The Effectiveness of Al-Qurun Teaching Model (ATM) Viewed from Gender Differences: The Impact on Mathematical Problem-Solving Ability

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The Effectiveness of Al-Qurun Teaching Model (ATM) Viewed from Gender Differences: The Impact on Mathematical Problem-Solving Ability

Syamsul Huda[1,*], Suherman[2], Komarudin[2], Muhamad Syazali[2], Rofiqul Umam[3]

[1]Institut Agama Islam Negeri Kediri, Indonesia
[2]Universitas Islam Negeri Raden Intan Lampung, Indonesia
[3]School of Science and Technology, Kwansei Gakuin University, Japan

*Correspondent author: **syamsul_huda63@yahoo.co.id**

Abstract. This research aimed to see the ability to solve mathematical problems between genders by applying the Al-Qurun Teaching Model. The researchers report the results of the research on the effectiveness of Al-Qurun Teaching Model on mathematical problem-solving ability viewed from gender differences. The research method used is 2 x 2 factorial design of quasi-experimental with random sampling technique. Data collection techniques used were the test method to see the results of students' mathematical problem-solving ability. The normality test employed was Liliefors test and the homogeneity test used was the similarity of two variances. Hypothesis testing used was two-way ANAVA. The results of the study are: (1) There are differences between the Al-Qurun Teaching Model and the conventional teaching model on mathematical problem-solving ability and the use of Al-Qurun Teaching Model is more effective than the conventional teaching model, (2) There are differences in the results of mathematical problem-solving ability between female and male students and the results of mathematical problem-solving ability of female students are higher than the male students, (3) There is no interaction between learning and gender on mathematical problem-solving ability.
Keywords: Al-Qurun Teaching Model, Gender, Mathematical Problem-solving Ability

1. Introduction

Problem-solving ability in learning arithmetic is extremely necessary to be developed [1, 2]. This ability is extremely helpful for college students once learning arithmetic and in way of life [2, 3]. The ability to solve mathematical problems can be made into more concrete ideas that can help the students to solve a complex problem into simpler ones [4–6]. Therefore, studying mathematics is besides focused on the understanding of problem-solving [8] but there are many processes inside which certainly require a good mathematical [9–11], thus, it will give a decent chance for pupils to be able to develop their thinking skills [12].

Success in determination mathematical issues is influenced by many factors [13, 14], one of which is the use of learning models [15, 16]. The learning model that's expected to make and improve the mathematical problem-solving ability of each feminine and male students is that the Al-Qurun Teaching Model (ATM).

Al-Qurun Teaching Model is a learning model that is the combination of the modified Bloom's Taxonomy and the 2013 curriculum competencies [17]. ATM learning model is consists of acknowledge, literature, quest, unite, refine, use, and name steps [18], so that the students can get

used to solving problems [19], can express their ideas through naming new ways of solving problems [20, 21], and can respond to problems in their own way [22, 23].

Based on previous research, Al-Qurun Teaching Model can improve students' understanding of mathematical concepts [18] and improve learning outcomes from previous learning [24].

Learning within the schoolroom incorporates a terribly numerous success rate between female and male students. There are variations in learning outcomes between completely different genders in terms of psychological or physiological [26]. In the previous studies, the learning outcomes of male students were over those of girls [27], the accomplishment ability between male and female pupils wasn't considerably completely different between the number of two [28], and the learning achievement can be improved by using teaching materials based on the Al-Qurun Teaching Model [29].

The distinction of this analysis with the previous ones lies in gender to visualize the flexibility to unravel mathematical issues victimization Al-Qurun Teaching Model. This research aims to see the ability to solve mathematical problems between genders by applying the Al-Qurun Teaching Model.

2. Research Method

This research method uses a quasi-experiment design with a 2 x 2 factorial design. The design can be seen in table 1.

Table 1. Research Design

Model (A_i)	Gender	
	Male (B_1)	Female(B_2)
Alqurun Teahing Model (A_1)	A_1B_1	A_1B_2
Conventional (A_2)	A_2B_1	A_2B_2

The population of this study was the pupils of SMP Negeri (State Junior High School) 17 Bandar Lampung. The sampling used was simple random sampling technique. 50 students were divided into twenty five students within the experimental cluster and 25 students in the management group. Data collection techniques used were essay tests. The following are the steps of the learning process.

Figure 1. Step of Learning of the Al-Qurun Teaching Model
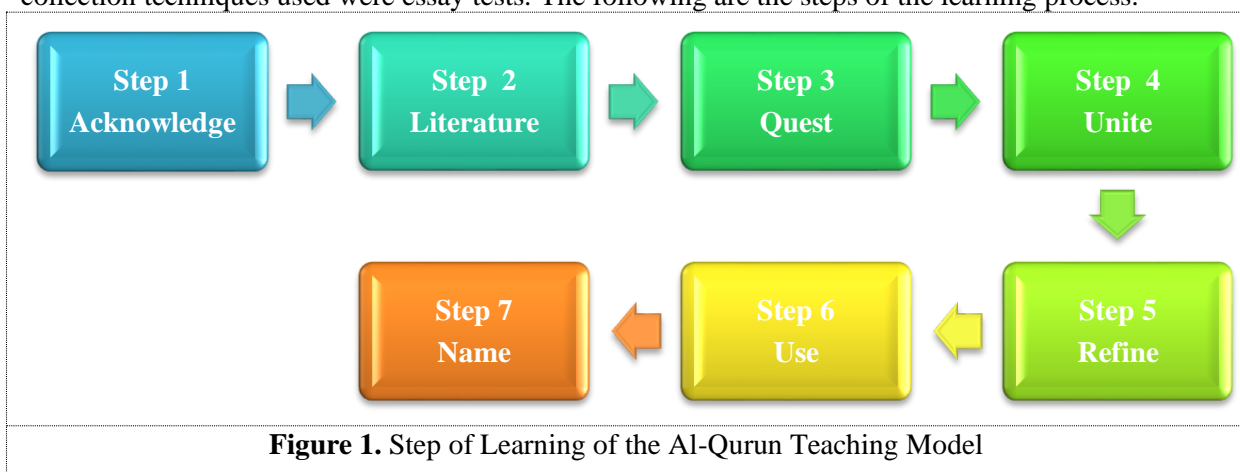
These indicators was needed to be developed and to facilitate the analysis of mathematical problem-solving ability [30], the indicators used in the table below:

Table 2. Indicators of the Mathematical Problem-Solving Ability

Problem-Solving Steps	Descriptions	Score
Understanding the	Complete understanding of the matter	2

Problem-Solving Steps	Descriptions	Score
problem	Part of the matter misunderstood or misinterpreted	1
	Complete misunderstanding of the matter	0
	Plan might have semiconductor diode to an accurate answer if enforced properly	2
Planning a solution	Partially correct arrange supported a part of the matter being understood properly	1
	No attempt, or all inappropriate arrange	0
	Correct answer	2
Getting an answer	Copying error; process error; partial account a haul with multiple answers	1
	No answer, or wrong associateswer supported an inappropriate arrange	0

Before the analysis was conducted, the normality check and homogeneity tests were administered. the extent of significance of 5% was utilized in the applied math tests. Hypothesis take a look ating was applied mistreatment two-way ANAVA test with the assistance of SPSS program seventeen [31].

3. Results And Discussion

Research information includes knowledge on the results of mathematical problem-solving ability tests. Table 3 is that the score of mathematical problem-solving ability supported learning and Table four is that the score of mathematical problem-solving ability supported gender.

Table 3. The Score of Concept Understanding Based on Learning

Teaching Model	Maximum	Minimum	Average
Teaching Model (ATM)	90	61.6	75.53
Conventional	83.3	50	68.97

Based on Table 3, the average score of Al-Qurun Teaching Model mathematical problem-solving ability is higher compared to the conventional model. Furthermore, the highest score of Al-Qurun Teaching Model is higher than conventional learning.

Table 4. The Score of Concept Understanding Based on Gender

Teaching Model	Gender	
	Female	Male
Alqurun Teahing Model	75.55	75.49
Conventional	72.32	65.86

Based on Table 4, the check score of the mathematical problem-solving ability of feminine students is on top of male. The necessity checks analysis used were the Shapiro Wilk test for the normality test and therefore the homogeneity of variances for the homogeneity test with the assistance of SPSS seventeen program with five-hitter significance [32]. The following table shows the results of the normality and homogeneity test.

Table 5. Normality Test

Class	Total Sample	$L_{count}(L_{(\alpha,n)})$	L_{table}	Result
Experimental	25	0,1443	0,1590	Normal
Control	25	0,1396	0,1590	Normal

To determine whether both scores have the same or different characters, an F-test was needed. The variance test results with a significant level of $\alpha = 5\%$ are presented in Table 6:

Table 6. Homogeneity Test

Class	Total Sample	χ^2_{count}	χ^2_{table}	Result
Experimental	25			
Control	25	0.507	3.481	Homogeneous

Based on Table 5 and Table 6, the data were unremarkably distributed and same. in order that information hypothesis testing are often done victimisation two-way ANAVA with the assistance of the SPSS program [33]. The calculation results can be seen in table 7:

Table 7. Hypothesis Test Results

No.	Source	F_{count}	F_{table}	Result
1	Learning model	7,164	4,013	H_{0A} Rejected
2	Gender Differences	1.841	4.013	H_{0B} Received
3	Interaction	1.774	4.013	H_{0AB} Accepted

Based on table 3, the average score of students who were taught using Al-Qurun Teaching Model is 75.53 while the typical countless pupils who were schooled victimisation the traditional learning model are 68.97. This means that the Al-Qurun Teaching Model with cube and block material makes it easy for students to understand and master abstract material rather than using conventional learning.

Furthermore, the students were assisted by the teacher to watch phenomena that occur in existence. The first stage (Acknowledgment) is to get recognition of the students' initial abilities. In the second step (Literature), the teacher facilitated the students by searching the literature related to the cube and block material. It appeared that the students can investigate (Quest), combine (Unite), and filter (Refine) information delivered by the teacher [34]. Students preferred to ask directly regarding the way to solve the problem to the teacher rather than understanding, searching, and discussing materials they obtain with their group from. The students got knowledge or new things from what they observed and trained to be adept in analyzing and thinking critically [34].

This is in accordance with research from Priscilla and Denis, who say that teaching model can improve students' thinking ability [35], so students are trained to grasp problems by thinking mathematically. The next step is Use. The pupils implemented the knowledge gained from the results of investigation activities. This result was used to solve mathematical problems. The teacher's role was to give students the freedom to solve mathematical problems in their life [37]. The pupils were additionally asked to style various answers and to answer queries associated with the fabric mathematically [38]. The students tried to form their concepts as made public in a very worksheet and created applicable answer styles in learning and standard of living. The teacher played the role of directing and testing the effectiveness of new ways named by the students.

This is in accordance with last research from Ismayani which says that the Al-Qurun Teaching Model will improve students' ability such as creative thinking [37]. The final step is the value (society). The students created conclusions associated with way of life and applied to be told in life. This can help them to master the lesson not only to be understood but also to be applied in everyday life.

Unlike the control class that used conventional learning. At the beginning of learning, the researchers explained the educational objectives and provided basic cognitive process on the fabric [40]. Furthermore, the students were allowed to read books on the material and were also allowed to

ask the researchers about the content [41]. Furthermore, students mentioned by performing on worksheets and presenting the results of the discussion [42].

In learning practice the quality model, the students were rarely active at intervals the initial information and lacking motivation at the beginning of learning [14]. The pupils solved the queries completely to complete the task whereas not understanding the material so as that the students got less knowledge that impacted their learning methodology and low understanding [43].

The conclusion shows that there are variations between the Al-Qurun Teaching Model and also the typical model. The Al-Qurun Teaching Model is more practical, though not vital, compared to the standard model [44]. The understanding of mathematical problem-solving within the experimental category is on top of in the management class. Research by Tseng (2011) says the Al-Qurun Teaching Model can give real learning experiences and may increase the effectiveness of learning and can support future careers and professions [42]. By using the Al-Qurun Teaching Model, the students not only get the material but also practice to find information to ease them in the learning process.

Figure 2. Mathematical Problem-solving Ability of the Experimental and Control Class based on Gender
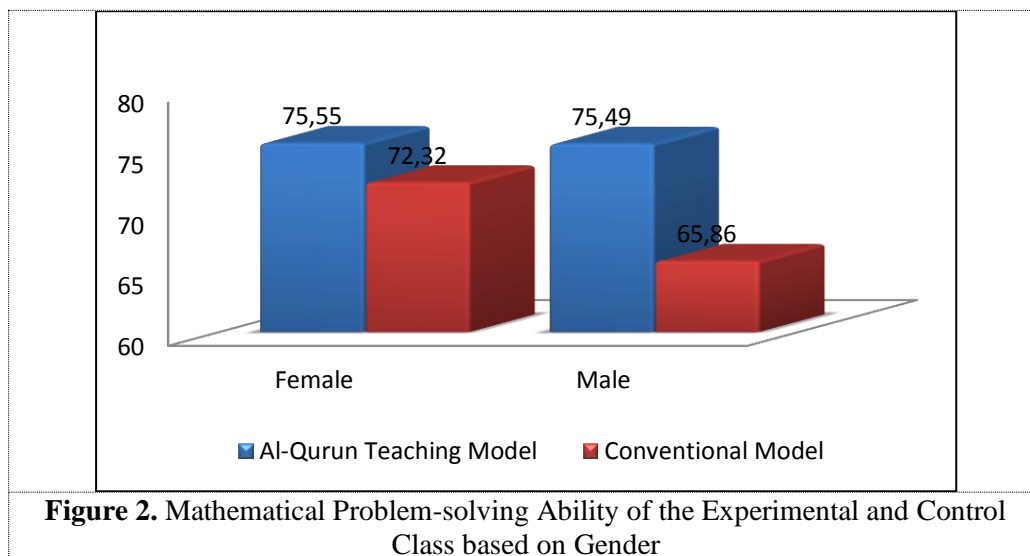
Based on Figure 2, the average scores of female and male students respectively are 75.55 and 75.49. However, in conventional learning, the score of the female students is 72.32 and the male students are 65.86. This shows that gender variations between male and female groups among the power to understand mathematical concepts are a priority in learning [46]. Research conducted by Apriyanti (2008) shows that gender variations have an effect on the amount of understanding in her analysis that uses inquiry learning methodology to boost students' understanding [44].

Table 7 shows that there's no interaction between learning and gender with the flexibility to resolve mathematical issues [48]. The Al-Qurun Teaching Model and conventional learning, in this case using scientific learning, are relatively good toward the mathematical problem-solving ability seen from gender [49].

This study has similar results in terms of gender as the research conducted by Bambang Abdul Jabal Dupri who claims that there is no significant relationship between learning and gender [50]. So that male and female students can participate well in learning [51].

The learning process that can affect the ability to solve mathematical problems depends on the approach from the teacher in providing learning-based on gender differences in the Al-Qurun Teaching Model to be more active and creative compared to the conventional model [52]. However, in this study, there is no relationship between learning approaches and gender variations among the power to resolve mathematical problems [53]. This can be caused by the students' low focus and enthusiasm during the learning processes while in the control class; the situation was not conducive so that it disrupted the students' concentration.

4. Conclusions and Suggestions

There is a difference in learning between the Al-Qurun Teaching Model and conventional learning which shows that the Al-Qurun Teaching Model is better than the conventional one. In terms of gender differences, female students have higher mathematical problem-solving talents than male students. Between learning and gender, there is no interaction between the two. Thus, the use of the Al-Qurun Teaching Model more effective within the learning method and provides improved mathematical problem-solving ability that for feminine students though there's no interaction between learning and gender

Further researchers are expected to use Al-Qurun Teaching Model in the learning process. The academics ought to pay additional attention to the training period and will direct the scholar in order that the determined time isn't depleted once the learning method takes place.

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