Students' Response to the Integration of Islamic Context in PISA-Oriented Social Arithmetic

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Abstract. Programme for International Student Assessment PISA) raises mathematics questions regarding contextual issues in real life. One potential context is the integration of Islam, also known as the Islamic context. The aim of this study was to determine students' responses to the integration of Islamic context in PISA-oriented social arithmetic problems. A descriptive qualitative approach was used to conduct this study. The participants were 8th grade students from a Junior High School in Banda Aceh. The research data was collected by questionnaires and interviews. The instruments used student response questionnaires sheets and semi-structured interview guides. The results showed that students' responses to the integration of Islamic context in PISA-oriented social arithmetic problems had an average percentage of 81.66%, which is categorized as 'very good'. Based on each indicator, it can be concluded that although students' problem-solving abilities are still categorized as 'bad', most students are very enthusiastic and like the type of problem that integrates the Islamic context to be applied in learning. Additionally, the integration of Islamic contexts - values and other concepts - in the learning process influence students' motivation to learn, guide their actions according to Islamic law, and develop religious attitudes and characters.

Keywords: Islamic Context, PISA, Student's Response.

1 Introduction

Education is essential in preparing excellent human resources. Specifically, school education provides students with the opportunity to develop their potential and hone the skills they will need in the future. Mathematics supports students' growth in logical thinking and reasoning. The thinking process requires the ability to think critically, creatively, and communicate using mathematical models effectively. This aligns with the aims of teaching mathematics in schools, as outlined in Permendikbud 2014 [29].

The educational process includes the assessment of learning outcomes in accordance with desired outcomes. One method of assessing student proficiency in mathematics is to examine their reasoning skills. Specifically, students are given non-routine mathematical problems to demonstrate their ability to solve problems, reason

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mathematically, and communicate. The assessment process requires mathematical problems to serve as measurement tools. The Program for International Student Assessment (PISA) has developed a framework for most of these instruments. PISA modeled mathematical problems are used to measure students' mathematical communication, reasoning and problem solving [1-4].

PISA uses contextualized problems as a framework for presenting mathematical concepts, which allows students to better understand their application in real-life contexts [5- 6]. PISA questions are questions that can sharpen students' understanding of pure mathematical concepts and their application to real-life problems. Various countries in the world, including Indonesia, have used PISA assessments to evaluate the progress of their students. Indonesia has participated in the PISA assessment since 2000 [6-7].

Unfortunately, the 2018 PISA survey revealed that Indonesia remains ranked at the bottom. Indonesia was ranked 73rd out of 79 participating nations in mathematics with a score of 379, falling below the OECD's average score of 489, as reported by [6]. Improvements in the education sector are crucial since Indonesia remains at the bottom of the rankings. This is important since PISA serves as a standard for a nation's education system's quality.

The most important domains of mathematics in the PISA 2022 framework include the context domain [8]. According to KBBI [9], context pertains to the situation or background of a problem. The PISA math problems aim to enhance students' mathematical problem-solving skills by providing real-life scenarios which enable them to grasp the situation more effectively and reap the benefits of mathematics. It is expected that these problems will train students to become better problem solvers.

In a country with a Muslim majority, Islamic values can be integrated into learning contexts. Abdussakir [10] suggests that incorporating these values into math education can benefit students. Lutfiano & Sari [11] stated that when students understand the advantages of the problem or material they are learning, they are more inclined to apply it in real life. Furthermore, the integration of Islamic contexts into mathematics education can facilitate the acquisition of knowledge and behavior aligned with Islam, promote positive character development, and enhance motivation and critical thinking abilities [12-13].

Social arithmetic [13-14] is a topic in mathematics subject related to economic aspects of everyday life, such as sales, purchases, and profits and losses. The Sharia lays out Islam's views on economic activities, which have thrived since the Prophet Muhammad and the Caliphs' times, including industries, trades, and agriculture. Mathematical concepts will always be essential in solving economics- related problems [28].

Integrating Islamic context in the learning process can motivate students to learn and practice in accordance with Islamic law. By including Islamic context as one of the contextual options, problem-solving questions like those in PISA can be formulated. This article explores how students respond to the integration of Islamic concepts in PISA-based social arithmetic.

2 Method

This study used a qualitative descriptive method, which produces descriptive data in the form of writing that describes the experiences of the research subjects [16]. Careful consideration was taken in selecting the subjects, which comprised 20 students of 8th grade from a junior high school in Banda Aceh who had an integrated *Tahfidzul Qur'an* (memorize the Quran) education background. The data collection technique for this study was questionnaire and interview. The study used a questionnaire sheet with six response indicators and interview guidelines. Questionnaires were used to collect data related to students' responses after working on PISA-oriented social arithmetic problems integrated with Islamic contexts. The interviews were conducted with the subjects to strengthen the questionnaire data. The measurement of student responses in the questionnaires is based on a Likert scale. The study used Table 1. indicators of student responses:

Table 1. Indicators of student response questionnaire

Indicators	Criteria	Score
Students' attitude towards working on PISA-oriented questions integrated with Islamic contexts	Interested and seriously working on all questions	4
	Interested and seriously working on some problems.	3
	Interested but not seriously working on the problem	2
	Not interested in working on the problem	1
Students' impressions after working on PISA- oriented questions integrated with Islamic contexts	Very enthusiastic	4
	Enthusiastic	3
	Quite enthusiastic	2
	Unenthusiastic	1
Students' ability to solve PISA-oriented problems integrated with Islamic contexts	Do all the questions because they feel capable	4
	Do most of the question	3
	Working on questions and answering as best as you can	2
	Did not do all the questions because the questions were difficult	1

	Very frequently (every learning is done)	4
Intensity of usage of mathematical problems integrated with Islamic context	Frequently (during practice)	3
	Infrequently (during chapter tests)	2
	Very Infrequently (during the final assessment)	1
The questions were added/reinforced insight about Islam	Strongly Agree	4
	Agree	3
	Disagree	2
	Strongly Disagree	1
Integration of Islamic context into the problems motivates students to learn mathematics	Strongly Agree	4
	Agree	3
	Disagree	2
	Strongly Disagree	1

Source: [11; 17

The data obtained from the questionnaire was then analyzed qualitatively using Table 2. of student response criteria:

Table 2. Criteria for student response

Score Criteria	Percentage	Category
4	76-100	Very Good
3	51-75	Good
2	26-50	Bad
1	0-25	Very Bad

Source [17]

3 Result and Discussion

The research was conducted at one of Junior High Schools in Banda Aceh, with the research subjects as many as 20 students of 8th grade which aims to determine students' responses to the integration of Islamic context on PISA- oriented social arithmetic. All subjects will complete the designed questions and subsequently receive a questionnaire. This questionnaire includes the statements aimed at investigating the Integration of Islamic context on PISA-oriented social arithmetic questions. Table 3 is presented the data from the questionnaire:

Table 3. Results of student response questionnaire

Indicators	Students Response			
	4	**3**	**2**	**1**
Students' attitude towards working on PISA-based questions integrated with Islamic contexts	4	10	5	1
Students' impressions after working on PISA-oriented questions integrated with Islamic contexts	8	8	4	0
Students' ability to solve PISA-oriented problems integrated with Islamic contexts	1	3	12	4
Intensity of usage of mathematical problems integrated with Islamic context	20	0	0	0
The questions were added/reinforced insight about Islam	18	2	0	0
Integration of Islamic context into the problems motivates students to learn mathematics	15	5	0	0

The questionnaire data in table 3 were analyzed to determine the percentage of student responses for each indicator. The average percentage of student responses is presented in The table 4.:

Tabel 4. The percentage of student response

Indicators	Percentage	Category
Student's attitude towards working on PISA-oriented questions integrated with islamic contexts	71'5	Good
Student's impressions after working on PISA-oriented questions integrated with islamic context	80	Very Good
Students' ability to solve PISA-oriented problems integrated with Islamic contexts	47.5	Bad
Intensity of usage of mathematical problems integrated with Islamic context	100	Very Good
The questions were added/reinforced insight about Islam	97.5	Very Good
Integration of Islamic context into the problems motivates		

students to learn mathematics	93.75	Very Good
Average	**81.66**	**Very Good**

Table 4 presented that the average percentage of student responses is 81.66% in the "very good" category. This pattern reflects the outcomes of earlier studies, which assert that students encouraged by the relevance of learning to their lives find purpose and motivation in their studies, leading to improved academic performance [9, 16-18]. These findings suggest that pupils recognize the practical value of acquiring mathematical skills towards addressing a range of challenges in everyday existence. This pattern reflects the outcomes of earlier studies, which assert that students encouraged by the relevance of learning to their lives find purpose and motivation in their studies, leading to improved academic performance [9, 18-20]. The following transcripts of interviews are presented as supporting evidence for this assertion:

R : What do you think about the problem you did previously?
S : Some are straight forward while others are challenging, Miss.
R : Has the learning you've had so far been useful?
S : Yes, Miss. The problems studied are similar to those encountered on the exam.
R : Oh, I understand. Do you believe that acquiring knowledge in mathematics brings advantages in life?
S : Yes, it appears that mathematics is necessary for solving various issues in this life, including matters related to *zakat* (the issue posed in the question) and other problems.
R : So, do you think it's important for us to learn mathematics?
S : Yes, I do, Miss.

From the interview results above, it was found that students' responses were also accompanied by students' positive perceptions of mathematics. The integration of Islamic contexts into the learning process was found to have a positive impact on the students' perceptions of mathematics. This result supports research [19], which indicates that students with an Islamic educational background tend to have a negative perception of mathematics. However, when Islamic learning is integrated into mathematics education, this perception can change to a positive one. This is exemplified by Tahfidzul Qur'an, as evidenced by interviews with multiple participants regarding their perceptions of mathematics.

R : Did you receive the information well?
S : Yes, Miss.
R : Do you comprehend the correlation between mathematics and religious matters that are incorporated into education?

S : At first, I didn't comprehend the topic, but after the explanation and practicing with some of the exercises, I was able to grasp the connections.
R : Do you find mathematics to be a complex subject after completing this lesson?
S : It was challenging before, Miss. Sometimes when I was learning I would get stuck and feel bored, but after going through the lessons I got used to it and felt better.
R : So, do you think it's important for us to learn mathematics?
S : Yes, I do.

The above interview transcripts present the conclusions drawn from numerous interviewees. Generally, students' perceptions and achievements improved after receiving learning that integrated Islamic contexts. This aligns with related research indicating that students' perceptions, motivation, interest, and learning outcomes are positively affected by learning that incorporates Islamic contexts [17, 20]. For students with an Islamic educational background, whose daily routine includes memorisation of the Qur'an and studying religious knowledge [19], this is particularly relevant.

As presented in Table 4, the integration of the Islamic context in the problems can motivate students to learn more about mathematics because it can help solve problems in Sharia law and can also add and strengthen insights related to the practice of Islamic law. This study aligns with earlier research stipulating that introducing Islamic contexts in teaching and habituating them in the learning process can aid student interest and motivation in practicing the applicable sharia [9, 17]. In addition, research conducted by Wibowo et al. [17] demonstrated that habituating the integration of Islamic values in learning and students' daily lives can stimulate enthusiasm and have a positive impact on their intention to follow Islamic law. The interview transcripts provided below serve as supporting evidence for the findings.

R : In addition, in terms of the learning and the questions presented, did you find it interesting?
S : Yes, indeed. In addition to acquiring knowledge on the role of mathematics in problem-solving, such as with Zakat and other Islamic teachings, it also enhances comprehension of the associated concepts.
R : Did the lessons delivered increase your enthusiasm for charitable activities or religious worship, as described?
S : Right, Mum.

The results of the above interview showed that learning presented with the integration of Islamic contexts has a special attraction for students. They perceive various advantages and adhere to the taught practices of worship with great willingness. As per the investigation carried out by Wibowo et al. [17], the integration of Islamic

values in education not only piques students' curiosity but also encourages them to develop a propensity towards practicing relevant worship.

Integrating Islamic values and concepts into mathematics education is beneficial to students as it helps them understand the practical applications and significance of mathematics in everyday life. Avoiding subjective evaluations, clear and concise language, logical structure, conventional formatting, objective tone, and precise vocabulary are integral in achieving academic writing quality. Consistent adherence to grammar and spelling rules, as well as proper citations, also contribute to refined academic writing. Nizar, Putri, and Septy [6] found that incorporating Islamic contexts enhances students' mathematical proficiency, encompassing mathematical communication competencies, the formulation of mathematical problem-solving strategies, mathematical representation abilities, and mathematisation skills. The aforementioned survey reinforces the discoveries of past examinations indicating that the inclusion of Islamic context in education not only enhances students' mathematical skills but also has an impact on their views regarding mathematics [20].

4 Conclusion

Based on the results and discussion in this study, it can be concluded that students gave a "very good" response to the integration of Islamic context in PISA-oriented social arithmetics problems with a percentage of 81.66%. It can also be concluded from each indicator that although the average student's ability to solve the problem is still 'bad', the majority of students are very enthusiastic and like the type of problem that integrates the Islamic context to be applied in learning. Additionally, the integration of Islamic contexts - values and other concepts - in the learning process influence students' motivation to learn, guide their actions according to Islamic law, and develop religious attitudes and characters. However, further research is needed to apply PISA-oriented problems with relevant contexts in classroom learning.

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