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QUR'AN-BASED MATHEMATICS LEARNING DESIGN ON THE SET MATERIAL FOR JUNIOR HIGH SCHOOL STUDENTS

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Abstract

This study aims to develop a valid and effective Al-Qur'an-based mathematics learning design to be used as a choice of teaching materials for educators. The method used is the research and development method according to Borg and Gall, with the steps contained in this study: 1) Potential and Problems; 2) Data Collection; 3) Product Design; and 4) Product Validation and Trial. The study was conducted on three junior high schools with high, medium, and low levels. Each school was taken one class to be tested. The results showed: This learning is different from ordinary mathematics learning, because it will increase understanding of the verses of the Qur'an that contain mathematical concepts. Based on the results of the product validation test (RPP, learning books, and LKPD) obtaining a percentage score above 76 and being included in the very feasible category, the product is valid. The student's response to the product gets a percentage score of ≥ 60 , which is included in the positive category; the product can be said to be practical. While the effectiveness of learning is assessed from the activities of students with a very good category, namely the percentage value ≥ 90 , and the learning outcomes of students individually and classically get good results, So it can be concluded that the learning design developed is effective to use.

Keywords: Al-Qur'an; Learning Design; Mathematics learning

Abstrak

Penelitian ini bertujuan untuk mengembangkan desain pembelajaran matematika berbasis Al-Qur'an yang valid dan efektif untuk digunakan sebagai pilihan bahan ajar bagi tenaga pendidik. Metode yang digunakan adalah metode penelitian dan pengembangan menurut Borg and Gall, dengan langkah-langkah yang terdapat dalam penelitian ini: 1) Potensi dan Permasalahan; 2) Pengumpulan Data; 3) Desain Produk; dan 4) Validasi dan Uji Coba Produk. Penelitian dilakukan pada tiga sekolah menengah pertama dengan tingkat tinggi, sedang, dan rendah. Setiap sekolah diambil satu kelas untuk diuji. Hasil penelitian menunjukkan: Pembelajaran ini berbeda dengan pembelajaran matematika biasa, karena akan meningkatkan pemahaman ayat-ayat Al-Qur'an yang memuat konsep-konsep matematika. Berdasarkan hasil uji validasi produk (RPP, buku pembelajaran, dan LKPD) memperoleh skor persentase di atas 76 dan masuk dalam kategori sangat layak, produk tersebut valid. Respon siswa terhadap produk mendapatkan skor persentase ≥ 60 , yang termasuk dalam kategori positif; Produk tersebut bisa dikatakan praktis. Sedangkan efektivitas pembelajaran dinilai dari aktivitas siswa dengan kategori sangat baik yaitu nilai persentase ≥ 90 , dan hasil belajar siswa secara individu dan klasik mendapatkan hasil yang baik, Sehingga dapat disimpulkan bahwa desain pembelajaran yang dikembangkan efektif untuk digunakan.

Kata kunci: Al-Qur'an; Desain Pembelajaran; Pembelajaran matematika



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INTRODUCTION

Islam pays great attention to and positions science at a major level. This is evident from the many verses in the Qur'an that encourage Muslims to study. The development of technology and an increasingly advanced era cannot match the essence of the Qur'an (Rahmawan & Kurniawan, 2019). The Qur'an is a guide for everyone; not only believers, whether they belong to the Muslim, hypocritical, or infidel groups, can use the Qur'an as a guide (Ulfah & Meiningtyas, 2020). This is in accordance with what Maarif (2015) said: making the Qur'an the main reference in the development of science before referring to the theory or the concept of *lain* is a must for Muslims.

The Al-Qur'an not only mentions procedures for carrying out worship, but also contains relationships between humans, both in life, work and study (Yunesti & Widyasari, 2022). One of the important abilities that every person must have in carrying out their life is the ability to count. In the Qur'an, Allah SWT mentions a lot about counting. Both are the basis for religious learning and life. Religious practice requires mathematics, and the use of mathematics must be based on religion. Therefore, mathematics as a science can be used as an approach in several Islamic teachings. Previous research that strengthens the understanding that in learning mathematics there are Islamic teachings, which are contained in the Qur'an are: (Hasanah et al., 2022; Rahmadhani & Wahyuni, 2020; Charoudin et al., 2021). The research writes that mathematics will not be separated from the foundation of the Qur'an as a guide to human life and a source for all knowledge.

Research from Gradini, Wahyuni, & Ansor (2017) and Winarso & Wahid (2020) says that the phenomenon that occurs a lot in Islamic schools is that

students have learned mathematics but do not understand the relationship between mathematics and the Qur'an. Therefore, the religious attitudes of learners do not increase as a result of learning mathematics. In fact, not a few students think that there is no relationship between mathematics and the Qur'an, even though, if you look at the philosophy, mathematics comes from the Qur'an. Saifuddin & Hanik (2020) also said that the quality of education in Indonesia has hardly improved or even tended to decline. One of the causes is the deterioration of moral attitudes and behavior.

The initial survey in this study was conducted through a Google Form that was distributed throughout Indonesia. The respondents who answered the survey were mostly from Aceh province and served at the junior high school level. However, some respondents described a decline in students' moral attitudes due to the pandemic which required students to study from home so that their moral attitudes were less controlled. The importance of education is related to values, character, morals and time which must become one unit so that students are able to make good decisions. Religious values are very important character building values because people with character are religious people (Rahmawati & Rizki, 2017) et al., 2020; Gradini, Wahyuni, & Ansor, 2017; Saifuddin & Hanik, 2020). Meanwhile, students' religious attitudes based on survey results are in the good category, this is because almost all students, especially in the Aceh region, apart from studying at school, also attend recitations in the evening. So, it can be assumed that there will be good potential if mathematics learning is carried out based on the Qur'an.

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Efforts that can be made to adapt the learning process to the conditions currently experienced by students are through the development of teaching materials, techniques, methods, media and other things related to the learning process. With development in learning, boredom can be minimized during the learning process, so that learning objectives will be achieved (Kurniawan & Rahmawan, 2021). Therefore, the development of learning tools based on Islam and the Qur'an is considered necessary to shape the character of students who are knowledgeable in mathematics based on Islamic values and the Qur'an (RSIS, 2020).

Some previous studies that discussed related to the development of teaching materials or Qur'an-based mathematics learning tools and Islamic values are: (Antari et al., 2022; Lubis et al., 2023). According to him, compiling a learning tool with mathematical material with the right approach will help students understand the material to be taught. (Putra & Haqiqi, 2022) wrote that the development of mathematics teaching materials integrated with Islamic values will be able to foster students' sense of faith and piety. The statements above are reinforced by Syafri et al. (2021), who state that skills that involve the value of the Qur'an have a significant correlation with good mathematical skills.

This research will discuss more specifically and more deeply about learning mathematics and the Qur'an by focusing the discussion on one teaching material, namely set material. The concepts in the set discussed will be linked to the relevant verses of the Qur'an. The resulting product will be tested on the subject of the study (three public schools); if the trial gets effective results, it can be concluded that the

product can be applied in both public schools and Islamic schools.

METHODS

This research aims to develop a valid and effective Qur'an-based mathematics learning design. Therefore, this research is included in the type of development research also known as research and development (R&D). The research approach used is to combine qualitative and quantifiable approaches. Product development using the R&D method according to Borg and Gall, with the stages in this study: 1.) Potential and Problems, identify potentials and problems in the field and analyze the needs in the development of Qur'an-based mathematical learning designs; 2.) Data Collection, the information or data obtained from the survey results will be analyzed and used for product development and problem solving. And a literature study will be carried out related to research variables;

3.) Product Design, continued with the initial product development, namely determining the product design to be developed, including: making lesson plans, learning books, and Qur'an-based LKPD on set materials; and then creating supporting instruments (validation sheets, observation sheets, and questionnaires for learners' responses to learning); and 4.) Product Validation and Trials, final step is to test the validation of the initial product or draft I (in the form of RPP, learning books, and LKPD) by a predetermined validator. If the product is said to be valid and without revision, it can be tested immediately; if the product is said to be valid but needs revision, a draft II (revised product) will be produced, after which the product can be tested; and if the product is said to be invalid, it is necessary to repeat the

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product design stage and need to be tested again.

The data obtained for the effectiveness of Qur'an-based mathematical learning is data in the form of numbers, then described based on predetermined criteria. The Qur'an-based mathematics learning tools used are the result of the development of learning designs that have been carried out, including learning implementation plans (RPP), learning books, and student worksheets (LKPD). The products developed will be tested to determine the effectiveness of Qur'an-based mathematics learning on the set material for grade VII junior high school (SMP) students.

The subjects of the study were junior high schools in Lhokseumawe city with three schools, namely SMP Negeri 5 Lhokseumawe as a school with a high School Competency Index (IKS) and a sample from Banda Sakti sub-district, SMP Negeri 7 Lhokseumawe as a medium IKS school and a sample from Muara Dua sub-district, and SMP Negeri 6 Lhokseumawe as a low IKS school and a sample from Muara Satu sub-district. The three schools were chosen on the assumption that if Qur'an-based mathematics learning is effectively applied to the school, then Qur'an-based mathematics learning can be applied to all junior high schools and MTsN in Lhokseumawe.

The data analysis techniques used in this research and development are quantitative and qualitative descriptive analysis techniques. Descriptive quantitative is to explain the results of the development of Qur'an-based mathematics learning product designs by processing data in the form of scores from validators, observers, and student responses. While descriptive is qualitative, it describes data in the form

of comments, suggestions, and improvements from validators and observers. As well as using the calculation of the Likert scale with the formula (1).

$$Persentase = \frac{Total\ Skor}{Total\ Nilai\ Maksimum} \times 100 \quad \dots (1)$$

The product validity category is determined by matching the total percentage of valid breast milk obtained with the eligibility criteria based on Table 1.

Table 1. Eligibility Criteria

Quality Score	Eligibility Criteria
$75\% < s \leq 100\%$	Very Decent
$50\% < s \leq 75\%$	Proper
$25\% < s \leq 50\%$	Not Worth It
$0\% < s \leq 25\%$	Very Unworthy

Meanwhile, class success (classical completion) is scored based on the number of students who can exceed or achieve the Minimal Completion Criteria (KKM) score from each school. Qur'an-based mathematics learning on the material can be said to be effective if at least 50% of the number of students in the class is complete.

RESULTS AND DISCUSSION

The results of this development research are in the form of RPP products, learning books, and Qur'an-based mathematics LKPD on the set material for grade VII junior high school students.

1. Potential Results and Problems

The survey conducted through a *Google Form* found that respondents described the moral and religious attitudes of students from their agencies as good enough, but some others There are still those who are indifferent and find it difficult to suppress emotions, and

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there are also some students who are easily influenced by other friends who do not prioritize their moral and religious attitudes. However, it was found that there is potential for students, especially in the Aceh area, in terms of religion, which is a good category, both in terms of knowledge, attitudes, and practice.

Field studies conducted further on the subject of the study stated that there are schools that have already implemented or included religious values in mathematics learning. However, the religious value in question only introduces the idea that students must behave honestly and not give up on learning. It is not to know that mathematics is closely related to the Qur'an and has never linked or associated mathematics learning with verses of the Qur'an that contain mathematical concepts.

There is a decline in the moral and religious attitudes of the students. It is feared that the situation will continue to deteriorate in the future, and unwanted things will happen, such as no longer using the Qur'an as a guide in studying. Therefore, it is not good if mathematics

learning is carried out in a Qur'an-based way. With Qur'an-based mathematics learning, learners not only gain academic knowledge but also renew their moral and religious attitudes.

2. Data Collection

Collecting information that can be used in product development and to solve emerging problems is part of this stage. In the literature, data and information are collected about learning design, about mathematics learning, and about the relationship between mathematics and the Qur'an. Then analyze the material, core competencies, and basic competencies that refer to K13, as well as the character of the students.

The subject matter analyzed is the set material studied by students in class VII junior high school. This material is suitable for development because many verses in the Qur'an talk about certain groups that have a connection in everyday life, so that students can feel real. As well, at this age, due to great curiosity, learners often classify or group certain objects. The core competencies and basic competencies in this study are:

Table 2. Core Competencies and Basic Competencies

	Core Competencies	Basic Competencies
Knowledge	3. Understanding knowledge (factual, conceptual, and procedural) based on his curiosity about science, technology, cultural arts related to phenomena and events appears to the eye.	3.4. Describes and expresses sets, subsets, sets of universes, empty sets, complements of sets, using contextual problems.
Skills	4. Trying, processing, and presenting, in the concrete realm (using, parsing, stringing, modifying, and creating) and the abstract realm (writing, reading, calculating, drawing, and composing) according to what is learned in school and other similar sources in point of view/theory.	4.4 Describes and expresses sets, subsets, h universes, empty sets, complements of sets, using contextual problems.

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In Table 2, it is explained that each development of both seniority and sustainability has its own domain related to core competencies and basic competencies. This will make it easier for educators to understand each of their respective students.

According to Piaget's theory, the level of cognitive development of junior high school learners is at a formal operational stage. At this stage, learners are already able to perform mathematical calculations, think creatively, use abstract reasoning, and imagine the results of certain actions. However, each individual has different abilities at different stages of development. The mathematical abilities of students are certainly different; there are some who are at low, middle, and high levels. This shows that the interest factor for each student's mathematics lesson is different. But the average learner likes challenges, so teachers can gradually motivate students.

3. Product Design

The next step is product design. Researchers develop learning tools (draft I) in the form of lesson plans, learning books, LKPD, and other supporting instruments. In accordance with the researcher's original intention, namely to integrate Islamic values or teachings into mathematics learning, integrating mathematical material with relevant Qur'anic verses is the researcher's choice in designing this learning. Designing learning tools in the form of lesson plans, learning books, and Qur'an-based LKPD has taken a long time because you have to choose al-Qur'ans that are in accordance with the learning material, namely set material.

The learning method used is problem-based learning (PBL). This model was chosen with the aim that learners can develop thinking skills and

problem-solving skills. Therefore, the students are required to be active during the learning process. In addition, to add value or spiritual intelligence to learners, the mathematical integration model and Qur'an, according to Abdussakir & Rosimanidar (2017), were also used in this study. The Learning Implementation (RPP) plan is prepared by considering the steps of the Problem-Based Learning (PBL) learning model and the mathematical integration model in the Qur'an. Table 3 describes the components of the RPP developed.

Learning books are designed as attractively as possible, using a clear and bright display of images, colors, and writing as shown in Figure 1. The Qur'anic verses linked to the set material are found in Table 4.



Figure 1. Front and Back Cover of Learning Book

The worksheet learners (LKPD) developed is intended for one meeting and designed as attractively as possible as shown in Figure 2. The Qur'anic verses linked to the set material. Verses of the Qur'an listed in the LKPD are found in Table 5.



Figure 2. LKPD Front and Back Covers

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Table 3. Components of RPP

No	Components of RPP	Explanation
1.	RPP Identity	The identity of the RPP includes the name of the school, subjects, classes or semesters, subject matter, sub-materials, time allocation, and meetings.
2.	Basic Competencies	The basic competencies taken are: 3.4 Describes and expresses sets, subsets, sets of universes, empty sets, and complements of sets using contextual problems. 4.4 Solves contextual problems relating to sets, subsets, sets of universes, empty sets, and complements of sets.
3.	Learning Objectives	It is hoped that after following the learning process, students will be able to: 1. identify the concept of set in an event; 2. distinguish groups or groups that are sets and not sets; and 3. distinguish the way the set is presented.
4.	Learning models, approaches, and methods	Using a <i>problem-based learning</i> model with a <i>scientific</i> approach and using question-and-answer and discussion methods.
5.	Learning media.	1. Media Props (cork boards and nails) 2. Tools and Materials Whiteboards, markers, and whiteboard erasers.
6.	Learning Resources	1. Junior High School Mathematics Book/MTs Class VII, Ministry of Education and Culture. 2. Qur'an-Based Mathematics Learning Books on Set Materials for Grade VII Junior High Schools/MTs 3. Qur'an-Based Mathematics LKPD on Set Materials for Class VII SMP/MTs
7.	Learning Steps	Contains an elaboration of teacher and learner activities in learning. The learning steps are adjusted to the integration model of mathematics and the Qur'an according to Abdussakir and Rosimanidar, including: mathematics from the Qur'an, mathematics to explain the Qur'an, mathematics to deliver the Qur'an, <i>and mathematics with the Qur'an</i>
8.	Learning Assessment	Learning assessment is in the form of assessment techniques used.

Table 4. Qur'anic Verses in Learning Books

Surah	Discussion
Q.S. An - Nahl verse 11	Mention of herbs or fruits. There is a concept of a set, that is, there is a certain collection / object of objects.
Q.S. Al - Asr verse 1-3	In verse 2 it is stated that man is at a loss. Then, in verse 3 it is explained that there are some human beings who do not lose money.
Q.S. Ali Imran verse 185	This verse conveys that every animate is bound to die. This means that this verse describes the empty set that no man is immortal.
Q.S. Az - Zariyat verse 56	In this verse it says that God created jin and men to worship. However, in worship, of course, not all are the same when carrying it out so that other groups will appear. So from this verse there is a set of universes.
Q.S. Al - Bayyinah verse 7	It is said that the believer and the one who works virtue are part of the best beings. This shows that this verse is about the subset.

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Table 5. Qur'anic Verses in LKPD

Surah	Discussion
Q.S. An - Nahl verse 11	Mention of herbs or fruits. There is a concept of a set, that is, there is a certain collection / object of objects.
Q.S. An - Nur verse 45	Conveying that God created all kinds of animals, this verse also mentions how to walk animals. So it can be said that this verse has the concept of a set.

Q.S. An-Nahl verse 11 is used as a discussion and example in the early part of the LKPD. Meanwhile, Q.S. An-Nur verse 45 is used for analysis by students. In addition to these three products, research instruments are also made as a complement, including validation sheets, student activity observation sheets, and student response sheets to Qur'an-based mathematics learning.

4. Product Validation and Trial

At this stage, validation tests are carried out on the products developed, namely RPP, learning books, and Qur'an-based mathematics LKPD on the set material. Validation was carried out by experts (validators). In this study, there were two validators who assessed the validity of the product: media expert lecturers to assess the design and rules for making learning tools and material expert lecturers to assess everything related to the material, ranging from the symbols used to language suitability. Table 6 are the results of the product validation test:

Table 6. Product Validation Test Results

Product	Total Percentage	Validity
RPP	100 %	Valid without revision
Learning Books	91,88 %	Valid without revision
LKPD	87,50 %	Valid but needs revision

Revisions to LKPD products are as follows: a.) In draft I (the initial product), the researcher directly gives questions that must be analyzed by students without providing summaries, grids, or examples of the material taught. Then the researcher made a revision by adding a discussion along with examples of questions in the initial section of the LKPD; b.) The question that the researcher gives has an ambiguous meaning so that the researcher must revise the question; the revision carried out is described in Figures 3 and 4. After the product revision is completed, a draft II (revised product) will be produced, and then the product can be tested.

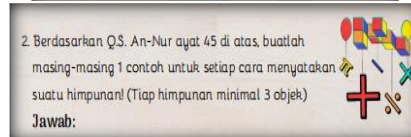
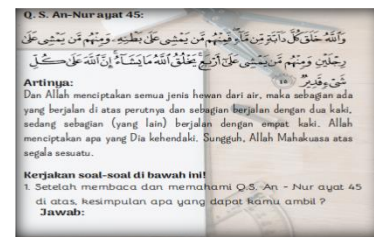


Figure 3. Questions Before Revision

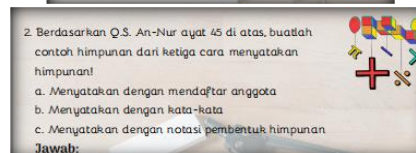


Figure 4. Post-Revised Questions

The practicality of the product is judged by the responses of students after using it. The product is said to be successful if the learning trial takes place effectively. Meanwhile, learning effectiveness is assessed using two

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indicators: student activities that support learning and good learning outcomes from students. Table 7 are the results of the responses of learners from 3 research subjects:

Table 7. Student Response Results

Subject of Research	Total Percentage	Categories Response
SMP Negeri 5 Lhokseumawe	68,60 %	Positive
SMP Negeri 6 Lhokseumawe	78 %	Positive
SMP Negeri 7 Lhokseumawe	73,90 %	Positive

Thus, from the results of the practicality test contained in Table 7, it can be concluded that the Qur'an-based mathematics learning design on this set material is included in

the practical criteria so that it can be used in mathematics learning. Then, the teacher of mathematics lessons in each school (the observer) observes the activities of students in one meeting (for 3 x 40 minutes). The results of

observations of student activities are show in the table 8:

Table 8. Observation Results of Student Activities

Subject of Research	Total Percentage	Categories Supporting the Learning Process
SMP Negeri 5 Lhokseumawe	90 %	Excellent
SMP Negeri 6 Lhokseumawe	90 %	Excellent
SMP Negeri 7 Lhokseumawe	93 %	Excellent

In general, the activities of students during the learning process are goofed tolerance. Students are enthusiastic about participating in Qur'an-based mathematics learning. However, some students are unfocused and less able to read the Qur'an. The results of the questionnaire of student responses showed a positive category towards Qur'an-based mathematics learning.

Table 9. Percentage of Classical Completion of Student Learning Outcomes

Statement	SMP Negeri 5 Lhokseumawe		SMP Negeri 6 Lhokseumawe		SMP Negeri 7 Lhokseumawe	
	Number of Students	Percentage	Number of Students	Percentage	Number of Students	Percentage
Completed learners	18	69, 20 %	15	75 %	15	51,70 %
Incomplete learners	8	30, 80 %	5	25 %	14	48,30 %

In Table 9, it can be seen that the percentage obtained for the classical completeness of students' learning outcomes from the three scenarios shows an average percentage above 50%. We can conclude that the results obtained from this learning are different from the usual mathematics learning because, in addition to students understanding

academic learning, which in this case involves understanding the set material, knowledge of the verses of the Qur'an, which contain the concept of mathematics, also adds up. The learning outcomes of students obtained from the three research subjects also did not describe that schools with a high School Competency Index (IKS) would get the

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highest learning outcomes. It is proven that the school with the highest percentage of classical completion is SMP Negeri 6 Lhokseumawe, which in this study has a low IKS.

The researcher's assumption is that this happens because SMP Negeri 6 Lhokseumawe adds a guidance program for all students. So, language guidance will increase the knowledge of students in terms of reading and writing the Qur'an. However, apart from these problems, based on the provisions that have been set, learning is said to be effective if at least 50% of the number of students in each trial class has reached the Minimum Completion Criteria (KKM) score. Because the learning outcomes of students in the three schools have reached a completion rate of $> 50\%$, it can be concluded that Qur'an-based mathematics learning on the set material carried out on the three research subjects, namely SMP Negeri 5 Lhokseumawe, SMP Negeri 6 Lhokseumawe, and SMP Negeri 7 Lhokseumawe, is said to be effective. So that this learning can be applied to all junior high schools and MTsN in Lhokseumawe

Based on the research results, researchers feel that Qur'an-based mathematics learning needs to be applied in school learning, one of which is mathematics learning. This is because this method is certainly different from ordinary mathematics learning because, through Qur'an-based mathematics learning, students not only understand mathematical concepts but also verses of the Qur'an that contain mathematical concepts. In this way, this understanding is in line with the opinion of Rahmawan & Kurniawan, 2019; Ulfah & Meiningtyas, 2020; Maarif, 2015; Hasanah et al., 2022; Rahmadhani & Wahyuni, 2020; Charoudin et al., 2021.

This is supported by the results of tests on the effectiveness of Qur'an-based mathematics learning which were tested in three schools in this research. It can be concluded that Qur'an-based mathematics learning is effectively applied to all junior high schools/MTsN in Lhokseumawe, and it was found that the completeness of student learning outcomes was not determined by high or low School Competency Index. Researchers also agree with research by Antari et al., 2022; Lubis et al., 2023; RSIS, 2020; Putra & Haqiqi, 2022; Syafri et al., 2021 when applied in mathematical learning in schools, students' mindsets in learning will develop and their religious values will also increase.

CONCLUSIONS AND SUGGESTIONS

The products of this research are RPP, learning books, and LKPD mathematics based on the Qur'an on a set material. With these three products are included in the valid category. Based on the results of the test of the effectiveness of Qur'an-based mathematics learning that it can be concluded Qur'an-based mathematics learning is effectively applied to all junior high schools/MTsN in Lhokseumawe.

Reviewing the results of this research, Qur'an-based learning design is very useful when applied in mathematical learning in schools. However, since the Qur'an-based mathematics learning design in this study only focuses on a set material, researchers consider it necessary to develop a Qur'an-based mathematics learning design for other materials.

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