Development of Mathematics Instructional Materials Integrated with Islamic Sciences

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Abstract: The purpose of this research is to produce Student Activity Sheet (SAS) based on Islamic integration in mathematics instruction. This research is a development research consisting of three stages namely front-end analysis, prototype, and assessment. Front-end analysis consists of analyzing syllabus and mathematics textbook and reviewing the literature of concept of integration, Quranic interpretation, and hadith of a prophet. The prototype stage consists of validation stage and practicality. The assessment stage consists of predictions by experts and teachers. The SAS is validated by an evaluation expert and obtained a score in the range of 88% to 100% which means it is very valid. The SAS practicability validated by education experts and obtained scores in the range of 68% to 87% which means quite valid. The validity of SAS validated by subject teachers obtained scores in the range of 61% to 80% which means valid. all students stated that SAS is practically valid enough to use.

1 INTRODUCTION

Islam is the Shari'ah of Allah SWT sent down to a human on earth so that they can worship him. The cultivation of belief in God can only be done through the process of education at home, school, and community. Islamic education is a human need because as a pedagogical (educational). Humans are born with the potential that can be educated to become a khalifah on earth, as well as supporters and holders of culture (Majid, 2014). Islamic education is a system, namely the Islamic education system that has components that supports the realization of the Muslim figure "insankamil". This is meaningful, education is done in accordance with Islamic ways or review material that has Islamic values. Theories of Islamic education are of course based on the Qur'an and Hadith. In decades, much thought and policy have been taken to integrate Islamic education in all fields of education including in mathematics education. Hopefully, the integration of science education with Islam and other science can contribute to and describe the significance of national education. This effort is expected to be able to educate and develop the potential of learners to become human beings who believe and cautious to God Almighty, noble, healthy, knowledgeable, capable, creative, independent and become citizens of democratic and responsible.

Based on the aims of national education, mathematics education should contribute to the achievement of educational objectives, namely, to make students who are smart, capable, have a balance between faith and piety (IMTAK) and Science and Technology (IPTEK). This is confirmed in the 2013 curriculum which states that every subject should contribute to the establishment, development of knowledge, skills, and attitudes (Human Resources Development Agency, 2013). Although the science (general) education curriculum is often regarded as a secular subject. The purpose of secular subjects is that public education is considered totally unrelated to religion. This assumption shows that the mathematics studied in schools so far is considered subjects that are not related to Islamic values. In the case of good moral or moral formation also develops according to the environment around the students, one of which is the school.

Mathematics education program Faculty of Tarbiyah and Teacher Training UIN Riau is one of the Islamic educational institutions that develop insight into Islamic and nationalism high spirit. One

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of the advantages of this institution is the integration of general science and religious science. Every activity including curriculum, teaching should be integrated with Islamic values either by lecturer, teacher, and student. Any branch of science, including mathematics cannot be separated from Al-Quran. Numbers and counting have been introduced by God through the Al-quran. Reality field shows that the integration of mathematics with the science of religion has not run optimally. During this time the integration of Islamic values done by lecturers and teachers is only limited to exemplary attitude. Lecturers and teachers feel difficult if integration is done on mathematics material with the concept of the Qur'an and Sunnah. Whereas Zubaidah (2013) states that the integration of Islamic values in learning strategies can be done on 4 aspects, namely: first, the integration of subject matter. The integration of the material is done to integrate the concept or teachings of religion into the material (theory, concept) of general knowledge that is being taught. Second, the integration of the process is done to avoid the learning process that is contrary to the teachings of religion. Third, integration in choosing teaching materials. Fourth, integration in choosing teaching media. Based on this, lecturers, teachers, and students suggested that the availability of teaching materials as a guide for the integration of mathematical science with Islamic science, both directly related to the Qur'an and Sunnah, including Islamic moral values.

2 LITERATURE RIVIEW

Mathematics is a part of science so that the nature that exists in science also applies in mathematics. Integration is an attempt to make two or more things into one indivisible entity. Integration, in general, can be interpreted as an integrated into a unified whole. Integration is an important process in science learning such as mathematics, as it teaches students to monitor, reflect actively, evaluate and modify knowledge. Integration is the process of scaling up knowledge and the ability to generate and connect scientifically the normative idea in explaining scientific phenomena (Lee & Liu, 2009). Integration is an important process in science learning such as mathematics, as it teaches students to monitor, reflect actively, evaluate and modify knowledge (Chen & Bradshaw, 2007).

Integration involves applying the process of pooling knowledge to ideas such as scientific principles, real-world experiences, classroom experiences and developing a strong and useful understanding (Davis, 2004). Integration allows students to link, evaluate and organize their ideas on science topics (Liu, Lee, Hofstetter & Linn, 2008). integration is born from an understanding that students have the ability to acquire and connect ideas as a basis for the development of a deep understanding of science(Lee, Liu, & Linn, 2011). Integration is a conceptual model and an ontology of traditional knowledge and science used to create a system of knowledge (Bohensky & Maru, 2011).

Islam is the religion of Allah brought by the Prophet Muhammad SAW who guided the Qur'an as a holy book. Scientific characteristics make science is a scientific knowledge. Defining science is not easy, because the various scientists have their own definition in proving science. For analysts of the methodology will say that science is a system of statements that can be reviewed or tested by anyone and anywhere. Heuristic observers will argue that science is a further development of the human talent to determine the orientation of its environment and determine its attitude toward it. Science can also be defined as a set of human collective human rationality, the set of human knowledge of nature acquired as a consensus of experts. rational inference of the results of a critical analysis of the measurement data obtained from observations on natural phenomena.

While most scientists define science as a result of experimentation, so to achieve a success must be through logical conclusions and empirical observations through scientific methods. From the above explanation can be concluded that the integration of Islam and science is an attempt to unify between Islam and science. Mahfuzoh (2011) illustrates the forms of scientific integration, namely; (1) The form of scientific integration based on classical philosophy, which is trying to explore the legacy of classical Islamic philosophy, (2) The form of science integration based on mysticism, namely Islamization of science or Islamization of knowledge which means the discussion of science from interpretation based on ideology, secular phrases, (3) The form of science-based integration of fiqhie Islamization of science departed from the fiqh scholars thought in making the Qur'an and Sunnah as the peak of truth. Mahfuzoh (2011) reveals the forms of scientific integration study that are: (1) Comparative, i.e. comparing the concept or theory of science with the concept or insight of religion about the same symptoms, (2) Inductive, that is basic assumption of scientific theory which is supported by empirical findings and continued his theoretically

abstract thought toward metaphysical or supernatural thinking, then connected with religious principles and the Qur'an about it, (3) Verification, that is connecting the results of scientific research that supports and proves the truth of Quran verses.

In integrating value education in learning, Suwarna (2010) offers several strategies, namely (1) implicit presentation strategy where in general textbooks do not present a straightforward and clear values education but are subtle and implicit (except for religious education and civic education). in these circumstances, it is the teacher who must be sensitive to the analysis of the value education phenomenon that implicitly arises within it. Any reading, example, question, an answer should contain value education. Because the value education is not presented explicitly, teachers with students should look for whatever values appear in a passage, examples, questions, and answers.

Teachers and learners should seek for themselves an integrated value in learning. If not found, teachers should be able to develop and insert Islamic values in the subject matter in context, (2) explicit presentation strategies in which all values are presented clearly and decisively. this is called the method of teaching values or character directly. This can be seen in the reading, material examples, problems that directly lead to the education value. For example, the readings directly presenting the manners of people entertaining, rights, duties and obligations of citizens, and love the land of water. Instant material example refers to servant obligation to God, obligation of learners, devoted to teacher, obligation of child to parent. The presentation of values education explicitly facilitates the learner in learning the noble values. But learning can happen to be monotonous because all the material is already available in the textbook. The teacher only conveys, the learner appreciates. Therefore, to make learning more dynamic, creative and efficient, teachers must be able to develop teaching materials with various techniques, which are discussing values education with the rules of life now, practicing values education, observing the phenomenon of morality that occurs among children, adolescents, and community.

Implicit and explicit strategies can lead learners to learn value education independently. This independence is demonstrated by the ability to analyze in various values education phenomenon which is further presented, discussed, summarized and internalized in the learner. One purpose of integrating Islamic values with mathematics is to improve the learning outcomes of student mathematics. Nasution (2009) says learning is to change the behavior of children, so it is about the character formation of children. Expected results are not only knowledgeable, but also the understanding, extent of interest, the appreciation of the norms, and the abilities that encompass all the characters of the child. According to Slameto (1991), learning is a process of effort by a person to obtain a change of behavior, as a result of his experience in interaction with his environment. While Suryabrata (2004) states "Learning is shown by a change in behavior as a result of experience". The results of learning mathematics in this study are changes in student behavior indicated by indicators of achievement level of learning objectives of mathematics. this achievement in the form of mastery of cognitive structure in the form of facts, concepts, and generalizations after gaining experience in the field of mathematics.

3 METHOD

This research is a development research. This research is used to develop Student Activity Sheet (SAS) based on Islamic integration in mathematics instruction which is valid and practical for MTs students. There are three stages of development carried out in this research, namely; front-end analysis, prototype stage, and assessment stage. The research was conducted in three districts, namely Pekanbaru, Kampar and Kuantan Singingi. The effectiveness of teaching materials in this study used a pre-experimental study with the design model "The One-Shot Case Study".

3.1 Development Procedure

The procedure of development in this research refers to three development step that is; front-end analysis, prototype phase, and assessment phase. The three stages of the research design are described in the following procedure stages.

Front-end analysis phase: Front-end analysis phase is conducted to get an overview of the conditions in the field. This stage consists of analyzing syllabus and mathematics textbooks to find out whether the material taught in accordance with material competence standards and concepts of integration, Quranic interpretation, the hadist prophet. Esensi of the integration of Islamic values begins with the assumption that in teaching materials, should get the emphasis on mathematical

relations with Islam both from the Qur'an and Assunnah.

Prototype phase: The making of this prototype is done in 2 phases, namely the validation phase and the phase of practicality. The validation phase consists of two validation types used, namely content validation and constructs validation. Content validation aims to determine whether SAS based on Islamic integration in mathematics instruction has been designed in accordance with the syllabus material. Construct validity aims to see the suitability of SAS components with predetermined indicators. The designed SAS will be consulted and discussed with experts to get suggestion or validation. Validation activities are carried out by filling out the SAS validation sheet and discussion until the SAS is appropriately used. Practicality steps are taken to see the SAS usage that has been designed.

Assessment phase: In the assessment phase, activities are centered on evaluating whether the prototype (trial version) can be used in accordance with expectations and effectively to improve the quality and achievement of student learning. The effectiveness of SAS based on Islamic integration in mathematics Instruction is tested to predict whether SAS is effective according to mathematicians and education experts. The research procedure is illustrated in figure 1.

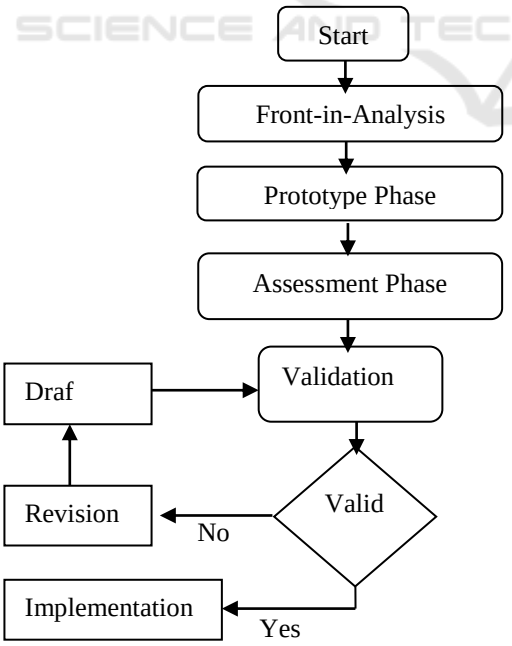

Figure 1. Illustration of Research Procedure

3.2 Data Collection Technique

Data collection techniques used in this study are validation sheets, observation sheets, questionnaires to assess attitudes and interviews. The validation sheet is used to determine the SAS and the instruments that have been designed valid or not. Riduwan (2005) stated that the observation is to observe directly to research object to see the activities done from close range. Observation aims to know the practicality of the implementation of SAS and see student activity during the learning process. The data collection tool used to observe is the observation sheet. The questionnaire aims to express the attitude or response of students on learning using SAS. Interview by Sudjana (2005) is as an assessment tool used to know opinions, aspirations, expectations, achievements, desires, and beliefs as a result of student learning. In this study interviews used is a free (unstructured) interview aimed at expressing the practicality of using SAS based on Islamic integration in mathematics instruction.

3.3 Data Analysis Technique

Data analysis in this study uses quantitative descriptive by describing the results of validation from experts, teachers, and students, which consists of validity, practicality, the effectiveness of instruments and products developed. Validation results from validator to all aspects assessed, presented in tabular form. Data from the results of instrument validation assessment and product validation are then tabulated and the percentage sought. The percentage results are consulted to the Conversion Table proposed by Riduwan (2005). Riduwan's proposed conversion table can be seen in Table 1.

Table 1: Product and Instrument Conversions

Interval (%)	Criteria
0-20	Invalid
21-40	Less Valid
41-60	Enough Valid
61-80	Valid
81-100	Very Valid

To illustrate the practicality of the implementation of learning with Islamic-based mathematics teaching materials, the results of observations and interviews were analyzed by descriptive techniques. Data from the attitude

questionnaire were analyzed by calculating the score of students who answered each item according to the number of items in the questionnaire. Scores that have been obtained then made a percentage. Data of learning result analyzed by descriptive statistic is done by calculating mean, standard deviation, and percentage. The effectiveness of teaching materials that have been designed is seen using pre-experimental research with the design of "The One-Shot Case Study".

4 RESULTS

To determine whether the product developed is valid or not, the SAS based on Islamic integration and assessment instruments are reviewed or assessed by evaluation experts and learning experts. This assessment intends to find out weaknesses or deficiencies that need to be added to the SAS before being tested further to students. Evaluation and learning experts who assess these SAS instruments and products are experts from the State Islamic University of SulthanSyarif Kasim Riau. The results of expert research can be seen in the table below.

4.1 Validity of the Instrument by Expert Evaluation and Learning Experts

An assessment of the validity of the instrument intends to see how far the instrument developed is valid. Assessment is carried out by evaluation and learning experts. There are six questionnaires assessed by experts. Expert assessment results can be seen in Table 2.

Table 2: Results of validity analysis of validity assessment instruments according to experts

Aspect Assessed	Expert1 (%)	Expert 2 (%)	Mean	Category
The validity of the Self Evaluation Questionnaire on SAS	100	93.18	96.59	Very valid
The validity of the SAS Practical Questionnaire with the Respondents are the Teacher	100	93.75	96.87	Very valid
The validity of the SAS Practical Questionnaire with the Respondents are the Student	100	93.75	96.87	Very valid
The validity of questionnaires to predict SAS practicality	100	85	92.5	Very valid
The validity of Questionnaire to predict SAS effectiveness	90	90	90	Very valid
The validity of the interview guide instrument	87.5	90.27	89.21	Very valid

Table 2 illustrates the results of expert judgments on questionnaires to assess the SAS based on the Islamic integration. Aspects of the validity of SAS self-evaluation questionnaires are considered experts with an average score of 96.65% in a very valid category. Aspects of the validity of the SAS practicality questionnaire with teacher respondents obtained an average score of 96,875 with a very valid category. Aspects of the validity of the questionnaire of practicality with student respondents get the average score of 98,675 with a very valid category. Aspects of the validity of the questionnaire to predict the practicality of SAS obtained the average score 92 with a very valid category. The aspect of the validity of the questionnaire to predict the effectiveness of SAS was obtained with a mean score of 90 with a very valid category. The aspect of the validity of the interview guideline instrument was assessed by experts with an average score of 89.21 with a very valid category. Scores given by experts show that the six aspects used as a quality standard for a product are in a very valid category or worthy of use. However, expert advice on the instrument needs to be considered for future research.

4.2 Assessment of The Validity and Practicality of SAS Based on Islamic Integration

The products of SAS based on Islamic integration are assessed by the evaluation and learning experts in terms of validity, effectiveness and practicality. Assessment of aspects of product validity aims to see whether the product being developed is valid or feasible to use. The predictive aspect of product

effectiveness is done to see how the product of SAS based on Islamic integration is effectively applied in teaching and learning process. The predictive aspect of practicability aims to see how the product developed in the form of SAS based on Islamic integration is practical to use. assessment results can be seen in Table 3. Table 3 shows the average score of expert judgment on the validity of the developed SAS. Aspects of product validity obtained mean scores of 72.92 with valid categories. Aspects of the predictive effectiveness of the SAS obtained an average score of 66.67 with a valid category. Aspects of the prediction of SAS practices are obtained with an average score of 66.68 with a valid category. Based on the evaluation of expert evaluation and education experts, it can be concluded that the product of SAS based on Islamic integration is good or feasible to use because it is valid.

Table 3. Assessment of SAS based on based on Islamic integration by evaluation and learning experts

Aspect Assessed	Expert 1 (%)	Expert 2 (%)	Mean (%)	Category
Validity of SAS based on Islamic Integration	70.83	75	72.92	valid
Prediction of the effectiveness of the SAS based on based on Islamic integration	50	83.33	66.67	valid
Prediction of the practicalities of SAS based on Islamic integration	52	81.35	66.68	valid

4.3 Assessment of the Practicality and Effectiveness of SAS Based on Islamic Integration by Teachers of Mathematics Subjects

Teachers as experts who assess this SAS based on the integration of Islam is as many as 5 teachers consisting of Mathematics Teachers MTsN Lipat Kain, MTsN 1 Pangean Kuantan Singingi, MTsN Al-Muttaqin Pekanbaru, MTsN Darel Hikmah Pekanbaru, MTsN Al-Munawarah Pekanbaru. The assessment is carried out by giving an assessment sheet consisting of 9 statement items. The results of the practicality and effectiveness analysis of SAS based on Islamic integration can be seen in Table 4.

Table 4: Summary of predicted results of the practicality and effectiveness of the SAS.

Aspect Assessed	Expert 1 (%)	Expert 2 (%)	Expert 3 (%)	Expert 4 (%)	Expert 5 (%)	Mean	Category
Practicality predictions of SAS	60	51.11	66.67	60	60	59.56	Enough valid
Effectiveness predictions of SAS	66.64	48.89	62.22	62.22	62.22	60.44	Valid

The table above shows the prediction results of the practicality and effectiveness of the SAS based on Islamic integration according to the mathematics teacher. The practical aspect of SAS based on Islamic integration is assessed by an expert with a mean score of 59.56 in the category is quite valid. The prediction aspect of the effectiveness of the SAS is considered expert with 60.44 or average in the valid category. The assessment of the five experts shows that the SAS based on Islamic integration is in the valid category or feasible to use. However, expert advice to improve SAS products should be considered.

4.4 Assessment of the Practice of Developing SAS Based on Islamic Integration by Students

Assessment of the practicality of SAS based on the Islamic integration assessed by 30 students from 3 districts in Riau Province, i.e. 6 students from MTsN Lipat Kain in Kampar district, 6 students from MTsN Pangen in Kuantan Singingi district, 6 students from MTsN Al-Mutaqqin in Pekanbaru district, 6 students from MTsN Darel Hikmah in Pekanbaru district, and 6 students from MTsN Al-Munawaroh in Pekanbaru district. Assessment of the practicality of SAS is done by giving a questionnaire

to the students. The results of an assessment of the practicality of SAS based on Islamic integration by students can be seen in Table 6.

Table5: The results of an assessment of the practicality of SAS based on Islamic integration by students

Practicality of SAS	Student 1 (%)	Student 2 (%)	Student 3 (%)	Student 4 (%)	Student 5 (%)	Student 6 (%)	Avg.	Category
MTsNLipat Kain	66.67	68.75	60.42	66.67	56.25	66.67	64.24	Valid
MTsNPangean	68.75	75	70.83	70.83	68.75	70.83	70.83	Valid
MTsNMuttaqin	68.75	72.92	70.83	66.67	68.75	70.83	69.79	Valid
MtsNDarel Hikmah	70.83	66.67	75	70.83	75	75	72.22	Valid
MTsN Al-Munawaroh	75	64.58	60.42	77.08	70.08	85.42	72.10	Valid

The table above is the result of the practicality of SAS based on Islamic integration according to 30 students from 3 districts in Riau Province. Assessment of students of MTsNLipat Kain obtained an average score of 64.24 with the valid category. Assessment of MTsN Pangean students has scored an average of 70.83 with the valid category. Assessment from students of MTsN Al-Muttaqin obtained an average score of 69.79 with the valid category. Assessment of MTsN student Darel Hikmah obtained an average score of 72.22 with the valid category. Assessment from students of MTsN Al-Munawaroh obtained an average score of 72.10 with the valid category. All student ratings on the practicality of the SAS are in the range of 61 to 80 with valid categories, so it can be concluded that students feel the SAS based on Islamic integration is practical and worthy of use in the learning program.

5 CONCLUSIONS

Based on the results of the research it can be concluded that:

1. According to evaluation and education experts, the six questionnaires used to assess SAS are valid. The six instruments developed are valid and worthy of use for assessing the SAS based on Islamic integration.
2. The practicality of the SAS based on the integration of Islam validated by evaluation and education experts is in the category of valid or practical use.
3. The practicality of SAS based on Islamic integration validated by subject teachers in 5 schools in Riau Province is in the category valid and feasible to use.
4. The result of the practicality of SAS based on Islamic integration assessed by students from 5 schools in 3 districts is a valid category and feasible to be used.
5. From the results of qualitative analysis based on interviews with students, obtained information that the developed SAS interesting to use, but need additional time to implement SAS in the process of learning mathematics in junior high schools, especially Madrasah Tsanawiyah.

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