

THE INFLUENCE OF DRILL AND TEAM TEACHING METHODS ON IMPROVING STUDENTS' CRITICAL THINKING SKILLS

JAUHARI, Z. A.^{1*} – BUDIWAN, J.¹ – MALIKA, N.¹

¹ *Department of Islamic Religion Education, University of INSURI, Ponorogo, Indonesia.*

**Corresponding author
e-mail: alwyjauhari25[at]gmail.com*

(Received 10th September 2025; revised 25th November 2025; accepted 02nd December 2025)

Abstract. The research aims to determine the effect of drill and team-teaching methods on improving students' critical thinking skills in solving Madrasah Science Competition (KSM) questions integrated with Islamic religion and culture subjects. Research location at State Islamic Senior High School (MAN) 3 Madiun. The research method used is quantitative with research instruments in the form of rubrics and questionnaires to determine the implementation and achievement of learning objectives using drill and team-teaching methods, as well as the MCR (Multiple Choice With Reason) test to measure critical thinking skills, which are prepared based on KSM questions. Based on data analysis using multiple linear regression tests, it is known that the influence of the drill and team-teaching methods on increasing students' critical thinking skills is 74.2%. These research findings indicate that drill and team-teaching methods can effectively improve students' critical thinking skills in solving KSM questions integrated with Islamic religion and culture.

Keywords: *drill method, team teaching, critical thinking skills, KSM*

Introduction

The Madrasa Science Competition (KSM) is a scientific competition event organized by the Indonesian Ministry of Religion for madrasa students throughout Indonesia. The KSM Technical Guidelines indicated that The Madrasah Science Competition (KSM) is a national event held by the Ministry of Religion to build enthusiasm for science competitions among madrasah students. Since its inception in 2012, KSM has become a positive event in building a competitive culture. KSM, in 2024, seeks to elaborate on science, culture, and technology in the context of Islamic values. The characteristics of the questions developed in KSM 2024 presented in the KSM Technical Guidelines are: (1) Simple Problem: This question has the characteristics of a choice of answers (choice problem) with a complete problem structure (well-structured); (2) Partial Problems: This question has characteristics between answer choices (choice problem)/design issues (design problem) with a complete/incomplete problem structure (well and ill-structured); (3) Complex Problem This problem has the characteristics of a design problem (design problem) with an incomplete problem structure (structured). At the Madrasah Aliyah (MA) level, six fields are contested: Integrated Mathematics, Integrated Biology, Integrated Physics, Integrated Chemistry, Integrated Economics, and Integrated Geography. With such characteristics of KSM questions, good critical thinking skills are needed to solve Integrated KSM questions.

Ennis suggests that Critical thinking is reasonable, and reflective thinking focuses on deciding what to believe or do, which means critical thinking is a reflective thinking process that focuses on deciding what to believe or do. Critical thinking skill is the ability to think logically, reflectively, systematically, and productively, which is applied in making judgments and making good decisions. In modern times and with

sophisticated technology that makes all information easier, critical thinking is very important for everyone. Previous study said critical thinking allows readers to assess the evidence against what is read and identify false or illogical reasoning; critical thinking will also help to make strong arguments (for example, in assignments). This means that it will look at and justify every claim made based on evidence that has been evaluated (Zakiah and Lestari, 2019). Critical thinking is a high level of thinking with four stages in solving problems: clarification, assessment, inference, and strategies for measuring students' critical thinking skills. An evaluation worksheet instrument containing questions is required to train students' critical thinking skills (Sudjana, 2004).

Critical thinking is important in education, according to Aqib and Murtdlo (2016), due to several considerations, including one, developing critical thinking in education means that we give respect to students as individuals (respect a person). This will provide opportunities for students' full personal development because they feel they are given the opportunity and their rights are respected in their personal development. Two, critical thinking is the ideal goal in education because it prepares students for adulthood. Third, the development of critical thinking in the educational process is a traditional ideal, such as what is to be achieved through the study of exact and natural sciences and other subjects traditionally thought to develop critical thinking. Fourth, critical thinking is needed in a democratic life. Democracy can only develop if citizens think critically about political, social, and economic issues.

In the KSM mentoring process, appropriate methods are needed to improve students' critical thinking skills. One method that can be used to familiarize students with working on questions in the integrated KSM mentoring process is the drill method. The drill method is a teaching method that provides repeated skills training activities to students so that students have higher skills related to the material being studied. The drill method aims to produce skills in doing something and form automatic habits or patterns in students (Helmiati, 2012). Yani Safitri, one of the teachers accompanying the integrated KSM MAN 3 Madiun, explained that because KSM is synonymous with students' skills/competence in working on questions, the drill method is appropriate and can improve students' critical thinking skills. The KSM accompanying teacher gives students lots of practice questions that are repetitive so that students get used to working on questions that have the same difficulty level as the integrated KSM questions.

Accordingly, the drill method aims to train motor and mental skills to strengthen the associations made; apart from that, the drill method functions to instill habits that have become a reality as well as efforts to gain dexterity, determination, and practice skills regarding something being studied. Learning using the drill method has the following objectives: One is to have motor/movement skills, such as memorizing words, writing, using tools/making objects, and carrying out movements in sports. Two, develop intellectual skills, such as transferring, dividing, adding, subtracting, taking roots in arithmetic, and recognizing objects/shapes in mathematics, science, chemistry, punctuation, etc. Third, having the ability to connect one situation with another, such as the causal relationship between lots of rain and flooding, letter signs and the sound-ny and so on, the use of symbols/symbols on maps and so on.

Instruments or tools that can be used in implementing the drill method, according to the drill method steps presented are: One, Drill schedule (Drill Schedule: (1) The plan will be put into practice using the drill method by preparing questions that will be used for practice, (2) Contains a schedule for implementing drill method assistance and carrying out drill method tests. Two, Drill worksheet: (3) Worksheets containing

practice questions are designed to be done quickly and repeatedly. (4) Provide space for students to answer and get feedback. Three, Monitoring format: (5) Tools to monitor individual student progress during drill practice, (6) Contains a column to record the results of the scores obtained by students while working on practice questions.

Following the 2024 KSM Technical Guidelines, the KSM questions are an elaboration between science, culture, and the context of Islamic values, then There needs to be a collaboration between religious and general subject teachers to jointly assist in solving problems that arise in the questions and provide input to students so that students gain experience and can solve problems that arise in integrated KSM questions. In KSM mentoring, collaboration between teachers can be realized through team teaching. Team teaching is a learning strategy in which the learning process activities are carried out by more than one teacher, with a division of roles and responsibilities for each, and a teaching method with more than one teacher, each of whom has a task. The teacher's burden becomes lighter through team teaching because each teacher has shared responsibility for their duties and roles (Ismail et al., 2018; Rositawati, 2018; Winarti et al., 2018; Sugiyono, 2007).

Instruments or tools that can be used to implement team teaching following the steps of team teaching presented by Ismail et al. (2018): One, Shared Lesson Planning: (1) Learning plan format created jointly between all teachers involved, (2) Includes learning objectives, teaching strategies, evaluation methods, and time allocation. Two, Division of Roles (Roles and Responsibilities): (3) Document that explains the roles and responsibilities of each teacher in team teaching. Three, Meeting Agenda: (4) Agenda format for team teaching meetings. (5) This includes discussion topics such as evaluating the mentoring process and providing constructive suggestions for further improvement. Four, Student Evaluation Format: (6) Tools for evaluating student understanding and achievement after team teaching sessions, including questions used for evaluation.

Jean Piaget and Vigotsky have suggested that strategies in collaborative learning (collaborative learning) is supported by the theory of constructivism. Previous study stated that this theory shows that there is interaction between group members which will later help other individuals in the development process and increase mutual respect for different opinions among all group members (Susilowati, 2013). Respecting opinions is one of the student's characters that must be accustomed to, as in the article written by Yulita et al. (2023), who wrote that "Good character is not built automatically; it is developed over a period of time through a process of teaching, example, learning and practice. It is built by the interaction of many variables such as; education, family, mass media, community or friendship. Although there are many factors that influence the formation of student character, character building through education, more specifically the learning process in the classroom, is one of the things that education practitioners can contribute to the formation of student character".

From the description above, the team-teaching method carried out by religious subject teachers with general subject teachers in coaching/mentoring prospective Integrated KSM participants can be classified as a form of collaborative learning (collaborative learning). The collaboration of the two methods (drill and team teaching) used in the mentoring process is expected to improve student's critical thinking skills in solving integrated KSM questions.

Suppose it is related to the actual conditions at Madrasah Aliyah Negeri 3 Madiun, based on observations made by researchers through interviews with Mrs. Yani Safitri, S.

Pd, one of the integrated KSM assistant teachers at MAN 3 Madiun. In that case, it is known that in the KSM mentoring process at MAN 3, Madiun has not used methods that can motivate students to be more enthusiastic in participating in the mentoring process. There is no collaboration between religious and general subject teachers to prepare students to participate in integrated KSM. For this reason, researchers provide solutions to policymakers and accompanying teachers at MAN 3 Madiun, so that in the mentoring process, preparation for KSM participation is integrated using drill and team teaching methods, which help provide varied experiences for students so that students can actively participate in mentoring activities, and can improve students' critical thinking skills in solving questions in preparation for taking part in Integrated KSM.

Materials and Methods

The research uses quantitative methods with instruments in the form of evaluation rubrics, evaluation questionnaires, and MCR tests. To determine the implementation and achievement of learning objectives using the drill method, an evaluation rubric instrument is used. To measure the implementation and achievement of learning objectives with team teaching, the Evaluation Questionnaire instrument is used. This questionnaire can be used to evaluate students' experiences in participating in learning using team teaching. To measure the increase in students' critical thinking skills, they need an Evaluation Worksheet instrument which consists of A worksheet containing questions in the form of MCR (Multiple Choice With Reason), which is assumed to be able to estimate and describe critical thinking abilities because it involves thought processes and existing knowledge to solve complex problems. This instrument has gone through validity and reliability tests. This instrument shows the involvement between X1 against Y, X2 against Y, and X1, X2 towards Y. Sampling in research used stratification techniques. The total population is 24 prospective KSM participants divided into six groups according to the subjects being contested in KSM (each subject consists of 4 students). The sample size was determined to be $50\% \times 24 = 12$ students, with each subject represented by two students chosen randomly. Collected data, then data analysis was carried out using the Paired Sample T-Test (T-Test) to measure the influence of the drill method on increasing students' critical thinking skills and the influence of team teaching on increasing students' critical thinking skills. Meanwhile, to measure the influence of the drill and team-teaching methods together on improving students' critical thinking skills, the Simultaneous Test (F-Test)/Multiple Linear Regression Test was used.

Results and Discussion

Data analysis results of the effect of the drill (X) method towards increasing students' critical thinking skills (Y) using the Paired Sample T-Test via SPSS ver. 16 can be seen in the following *Table 1*. From this table it is known that the t value count amounting to 3,195. For Ttable obtained by $(\alpha/2;n-k-1) = (0.05/2;12-2-1) = (0.025;9)$, so that the t distribution value is obtained $t_{table} = 2,262$. The percentage value of the influence of the drill method on improving students' critical thinking skills can be seen in the following *Table 2*. Based on the output above, it is known that the R Square value is 0.505. This means that the influence of the drill method on increasing students' critical thinking skills is 50.5%. Data Analysis Results of the Influence of Team Teaching (X2) Towards

Increasing Students' Critical Thinking Skills (Y) using the Paired Sample T-Test via SPSS ver. 16 can be seen in the following *Table 3*. In the table it is stated that the t value count amounting to 4,713. For Ttable obtained by $(\alpha/2; nk-1) = (0.05/2; 12-2-1) = (0.025; 9)$, so that the t distribution value is obtained $t_{table} = 2,262$. The percentage value of team teaching's influence on improving students' critical thinking skills can be seen in the following *Table 4*. Based on the output above, it is known that the R Square value is 0.690, this means that the influence of team teaching on increasing students' critical thinking skills is 69.0%. Data Analysis Results of the Effect of the Drill Method (X1) and Team Teaching (X2) together to increase students' critical thinking skills (Y) using the Multiple Linear Regression Test via SPSS ver. 16 can be seen in the following *Table 5*.

Table 1. Test paired sample T-test: Metode drill.

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	67.983	9.915	-	6.856	.000
Metode Drill	.285	.089	.711	3.195	.010

Table 2. Coefficient of determination: Metode drill.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.711	.505	.456	5.540

Table 3. Test paired sample T-test: Team teaching.

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
(Constant)	40.970	12.431	-	3.296	.008
Team Teaching	.448	.095	.830	4.713	.001

Table 4. Coefficient of determination: Team teaching.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.830	.690	.658	4.388

Table 5. Multiple linear regression test.

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	460.215	2	230.108	12.941	.002
Residual	160.035	9	17.782	-	-
Total	620.250	11	-	-	-

F table can be found by $= (k; n-k) = (2; 12 - 2) = (2, 10) = 4.10$. Meanwhile, the calculated F value or F regression is 12.941. The criteria for simultaneous testing with a significance level of $\alpha=5\%$ include: (1) If the significance value of the F test $> \alpha$ is 0.05 then the null hypothesis is accepted. (2) If the significance value of the F test $< \alpha$ is 0.05 then the null hypothesis is rejected. The percentage value of the influence of drill and team-teaching methods on improving students' critical thinking skills can be seen from the following coefficient of determination *Table 6*. Based on the results of the correlation analysis, it can be seen that the correlation between drill and team-teaching methods and increasing students' critical thinking skills is 0.861. This figure shows that there is a reasonably strong correlation. Next, the multiple linear regression equation will be presented in the following *Table 7*. Based on the table above, the regression equation is as follows:

$$Y = 41.358 + 0.120X_1 + 0.344X_2 \quad \text{Eq. (1)}$$

Table 6. Coefficient of determination.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.861 ^a	.742	.685	4.217

Table 7. Linear regression coefficient.

Model	Unstandardized coefficient		Standardized coefficient	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	41.358	11.949	-	3.461
	metode drill	.120	.089	.300	1.353
	team teaching	.344	.120	.637	2.874

Where; (1) The constant value $\alpha = 41.358$ means that if there is no change in the drill and team-teaching method variables, the student's critical thinking skills will be 41.358%; (2) The coefficient value $\beta_1 = 0.120$ means that if the drill method variable increases by one unit, students' critical thinking skills will increase by 12.0%; and (3) The coefficient value $\beta_2 = 0.344$ means that if the team-teaching variable increases by one unit, students' critical thinking skills will increase by 34.4%. In *Table 1* above, the significance value for the influence of X1 against Y is $0.010 < 0.05$. Accordingly, if $\text{Sig.} < 0.05$, then this means that the independent variable (X) partially influences the dependent variable (Y). t value count $(3,195) > \text{table} (2,262)$, so it can be concluded that H0 rejected and H1 accepted, which means there is an influence of X1 towards Y, meaning that the drill method affects increasing students' critical thinking skills in solving integrated KSM questions at MAN 3 Madiun. The relationship between the drill method and increasing students' critical thinking skills in solving integrated KSM questions is positive. So, the better the application of the drill method, the students' critical thinking skills in solving integrated KSM questions will also increase or improve. The percentage value of the influence of the drill method on increasing students' critical thinking skills in solving integrated KSM questions at MAN 3 Madiun can be seen in *Table 2*, namely 50.5%, and the remainder is influenced by other variables not included in this research.

Table 3 shows that the significance value for the influence of X2 against Y is $0.001 < 0.05$. Accordingly, if $\text{Sig.} < 0.05$, then this means that the independent variable (X) partially influences the dependent variable (Y). t value count $(4,713) > \text{table} (2,262)$, so it can be concluded that H0 rejected and H1 accepted, which means there is an influence of X2 towards Y, meaning that team teaching affects increasing students' critical thinking skills in solving integrated KSM questions at MAN 3 Madiun. The relationship between team teaching and improving students' critical thinking skills in solving integrated KSM problems is positive. So, the better the implementation of team teaching, the more the student's critical thinking skills in solving integrated KSM questions will also improve. The percentage value of the influence of team teaching on improving students' critical thinking skills in solving integrated KSM questions at MAN 3 Madiun can be seen in *Table 4*, namely 69.0%, and the remainder is influenced by other variables not included in this research.

Table 5 shows the results of data analysis on the influence of the drill method (X1) and team teaching (X2) together to increase students' critical thinking skills (Y). This table shows that the significance value is $0.002 < 0.05$, meaning that H0 is rejected, and Ha is accepted. The conclusion from the table above is that there is an influence of X1 and X2 together towards Y. This means that the drill method and team teaching together affect increasing students' critical thinking skills in solving integrated KSM questions at MAN 3 Madiun. It is said that there is an X influence1 and X2 together with Y because

it is strengthened by the following condition, namely $F_{count} (12,941) > F_{table} (4,10)$. The influence of drill and team-teaching methods on improving students' critical thinking skills in solving integrated KSM questions at MAN 3 Madiun is positive. So, if the implementation of both goes better, students' critical thinking skills in solving integrated KSM questions at MAN 3 Madiun will also increase or improve. The percentage value of the influence of drill and team-teaching methods on increasing students' critical thinking skills in solving integrated KSM questions at MAN 3 Madiun can be seen in *Table 6*, namely 74.2%, while other variables influence the remaining 25.8%.

Based on the results of the correlation analysis in *Table 6*, the correlation between drill and team-teaching methods and increasing students' critical thinking skills is 0.861. This figure shows that there is a reasonably strong correlation. Overall, the analysis results also show that the drill and team-teaching methods have an effect, both individually and collectively, on increasing students' critical thinking skills in solving integrated KSM questions at MAN 3 Madiun. These findings align with research conducted by Yopi Nisa Febianti and Widyastuti entitled *Team Teaching Learning Methods to Increase Student Learning Activeness in Economics Specialization*. So, the implementation of team-teaching learning can not only increase students' active learning but also improve students' critical thinking skills. Apart from implementing team teaching, this research also discusses and finds the positive influence of implementing the drill method on improving students' critical thinking skills, especially in solving integrated KSM questions.

The findings of this research also complement previous research findings, including research conducted by Endang Retno Winarti, Budi Waluya, and Rochmad entitled *Improving Critical Thinking Ability Through Problem-Based Learning with Peer Feedback Activity*, as well as research conducted by Mery Fransiska Simanjuntak and Niko Sudibjo entitled *Improving Students' Critical Thinking Skills and Problem-Solving Ability Through Problem Based Learning*. These two studies essentially found that Critical Thinking Skills can be improved by implementing Problem-Based Learning (PBL) or Problem-Based Learning (PBM). Meanwhile, in this research, it was found that Critical Thinking Skills can be improved by applying drill and team-teaching methods in learning.

Conclusion

Based on the data analysis that has been carried out, the following conclusions are obtained (1) 1. The drill method positively impacts students' critical thinking skills in solving integrated KSM questions at MAN 3 Madiun, with a percentage of 50.5%. (2) Team teaching positively affects students' critical thinking skills in solving integrated KSM questions at MAN 3 Madiun, with a percentage of 69.0%. (3) The drill and team-teaching methods positively increase students' critical thinking skills in solving integrated KSM questions at MAN 3 Madiun, with a percentage of 74.2%.

Acknowledgement

The author would like to thank the supervisor who has provided direction, guidance, and encouragement, which was very useful in writing this article. Besides that, the author realizes that writing this article cannot be separated from direction, guidance, and

assistance from various parties. On this occasion the author would like to express his most profound thanks to (1) Mr. Chancellor of INSURI Ponorogo. (2) Mr Postgraduate Director, INSURI Ponorogo. (3) Head of the Islamic Religious Education Masters Study Program and all lecturers and teaching staff at INSURI Ponorogo. (4) The Head of MAN 3 Madiun and all teachers and employees, especially the Integrated KSM accompanying teachers at the research location who have supported and assisted in collecting research data. (5) My beloved family always provided sincere support and prayers while researching and writing this article. (6) Fellow students of the INSURI Ponorogo Islamic Religious Education Master's Program have built togetherness from the start of their studies until the completion of writing this article. (7) All parties who cannot be mentioned one by one have paid attention and assisted in writing this article.

Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

REFERENCES

- [1] Aqib, Z., Murtadlo, A. (2016): *Collection of Creative and Innovative Learning Methods*. – Jakarta: Satu Nusa 556p.
- [2] Helmiati (2012): *Learning model*. – Aswaja Pressindo, Yogyakarta 120p.
- [3] Ismail, N., Desa, S., Balakrishnan, B. (2018): *Science creative teaching design for science teachers*. – *International Journal of Academic Research in Business and Social Sciences* 8(1): 1235-1241.
- [4] Rositawati, D.N. (2018): *Critical Thinking Study on Inquiry Methods*. – In *Proceedings of SNFA (National Seminar on Physics and its Applications)* 3: 74-84.
- [5] Sudjana, N. (2004): *Basics of the Teaching and Learning Process*. – Bandung: Sinar Baru Algensido Offset 176p.
- [6] Sugiyono, P.D. (2007): *Statistics for Research* (p. Bandung). p. Bandung. – Bandung: CV ALFABETA 370p.
- [7] Susilowati, E. (2013): *Penggunaan Metode Pembelajaran Drill Sebagai Upaya Meningkatkan Prestasi Belajar Akuntansi Pada Siswa Kelas XI IPS 1 SMA Negeri Kebakkramat Tahun Ajaran 2012/2013*. – *Univeritas Sebelas Maret* 78p.
- [8] Winarti, E.R., Waluya, B., Rochmad, R. (2018): *Meningkatkan kemampuan berpikir kritis melalui problem based learning dengan peer feedback activity*. – *Jurnal Pembelajaran Matematika* 5(2): 197-207.
- [9] Yulita, Y., Suciati, S., Suroyo, S. (2023): *Implementation of active learning approaches using the role playing method as character building effort*. – *Quantum Journal of Social Sciences and Humanities* 4(2): 70-81.
- [10] Zakiah, L., Lestari, I. (2019): *Berpikir kritis dalam konteks pembelajaran*. – Bogor: Erzatama Karya Abadi 63p.