

Development of Al-Quran Integrated Physics Practicum Manual in Accordance with the 2013 Curriculum to Develop Practical Skills, Scientific Attitudes, and Religious Attitudes for IT/MA High School Students

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Abstract

Based on questionnaire data distributed to 27 first-year students participating in the Basic Physics course at IAIN Batusangkar, the data obtained are: 1) 37% of students have never done physics practicum activities, 63% of students have done physics practicum activities, 2) 100% of students are not used to compiling reports on practicum activities, 3) 100% of students are not given a practice guide and 4) 93% of students, their physics learning is not associated with Islamic values, 7% of students' physics learning is associated with religion. Furthermore, interviews with 5 physics teachers from SMA/MA, it was found that: 1) there is no guidebook for physics practicum in accordance with the 2013 curriculum in their schools, 2) Physics learning in schools not integrated with the Alquran. This study aims to produce an integrated Al-Quran physics practicum manual in accordance with the 2013 curriculum for SMA/MA which is valid, practical, and effective. Based on the results of the data analysis that has been carried out, it can be concluded that the results of the validation of the physics practicum manual are categorized as very valid with a validity percentage of 83%. The results of the practicality of the products developed are categorized as highly practical with the percentage of practicality of 89.4%. The data from the observation of students' attitudes and practical skills found that the physics practicum manual was effective for developing practical skills, with an average score of 78.5, scientific attitude 77.8, and religious attitude 84.5 (scale value of 100).

INTRODUCTION

Physics is one of the subjects in natural science family to develop analytical and deductive thinking skills in solving problems related to natural events, both qualitatively and quantitatively. Mathematics, as a tool used to answer questions, can promote knowledge,

skills, and attitudes. Physical science is essentially seen as a process, product and scientific attitude. Physics is associated with how to identify natural phenomena based on systematical logical process, therefore, the prime goal is not to acquire the knowledge solely in the form of facts, concepts or principles, however, it is also a process of discovery. Thus, learning

physics should not separate the concept and the process of discovery. Physics in school should promote the real experiences to develop student competencies. In learning physics, students are instructed to "find out" and "create", so that students gain a deeper understanding of the natural surroundings. Physics is actually a simple answer to all the beauty and order of the universe that Allah has created. By understanding the correct physical concepts, the beauty of this universe is revealed.

The National Training Laboratories (Their and Davis, 2002: 13 in Septi Rahayu) has found that students can only remember 5% to 10% of what they read in textbooks, but they can remember up to 80% of what they have experienced (Rahayu, 2014). Practicum activities are activities that are suitable to support students in remembering and understanding subject matter more through direct experience. The advantage of practicum activities according to Trianto (2010:138) is to encourage students to disclose the truth based on experiments, to conceive new breakthroughs by experimental results, which are beneficial to human life. (Trianto, 2010) Based on the many benefits that can be taken from practical activities, it is important for teachers to prepare and carry out practicum sufficiently.

Nevertheless, the reality found in schools, there are still many physics teachers who do not conduct physics practicum for students learning activities. Based on questionnaire data distributed to 27 students participating in basic physics courses at IAIN Batusangkar in 2017 from various regencies/cities in West Sumatra regarding physics practicum activities at their high schools (SMA/MA), the results showed that: 1) 37 % of students have never done physics practicum activities, 63% of students have done physics practicum activities, 2) 100% of students are not used to compiling reports on practicum activities, 3) 100% of students were not provided with a module teacher/LKS/practice guide. 4) 93% of students did not experience the learning associated with Islamic values (Qur'an and Sunnah), 7% of students' physics learning is associated with religion.

Subject to the data above, it can be concluded that many students are not used to doing practicum activities. Meanwhile, by holding practicum activities, aspects of skills (psychomotor domain) and aspects of scientific

attitudes (affective domain) of students can be developed. The data also showed that none of the students were provided by teacher's module, students' worksheet, or physics practicum guidance and there was only 7% of the students experienced the learning associated with the Al-qur'an.

In the current era of globalization, the sovereignty of science and technology (IPTEK) has been substantial. Science and technology can alter anything that is needed for human convenience. In other words, the dominance of science and technology is slowly shifting human, cultural and religious values. As stated by Ahmad Barizi (2011: 256) in his book, the majority of social and religious observers agree that globalization and technology have caused a shift in values between good and bad in society. (Barizi, 2011) The good tuning of globalization and technology can produce good results while as bad tuning can produce catastrophic results to the society. Therefore, one of the primary roles of lecturers and teachers is to strengthen the original vision, concept and orientation of mastery, and at the same time, teachers and lecturers are expected to apply science and technology along with book as one of the supports for the education curriculum.

Implementing the integration of scientific concepts with religious values through Al-qur'an is in accordance with the vision of the West Sumatra Provincial government. The vision of the government of West Sumatra is the realization of a civil and prosperous West Sumatra. This program is also in line with the work cabinet's priority program on the implementation of the Mental Revolution Program in NAWACITA which was launched by the President of the Republic of Indonesia. The development and strengthening of The Character Education Action Plan based on the values of the Al-qur'an and Minangkabau Natural Culture which was launched in September 2017 accommodates local needs and wisdom in order to preserve the values of the Minangkabau natural cultural tradition which is known as "adat basandi syara', syara' basandi kitabullah. syara' mangato adat mamakai, alam takambang jadi guru". The integration of the values of the Al-qur'an is applied directly in the classroom in accordance with the subject taught. (Provincial Education Office: 2017: IV). (Dinas Pendidikan Provinsi Sumatera Barat, 2017)

Based on interviews with physics teachers at Islamic Senior High School Raudhatul Jannah Payakumbuh, SMA Insan Cendekia Payakumbuh, and SMAN 1 Payakumbuh, the result showed that: 1) there was no guide book, module, or students' worksheet for physics practicum based on 2013 curriculum in their school, 2) Physics learning in schools was not integrated with the Al-qur'an. To overcome this, it is necessary to have a physics practicum manual or practicum guide that integrates the Al-qur'an in accordance with the 2013 curriculum for SMA IT/MA. This manual or practicum is expected to meet the needs of teachers and students for teaching materials, provide guidance for teachers in implementing Al-Quran-integrated learning, and become a guide for students to understand physics that is integrated with the Al-Quran.

This study is development research using the ADDIE model which is carried out through five stages, namely 1) the analysis stage, 2) the design stage, 3) the development stage, and 4) the development stage. Implementation (Implementation), 5) the evaluation stage. (Priyadi, 2014)

METHOD

The purpose of this study is to create an integrated Quranic physics practicum manual that is in accordance with the 2013 curriculum which is valid, practical, and effective to be used in teaching and learning physics at SMA IT/MA. The formulation of the research problem was: how the development of the Al-Quran integrated physics practicum manual according to the 2013 curriculum for IT/MA SMA IT/MA.

The development stages in this research were; 1) The analysis stage which is to analyze the need for development. At this stage, the need analysis and literature study were carried out to see the necessity of integrated Al-Quran physics practicum manual according to the 2013 curriculum in the teaching and learning process

for SMAIT/MA. 2) The planning stage (design). At this stage, product planning and preparation of a draft of the Al-Qur'an-integrated physics practicum manual according to the 2013 curriculum for SMA IT/MA are carried out. 3) The development stage which is in the form of product design realization activities, the conceptual framework is realized into products that are ready to be implemented. At this stage, improvements will be made to the draft of the Qur'an-integrated physics practicum manual according to the 2013 curriculum for SMA IT/MA which has been prepared in the previous step, revised based on suggestions from experts, then product validation tests are carried out by experts, so that it becomes a product that is ready for use. implemented. 4) Implementation phase, this activity is a trial activity to observe the use of the Al-Quran integrated physics practicum manual according to the 2013 curriculum for IT/MA SMA in learning activities at several SMA/MA schools in West Sumatra. From this implementation stage, the results of the practicality test and the effectiveness test of the use of the practicum manual were obtained. The observed aspects of practicality and effectiveness in the process of practicum activities were student activities while carrying out practicum activities with Al-Quran integrated physics practicum manual. 5) Evaluation stage. after using the Al-Quran integrated physics practicum manual in accordance with the 2013 curriculum for IT/MA SMA in real activities in the field, then an evaluation of the usability of the product is carried out. The evaluation aimed to inspect the Al-Quran integrated physics practicum manual according to the 2013 curriculum for IT/MA SMA for further learning.

The product development of this research was carried out at IAIN Batusangkar, West Sumatra. The product was validated by 3 validators, namely one physics lecturer as material and media expert, one interpreter lecturer, and one high school physics teacher. The validated aspects can be seen from Table 1.

Table 1. Validation aspects of Al-Quran integrated physics practicum manual

No.	Aspects	Method of Data Collection	Instrument
1.	Pupose	Discussion conducted with physics education experts	Validation sheet
2.	Rationality		
3.	Content		
4.	Suitability		
5.	Language		
6.	Flexibility		

(Source: Modification of Nunuk Suryani.(Suryani, Setiawan, & Putria, 2018))

Table 2. Categories of Book Validity

Percentage (%)	Category
0-20	Not valid
21-40	Less valid
41-60	Quite valid
61-80	Valid
81-100	Highly valid

(Riduan, 2011)(Riduwan, 2005)

The data from the validation sheet is then tabulated, from the tabulation results the percentage is sought, with the formula: $P = (\text{number of scores per item} / \text{maximum score}) \times 100\%$. The percentage category of product validity is as shown in Table 2.

After the product developed was marked valid based on the validator's assessment, then a prototype was conducted in physics learning activities at school. The prototype was conducted at SMA 1 Payakumbuh. Practical

trials were carried out on fluid practicum material. When students conducted practicum activities, the teacher observed the practicum implementation process. After testing the use of the product by students in the form of practical activities, then a questionnaire sheet was given to determine the practicality of the product. The questionnaire sheet was filled out by 30 respondents. Aspects of practicality and effectiveness of using the Qur'an-integrated practicum manual are in Table 3 and Table 4:

Table 3. Practicality Aspect of Using The Qur'an-Integrated Practicum Manual

No.	Aspects	Method of Data Collection	Instruments
1.	The process of implementing practicum activities	Direct observation of the implementation process by the observer	Observation sheet
2.	Procedures and technical steps for the implementation of the practicum.	Student response questionnaire	Questionnaire
3.	Time of practicum activities		

Table 4. Effectiveness Aspect of Using The Qur'an-Integrated Practicum Manual

No.	Aspects	Method of Data Collection	Instruments
1.	Practicum skills and attitudes (scientific attitude and religious attitude)	Observation	Observation sheet of practicum activities and student attitudes

According to Sarwi and Khanafiyah (Sarwi & Khanafiyah, 2010), the calculation of the success of practical activities such as to achieve scientific work skills uses the equation:

$$K = \left(\frac{P}{N}\right) 100\%$$

Description:

K = The percentage of students who scored >70.

P = The number of students who scored >70.

N = The number of all students.

The parameter used to measure the success of this research is when the number of students who achieve a score of >70 is 85% of the total number of students. In other words, the use of this Quran-integrated physics practicum manual can be acknowledged effective for developing students' scientific work skills if the practicum score >70 is 85 %. The score is based on the KKM for high school physics subjects, for example 70 (B grades and above).

RESULT AND DISCUSSION

1. Analysis Stage

From the analysis stage, a need analysis and literature study was carried out. On this stage, it was found that high school physics practicum manual is really needed by teachers and high school students. The literature study was carried out by analyzing the syllabus and high school physics textbooks, so that it could be identified what physics materials could be developed for practicum activities.

2. Design Phase (planning)

At the planning stage, the objectives were formulated, analyzed the physics practicum material for class XI according to the 2013 curriculum KI and KD. Al-qur'an verses relevant to the physics practicum material were identified. The following showed practicum material and verses of the Al-qur'an that are relevant to the practical material in Table 5:

Table 5. Practicum Topics and Relevant Verses

Practicum Topics	Relevant Al-qur'an Verses
1. Rotational Motion of a Rigid Body	- QS Annisa verse 1 - QS Al- Jatsiah verse 22
2. Elasticity of materials and Hooke's law	- QS Ar-Rahman verse 7
3. Static Fluid	- QS Al- Fathir verse 12 - QS An-Nahl verse 79
4. Fluid Dynamics	- QS Al- Jatsiah verse 5 - QS Al- Jatsiah verse 13
5. Calometry	- QS Al-Quraisy verse 2 - QS Al-Kahfi verse 96
6. Heat Transfer	- QS Al- Waqiah verse 73 - QS Al- Qassash verse 29
7. Optical Instruments	- QS Al-Insyiqaaq verse 16 - QS As-Sajadah verse 5 - QS At-Tahrim verse 8 - QS An-Nur verse 35

3. Stage of development (development)

At the development stage, the design of the high school physics practicum manual integrated with Al-Quran was carried out. The researcher made a practicum manual that can be used by teachers in planning, implementing, and evaluating practicum activities in order to implement the 2013 curriculum. The advantages of this designed book are: 1) the developed practicum manual is in accordance with the 2013

curriculum which was developed according to the demands of KI, and KD in the 2013 curriculum. 2) in the practical material section in Chapter IV of the book, verses that are relevant to physics material of the Al-qur'an were added, therefore, teachers and students will be helped in implementing integrated physics learning Al-Qur'an. 3) the manual is also equipped with an assessment guide that can be used by teachers in assessing attitudes (affective domain) and

practical skills (psychomotor domain). 4) by taking a snippet of the practicum material in CHAPTER IV of the book, it can be used as a physics practicum module for students, so that teachers will be assisted to provide physics practicum modules for class XI SMA.

Product validation was assessed by 3 validators with different skills: an expert from Physics Education from the Physics Department, FMIPA UNP, an expert in interpretation of Quran from IAIN Batusangkar, and a physics teacher in high school. There were 7 validated indicators including: purpose, rationale, content, appropriateness, presentation, language, and flexibility. Based on the results of validation by experts, the category of physics practicum manual that integrates the Al-qur'an according to the 2013 curriculum for SMA/MA that has been developed is very valid, with the percentage of 83% as displayed below in Table 6:

From Table 6, it can be asserted that the assessment measured the product developed as feasible according to the assessment of physics learning experts, Quranic commentaries, and teacher assessments as users.

The results of practicality and effectiveness were obtained through a trial of the use of physics practicum manual integrated with Al-qur'an according to the 2013 curriculum for SMA/MA, in a high school in Payakumbuh. Practical aspects observed in the practicum process were student activities in carrying out practicum activities on the topic of calorimetry. The practicum assessment used the Physics Practicum assessment instrument including practicum performance, scientific attitude, and students' religious attitudes during practicum. The results of student attitudes observation can be seen in Table 7 and Table 8:

Tabel 6. Product Validation Result

NO	Indicator	Validator Score			Total	Maximum Score	% Validity	Category
		1	2	3				
1	Purpose	4	4	3	11	12	92%	Highly Valid
2	Rasional	11	9	10	30	36	83%	Highly Valid
3	Content	59	53	48	160	192	83%	Highly Valid
4	Suitability	23	20	18	61	72	85%	Highly Valid
5	Presentation	30	30	27	87	108	81%	Highly Valid
6	Language	35	29	27	91	108	84%	Highly Valid
7	Flexibility	3	4	3	10	12	83%	Highly Valid
Total						450		
Max Score						540		
% Validation						83%		
Category						Highly Valid		

Tabel 7. Result of Observation on Student's Attitude toward Science

No	Aspects Assessed	Total	Average	The Average of Student's Attitude toward Science
1	Discipline	94	78	77,8
2	Group Work	93	78	
3	Earnestness	93	78	

Tabel 8. Result of Observation on Students' Religious Attitude

No	Aspects of Religious Attitude	Total	Average	The Average of Student's Attitude toward Science
1	Pray before and after doing something.	101	84,16667	84,2
2	Give thanks when you succeed in doing something.	101	84,16667	
3	Tawakkal	101	84,16667	
4	Maintain good relations with humans.	101	84,16667	

Table 9. Result of Student Practicum Performance Scores

No	Practicum Skill Aspects	Total	Average value of each aspect	Class performance practicum average
1	Identify practical materials and tools	95	79	78,5
2	Stringing tools	93	78	
3	Implementation of practical procedures	94	78	
4	Reading measurement results	93	78	
5	Tidy up tools	96	80	

The practicum skills assessed in practicum activities consisted of 6 indicators namely, 1) students' ability to identify practicum materials and tools, 2) assembling tools, 3) carrying out practicum procedures, 4) reading results, 5) reporting data on practicum results (this was collected from student practicum reports), and 6) equipments maintenance by tidying up after the practicum. Practicum performance that can be developed through the use of high school/MA physics practicum manual integrated with the Al-qur'an according to the 2013 curriculum with an average score of 78.5 (scale 100) was considered in the prosperous category. The Result of students' Practicum Performance scores can be examined in Table 9.

As the average score of student learning outcomes is more than the essence minimum completeness criteria score which is 70, it can be stated that the use of the Al-Quran integrated physics practicum manual according to the 2013 curriculum for SMA/MA has reached an effective level in achieving practical skills with a score of 78.5.

Data effectiveness showing the effectiveness of the product that the researchers designed to develop practicum performance are not distinctive from the research conducted by Sarwi and S. Khanafiyah "Developing scientific

work skills of prospective physics teacher students through open-inquiry wave experiments", which was published in the Indonesian journal of physics education. 6 (2010) pp. 115-122. The average score of scientific work skills in the open-inquiry experiment of vibrations and wave courses has reached the effective level with a score of 78 (robel 1) and a score of 77 (robel 2). The indicators of scientific work observed also consisted of 6 indicators, but there is a slight difference from the performance indicators of the practicum conducted, namely: 1) determining student competencies according to the title of the experiment, 2) understanding the basic theory, 3) identifying materials and assembling tools, 4) formulating procedures and implementing (data collection), 5) compiling reports, 6) presentation skills (Sarwi and Khanafiyah: 2010). (Sarwi & Khanafiyah, 2010)

The scientific attitude of the students assessed in this study consisted of 3 indicators, namely: 1) discipline, 2) group work, and 3) earnestness. The average score for the student's scientific attitude is 77.8 (scale 100) with a good category. While the value of students' religious attitudes that were observed consisted of 4 indicators; namely, 1) Praying before and after doing something, 2) Saying gratitude words when successfully doing something, 3) Giving

thanks when successfully doing something, 4) Maintaining good relations with others. The average value of the religious attitude class of students observed by the teacher in the calorimetry practicum activity is 84.2 (scale 100). Indicators of religious attitudes and scientific attitudes that can be developed through the use of high school/MA physics practicum manual integrated with Al-qur'an according to the 2013 curriculum remains the same as former study conducted by Fauziah Ulmi et al. (Ulmi, Murtiani, & Hidayati, 2013) In his research titled "Development of physics teaching materials to integrate the character values of the Koran in static fluid and dynamic fluid materials for the learning of class XI high school students", which was published in the journal *Pillar of physics education*, Vol. 2. October 2013, pages 105 – 112, the indicators were religious character, hard work, curiosity, cooperation (communicative), and responsibility. The student character assessment for 4 meetings is plotted in a graph with a value range of 60 to 84 as the average.

Practicum results were obtained from student response questionnaires regarding the use of the Al-Quran integrated physics practicum manual according to the 2013 curriculum for SMA/MA in SMA 1 Payakumbuh. This data shows the practicality of the Al-Quran integrated physics practicum manual according to the 2013 curriculum for SMA/MA, obtaining an average practicality score of 89.8% in the very practical category. The statement presents; 1) The integration of the Al-Quran in the physics practicum manual opens my thinking horizon to the power of Allah SWT, 2) The integration of the given Al-Quran verses motivates me to study further to get 90% practicality percentage, 3) Integration The Koran in the physics practicum manual adds to my belief in the power of Allah SWT, getting a score of 91% in the very practical category. Therefore, it can be stated that the use of the Al-Qur'an-integrated physics practicum manual according to the 2013 curriculum for SMA/MA is very practical for use in learning physics in schools. In other words, learning related to the values of the Koran can increase students' belief in the greatness of Allah, and make students motivated to learn.

These results are also in line with those obtained by (Winarti, 2015) in a study titled, "Development of physics learning tools

containing Islamic-science integration to instill spiritual values in madrasah aliyah students". The results of his research stated that when the concept of physics is associated with verses of the Al-qur'an in learning, students are more interested due to the new information that has not been obtained in previous class. The results of the field test showed that students were very enthusiastic about participating in learning and became more curious about other physics concepts that could be related to the verses of the Qur'an. This is also in accordance with the opinion expressed by the teacher during the interview that students will be very interested if there is a touch of verses and Islamic values in learning physics.

CONCLUSION

Based on the development and trials that have been carried out, the following conclusions are obtained; such as, 1) developing a practicum manual for physics integrated with the Alqur'an according to the 2013 curriculum for SMA MA including stages which are analysis, planning, development, implementation and evaluation stages. After this stage was carried out, a physics practicum manual book integrated with the Qur'an was produced in accordance with the 2013 curriculum for SMA MA. 2) The research and development carried out produced physics practicum manual that was integrated with the Al-qur'an in accordance with the 2013 curriculum for MA SMA which was categorized as highly valid with the validity of 83%. 3) Based on the data from the observation of students' attitudes and practicum skills, it can be concluded that the Al-Quran integrated physics practicum manual in accordance with the 2013 curriculum for SMA/MA was effective for developing practicum skills, with an average score of 78.5 including scientific attitude 77.8, and religious attitudes 84.5. 4) From the student's response questionnaire, it can be deduced that the physics practicum manual integrated with Al-qur'an in accordance with the 2013 curriculum for SMA/MA is in the highly practical category with 89.4%.

The author suggests that the Al-Qur'an-integrated physics practicum manual in accordance with the 2013 curriculum for SMA/MA can be utilized as a guide for teachers

and students in carrying out practicum activities at school. Due to the limited amount of time, the author has not been able to test the effectiveness in using all the practicum modules in this manual. Therefore, it is hoped that there are teachers who are willing to use this practicum module in schools so that the effectiveness of this manual can be analyzed.

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