength, and generality. The self-efficacy questionnaire focused on three dimensions of measurement, namely (1) the magnitude or level related to student confidence in determining the level of difficulty encountered; 2) strength, associated with student confidence in their ability to overcome problems, (3) generality, associated with student confidence in generalizing assignments and previous experience. The magnitude dimension consists of (a) students' optimism about success; (b) students' ability to adapt to difficult assignments; (c) students' ability to avoid situations and behaviors that exceed their limits. The strength dimension consists of (a) the ability to survive; and (b) tenacity. The generality dimension consists of (a) cognitive ability; (b) affective ability; (c) psychomotor ablity. The self-efficacy questionnaire used in this study consisted of 30 statement items. Participants' alternative answers were evaluated at intervals of 1-100 starting from 0-49 (uncertain), 50-89 (quite certain), and 90-100 (very certain).

An R&D expert, an instrument development expert, and a biology learning expert then validated the instruments. Expert validation results showed a score of 3.68 (very valid) for the observation sheets and 3.76 for the self-efficacy questionnaire (very valid). Then, the instruments were then subjected to empirical validity and reliability tests. Empirical validation was done to thirty Tadris Biology students. The Cronbach Alpha value showed that all the questionnaire items were reliable. The results of the tests showed that the instrument elements were valid and reliable. The alternative hypothesis explored in this study was that RQANI had an impact on the self-efficacy of biology students in the city of Ternate, North Maluku, Indonesia.

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Data Analysis

Data analysis involved descriptive and inferential statistics. The inferential statistical analysis was conducted to examine the effect of the learning model on participants' self-efficacy. The descriptive and inferential analyses were run in SPSS. The research data were analyzed using analysis of covariate (ANCOVA) with 5% level of significance. Before conducting ANCOVA, data normality and homogeneity of variance were tested. Data

normality was examined using the One-Sample Kolmogrov-Smirnov test, whereas homogeneity of variance was assessed using the Levene's Test of Equality of Error Variances.

▪ RESULTS AND DISCUSSION

The mean self-efficacy scores obtained by each treatment group were different. Table 2 and Table 3 shows the self-efficacy pretest and posttest scores of the experimental and control groups in this study.

Table 2. Self-Efficacy of Students in the Experimental Group

No	Dimension	Indicators/Aspects	Pre-test	Post-test	N-Gain
1	*Magnitudo*/level (task difficulty)	1. optimistic about success	44.00	75.67	0.57
		2. ability to adapt to difficult tasks	42.33	73.11	0.53
		3. ability to avoid unusual situations or behaviors that exceed the limits of self-ability	43.67	72.03	0.50
2	*Strength* (Belief, confidence, hope)	4. the ability to survive/maintain	44.33	73.17	0.52
		5. tenacity	46.83	74.67	0.52
3	*Generality* (diversity and breadth of behavioral fields)	6. cognitive ability	45.93	74.17	0.52
		7. affective ability	46.64	75.77	0.55
		8. psychometric ability	45.33	75.63	0.55
		Mean	44.88	74.27	0.53

Table 2 shows a mean score of 44.88 for the pretest and a mean score of 74.27 for the posttest with an N-gain value of 0.53. The analysis of the control groups' self-efficacy is presented in Table 3.

Table 3. Table 2. Self-Efficacy of Students in the Control Group

No	Dimension	Indicators/Aspects	Pre-test	Post-test	N-Gain
1	*Magnitudo*/level (task difficulty)	1. optimistic about success	42.47	55.33	0.22
		2. ability to adapt to difficult tasks	41.67	55.67	0.24
		3. ability to avoid unusual situations or behaviors that exceed the limits of self-ability	41.67	53.67	0.21
2	*Strength* (Belief, confidence, hope)	4. the ability to survive/maintain	39.33	52.67	0.22
		5. tenacity	40.11	52.51	0.21
3	*Generality* (diversity and breadth of behavioral fields)	6. cognitive ability	39.67	54.71	0.25
		7. affective ability	43.57	56.67	0.23
		8. psychometric ability	44.17	57.92	0.25
		Mean	41.58	54.89	0.23

Table 3 shows a mean score of 41.58 for the pretest and a mean score of 54.89 for the posttest with an N-gain value of 0.23. Figure 1 describes the results of self-efficacy analysis of biology students in the experimental and control groups.

Figure 1. Self-Efficacy of Students in the Experimental and Control Groups

Based on the Kolmogorov-Smirnov statistical analysis, the pretest and post-test data were distributed normally with $p > 0.05$. The test of homogeneity showed a significance value greater than 0.05. It means that the variance of self-efficacy data was homogeneous. Hypothesis testing was performed to examine the effect of the independent variable (the RQANI learning model) on the dependent variable (self-efficacy). The research hypothesis was tested using ANCOVA (Table 6). The ANCOVA results in Table 6 showed F-calculated of 466.331 and a significance value of 0.000, which is smaller than 0.05. These values indicated that H_0 (RQANI had no effect on self-efficacy) was rejected and Ha was accepted. Therefore, the RQANI (Reading, Questioning, Answering, and Integration) learning model was effective in improving biology students' self-efficacy.

Table 6. The Results of the ANCOVA on the Effect of the Learning Model on Self-Efficacy

	Mean Square	F	Sig.	Finding
RQANI Model	9054,493	466,331	,000	H_0 is rejected

The results of the SPSS data analysis suggest that the RQANI learning model can increase the self-efficacy of biology students and stimulate students' learning motivation to become lifelong learners. The RQANI model also improves students' questioning and answering skills, which are fundamental for improving thinking, reasoning, communication, and scientific competence to meet the challenges of the 21st century. To be successful in science education, a learner must have higher levels of motivation and self-efficacy to learn and develop skills (Mazumder, 2014). Educators play a critical role

in managing instruction, empowering students to find more meaningful assignments, and implementing effective learning models (Cardenas & Cerado, 2016).

The RQANI syntax can demonstrably stimulate increased self-efficacy in biology students.This study proved that the *Reading* phase in the RQANI can instill confidence in each student to engage in discussions. The implementation of RQANI can increase student self-confidence, since every student can read the material first before asking or answering questions, arguing, having dialogues, or discussing with other students. This phase also helps students understand the text by analyzing and interpreting it, so they gradually practice independent study. Their reading experiences significantly influence students' initial knowledge about topics covered or discussed in class (Hikmawati and Taufik, 2017). Increasing students' interest in reading not only increases students' cognitive abilities but can also develop their positive behavior towards the environment.

The *Questioning* phase in the RQANI model has the potential to stimulate students' ability to ask questions. In this case, students are trained to get used to asking questions that encourage logical thinking and higher-level thinking skills. All students must be able to ask questions in front of the class. The questions asked can activate their previous knowledge, focus their learning efforts, and help to deepen existing knowledge. Organizing questions draws students' attention to the content and main ideas and ensures that the students understand the content being studied. Continued practice can build students' positive self-concept, making them more independent learners with high self-efficacy. Students with good self-concept and self-efficacy feel more challenged to complete tasks requiring thinking skills. Students with high self-efficacy usually perform better academically.

Next, the *Answering* phase in the RQANI model can improve students' ability to answer questions effectively and efficiently. This phase can train students' self-confidence in their opinions or arguments from their learning experiences. This phase encourages students to answer questions from both peers and faculty. This phase also provides students with an opportunity to build confidence and gives them comfort to engage in the academic process in class. In other words, this stage has the potential to increase student self-efficacy and provide students with more meaningful learning experiences.

The *Elaboration* phase in the RQANI model allows students to work together in groups to understand what they have learned, discuss difficult-to-understand materials with their group peers, and solve problems related to daily life. This level trains students' collaboration skills and empathy to achieve learning success. Peer support can increase students' self-efficacy and motivation. With peer support, students with low self-concept and self-efficacy can slowly improve their self-concept and learning patterns. Researchers agree that a core element of pedagogy is the amount and intensity of student engagement in class activities and learning assignments (Cardenas & Cerado, 2016; Rink, 2013; Rivkin et al., 2005). Motivation and self-efficacy in learning science is one of the factors that can increase learning achievement (Beal & Stevens, 2011). Educators instill self-efficacy and learning motivation in their students so they can complete assignments and pursue academic success (Llbao, 2016).

The *Integration* phase in the RQANI model allows students to discuss with their peers to find verses from the Holy Al-Quran and Al-Hadith relevant to the topic discussed in class. This phase teaches students that all biology learning concepts can be applied to everyday life by integrating them with the holy verses of Al-Quran and Al-Hadith. This phase promotes a contextual and meaningful learning environment and can increase students' self-efficacy. Integrating Islamic values into science classes allows students to receive meaningful learning, where the important points in the Qur'an and Hadith can

instill spiritual values (Sabki & Hardaker, 2013). Al-Qur'an reading and memorization activities indirectly improve students' ability to recall lessons about verses related to scientific material and vice versa, making it easier for students to achieve learning success (Baba et al., 2015). Islamic teachings can be used as a way of life to shape a physically, intellectually, spiritually and emotionally balanced personality (Kasim & Yusoff, 2014).

It is believed that motivation has a direct impact on self-efficacy (Shea and Bidjerawo, 2010). Self-efficacy influences a person's choices and effort to achieve a goal (Peter and Stepherd, 2008). Belief in one's ability to effectively manage and solve problems can determine success in life (Reivich and Shatter, 2002). Self-efficacy is a reliable indicator of success and academic achievement (Richardson, Abraham & Bond, 2012). Bandura (1997) defines self-efficacy as a person's belief in their ability to achieve specific achievements that affect their life.

Research by Mahyudin et al (2006) explains that self-efficacy is related to student learning outcomes. Furthermore, it is explained that students with high self-efficacy always show better skills and performance than students with low self-efficacy. Students with low self-efficacy tend to be shy, feel inferior, and lack confidence in the learning process. On the other hand, students with high self-efficacy have strong self-esteem and confidence to achieve desired goals. Therefore, self-efficacy can influence student learning outcomes and academic performance.

Good self-concept affects students' self-efficacy in problem-solving and academic performance (Hernawati and Amin, 2017). Self-efficacy can be trained through habituation. Students with a positive self-concept will better understand their potential and be able to act more independently. Self-concept influences one's personality formation and life satisfaction. Self-efficacy is guided by students' ability to organize and implement actions, and to achieve specific skills and abilities (Bandura, 1986). Students with high self-efficacy demonstrate positive self-existence (Hernawati and Amin, 2017).

According to Bandura (1997), there is a relationship between experience and action. Changes in a person's self-efficacy depend on the following factors: (1) self-perception of one's ability or potential; (2) task difficulty level; (3) efforts made to achieve a skill/ability; (4) assistance received from someone; (5) the condition and circumstances of a person in acting; (6) the times when someone succeeded or failed; (7) the method used in managing enactive mastery experiences through cognitive processes. The higher the self-efficacy of the students, the higher the school performance that can be achieved, and vice versa, the lower the self-efficacy of the students, the lower the learning performance (Mahardikawati, 2011; Amin, 2022). Self-efficacy in certain scientific disciplines shows the strongest correlation with related career paths, for example, there is a strong relationship between self-efficacy and student interest in science (Panergayo et al., 2021). There is a correlation between students' academic self-efficacy and their learning success (Gavora, 2010). Motivation refers to the reasons underlying student learning behavior, characterized by the development of interest and willingness of students to learn. Motivation in learning science is a determining factor for learning achievement in class (Beal & Stevens, 2011; Amin et al., 2016).

▪ CONCLUSION

Using descriptive and inferential statistics, the current study demonstrated that the RQANI learning model had an effect on biology students' self-efficacy. The experimental group achieved a mean score of 44.88 in the pretest and a mean score of 74.27 in the posttest with an N-gain value of 0.53, while the control group obtained a mean score of

41.58 for the pretest and a mean score of 54.89 for the posttest with an N-gain value of 0.23

The results of this study are intended to serve as a reference for implementing a learning model that integrates Islamic values into science education. The RQANI model is a learning model developed by the research team and therefore requires more extensive experimentation in different subjects or at earlier levels of education. The development of this model can also be further explored to see the effect of the model on other variables such as scientific literacy, creative thinking, misunderstanding, etc. This study is limited to using a negative control class; therefore it is suggested that other studies can use a positive control class as a comparison.

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The Effect of the RQANI Model on Biology Students' Self-Efficacy in Ternate, North Maluku, Indonesia

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Abstract: Self-efficacy creates quality graduates. Self-efficacy is not something that is innate or a trait inherent in every student, but is achieved through learning activities. RQANI is a new learning model that combines science with Islamic values. Preliminary studies show that teachers did not present biology topics in context or linked them to Islamic values. **Objective:** The purpose of this study was to identify the effect of the RQANI model on the self-efficacy of biology students in Ternate City, North Maluku, Indonesia. **Methods:** The present study was a quasi-experimental study with a non-equivalent control group design. The study population contained all students from the Department of Biology Education in the city of Ternate, North Maluku, Indonesia. The sample consisted of 120 biology education students from IAIN Ternate and STIKIP Kie Raha, the city of Ternate, North Maluku. The investigation was conducted in the odd semester of the 2020/2021 academic year, between August 2020 and February 2021. The data were collected through survey and observation. The instruments used to collect the data had undergone expert validation and empirical validation before use. Data analysis involved descriptive and inferential statistics. **Findings:** The study results showed that the RQANI learning model had an effect on biology students' self-efficacy. The self-efficacy of the RQANI (experimental) group (73.746) was better than that of the control group (55.426). **Conclusion:** RQANI learning model had an effect on biology students' self-efficacy

Keywords: Biologi students', learning model, RQANI, self-efficacy.

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Abstrak: *Self-efficacy sangat diperlukan untuk menciptakan kompetensi luaran yang berkualitas. Self-efficacy bukanlah sesuatu yang dibawa sejak lahir atau sesuatu kualitas yang melekat secara permanen pada setiap peserta didik, tetapi makna dari self-efficacy diperoleh melalui kegiatan yang dirancang dalam pembelajaran. RQANI merupakan model pembelajaran baru yang mengintegrasikan sains dengan nilai-nilai islam. Studi pendahuluan menunjukkan bahwa penyajian konsep biologi yang dikaitkan secara kontekstual dengan kehidupan sehari-hari dan pengintegrasian dengan nilai-nilai Islam masih kurang diimplementasikan.* ***Tujuan:*** *Tujuan dari penelitian ini adalah untuk mengidentifikasi pengaruh model RQANI terhadap Self-Efficacy Mahasiswa Biologi di Kota Ternate, Maluku Utara, Indonesia.****Metode:*** *Penelitian ini merupakan penelitian quasy eksperiment dengan desain Nonequivalent Control Group Design. Populasi penelitian merupakan seluruh mahasiswa pendidikan biologi di Kota Ternate, Maluku Utara, Indonesia. Sampel penelitian terdiri dari 120 mahasiswa pendidikan biologi di IAIN Ternate dan STIKIP Kie Raha, Kota Ternate, Maluku Utara. Penelitian ini dilaksanakan semester ganjil tahun akademik 2020/2021 mulai Agustus 2020 sampai Februari 2021. Instrumen yang digunakan adalah instrumen untuk mengukur self-efficacy mahasiswa melalui angket dan lembar observasi. Sebelumnya instrumen ini telah melalui proses validasi ahli dan validasi empiris. Selanjutnya, data penelitian dianalisis dengan menggunakan analisis deskriptif dan inferensial.* ***Temuan:*** *Berdasarkan hasil penelitian dan analisis data, maka dapat disimpulkan bahwa terdapat*

pengaruh model pembelajaran RQANI terhadap self-efficacy mahasiswa biologi. Rata-rata skor terkoreksi self efficacy pada kelas kontrol adalah sebesar 55,426 sedangkan pada kelas RQANI sebesar 73,746. ***Kesimpulan:*** *terdapat pengaruh model pembelajaran RQANI terhadap self-efficacy mahasiswa biologi.*

Kata kunci: *Mahasiswa Biologi, Model Pembelajaran, RQANI, self-efficacy.*

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INTRODUCTION

Self-efficacy is a psychological attribute that needs to be formed through the educational process at tertiary institutions. It is important not only to shape professional maturity but also to shape student character (Faiz, 2015). Self-efficacy is a person's confidence in the skills they have and in using them to accomplish specific work behaviors (Cai et al., 2021). Individual self-efficacy depends on the environment and cognitive conditions that surround them (Badrun et al., 2022). Someone with self-efficacy always has a desire to advance and develop (Dari & Putro, 2021). With self-efficacy, an individual can assess their ability and competition to perform tasks, achieve goals, and overcome obstacles (Kamsurya et al, 2022). When self-efficacy is high, learners can use specific responses to gain reinforcement and be always ready and alert when solving problems. Conversely, when learners have low self-efficacy, they tend to feel anxious and unresponsive (Pajares & Miller, 1994; Elias & Loomis, 2002). Educators need to change their learning strategies and techniques to increase student self-efficacy (Bandura, 2006; Schunk & Pajares, 2002).

The serious problem that the Indonesian government is currently facing is the education system, which is still oriented towards cognitive development and mastery of concepts/theories and pays little attention to the development of affectivity, empathy and feelings (Sahroni, 2017). Indonesian educational practices tend to focus on the development of cognitive aspects, ignoring soft skills and character building that affect the development of positive values in students (Setiawati, 2017). Social phenomena such as fights, drug use, depression, cheating, truancy serve as a mirror for teachers and educational observers that character education is important. Character building and self-efficacy improvement can be realized through learning processes at all levels of education. In interview sessions, several biology lecturers from *IAIN* (Public Islamic Institute) Ternate, STKIP KIE Raha Ternate and *UIN* (Public Islamic University) Alauddin Makassar admitted that they did not teach science and biology thoroughly. A learning model based on the integration of Islamic values is therefore necessary to avoid these social deviations.

Based on observations and interviews with a group of students from the Biology Department at IAIN Ternate, STKIP KIE Raha Ternate and UIN Alauddin Makassar, it is known that biology lessons at the university have not integrated Islamic values. In other words, learning ends in the cognitive domain, where students have to study abstract, solid, and difficult-to-understand theories on biology. Also, they have not found any material presentation that is contextually related to daily life or Islamic values. These educational practices certainly affect student character formation and self-efficacy.

Self-efficacy is a person's belief in their own ability to perform a task and be responsible for it (Atoum and Al-Momani, 2018). Self-efficacy is not something innate or a trait inherent in every student, but is acquired through learning activities (Sahara, Mardiyana, Sari, 2017). Learning experience also contributes to maintaining individual effectiveness (Flores, 2015). If students believe in their abilities, they can increase their motivation to study at the same time. Self-efficacy affects the level of effort and persistence in interpreting tasks (Lunenburg, 2011). Self-efficacy serves as an important predictor of academic success, affecting student academic performance and retention (Honicke & Broadbent, 2016; Rooiji, Jansen, Grift, 2017).

An effective learning process can provide a solid framework to improve the quality of science education, foster students' critical and creative thinking, and encourage student participation in science classes (Tastan et al., 2018; Amin et al., 2017). Self-efficacy is required to produce graduates with good competence (Kurt et al., 2014). Educators play

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mohon tambahkan 1-2 paragraph khusus mengenai kajian penelitian-penelitian relevan terdahulu yang sudah dipublikasi dengan topik penelitian Anda, kemudian nyatakan kebaruan (novelty) dan gap dari penelitian Anda yang belum dikerjakan oleh peneliti lain.

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an important role in improving classroom management by encouraging students to complete tasks that challenge logical thinking and employing meaningful and effective models of learning (Cardenas & Cerado, 2016; Amin et al., 2020). Keeping students engaged in meaningful learning environments can enable them to improve their ability to practice science sustainably. Such learning process may affect students' motivation to learn and their self-efficacy (Osborne & Collins, 2001).

The RQANI learning model offers students the opportunity to actively participate in learning, develop knowledge, build understanding, deepen existing knowledge and understanding, and integrate Islamic knowledge and understanding from Al-Quran and Al-Hadith (Amin et al., 2022). We believe that the RQANI model can overcome problems biology classrooms and improve student character and self-efficacy. The purpose of this study was to identify the effect of the RQANI model on the self-efficacy of biology students in Ternate City, North Maluku, Indonesia. The results of this study should contribute to improving the quality of learning in the industrial age 4.0 and society age 5.0.

METHODS

The present study was a quasi-experimental with a non-equivalent control group design (Sugiyono, 2012). The study population contained all students from the Department of Biology Education in the city of Ternate, North Maluku, Indonesia. The sample consisted of 120 biology education students from IAIN Ternate and STIKIP Kie Raha, the city of Ternate, North Maluku. The investigation was conducted in the odd semester of the 2020/2021 academic year, between August 2020 and February 2021. Participants of the study had undergone an equivalence test to prove that they were at the same level of academic ability. Table 1 shows the research design.

Table 1. The Research Design

No	Group	Pretest	Treatment	Post-test
1	E	O_1	X	O_2
2	K	O_3	-	O_4

Remarks
E : The experimental group (RQANI learning)
K : The control group (non-RQANI/conventional)
O_1 : Pretest score of the experimental group
O_2 : Post-test score of the experimental group
O_3 : Pretest score of the control group
O_4 : Post-test score of the control group
X : The implementation of the RQANI model

There were two treatment groups in this study, who received a pre-test, treatment, and post-test. The experimental group learned using RQANI, while the control group studied conventionally (without RQANI). The RQANI syntax consists of reading, questioning, answering, elaboration, and integration (Amin et al., 2022). Table 2 contains a detailed description of the RQANI syntax.

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Participants --> Jelaskan siapa saja populasi dan sample dan jumlahnya, teknik pengambilan sampel
Research Design and Procedures --> tentukan desain penelitian, step by step penelitian ini sesuai desain penelitian, jangka waktu penelitain
Instrument --> jelaskan apa saja instrument penelitian yang digunakan, diadaptasi dari siapa, tentukan validitas dan reliabilitas instrument
Data analysis --> jelaskan teknik statistic yang digunakan

Mohon disesuaikan

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Table 2. The RQANI Syntax

Syntax	Learning Activities	
	Lecturer	**Student**
Phase 1 *Reading*	1. Provides motivation for students 2. Delivers the learning objectives 3. Provides students with the opportunity to read relevant literature	1. Pays attention to the lecturer's motivational session 2. Takes notes on the learning objectives delivered by the lecturer 3. Reads relevant literature about the topic being discussed
Phase 2 *Questioning*	Provides opportunities for students to make questions and ask questions related to the topic being discussed in the classroom	Creates and ask questions related to the topic being discussed in the classroom
Phase 3 *Answering*	Provide opportunities for students to answer questions related to the topic being discussed in the classroom	Provides effective answers to the questions being discussed in the classroom
Phase 4 *Elaboration*	Facilitates students to work together in groups to understand what they are studying, to discuss difficult-to-understand material with their classmates, and to solve problems related to everyday life	Works together in groups to understand what has been studied, discusses difficult-to-understand material with classmates, and solves problems related to everyday life
Phase 5 *Integration*	1. Provides students with an opportunity to work with their peers or group partners to find verses from the Holy Al-Quran and Al-Hadith that are consistent with the material being studied and write them in their respective notebooks. 2. Summarize the material that has been studied.	1. Works with their peers or group partners to find verses from the Holy Al-Quran and Al-Hadith that are consistent with the material being studied and writes them in the notebooks. 2. Pays attention to the lesson and summarizes the material that has been studied.

(Source: Amin et al., 2022)

The instruments used to measure participants' self-efficacy were a questionnaire and observation sheets. The instruments were validated by an R&D expert, an instrument development expert, and a biology learning expert. Then, the instruments were then subjected to empirical validity and reliability tests. The results of the tests showed that the instrument elements were valid and reliable. The alternative hypothesis explored in this study was that RQANI had an impact on the self-efficacy of biology students in the city of Ternate, North Maluku, Indonesia.

Data analysis involved descriptive and inferential statistics. The inferential statistical analysis was conducted to examine the effect of the learning model on participants' self-efficacy. The descriptive and inferential analyses were run in SPSS. The research data were analyzed using analysis of covariate (ANCOVA) with 5% level of significance. Before conducting ANCOVA, data normality and homogeneity of variance were tested. Data normality was examined using the One-Sample Kolmogrov-Smirnov test, whereas homogeneity of variance was assessed using the Levene's Test of Equality of Error Variances.

Commented [A11]: apa saja indicator efikasi diri yang digunakan dalam peneltiian ini?

Commented [A12]: belum ada deskripsi mengenai Instrumen penelitian?

Apa saja instrument penelitian yang digunakan? Instrument apa yang digunakan dalam penelitian ini, apakah instrument test atau non-test?

jika instrument test, jelaskan ada berapa item soal dan indicator-indikator apa saja yang dievaluasi untuk tiap item soal tersebut? apakah instrument dikembangkan sendiri atau diadaptasi dari penelitian orang lain, jelaskan juga validitas dan reliabilitas instrument test tersebut,

jika instrument non test, ada berapa item kuisioner yang digunakan, jelaskan indicator-indikator kuisioiner tersebut dan tiap indicator diwakili oleh berapa item pertanyaan, apakah instrument dikembangkan sendiri atau diadaptasi dari penelitian orang lain, jelaskan juga validitas dan reliabilitas instrument non-test tersebut,

▪ RESULTS AND DISCUSSION

The mean self-efficacy scores obtained by each treatment group were different. Table 3 shows the self-efficacy pretest and posttest scores of the experimental and control groups in this study.

Table 3. Participants' Pretest and Post-test Scores

No	Learning Model	Mean	
		Pretest	***Post-test***
1.	Control	41.5827	54.8943
2.	RQANI	44.8833	74.2777

The RQANI (experimental) group experienced an increase of 29.3944 from the pretest to the post-test, bigger than that of the control group, which is 13.3116. Figure 1 demonstrates participants' self-efficacy based on their pretest and post-test scores.

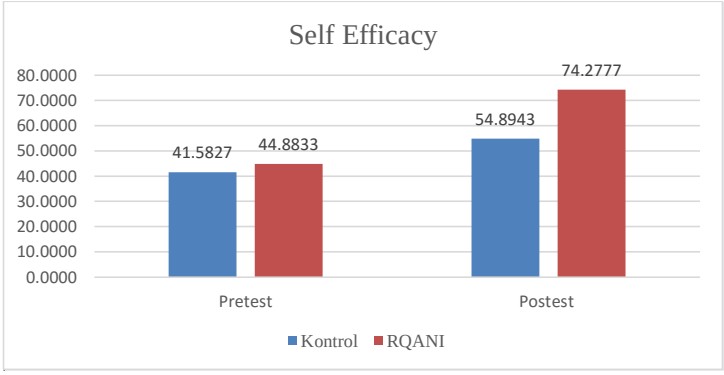

Figure 1. Participants' Pretest and Post-test Mean Scores

The results of the normality test on the self-efficacy data in this study are presented in Table 4.

Table 4. The Results of the Normality Test on Self-Efficacy Data

Tests of Normality

	Learning Model	Kolmogorov-Smirnov(a)		
		Statistic	**df**	**Sig.**
Posttest Self-Efficacy	Control	.102	60	.188
	RQANI	.104	60	.165

(Source: Appendix on SPSS Data Analysis, 2020)

The normality test showed a significance value of 0.188 for the control class and 0.165 for the RQANI group. These values were greater than 0.05, thus, the self-efficacy

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berdasarkan uji statistik Kolmogorov-Smirnov, data pretes dan postes untuk kelas eksperimen dan kelas control memiliki nilai p > 0.05 yang mengindikasikan bahwa data kedua kelompok tersebut berdistribusi normal

data on both classes were distributed normally. Homogeneity of variance of the study was also measured. Table 5 showed the results of the homogeneity test. The test of homogeneity showed a significance value greater than 0.05. It means that the variance of self-efficacy data was homogeneous.

Table 5. The Results of the Homogeneity Test on Self-Efficacy Data

variable	F	df1	df2	Sig.
Self-efficacy	0.004	1	118	0.948

Hypothesis testing was performed to examine the effect of the independent variable (the RQANI learning model) on the dependent variable (self-efficacy). The research hypothesis was tested using ANCOVA (Table 6). The ANCOVA results in Table 6 showed F-calculated of 466.331 and a significance value of 0.000, which is smaller than 0.05. These values indicated that H_0 (RQANI had no effect on self-efficacy) was rejected and Ha was accepted. Therefore, the RQANI (Reading, Questioning, Answering, and Integration) learning model was effective in improving biology students' self-efficacy.

Table 6. The Results of the ANCOVA on the Effect of the Learning Model on Self-Efficacy (Tests of Between-Subjects Effects)

Dependent Variable: *Self-Efficacy Post-test*

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	11574,973(a)	2	5787,486	298,072	,000
Intercept	3956,610	1	3956,610	203,776	,000
XSELF	303,565	1	303,565	15,634	,000
Model	9054,493	1	9054,493	466,331	,000
Error	2271,723	117	19,416		
Total	514408,863	120			
Corrected Total	13846,695	119			

a R-Squared = .836 (Adjusted R Squared = .833)

The self- efficacy mean scores of the participants can be seen in Table 7.

Table 7. Participants' Self-efficacy mean scores

GROUP	XSELF	YSELF	SELISIH	SELFCOR
Control	41.5827	54.8943	13.3116	55.426
RQANI	44.8833	74.2777	29.3944	73.746

The mean self-efficacy score in the control class was 55.426, lower than in the RQANI class, which was 73.746. In addition, the RQANI class experienced a greater increase (65.492%) in self-efficacy compared to the control class (32.01%).

The results of the SPSS data analysis suggest that the RQANI learning model can increase the self-efficacy of biology students and stimulate students' learning motivation to become lifelong learners. The RQANI model also improves students' questioning and answering skills, which are fundamental components for improving thinking, reasoning,

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bisakan tabel ini dibuat lebih informatif pada sebenarnya apa yang sedang dikaji… pada tabel 6 ini ada 4 data nilai signifikansi (artinya ada 4 hal yang diteliti efek/dampaknya) yaitu untuk corrected model, intercept, XSELF, model…. ini maksudnya apa dan mungkin bisa diubah menjadi lebih mudah dipahamui

tambahkan data uji parsial dampak model RQANI terhadap tiap indicator efikasi diri yang dikaji pada penelitian ini

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communication, and scientific competence to meet the challenges of the 21st century. The RQANI syntax can demonstrably stimulate increased self-efficacy in biology students.

This study proved that the *Reading* phase in the RQANI can instill a sense of confidence in each student to engage in discussions. The implementation of RQANI can increase student self-confidence, since every student is given the opportunity to read the material first before asking or answering questions, arguing, having dialogues, or discussing with other students. This phase also helps students to understand the text by analyzing and interpreting it, so that they gradually practice independent study. Students' initial knowledge is significantly influenced by their reading experiences in relation to topics covered or discussed in class (Hikmawati and Taufik, 2017). Increasing students' interest in reading not only increases students' cognitive abilities but can also develop their positive behavior towards the environment.

The *Questioning* phase in the RQANI model has the potential to stimulate students' ability to ask questions. In this case, students are trained to get used to asking questions that encourage logical thinking and higher-level thinking skills. All students must be able to ask questions in front of the class. The questions asked can activate their previous knowledge, focus their learning efforts, and help to deepen existing knowledge. The activity of organizing questions draws students' attention to the content and main ideas and makes sure that the students understand the content being studied. Continued practice can build students' positive self-concept, leading them to be more independent learners with high self-efficacy. Students who already have good self-concept and self-efficacy feel more challenged to complete tasks that require thinking skills. Students with high self-efficacy usually perform better academically.

Next, the *Answering* phase in the RQANI model can improve students' ability to answer questions effectively and efficiently. This phase is able to train students' self-confidence in their opinions or arguments resulted from their learning experiences. This phase encourages students to answer questions from both peers and faculty. This phase also provides students with an opportunity to build confidence and gives them comfort to engage in the academic process in class. In other words, this stage has the potential to increase student self-efficacy and provide students with more meaningful learning experiences.

The *Elaboration* phase in the RQANI model allows students to work together in groups to understand what they have learned and to discuss with their group peers difficult-to-understand materials and solve problems related to daily life. This level trains students' collaboration skills and empathy to achieve learning success. Peer support can increase students' self-efficacy and motivation. With support from peers, students who initially have low self-concept and self-efficacy can slowly improve their self-concept and learning patterns.

The *Integration* phase in the RQANI model provides students with the opportunity to discuss with their peers to find verses from the Holy Al-Quran and Al-Hadith relevant to the topic discussed in class. This phase teaches students that all biology learning concepts can be applied to everyday life by integrating them with the holy verses of Al-Quran and Al-Hadith. This phase promotes a contextual and meaningful learning environment and can increase students' self-efficacy.

It is believed that motivation has a direct impact on self-efficacy (Shea and Bidjerawo, 2010). Self-efficacy influences a person's choices and the effort expended to achieve a goal (Peter and Stepherd, 2008). Belief in one's ability to effectively manage and solve problems can determine one's success in life (Reivich and Shatter, 2002). Self-efficacy is a reliable indicator of success and academic achievement (Richardson,

Abraham & Bond, 2012). Bandura (1997) defines self-efficacy as a person's belief in their ability to achieve specific achievements that affect their life.

Research conducted by Mahyudin et al (2006) explains that self-efficacy is related to student learning outcomes. Furthermore, it is explained that students with high self-efficacy always show better skills and performance than students with low self-efficacy. Students with low self-efficacy tend to be shy, feel inferior, and lack confidence in the learning process. On the other hand, students with high self-efficacy have strong self-esteem and confidence to achieve desired goals. Therefore, self-efficacy can influence student learning outcomes and academic performance.

Good self-concept affects students' self-efficacy in problem-solving and academic performance (Hernawati and Amin, 2017). Self-efficacy can be trained through habituation. Students with a positive self-concept will better understand their potential and be able to act more independently. Self-concept influences one's personality formation and life satisfaction. Self-efficacy is guided by students' ability to organize and implement actions, and to achieve specific skills and abilities (Bandura, 1986). Students with high self-efficacy demonstrate positive self-existence (Hernawati and Amin, 2017).

According to Bandura (1997), there is a relationship between experience and action. Changes in a person's self-efficacy depend on the following factors: (1) self-perception of one's ability or potential; (2) task difficulty level; (3) efforts made to achieve a skill/ability; (4) assistance received from someone; (5) the condition and circumstances of a person in carrying out an action; (6) the times when someone succeeded or failed; (7) the method used in managing enactive mastery experiences through cognitive processes. The higher the self-efficacy of the students, the higher the school performance that can be achieved, and vice versa, the lower the self-efficacy of the students, the lower the learning performance (Mahardikawati, 2011; Amin, 2022). Self-efficacy in certain scientific disciplines shows the strongest correlation with related career paths, for example, there is a strong relationship between self-efficacy and student interest in science (Panergayo et al., 2021). There is a correlation between students' academic self-efficacy and their learning success (Gavora, 2010). Motivation refers to the reasons underlying student learning behavior which is characterized by the development of interest and willingness of students to learn. Motivation in learning science is a determining factor for learning achievement in class (Beal & Stevens, 2011; Amin et al., 2016).

▪ CONCLUSION

Using descriptive and inferential statistics, the current study demonstrated that the RQANI learning model had an effect on biology students' self-efficacy. This is confirmed by the mean score of the RQANI class (73.746), which is higher than that of the control class (55.426). In addition, the RQANI experienced a 65.492% increase in self-efficacy, form pretest to post-test, which is higher than that reported by the control class (32.01%).

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Commented [A18]: sebaiknya pembahasan terhadap data-data hasil penelitian Anda diarahkan untuk **menjawab "mengapa dan bagaimana"** data penelitian tersebut berdasarkan referensi dari jurnal internasional

selanjutnya, akan lebih baik lagi, jika ada perbandingan temuan hasil penelitian Anda terhadap penelitian orang lain, dan nyatakan apakah temuan/hasil penelitian Anda sejalan (inline) atau kontradiktif terhadap penelitian orang lain

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paragraf pertama berisi summarizing the research findings
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1. REFERENSI MINIMAL 20 ARTIKEL JURNAL INTERNASIONAL

2. FORMAT REFERENSI HARUS SESUAI APA VERSI 6.0

Contoh:

Cheung, J. M. Y., Bartlett, D. J., Armour, C. L., Laba, T. L., & Saini, B. (2018). To drug or not to drug: A qualitative study of patients' decision-making processes for managing insomnia. *Behavioral Sleep Medicine, 16*(1), 1-26.

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contoh:

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128. http://journal.iain-ternate.ac.id/index.php/Al-Nafis/issue/view/85/showToc.
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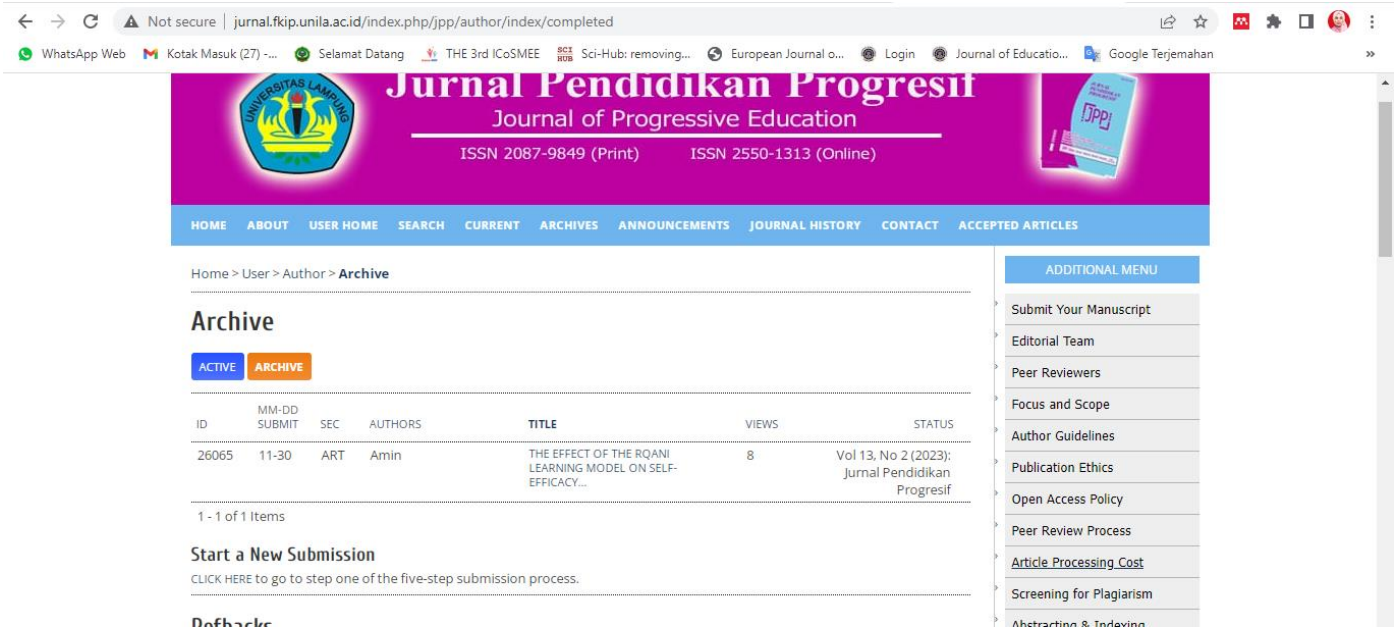

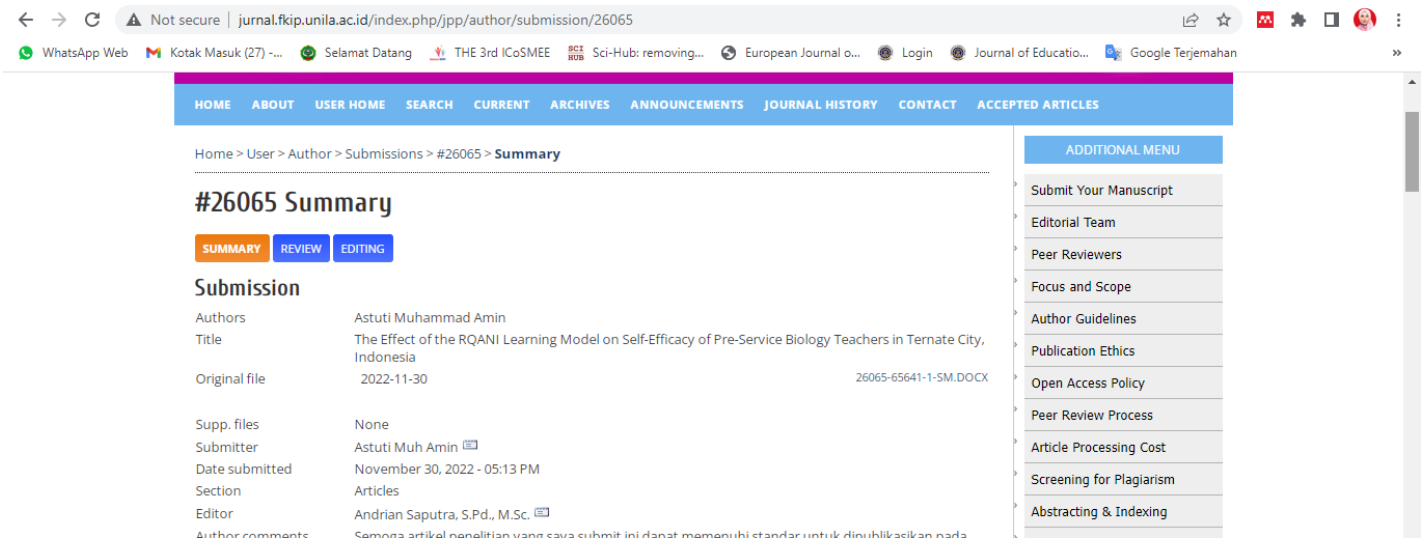
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Authors Astuti Muhammad Amin
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Original file 2022-11-30 26065-65641-1-SM.DOCX
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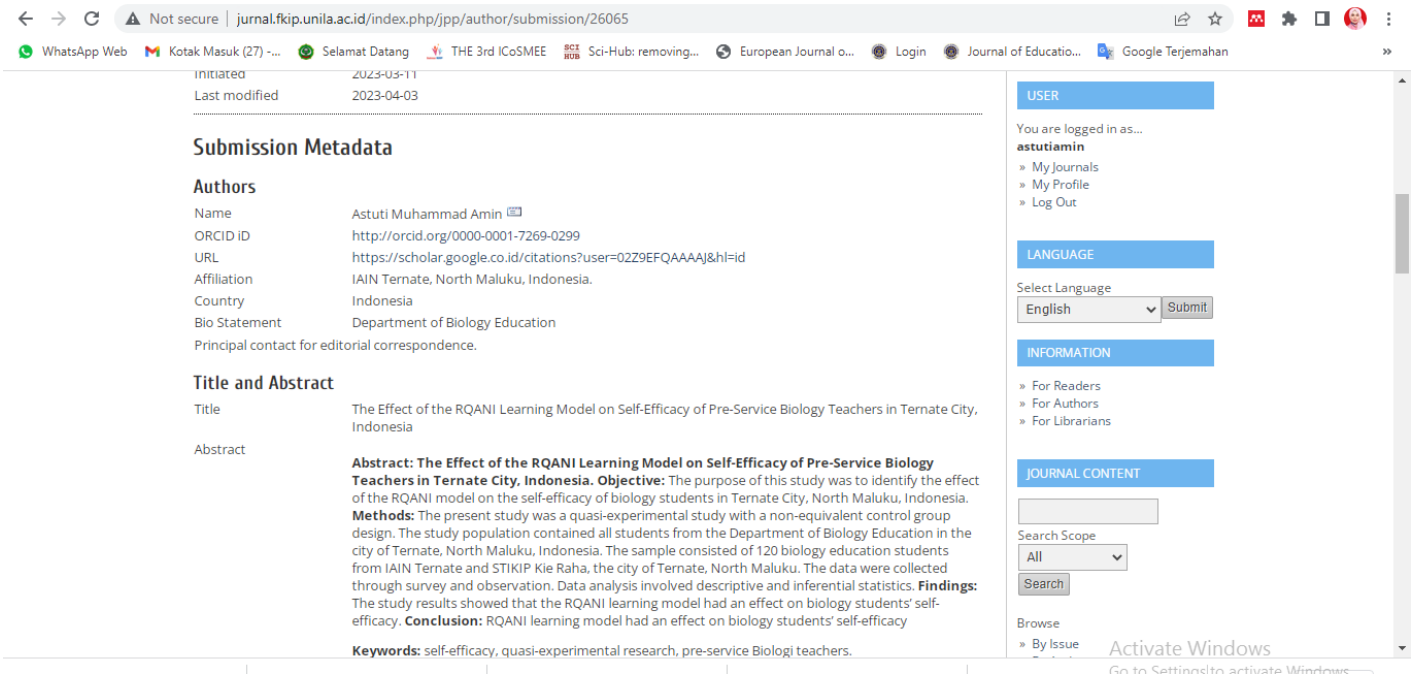
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Title and Abstract
Title The Effect of the RQANI Learning Model on Self-Efficacy of Pre-Service Biology Teachers in Ternate City, Indonesia
Abstract
Abstract: The Effect of the RQANI Learning Model on Self-Efficacy of Pre-Service Biology Teachers in Ternate City, Indonesia. Objective: The purpose of this study was to identify the effect of the RQANI model on the self-efficacy of biology students in Ternate City, North Maluku, Indonesia. Methods: The present study was a quasi-experimental study with a non-equivalent control group design. The study population contained all students from the Department of Biology Education in the city of Ternate, North Maluku, Indonesia. The sample consisted of 120 biology education students from IAIN Ternate and STIKIP Kie Raha, the city of Ternate, North Maluku. The data were collected through survey and observation. Data analysis involved descriptive and inferential statistics. Findings: The study results showed that the RQANI learning model had an effect on biology students' self-efficacy. Conclusion: RQANI learning model had an effect on biology students' self-efficacy
Keywords: self-efficacy, quasi-experimental research, pre-service Biologi teachers.
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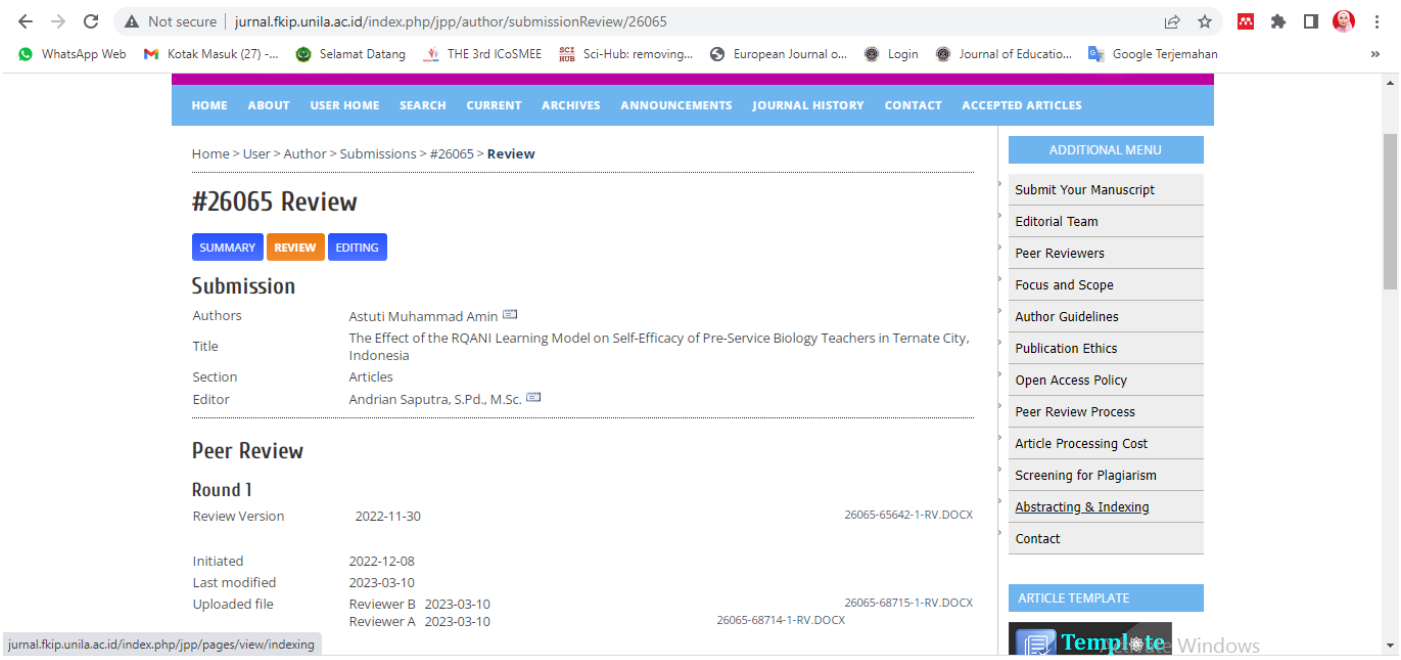
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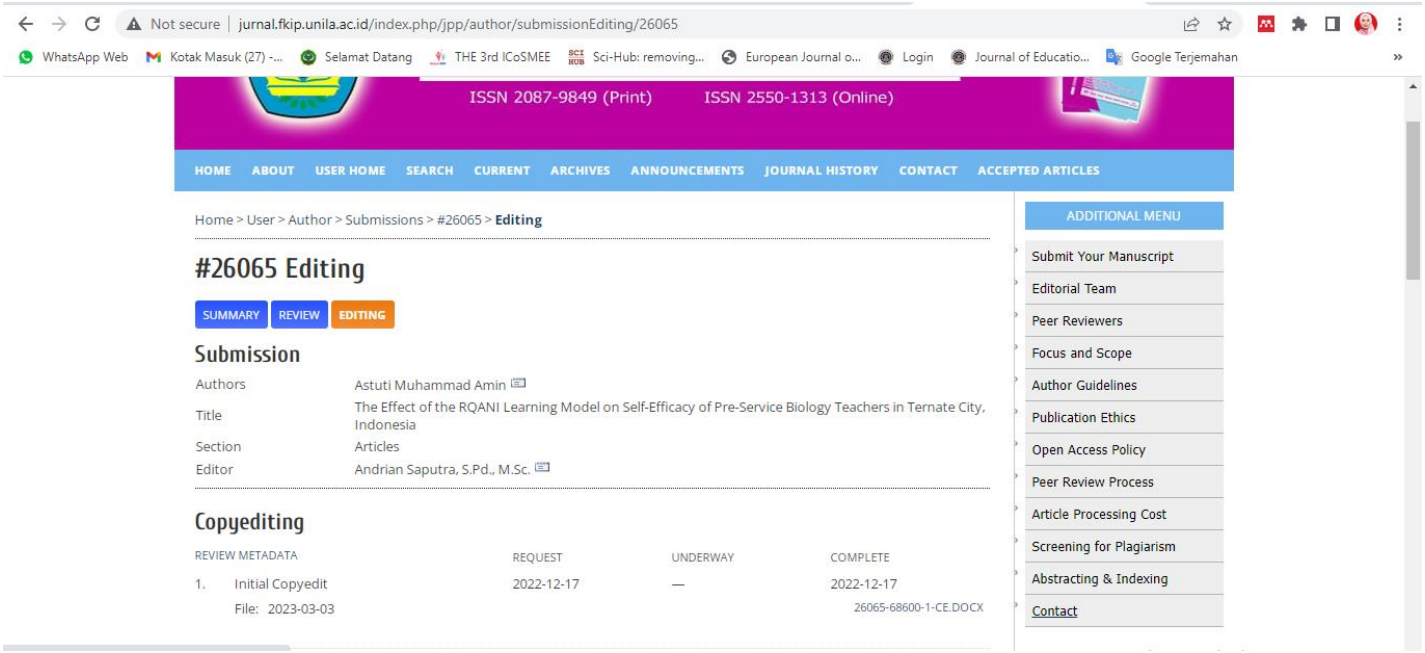
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