

Does Qur'an and Science Literacy Interrelated?

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Abstract

Al-Qur'an is the main guideline for Muslims. Muslims believe that all aspects of human life can be solved with it. Research with a mixed-method approach aims to answer the question of whether Qur'an literacy (QL) has an impact on the science literacy (SL) of prospective physics teachers. Based on the results of tests on 23 Physics teacher candidate students at UIN STS Jambi, it was found that the correlation between scientific literacy and Qur'an literacy was positive, 0.761, and significant, with a value $0.00 < 0.05$. The data show that there is a very strong positive relationship between SL and QL. Thus, it can be concluded that students (people) with good QL will tend to have good SL, as well. Therefore, those who study the Qur'an will indirectly have good scientific literacy skills. Thus, there is a need for integrated learning of the Qur'an and science. Such learning can be carried out for nonscience students, as well as for science students, to make them superior human resources with character.

Keywords: Qur'an literacy (QL), Science literacy (SL), Physics teacher candidates

1. Introduction

Science is the backbone of human civilization. Almost all changes in civilization begin with technological development, while technology is born and develops based on science. That is, why science can be said to be the backbone of civilization [1] [2] [3] [4]. It can also be seen, in general, that developing countries often "lose" in competitions with developed countries; why? Because developed countries are masters of science and technology. Thus, it can be said that those who master science and technology will rule the world.

Currently, science plays a role in almost all fields of human life, both in the field of technology and social politics. Global issues are always related to science for example, global warming, nuclear issues, economic issues, political issues and many more [5] [6] [7]. Even simple vehicles also involve science in the development process. This situation encourages all people (the State) to be science literate. That is, why literacy is a very important thing to be developed and controlled by all citizens so that their countries can advance.

People or countries who are literate in science will be able to address every development (global issues) better. They can analyze data accurately and make decisions quickly and accurately. In addition, people (countries) who are literate about science will also be able to analyze problems

and solve problems better. In short, people (the State) who are literate about science will be able to live better and more advanced lives. Therefore, scientific literacy is very important because science is always closely related to human life [8] [9].

The importance of science as a means of achieving a better civilization needs to be realized early on. In Indonesia, efforts to improve literacy continue to be pursued, for example with the implementation of the 2013 curriculum. Therefore, scientific literacy must be taught early so that students will have a better level of scientific literacy. In theory, scientific literacy can be taught from early childhood [10], to teenagers [11], adults/students and even to parents [12]. This means that scientific literacy can be studied and controlled by humans regardless of age.

Literacy comes from English “literacy” and is derived from the Latin “literatus”, which means people who study. In Indonesian, literacy is defined as a person's ability to understand and process information through reading and writing. This is in line with the opinion [13] that literacy is the ability to write, read, speak, extract, build, integrate and criticize a phenomenon that occurs. Understanding literacy is a very important and central public discussion because the ability to read and write illustrates the ability to understand a phenomenon that occurs [14]. Thus, literacy can be said to be an individual's ability to write, read and analyze, including interpreting various information/data from written material, or reading it. In general, literacy includes writing, reading, and listening skills [15]. Literacy can also be said to be the knowledge and skill to use this knowledge. These skills consist of the ability to read, write, and count, not only for self-development but also for others [16]. Literate people are able to read and write and provide ideas or statements that are simple in everyday life [17].

Referring to the above definition, it can be understood that literacy can be differentiated based on its source and field; for example, scientific literacy is the ability to read and write about science and technology. Digital literacy is the ability to understand and use digital technology and information devices [18] [19] [20]. Health literacy is the ability to understand and apply health science in daily life [21] [22] [23]. And, economic literacy is the ability to understand and apply economic science concepts in economic activities [24] [25] [26]. The diversity includes various disciplines including visual literacy, computer literacy, cultural literacy, formal literacy, functional literacy, work literacy, critical literacy, academic literacy, media literacy, non-school literacy, multi-capital literacy, and household literacy. Thus, if literacy is associated with the Qur'an, it becomes Qur'an literacy, which is the ability to read, understand and apply concepts contained in the Qur'an.

At present, the general level of science literacy in Indonesia is still relatively low. Various massive efforts to increase scientific literacy in Indonesia have been developed. This can be seen from the existence of various studies related to scientific literacy at various levels of education. Efforts to improve literacy not only apply certain learning models, but also involve the development of media, teaching materials, assessment instruments and training of prospective teachers, instructors and teachers. Scientific literacy is influenced by social culture, as well as the cultural perspective of society [27]. Therefore, efforts to increase scientific literacy also involve

various cultural elements; for example, through a wisdom approach or local excellence [28]. In addition, increasing scientific literacy can also be achieved with religious-based learning [14]. This proves that scientific literacy can be improved through a cultural approach and not merely through classrooms in schools. Thus, it is believed that an increase in scientific literacy can also be achieved through a religious approach.

Indonesia has majority Muslim population. Islam is practiced by approximately 75% of the population of Indonesia. Thus, the potential of Muslims in building the nation's civilization through scientific literacy is huge. If Muslims are scientifically literate, in general, the life of the Indonesian people will also improve. Various problems of the nation will be resolved quickly and accurately, so as not to cause prolonged conflict. The people who are literate in science will have the ability to think of various natural phenomena logically, systematically and based on critical thinking [16] [28] [29]. It is understood that the lives of almost all Muslims are strongly influenced by the Qur'an as a way of life. The Qur'an is the ultimate guide for Muslims. Muslims believe that all problems of human life, whether their own, their families', or even the nation's or state can be solved by the Qur'an. In addition, Muslims also believe that the Qur'an can be used as a guide for building a better human civilization because the Qur'an provides inspiration for its adherents to live more advanced and better lives.

At present, in general, the lives of Muslims are not as advanced as those of other people. This can be seen clearly in that the countries with majority Muslim populations are relatively behind other countries in which Muslims are not the majority. How could this happen? Some studies show that the backwardness is because they (Muslims) abandoned the Qur'an as the main guide in their lives. They do not truly follow the Qur'an as a real-life guide. They position the Qur'an as a holy book that is studied and read only at certain times. This resulted in Muslims not truly understanding the Qur'an as a way of life that is able to provide inspiration in solving various problems in daily life. The Islamic *ummah* became less literate in the Qur'an as a guide to life. Therefore, to live in a better civilization, Muslims must be literate about the Qur'an.

History proves that some people who are literate about the Qur'an will also be literate about life. For example, Abdurrahman ibn Awf was able to become the leading economist (economic/scientific literacy) in Medina [30] because he was literate in the Qur'an. One of the strengths of Abdurrahman bin Auf is being able to read (*iqra*) on business opportunities. Al-Jabar, also known as Al-Khawarizmi, an expert in algebra, geometry, and arithmetic [31], has known al-Quran since childhood. Ibn Sina, known by the name Avicenna, is a philosopher, scientist, and doctor [32] who also has known (literate) of the Qur'an since childhood. They become experts in their fields (literate in science) after they became literate in the Qur'an (having known the Qur'an since they were young). Ibnu Maskawaih and Mrs. Khaldun are philosophers (philosophical/scientific literacy), and educators [33] after they were literate towards the Koran. Even Yusuf Habibie (former President of Indonesia) became more enthusiastic and steeped in science after he became literate in the Qur'an. There are many more Islamic figures who contribute to human civilization. Likewise, the ancient Greeks also used religious values as a material consideration in

formulating various things about the world/nature. Thus, from the various facts and examples above, this article aims to illustrate the relationship between al-Quran literacy and scientific literacy, with the main question of whether Qur'anic literacy has an impact on the scientific literacy of prospective physics teachers?

2. Research Methods

This study uses a mixed-method approach to data collection and analysis. Qualitative data were obtained through a literature review of relevant sources. The quantitative data obtained related to Quran literacy and scientific literacy. Both data are obtained through tests. The test instruments compiled consisted of several questions that adjusted for the respondent's situation and conditions. Respondents in the study were students and the general public. Each respondent comes from a group that is estimated to have access to the Qur'an and science.

The scientific literacy test includes seven scientific literacy indicators, namely: (1) the ability to identify scientific ideas in an event/phenomenon, (2) the ability to find scientific literature, (3) an understanding of the research component, (4) the ability to read simple graphs, (5) the ability to find scientific solutions from data presentations, (6) the ability to make data-based conclusions, and (7) the ability to make data-based inferences/predictions. Each indicator is measured by three questions so that all SL questions consist of 21 questions with a maximum score of 21 points. Based on the points obtained, the respondents were grouped into three categories: high, medium and low.

In addition, to see the SL prospective teachers in more detail, the test results are analyzed in more depth. This analysis is to see how the ability of SL in each indicator so that it is easier to understand which indicators are already good and which indicators need improvement. The analysis of SL indicators is also based on test result scores. Of a total of 23 students, and with a score per item indicator of 3 points, the maximum total score of each indicator is 69 points. Based on the score, points are further grouped into three categories: high (46-69 points), moderate (24-45 points), and low (1-23 points).

Qur'anic literacy tests include the following indicators: (1) the ability to read and write verses of the Qur'an, (2) understanding/interpreting verses of the Qur'an, (3) applying the values of the Qur'an in everyday life, and (4) finding verses of the Qur'an that are appropriate to the situation and conditions for problem-solving. Based on the points obtained, respondents are grouped into three categories: high, medium and low.

As with the SL analysis, the QL test results are also analyzed according to the indicators. This analysis is to see the effect of QL on each indicator so that it is easier to understand which indicators are good and which indicators need improvement. Analysis of the QL indicator is also based on test result scores. With a total of 23 students, while the score per item indicator is 3 points, then the maximum total score of each indicator is 69 points. Based on the score, respondents are further grouped into three categories: high (46-69 points), moderate (24-45 points), and low (1-23 points). A correlation test is used to see the relationship between the ability of SL and QL using a Pearson correlation test with the help of SPSS version 25.

3. Results and Discussion

3.1. Science in Al-Qur'an view

The concept of science is defined as a methodology to investigate nature in an organized manner [34] [35]. According [36], science can be defined as an effort to understand and study the natural environment as experienced by humans. Technology is an effort to meet the needs of human life [37], which can be physical, social and cultural, as a result of the application of science. Science can be described as a complex network to help humans can manage themselves and the process of involving other people that are dynamic, for example in a research project, and many more [38]. Thus, a theory can be said to be scientific if: 1) Is done in according to natural law; 2) Explains natural events or phenomena; 3) Can be empirically tested; 4) Tentative conclusions, and; 5) Can be falsified [34] [39] [40]. Conventionally, science has three main functions, namely: (1) to seek the truth, (2) to gather valid knowledge, and (3) to admire the wonders of the universe.

As has been explained above, science greatly influences human life and the way we view nature, thus, it is only with religion that it has been widely accepted by humans in their lives [7] [41] [42]. By understanding science, humans will know where God is. Science also plays an important role in religious education. Thus, it is clear that science versus religion is not something that needs to be debated, so there is no need for a dichotomy between science and religion.

The Qur'an as the main guideline for Muslims is a perfect book to respond to various problems faced by humans [43]. The Qur'an provides guidance to humans (Muslims) about rituals of the end and talks about nature and science. Al-Qur'an and Sunnah have provided a complete system of inspiration and cover all aspects of human life [44]. In the Qur'an, there are three dimensions, namely, belief or faith, humanity and science. Thus, it is natural for Muslims to believe that religion is a guide to humans in pursuing or studying science.

Regarding science, the Qur'an gives (the first) command to read or *iqra*. The word *iqra* can also be interpreted contextually as an observation or observing activity. The meaning of *iqra* in the Qur'an has four meanings, namely: (a) how to read, (b) how to learn, (c) how to understand, and (d) how to know (research). From these explanations, it can be understood that the word *iqra* means, as stated by researchers, observing, studying (classifying and associating) and collecting data as part of the scientific process [45]. This proves that this first verse is the basis for humans (Muslims) and can be used as a scientific basis because in this verse there is also a push for humans to have a scientific attitude, *iqra*, which means observation as the initial step of a scientist. This verse also means to encourage Muslims to be literate of religion and science together. The Qur'an as a guide to humanity for a better life is not specifically speaking about science. The Qur'an only provides stimuli and commands that humans think about life in the universe. However, the Qur'an gives very serious attention to science. This shows that the Qur'an views science as something very important and it encourages and commands humans to learn it.

In the Qur'an, the urge that humans become scientists is found in several verses, for example by using invitations to read (Al-Alaq verses 1-5), see (Father, verse 27), pay attention (Al-Hajj,

verse 5), and observe natural phenomena (Luqman, verse 20). In addition, the Qur'an also teaches reasoning and thinking (An-Nahl, verse 11), in order to become a scientist or expert (Al-Imron, verse 190) and take lessons from various natural phenomena (Yunus, verse 3). The verses above indirectly encourage humans to become scientists with critical thinking skills and processing skills. This is in line with the opinion [45] that scientific process skills (basic) include the ability to observe, classify, collect data, analyze data and communicate. The ability to think critically is the basis for understanding scientific concepts [46] [47] [48], applying and locating and evaluating various information that has been obtained to take lessons and conclusions.

In addition, there are several verses of the Qur'an specifically talking about matter or chemicals. For example, the Qur'an talks about chemicals (iron) and steps to overcome corrosion. Of course, this can be done only if readers are able to interpret al-Quran (Quran literacy) and have scientific literacy. The Qur'an is an effective source for introducing God as the creator of nature (science). Thus, the Qur'an can be used as a teaching material in learning science [49] . Science, technology, and religion are forces that can color and transform human life. In theory, belief (religion) is very influential, and there are various social processes of society, including public health and the process of evolution [50].

3.2. Relationship between Qur'anic Literacy and Science Literacy

3.2.1. Science Literacy

Science literacy (SL) test for 23 students of prospective physics teachers, involving seven indicators of scientific literacy obtained the following data in Table 1.

Table 1. Literacy Test Results for Prospective Physics Teacher Students

No	Total of Student	Percentage (%)	Category
1	5	21,73	High
2	10	43,47	Medium
3	7	30,43	Low
Mean	23	100	

Based on Table 1a above, it appears that prospective physics teachers have SL at the medium level, which is as much as 43.47%. Furthermore, 30.43% have a low ability, and 21.73% have a high ability. This shows that, in general, prospective physics teachers have relatively high school skills that can be improved. To determine in more detail how the SL of prospective teachers in each SL indicator, below are presented the results of the analysis of indicator-based SL tests. Table 2 shows that each indicator has a different score.

Table 2. Literacy Test Results of Prospective Physics Teacher Students in Each Indicator

No	Indicators	Average of score	Percentages (%)	Category
1	Identification of scientific ideas	58	26,97	High
2	The ability to find scientific literature	28	13,02	Moderate
3	Understanding of research components	20	9,30	Low
4	Read data in a graph	18	8,37	Low
5	Find scientific solutions from data	36	16,74	Moderate
6	Make data-based conclusions	34	15,81	Moderate
7	Make data-based inferences/predictions	21	9,76	Low
Total		215	100	moderate

Based on Table 2, it can be seen that the scientific literacy of prospective physics teachers is an indicator of identifying scientific ideas, which is 26.97% in a high category. The lowest indicator is the indicator of understanding the research component. This shows that, in general, prospective physics teachers have good abilities in finding and identifying scientific ideas that underlie an invention. However, they still have difficulty in understanding the procedures in the research process. Therefore, it can be said that their ability to conduct research is relatively low.

3.2.2. *Qur'an Literacy*

The Qur'an literacy (QL) test of 23 physics teacher candidates, involving seven indicators of scientific literacy, obtained the following data in Table 3.

Table 3. Qur'an Literacy Test Results of Prospective Physics Teacher Candidates

No	Total of Student	Percentages (%)	Category
1	8	34,78	High
2	11	47,82	Medium
3	4	17,39	Low
Mean	23	100	

Based on Table 3, it is seen that in general prospective physics teacher students have the capability of Quran literacy at the medium level, which is as much as 47.82%. Furthermore, 34.78% have high ability and 17.39% have a low ability. Thus, such as SL, QL also needs to be

improved. For this reason, the following are presented in more detail the results of the analysis of indicator tests in QL. More complete data can be seen in Table 4.

Table 4. Qur'an Literacy Test Results for Prospective Physics Teacher Students in Each Indicator

No	Indicators	Average of Score	Percentages (%)	Category
1	Ability to read/write the Qur'an	55	31,97	High
2	Understanding/interpreting the Qur'an	38	22,09	Moderate
3	Applying the Qur'anic values of life	20	11,62	Low
4	Find the appropriate verse in problem-solving	59	34,32	High
	Total	172	100	Moderate

Based on Table 4, it can be seen that for QL, the first indicator (the ability to read and write the Qur'an) and the fourth indicator (finding a verse that fits the problem) is in the high category. The lowest ability is in the application of AL-Qur'an values in daily life. Whereas in the second indicator, that is, understanding the meaning and meaning of the Qur'an, is in the moderate category. The situation in the above table can be understood considering the first indicator and the fourth indicator is in the cognitive domain, which is lower than the third indicator.

3.2.3. Science Literacy Correlation Vs Qur'an Literacy

Tadris Physics Department is one of the departments at Sulthan Thaha Saifuddin Jambi State Islamic University that strives to train prospective physics teachers. In this department, students are trained to be able to integrate science (Physics) with the values contained in the Qur'an and Hadith as the main source of Islamic law. Thus, students of this department have the opportunity to study science and the Qur'an in an integrated manner so that they have the opportunity for SL and QL to be relatively balanced. The test for students majoring in Physics Tadris aims to see the correlation between SL and QL. Based on the results of tests and analyses using SPSS version 2.0 obtained the following correlation in Table 5.

Table 5. Data Normality Test of Science Vs. Literacy Students (Nonscience)

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Science Literacy	.169	20	.135	.887	20	.024
Qur'an Literacy	.177	20	.101	.894	20	.032

a. Lilliefors Significance Correction

Based on SL and QL data normality tests, each value of sig is obtained. of 0.24 and 0.32, which means > 0.05 . Thus, both data are normally distributed. Furthermore, the correlation can be tested. The results of the data correlation test can be seen in Table 6.

Table 6. Correlation of Science Literacy Vs. Student Literacy

Correlations			
		Science Literacy	Qur'an Literacy
Science Literacy	Pearson Correlation	1	.761**
	Sig. (2-tailed)		.000
	Sum of Squares and Cross-products	180.550	126.100
	Covariance	9.503	6.637
	N	20	20
Qur'an Literacy	Pearson Correlation	.761**	1
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross-products	126.100	152.200
	Covariance	6.637	8.011
	N	20	20
**. Correlation is significant at the 0.01 level (2-tailed).			

Based on Table 6, obtained a correlation between scientific literacy and Qur'anic literacy of positive 0.761 and a significance value of $0.00 < 0.05$. The data shows that there is a positive relationship between SL and QL with a very strong relationship category. Thus, the data showed that students (people) with good QL skills will tend to have good SL, as well. Therefore, it can be said that people who study the Qur'an will, indirectly have good scientific literacy skills. In addition, vice versa that people who study science will be increasingly convinced of the truth of the Qur'an as a guide to human life.

Referring to the above exposure data, it can be understood that the Qur'an as a guide to Muslim life inspires and encourages humans to become scientists, that is, those who have good scientific literacy. The Qur'an does not give instructions or information about science in detail, but will give it generally in the form of instructions to read, observe, contemplate, think about and take lessons from various natural and social phenomena in the past. In addition, the Koran also encourages humans to explore scientific approaches (scientific methods), to objects or substances that are very small by using the term Dzarroh (QS: Al-Zalzalah, verses 7-8), or to extrapolate the

universe (QS; Ar-Rahman, verse 36). Overall, the commands in the Qur'an encourage people to be literate about science.

4. Conclusions

Based on the data and discussion as described above, the correlation between scientific literacy and Qur'anic literacy is positive 0.761 and significance value $0.00 < 0.05$. The data shows that there is a very strong positive relationship between SL and QL. Thus, it can be concluded that students (people) with good QL skills will tend to have good SL, as well. Therefore, those who study the Qur'an indirectly will have good scientific literacy skills.

Suggestion

At the end of this research, the suggestion that can be made is that there is a need for integrated learning between the Qur'an and science. Learning can be carried out for nonscience students as well as for science students. With this integration, it is hoped that the Indonesian people will have better literacy in Qur'an and science. It is this two literation's that will ultimately make them superior human characters.

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