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Development of Social Arithmetic Teaching Materials with Islamic Characters on 7th Grader Students

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abstract

This study aims to develop Social Arithmetic teaching materials integrated with Islamic characters that valid, practical, and effective. This research is developmental research that deploys a four-D development model from Thiagarajan, Semmel, and Semmel. The research stages are Define, Design, Develop, and Disseminate. The research instruments used were expert validation sheets, teacher and student response questionnaires, and learning outcomes tests. The data analysis of the validity and practicality of the prototype was carried out by converting quantitative data in the form of an assessment score into qualitative data. Effectiveness data analysis was carried out by determining the percentage of student learning completeness based on a standard of learning completeness criteria (KKM). This developmental research produced teaching materials for 7th grader students: Teacher handbooks, Student handbooks, Student Activity Sheets, and Learning Outcomes Tests that integrated with Islamic value; religion, honesty, curiosity, caring, hard work, independence**,** patience, honest, thoughtful, consistent, and tolerance. The research showed that the developed teaching materials were valid, practical, and effective in Social Arithmetics learning. Teaching materials are declared valid with the content validity value of the Teacher handbook is 1.00; Student handbook is 0.96, and Students Work Sheet is 0.86. Teaching materials are stated to be practical by obtaining an average value of the teacher's response is 4.75, and student response is 3.45 with both categories are good. Teaching materials are declared effective based on the 95% completeness of student mastery learning and hypotheses testing.

Keywords:
Islamic Character, Teaching Material, Developmental Research, Social Arithmetic, affective assessment,

INTRODUCTION

Reconstructing character education in schools is a discussion and special concern for academics (Erricker & Erricker, 2000; Rasna & Tantra, 2017; Rudyanto & Retnoningtyas, 2018; Sanjaya, 2017) since the Ministry of Education and Culture formulates no character education model through the 2013 curriculum. In 2010 the Ministry of National Education launched a National Policy on Character Development Nation Year 2010-2025. This policy was motivated by the dire situation and condition of the nation's character. Besides, the attachment of Law of the Republic of Indonesia Number 17 of 2007 concerning the National Long-Term Development Plan 2005-2025 also empasized that the first of the eight missions are to realize national development, creating a society with noble character, morals, ethics, culture and civilization based on the philosophy of Pancasila. It is to strengthen national identity and character through education. It forms human beings who devote to God, obey legal rules, maintain internal and harmony between religions, carry out multicultural interactions, develop social capital, implement noble cultural value, and are nationalist to strengthen the spiritual, moral, and ethical foundation of the country development (Republik Indonesia, 2007).

In Mathematics, character education is integrated as an effective aspect that students must master by incorporating Islamic values (Maarif, 2015; Rudyanto & Retnoningtyas, 2018; Safitri et al., 2020; Yustinaningrum et al., 2020). As a result, teachers must plan character education from beginning to end, from planningto evaluation. Character education in schools must be backed up by positive role models such as teachers and parents, as well as a culture of character (Marzuki, 2012, 2019). According to (Pertiwi & Marsigit, 2017) the supporting factors for the implementation of character integration in schools are (1) the school's vision and mission; (2) the existence of rules and regulations that the school has regulated, (3) good support and cooperation among school members; (4) the condition of students who have good character basics; (5) examples of positive teacher behavior as role models. While the impediments are (1) the teacher's lack of understanding of the concept of character education in mathematics learning; (2) teachers' difficulty identifying character values from basic mathematical competencies; and (3) teachers' inability to implement integrated character education in mathematics learning properly; (4) incomplete facilities and infrastructure; (5) documentation of assessment of student attitudes is still weak. This finding is in line with the conditions at MTsN Aceh Tengah, where character education is difficult to implement due to the absence of Mathematics learning tools with character content even though MTsN 2 Aceh Tengah is a religion-based school. This is a phenomenon in schools/madrasahs because teachers do not know the planning, implementation, and evaluation of learning those hone effective aspects. Schools only focus on cognitive assessment (Fitriah et al., 2015; Muslich, 2014; Noer, 2012; Saftari & Fajriah, 2019), while affective aspects are only seen generally through discipline, politeness, and student hygiene. However, the 2013 curriculum requires a balanced assessment of cognitive, affective, and psychomotor. In an attempt to increase academic performance and the consistency of the educational environment offered in schools, (Hall, 2011; Kleebbua & Siriparp, 2016; Koren et al., 2008) suggested that students' attitudes, beliefs, dispositions, and ethical perspectives are important and essential to embraced and assessed. Therefore, it is essential to design and develop teaching material integrated with Islamic characters/values.

This research is important because based on interviews with Mathematics teachers at MTsN 2 Aceh Tengah, teachers have difficulty integrating Islamic characters in mathematics teaching materials. Students are active in learning but are not honest when working on the questions given by the teacher and tend to cheat on their friends. When working on the assignment, students are also less careful and impatient. They tend to get

bored quickly, give up quickly, and rush to solve math problems, and assume that mathematics is a difficult subject. Students tend to argue and do not respect each other's answers in solving math problems if there are different solving steps. This condition is in line with some research that found that many students have negative attitudes while learning Mathematics (Akin & Kurbanoglu, 2011; Bekdemir, 2010; Bragg, 2007; Ignacio et al.

Several studies have shown the urgency of developing teaching materials integrated with Islamic character in Mathematics learning. Integrating mathematical concepts with Islamic values is very important to shape the character of the nation's generation (Khoiriyah, 2018). According to (Asdarina & Arwinda, 2020), character education improves both student achievement and attitude. Another study found that Al-Qur'an-based mathematics learning tools are effectively applied to improve students' abilities and character (Gradini et al., 2017). Moreover, it is important to develop teaching materials integrated with Islamic characters to change the perception of mathematics teachers. In the teacher's mind, learning mathematics is only about how to master the learning material e.g how students understand and solve problems in Mathematics. Teachers should hone the character of Islamic values to increase students' faith and piety by integrating existing basic competencies (Arif, 2019). The integration of character is carried out by linking the verses in the Al-Quran and Islamic morals and values (Istiqlal & Jumadi, 2018).

There are many theories on the concept of character and Islamic character building in particular (Agusti et al., 2018; Jamaluddin, 2013; Kim et al., 2019; Sukardi, 2016; Sukestiyarno et al., 2019; Suyitno et al., 2019). Aristotle defines character as a true-life relationship both to others and to oneself. This relationship presents control over oneself, self-desire to do the right thing for others (Lickona, 2009). Lickona states that character is the values that operate and act in response to situations and consist of knowledge about morals, moral feelings, and behavior. Furthermore, (Kusno et al., 2014) stated Islamic character as a quality inherent in someone who shows identity, characteristics, obedience, or Islamic information. The Islamic character will be reflected in thinking and acting, which always represent Islamic values. In terms of behavior, people with Islamic character always show perseverance in belief, obedience to worship, and good relations between humans and the environment.

In this study, Islamic character that integrated to Social Arithmetics are honesty(الصدق), curiosity (الا سـ تطلاع حب), caring (رعاية), hard work (الـ جهد), independent (مـ سـ تـ قل), patience (الـ صـ بر), thoughtful(تـ فكـ ير), consistent (ا سـ تـ قامة), and tolerance (تـ سامح). The indicator used for those Islamic characters adapted from (Masduki et al., 2014). Social Arithmetics and students daily life is inseparable so that many Islamic character/values can be found and explored. Exploring Islamic character/values in the material believed will help the teacher in both affective and cognitive domains. Since the act of valuing is performed by individuals, (Bishop, 2001, 2008) claims that a socio-cultural perspective is important to comprehend the role of values in mathematics education. In and of themselves, the symbols, methods, and products of mathematical operation have no meaning. These practices and products can only be valued by people and the institutions of which they are part.

METHODS

This research is developmental research that deploys the Four-D development model from Thiagarajan, Semmel, and Semmel. The model initiates four steps; Define, Design, Develop, and Disseminate (Thiagarajan et al., 1974) described as follow:

1. Define. This phase aims to define the requirements for the learning process. The define phase consists of front-end analysis, learner analysis, task analysis, concept analysis, and specifying instructional objectives.
2. Design. This phase aims to design the teaching materials that will be developed to obtain a prototype. This phase consists of media selection, format selection, and initial design.
3. Develop. This phase aims to modify and develop the prototype, Teacher Handbook, Student Handbook, and Student Activity Sheet designed in the previous stage. Then, the validity, practicality, and effectivity of the prototype assessed by expert validators and trial respondents.
4. Disseminate. This phase aims to distribute the prototype, Teacher Handbook, Student Handbook, and Student Activity Sheet that has been valid, practical, and effective. The teaching material was distributed to mathematics teachers from junior high school at Aceh Tengah at this phase.

The developed teaching material was analyzed to determine its validity, practicality, and effectiveness. The relevance and consistency of a teaching tool are used to determine its validity. Two experts validated the teaching materials: the 1st validator's expertise is in mathematics education and the 2nd validator is in Islamic character building. The expert agreement index for content validity compares the number of items in the strong relevance category of overall items between two experts. The expert agreement index for content validity compares the number of items from two validators highly relevant to the general item's category (Gregory, 2004). Table 1 shows the results of the contingency tables, while Formula 1 shows the validity coefficient.

Table 1.
The relevance category scoring with two validators (Gregory, 2004)

		Validator 1	
		Weak	Strong
Validator 2	Weak	A	B
	Strong	C	D

Validity coefficient $= \frac{D}{(A+B+C+D)}$ .... (1)

Observing the implementation of teaching tools is one way to assess the practicality of the teaching material. A questionnaire, 1 to 4 Likert scale, was distributed to three mathematics teachers and 40 7th grader students to obtain the practicality score. The practicality score is obtained from the average score of each item then interpreted to a category. Table 2 shows the practicality score for each teaching material.

Table 2.
Practicality Score of Teaching Tools

Interval	**Category**
$3.50 \leq M \leq 4.00$	Very Good
$2.50 \leq M < 3.50$	Good
$1.50 \leq M < 2.50$	Fair
$0.00 \leq M < 1.50$	Poor

Five lessons were conducted at 7th grader students at MTsN 2 Aceh Tengah to determine the effectiveness of the teaching materials. 40 students were divided fairly into experimental and control groups. Both the experimental and control group assessed with pre-test and post-test on Social Arithmetic. The experimental group was taught using the teaching material integrated with Islamic character, whereas the control group was not. The normality of data was analyzed using Shapiro-Wilk with a significance value 0.05 and two-tailed t-student with a significance value 0.05 to test the hypothesis below:

H_0 : $\mu_1 = \mu_2$

H_a : $\mu_1 > \mu_2$ .....(2)

Explanation:

μ_1 : The mean score of students in the experimental group

μ_2 : The mean score of students in the control group

H_0 : Student learning outcomes taught using social arithmetic teaching materials integrated Islamic character is same as student learning outcomes taught with conventional models

H_a : Student learning outcomes taught using social arithmetic teaching materials integrated Islamic character is higher than student learning outcomes taught with conventional models

If the significant value <0.05, then H_0 is rejected and vice versa.

RESULTS AND DISCUSSION

Teacher Handbook, Student Handbook, Student Activity Sheet, test have been developed by integrating Islamic characters, namely, honesty(الصدق), curiosity (حب الاستطلاع), caring (رعاية), hard work (الجهد), independent (مستقل), patience (الصبر), thoughtful(تفكير), consistent (استقامة), and tolerance (تسامح). Before designing and developing the teaching material, at the defined phase, basic problems faced in building Islamic character in mathematics learning were determined through an interview with the teacher and students. Teachers were concerned with conveying aspects of knowledge to their students and attitudes and skills essential to achieving the meaning of learning. Teacher aware and concerned about students' attitude but has difficulties with designing the material. Students did not feel happy to learn mathematics since other students (highly academic achievement students) never share their knowledge. They admitted to frequently cheating during the learning or the exam. Students were also less careful and impatient in solving problems. They get bored easily and give up quickly when a teacher gave mathematics problems to solve.

Moreover, students assumed that mathematics is a difficult subject and hard to understood—students were required to respect each other. But, in reality, students tend not to appreciate the answers from their friends. These findings strengthen our assumptions to develop teaching materials with Islamic characters. After front-end analysis, learner analysis, task analysis, and concept analysis, we specify instructional objectives integrated with Islamic character, as shown in Table 3.

Table 3.
Instructional Objectives

Basic Competencies		Indicators of Competency Achievement		Integrated Islamic Characters
1.1	Respect and live up to the teachings of the religion	1.1.1	Praying before and after doing something	honesty(الصدق), curiosity (حب الاستطلاع), caring (رعاية), hard work (الجهد), independent (مستقل)
		1.1.2	Giving greetings at the beginning and the end of the presentation according to one's religion	
2.1	Having a logical attitude, critical, analytical, consistent and thorough, responsible, responsive, and not easy to give up in solving problems	2.1.1	Showing a responsible attitude in completing the assignment given by the teacher	honesty(الصدق), curiosity (حب الاستطلاع), caring (رعاية), hard work (الجهد), independent (مستقل)
3.11	Analyzing social arithmetic (sales, purchases, deductions, profits, losses, single interest, percentage, gross, net, tare)	3.11.1	Identifying phenomena or activities related to social arithmetic (sale, purchase, discount, profit, loss, single interest, percentage, gross, net, tare)	honesty(الصدق), curiosity (حب الاستطلاع), caring (رعاية), hard work (الجهد), independent (مستقل), patience (الصبر), thoughtful(تفكير), consistent (استقامة), and tolerance (تسامح)
		3.11.2	Obtain information related to social arithmetics	
		3.11.3	Determine the relationship between sales, purchases, profit, and loss	
		3.11.4	Determine single interest and tax	
		3.11.5	Determine the relationship between gross, net, and tare	
4.11	Solving problems related to social arithmetic (sale, purchase, discount, profit, loss, single interest, percentage, gross, net, tare).	4.11.1	Solve problems related to social arithmetic either through question and answer, discussion, or, presentation.	honesty(الصدق), curiosity (حب الاستطلاع), caring (رعاية), hard work (الجهد), independent (مستقل), patience (الصبر), thoughtful(تفكير), consistent (استقامة), and tolerance (تسامح)

After defining, we design and develop the teaching materials to obtain a prototype. The media and format were selected in this phase and continue with the initial design. Below is the teaching material that has been integrated with Islamic characters.

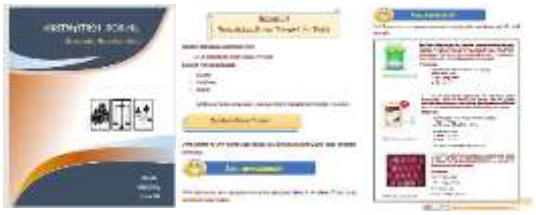

Figure 1.
Teacher Handbook

Figure 2.
Students Handbook

Figure 3.
Students Activity Worksheet

Teacher and student handbook are developed and validated for the content, construction, illustration, formula, and language. Students activity sheet are developed and validated for the content, construction, illustration, formula, language, and conformity to didactic, construct requirements, and technical requirements. Besides, the test is developed and validated for the construction, cognitive and affective assessment, and LOTS and HOTS problems.

Table 4
The Validity of Teaching Material

Prototype	Content Validity	Category	
Teacher Handbook	1.00	Very High	Valid
Student Handbook	0.96	Very High	Valid
Student Activity Sheet	0.86	Very High	Valid
Test	0.71	High	Valid

By using the expert agreement index for content validity (Gregory, 2004), the validity of Teacher Handbook is 1.00 (very high), the validity of Student Handbook is 0.96 (very high), the validity of Students Activity Sheet is 0.86 (very high), the validity of the test is 0.71 (high). From table 2 it can be concluded that teaching material that integrated with Islamic value is valid to be implemented in Social Arithmetic learning.

Table 5.
The Practicality of Teaching Material

Prototype	Practicality	Category	
Teacher Handbook	3.75	Very Good	Practical
Student Handbook	3.45	Good	Practical
Student Activity Sheet	3. 20	Good	Practical

Table 5 shows that the teacher handbook practicality is 3,75 (very good), student handbook practicality is 3.45 (good), and students activity sheet practicality is 3.20 (good). Based on this finding, teaching material integrated with Islamic values is practical to be implemented in Social Arithmetic learning.

Effectivity of teaching material was analyzed by (1) testing the normality of both experimental and control group post-test scores and (2) testing the hypotheses. The normality of the post-test score is described in table 6, and the hypotheses testing is described in table 7.

Table 6
Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Post-test experimental group	.184	20	.075	.950	20	.367
Post-test control group	.123	20	.200*	.913	20	.072

a. Lilliefors Significance Correction
*. This is a lower bound of true significance.

Table 7
Test of Hypotheses

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
Social arithmetic test score	Equal variances assumed	.514	.478	4.106	38	.000	7.15000	1.74156	3.62440	10.67560
	Equal variances not assumed			4.106	35.520	.000	7.15000	1.74156	3.61630	10.68370

Based on the calculation, it was obtained that t_{count} = 4.106 with a 2-tailed significance 0.000 ($p < 0.05$). This condition shows that H_0 is rejected. This calculation indicates differences in student learning outcomes taught using social arithmetic teaching materials integrated with Islamic characters and student learning outcomes taught with conventional models. The analysis results concluded that the provision of social arithmetic teaching materials with Islamic characters could improve student learning outcomes. There are 95% of students who passed the learning completeness criteria (KKM). These indicated that teaching material integrated with Islamic values is effective in Social Arithmetics learning. Table 8 shows the students' mastery learning in Social Arithmetic integrated with Islamic values at 20 students in the experimental group.

Table 8
Students' Learning Completeness

No	Description	Score
1	Maximum Score	92
2	Minimum Score	74
3	Average	84
4	Number of students who passed KKM	19
5	Number of students not passed KKM	1
7	Percentage of learning completeness	95%

The last step of this research is disseminated. The prototype, Teacher Handbook, Student Handbook, and Student Activity Sheet, has been valid, practical, and effective distributed to mathematics teachers from some junior high schools at Aceh Tengah district. The teaching materials developed can hone students' character, for example, in solving mathematics problems, especially problems that require higher-order thinking skills. Students look more patient, calm and enthusiastic than before. Students who used to argue with each other and easily quit when do not find the solutions now look more tolerant and respect each other students who initially tended to cheat, now working harder and more disciplined in the learning process.

CONCLUSIONS AND IMPLICATIONS

This developmental research produces teaching material; teacher handbook, student handbook, student activity sheet, and test by integrating Islamic characters, namely honesty, curiosity, caring, hard work, independence, patience, thoughtful, consistent, and tolerance. The validity of the Teacher Handbook is 1.00 (very high), the validity of the Student Handbook is 0.96 (very high), the validity of the Students Activity Sheet is 0.86 (very high), the validity of the test is 0.71 (high). Teacher handbook practicality is 3,75 (very good), student handbook practicality is 3.45 (good), and student activity sheet practicality is 3.20 (good). The provision of social arithmetic teaching materials with Islamic characters can improve student learning outcomes, with 95% of students passed the Minimum Criteria of Mastery learning (known as KKM). Based on these findings, teaching material integrated with Islamic values is valid, practical, and effective in Social Arithmetic learning.

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