



## Development of RQANI Learning Modules to Improve Students' Understanding of concepts Class XI Science at SMA Negeri 6 Ternate City

Ningsi Samsudin, Astuti Muh.Amin\*, Lintal Muna

Tadris Biology, Faculty of Tarbiyah and Teacher Training (FTIK), IAIN Ternate, Jalan Lumba-Lumba Dufa-Dufa, Ternate City, North Maluku, Indonesia

\*corresponding author: [astutimuhamin@iain-ternate.ac.id](mailto:astutimuhamin@iain-ternate.ac.id)

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**Abstract:** RQANI (Reading, Questioning, Answering, Elaboration, and Integration) is a learning model that integrates science and Islamic values. Utilizing modules in the learning process can provide learning opportunities for students to be more independent and motivated to master concepts. The research objectives were to identify (1) the validity of the RQANI module on body defense system material for class XI IPA students at SMA Negeri 6 Ternate City and (2) the effectiveness of the RQANI learning module in increasing students' understanding of concepts in class XI Science at SMA Negeri 6 Ternate City. This research is development research that refers to 4-D development design. The trial was carried out on a limited scale on class XI Science students at SMA Negeri 6 Ternate City. The instruments used in collecting research data consisted of validation sheets for research modules and instruments, response questionnaires, and essay tests to measure understanding of concepts. The research results showed (1) the validity of the RQANI-based learning module on body defense system material by the first validator in the very valid category (90.41) and the second validator in the valid category (79.16); (2) RQANI-based learning modules are effective in increasing concept understanding with 38.46% of students obtaining N-Gain at high criteria; and 38.46% of students gave very good responses and 53.84% of students gave good responses to the RQANI module. The research conclusion is that the learning module is declared valid and effective in increasing student understanding.

**Keywords:** Module, Concept Understanding, RQANI, Students.

### INTRODUCTION

Education plays an important role in improving and developing the quality of human resources (Wijayanti & Ghofur, 2021). The capabilities and excellence of Indonesia's human resources are very important as a solution to facing global challenges. The scientific dimension is the basis for strengthening moral attitudes and behavior or moral actions, so that humans are formed who are devout or have noble personalities individually and socially (Lickona, 2012). Learning using an integrative approach (integrated between science and religion) is very important both scientifically and for developing students' character (Suparjo et al., 2021).

Teaching materials with the integration of Islamic values are learning materials with relevant holy verses from the Koran and Al-Hadith as well as divine values which imply the idea of integrating these values (Ersa, 2021).

According to Wathoni (2018), integrating Islam into the module that will be developed is something new in research and development because of the urgency of the foundation of divine awareness that accompanies the learning process. The existence of a foundation of divine consciousness makes students who study knowledge not only knowledgeable but also moral and civilized individuals. Apart from that, according to him, the integration of Islam in learning makes it easier for students to acquire spiritual attitude competencies (Isma et al., 2023). Character and moral education is very important to build students' sense of responsibility, creativity and foundation of faith (Raharjo & Puspita, 2023). Learning strategies that combine Islam and science can be a solution for developing good character in students (Winarti, 2015). The development of biology learning modules with the integration of the Al-Quran helps teachers improve and improve the quality of the biology learning process in madrasas (Wasehudin et al., 2022).

One of the factors that can make students successful in the learning process is selecting appropriate teaching materials. The use of modules is very effective in making students more active, creative and reflective (Alias & Siraj, 2012). The use of reference books or modules in the learning process can provide learning opportunities for students to be more independent and motivated in learning (Lestariningsih et al., 2023). The use of integrated biology teaching materials with Al-Qur'an values can improve students' spiritual attitudes (Syarimansyah et al., 2019). Student responses to science teaching materials with an integrated character of Al-Qur'an verses are in the positive and very positive categories (Irwansyah et al., 2021).

Students have difficulty finding references with themes that suit their biology learning needs so that interactive discussions are less than optimal (Lestariningsih et al., 2020). According to Budiono & Susanto (2006), modules with less varied activity designs tend to make students bored. Therefore, so that it is not boring, the module must be packed with interesting activities. Islamic values in Madrasas have been integrated into several Islamic Religious Education subjects, but students still need encouragement to appreciate these Islamic values (Safitri et al., 2020).

The current reality is that it is difficult to find in the teaching and learning process by instilling religious values that can link science and religion (Chandra & Lizelwati, 2022). Biology learning only concerns the cognitive domain and does not optimally reach far into the affective and psychomotor domains; and the dichotomy between religious knowledge and biological science which influences students' learning motivation (Mubarok et al., 2015). Learning so far separates general material from religious knowledge, giving rise to a dichotomy of knowledge in students' understanding (Rahmawati & Bakhtiar, 2019; Shofa et al., 2020). Utilization of learning resources that integrate Islam and science is still very low (Adawiyah & Kartika, 2020).

RQANI is a learning model that integrates the values of science and religion. This learning model consists of the stages of reading, questioning,

answering, elaboration and integration. This model has proven to be effective in improving students' character and understanding of concepts (Amin, et al., 2022). Based on the results of an interview with one of the class still need other learning resources. Apart from that, the textbooks used are less able to help students carry out exploration in observing and connecting phenomena that occur in the surrounding environment as well as integrating science and religious material.

Based on this background, the aim of this research is to identify (1) the validity of the RQANI module on body defense system material for class XI IPA students at SMA Negeri 6 Ternate City; (2) the effectiveness of the RQANI learning module in increasing students' understanding of concepts in class XI Science at SMA Negeri 6 Ternate City

### METHOD

This research is research and development by producing an RQANI-based biological module. The module development procedure uses a 4-D model which includes define, design, development and disseminate. The definition stage aims to determine and define the form of the module. In determining and determining the form of a module, it begins with an analysis of student needs for the module that will later be developed. Next, the planning (design) stage aims to prepare an initial prototype of the learning module. The learning module is designed in such a way as to meet students' learning needs by adapting the syntax of the RQANI learning model. Next, the development stage aims to produce learning modules that have been revised based on input/suggestions from experts. This stage includes: (a) module validation by experts followed by revision, and (b) limited trials with real students in class XI Science at SMA Negeri 6 Ternate City, North Maluku.

This research was carried out in April-May 2023. The research subjects were 13 class XI students of SMA Negeri 6 Ternate City, North Maluku. The research instruments used were module validation sheets and research instrument validation sheets, response questionnaires, and learning outcomes test questions. Data collection techniques used include observation, questionnaire techniques, test techniques and also documentation. The test used in this research is in the form of an essay test consisting of 10 questions. The Syntax/Stages of the RQANI Model consists of five phases, namely reading, questioning, answering, elaboration, integration (Amin et al., 2022) which can be seen in Table 1 below.

Table 1. Syntax of the RQANI Learning Model

Syntax	Learning Activities	
	Teacher	Student
Stage 1 <i>Reading</i>	<ol style="list-style-type: none"> <li>1. Providing learning motivation to students.</li> <li>2. Conveying learning objectives to students.</li> </ol>	<ol style="list-style-type: none"> <li>1. Pay attention to the teacher's learning motivation.</li> </ol>

Syntax	Learning Activities	
	Teacher	Student
	3. Provide opportunities for students to read literature/modules related to the material to be discussed.	2. Listen and record the learning objectives presented by the teacher. 3. Read literature/modules related to the material to be discussed.
Stage 2 <i>Questioning</i>	Provide opportunities for students to ask questions and ask questions related to learning material.	Create questions and ask questions related to learning material.
Stage 3 <i>Answering</i>	Provide opportunities for students to answer questions related to learning material	Answer questions related to learning material effectively and efficiently.
Stage 4 <i>Elaboration</i>	Facilitate students to work together in groups to understand the material they have studied, dialogue and discuss with their group colleagues regarding material that is difficult to understand and solve problems related to everyday life.	Collaborate in groups to understand the material that has been studied, dialogue and discuss with group colleagues regarding material that is difficult to understand and solve problems related to everyday life.
Stage 5 <i>Integration</i>	1. Provide opportunities for students to work together with peers or in groups to find holy verses from the Koran and Al-Hadith that are appropriate to the material they have studied, and write them in their respective notebooks. 2. Summarize the learning material.	1. Collaborate with peers or in groups to find holy verses from the Koran and Al-Hadith that are appropriate to the material that has been studied, and write them in their respective notebooks. 2. Listen and summarize learning material.

The data analysis used in this research consists of validity data analysis and effectiveness analysis. Validity data analysis, namely the data collected from this research is the result of validating teaching materials. This data was analyzed using descriptive analysis. Data on the suitability of teaching materials is in the form of a 1-4 Likert scale, with the following steps: Give a score for each item with answers as very valid (4), valid (3), quite valid (2), and not very valid (1). Add up the total score of each validator for all indicators. The level of achievement of the module validity category uses the criteria according to Table 2 below.

Table 2. Criteria for Determining Validity Levels

Range	Category
21-40	Not valid
41-60	Fairly valid
61-80	Valid
81-100	Very valid

Data analysis of module effectiveness is based on student achievement in completing concept understanding tests. The maximum score on the concept understanding test is 100 with the Minimum Completeness Criteria (KKM) set for science subjects, namely 75. The research data that has been analyzed is then interpreted based on the score conversion guidelines according to Arikunto (2006) which are shown in Table 3 below..

Table 3. Value Conversion Guidelines

Percentage %	Criteria
0-20 %	Very low
21-40 %	Low
41- 60 %	Currently
61-80 %	High
81-100 %	Very high

Furthermore, data from the concept understanding test results before and after treatment (Improvement Score) N-gain was used to determine how much improvement in students' conceptual understanding was obtained from the pretest and posttest. N-gain is calculated using the following formula.

$$\text{Gain normality} = \frac{\text{Posttest Score} - \text{Pretest Score}}{\text{Ideal Skor} - \text{Pretest Score}}$$

To interpret the N-gain obtained using the following criteria: ( $g > 0.7$ ) = High, ( $0.3 < g \leq 0.7$ ) = Medium and ( $g \leq 0.3$ ) = Low. To categorize students' level of conceptual understanding, based on the standard categorization technique established by the Ministry of Education and Culture, as follows.

Table 4. Concept Understanding Categorization Techniques

No	Mastery	Category
1	85-100	Very high
2	65-84	High
3	55-64	Currently
4	35-54	Low
5	0-34	Very low

The results of the percentage of student responses according to standards can be seen as follows.

Table 5. Student Response Criteria

Percentage %	Category
$81,25 < x < 100$	Very good
$62,5 < x < 81,25$	Good
$43,75 < x < 62,5$	Poor

## RESULTS AND DISCUSSION

The RQANI-based learning module on the body's defense system material that has been completed is developed, then validated by expert validators. The validators consisted of two lecturers from the Tadris Biology Study Program at IAIN Ternate. The results of the first validator's assessment as a material expert can be seen in Table 6 below.

Table 6. Results of the First Validator Assessment of the Modules Developed

No	Assessment Aspects	Score	Category
1	Relevance	100	Very Valid
2	Accuracy	81,25	Very Valid
3	Serving Equipment	87,50	Very Valid
4	Basic Concepts of Matter	100	Very Valid
5	Suitability of Serving	83,33	Very Valid
<b>Total</b>		<b>90,41</b>	<b>Very Valid</b>

Based on the data in Table 6, it can be seen that the average of the first validator's assessment of the RQANI-based learning module developed was in the very valid category with a total score of 90.41. The results of the module assessment for the second validator as a media expert can be seen in Table 7 below.

Table 7. Results of the Second Validator's Assessment of the Modules Developed

No	Assessment Aspects	Score	Category
1	Material	100	Very Valid
2	Illustration	75	Valid

No	Assessment Aspects	Score	Category
3	Module Display Quality	70,83	Valid
4	Attractiveness	75	Valid
5	Module Content Design	75	Valid
<b>Total</b>		<b>79,16</b>	<b>Valid</b>

Based on the data in Table 7, it can be seen that the average validator assessment by media experts for the RQANI-based learning module developed is in the valid category with a total score of 79.16. The RQANI-based biology learning module developed can be said to be valid if all validating experts declare it valid. This opinion is supported by the research results of Sawitri, et al (2014) which states that learning modules are quality and suitable for use if they meet the validity standards assessed by experts and specialists. Apart from that, Hala (2015) also stated that validation has met the validity criteria if in this case the instrument developed has been based on strong theoretical rational studies and has internal consistency. The RQANI module is structured based on the RQANI learning phases, namely reading, questioning, answering, elaboration, integration. The reading phase plays a role in providing initial knowledge to students regarding the concepts to be studied. This is also to strengthen students' understanding of concepts so that they actively contribute to learning. The results of the student response questionnaire assessment can be seen in Table 8 below.

Table 8. Results of Validator Assessment of Student Response Questionnaire

No	Rated aspect	First Validator		Second Validator	
		Score	Category	Score	Category
1	Format	93,33	Very Valid	100	Very Valid
2	Contents	80	Valid	100	Very Valid
3	Benefit	100	Very Valid	100	Very Valid
4	Language	86,66	Very Valid	100	Very Valid
<b>Total</b>		<b>89,99</b>	<b>Very Valid</b>	<b>100</b>	<b>Very Valid</b>

Based on the data above, the average of the first validator's assessment of the student response questionnaire is in the very valid category with a total score of 89.99, while for the second validator it is in the very valid category with a total score of 100. Results of validation of the test instrument by the first validator and secondly can be seen in Table 10 below.

Table 10. Results of Material Expert Validator Assessment of Test Instruments

No	Rated aspect	Validator Pertama		First Validator	
		Score	Category	Score	Category
1	Suitability of Assessment Techniques	100	Very Valid	100	Very Valid

No	Rated aspect	Validator Pertama		First Validator	
		Score	Category	Score	Category
2	Instrument Completeness	100	Very Valid	80	Valid
3	Conformity of content/substance	100	Very Valid	100	Very Valid
4	Question Construction	100	Very Valid	80	Valid
5	Language Aspects	100	Very Valid	100	Very Valid
<b>Total</b>		<b>100</b>	<b>Very Valid</b>	<b>92</b>	<b>Very Valid</b>

Based on the data in Table 10, it can be seen that the average assessment of the first and second validators is in the very valid category. The average RPP validation results can be seen in Table 11 below.

Table 11. Average Validator Assessment Results on RPP

No	Rated aspect	Score	Category
1	Format	95	Very Valid
2	Learning Activities	88,88	Very Valid
3	Language	100	Very Valid
Total		94,62	Very Valid

The testing phase for this module was carried out at SMA Negeri 6 Ternate City, Class XI Science, even semester of the 2022-2023 academic year. The pre-test and post-test results can be seen in Table 12 below.

Table 12. Recapitulation of N-Gain Test Results

Criteria	Frequency	Percentage
High	5	38,46
Currently	8	61,54
Low	0	0

Based on the recapitulation of the N-Gain test results, it is known that 38.46% are in the high category, 61.54% are in the medium category and 0% are in the low category. Data from the categorization of conceptual understanding of biology learning activities using the RQANI learning module, which can be seen in the following table.

Table 13. Categorization of Concept Understanding Levels After Implementing the RQANI Model.

No	Score	Category	Frequency	Percentage
1	85-100	Very High	7	53 %
2	65-84	High	5	38 %
3	55-64	Currently	1	7 %
4	35-54	Low	0	0 %

No	Score	Category	Frequency	Percentage
5	0-34	Very Low	0	0 %

Based on Table 13, it can be seen that the number of students who obtained a very high understanding of the concept was 53%, 38% in the high category, 7% in the medium category, 0% in the low and very low categories. The use of RQANI-based modules is effective in increasing students' understanding of concepts. This is because the use of RQANI-based learning modules on body defense system material in learning can make students active and motivated because the module is an interesting independent learning package and allows students to develop knowledge optimally. The RQANI-based body defense system module, which is integrated with the holy verses of the Koran, also broadens students' insight both in terms of scientific knowledge and insight into Islam. The integration of Islam in the basic biology module allows the integration of Islamic knowledge with biology so that it can increase spiritual values (Herlanti et al., 2022). The need for the integration of Islam in textbooks aims to build students' character into individuals who are not only cognitively intelligent but also spiritually and emotionally intelligent (Mudlofir, 2016). An integrative approach between science and religion is very beneficial for students' cognitive and character development (Suparjo et al., 2021). Teaching materials must be designed to be attractive with a pleasant learning atmosphere, so that students do not feel bored while studying them and help students understand concepts and learning materials (Haka et al., 2020). Below is a table of categorization of student response levels regarding the use of the RQANI learning module.

Table 14. Categorization of Student Response Levels

No	Category	Category	Frequency	Percentage
1	$81,25 < x < 100$	Very good	5	38,46
2	$62,5 < x < 81,25$	Good	7	53,84
3	$43,25 < x < 62,5$	Poor	1	7,70

Based on Table 14, it can be seen that 38.46% of students gave very good responses, 53.84% good, 7.70% poor. Below are presented the results of the pre-test and post-test of students' conceptual understanding after implementing the RQANI module.

Table 15. Criteria for Pre-test and Post-test KKM Values

No	KKM score criteria	<i>Pre-test</i>		<i>Post-test</i>	
		Frequency	Percentage	Frequency	Percentage
1	Meets KKM score of 75-100	2	15,38	9	69,23
2	Does not meet the KKM score < 75	11	84,62	4	30,77

Based on Table 15, it can be seen that 15.38% of students who met the KKM score criteria were found in the pre-test, and 84.62% of students who did not meet the pre-test KKM score were 84.62%. Meanwhile, students who met the post-test KKM score were 69.23% and students who did not meet the KKM score criteria were 30.75. The balance of high academic mastery and emphasis on spiritual-based character can be a provision for students to win global competition (Khairiyah & Faizah, 2019). The thematic module integrates Islam and science using an inquiry approach which allows students to develop critical thinking skills (Faizah, 2018). The module is self-instructional, and can be used as a learning resource without requiring direct support or direction from the teacher (Choirunnisya' & Sudira, 2021). Al-Quran-based science learning can increase students' interest in learning and learning outcomes (Agustin et al., 2019; Ramadhan et al., 2023). Implementing integrated learning can develop several levels of student intelligence, one of which is spiritual intelligence (Munadi & Dewi, 2019). An integrated learning model with the Al-Qur'an can significantly increase students' understanding during the learning process (Muflihah et al., 2020). Other research conducted by (Suhendi et al., 2022) shows that the integrated module contains Al-Quran values. 'an greatly influences students' problem solving abilities and spiritual abilities.

The elaboration stage in the RQANI model provides opportunities for students to work together in groups to understand the material they have studied. This will of course train cooperation and empathy skills so that you can achieve better learning success. The integration stage in the RQANI model provides students with the opportunity to search and discuss with their peers to relate the material being taught to the holy verses of the Koran and Al-Hadith. This phase teaches students that all material concepts can be linked contextually in everyday life by integrating the material with the holy verses of the Koran and Al-Hadith. RQANI learning has been proven to be able to increase students' understanding of concepts. The steps of the RQANI model provide opportunities for students to be actively involved in learning (Amin et al., 2023). Students have a tendency to choose certain learning strategies in order to successfully complete learning tasks well (Adiansyah et al., 2023). Choosing a learning model that suits students' learning needs is very important to optimize mastery of concepts (Amin & Adiansyah, 2023). The RQANI model also influences students' self-efficacy (Amin, 2023).

Limitations of this research include (1) the researcher only reached the develop stage and did not reach the disseminate stage due to limited time for research in schools, (2) the research was conducted at one school, namely SMA Negeri 6 Ternate City. with the body's defense system material. Therefore, it is hoped that on the next occasion, further efforts will be needed in testing development products on a trial study scale in SMA/MAN with the same or different material in order to see how much effectiveness the use of RQANI-based modules is evenly distributed.

## CONCLUSION

Based on the research results, it can be concluded that: (1) The validity of the Reading, Questioning Answering, Elaboration and Integration (RQANI) based learning module on body defense system material by the first validator is in the very valid category (90.41) and the second validator is in the valid category (79.16); (2) The RQANI-based learning module is effective in increasing students' conceptual understanding with a score of 38.46% of N-Gain students being in the high criteria and 38.46% of students giving very good responses and 53.84% giving good responses to the RQANI module.

The next researcher is expected to be able to continue the research stage up to the disseminate stage. This is to further introduce the application of Reading, Questioning, Answering, Elaboration and Integration (RQANI) based modules in classroom learning. Future researchers can use more research samples and expand them at various levels of education.

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