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Implementation of the POE2WE Model in Classroom Action Research Training to Enhance Teacher Competence at a Quranic Science Boarding School

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Abstract

Classroom Action Research (CAR) enables teachers to enhance teaching quality and student achievement. In Tasikmalaya Regency, however, many teachers need help to develop CAR effectively, impacting learning outcomes. To address this, a CAR training program utilizing the POE2WE (Predict, Observe, Explain, Elaborate, Write, Evaluate) model was implemented through the Participatory Action Research (PAR) approach, fostering active teacher engagement. The training, targeting high school teachers in Tasikmalaya, focused on equipping participants to develop high-quality CAR. Results indicated significant improvements in teacher competence, with participants achieving high ratings in critical skills: discussion activity (3.8), prediction formulation (3.7), and self-evaluation (3.9). Over 90% of participants expressed satisfaction with training materials, instructor competency, and the applicability of theory to practice. These findings underscore the value of structured CAR skills enhancement for educational development in Tasikmalaya and beyond, recommending that future programs adopt adaptable models to meet evolving teacher needs in classroom outcomes.

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INTRODUCTION

Classroom Action Research (CAR) is a scientific activity conducted by teachers in the classroom to implement actions to improve their teaching performance and enhance the overall quality of learning in schools (Azizah, 2021). CAR is urgent to enhance the quality of learning and teacher professionalism (Lafendry, 2023). CAR can also be utilized to develop learning innovations tailored to student characteristics and the classroom environment. In practice, CAR involves teachers as researchers and decision-makers, using data generated from the research to guide their decisions. Additionally, CAR helps identify and address deficiencies or weaknesses in the teaching and learning process, allowing for the development of appropriate solutions (Nurulanningsih, 2023). From several of these definitions, CAR is a scientific activity carried out by teachers to improve joint learning and professionalism and overcome deficiencies in teaching by using data and innovations based on student needs.

Each CAR cycle has at least four stages, namely planning, implementing or often also called acting, observing, and reflecting (Rahmawati et al., 2023). In the planning stage, the teacher designs learning activities with specific objectives. During the implementation

stage, the teacher carries out these activities according to the plan. In the observing stage, the teacher monitors the learning process unfolding. Finally, in the reflecting stage, the teacher reflects on the learning process and evaluates the outcomes.

CAR is an essential instrument in improving the quality of education because it actively involves teachers in solving learning problems faced in the classroom, thereby helping to improve the effectiveness of student learning (Aulia et al., 2023). However, many teachers in Tasikmalaya Regency need help conducting CAR due to limited knowledge and skills in designing and implementing such research. According to data from the Tasikmalaya Regency Education Office (2020), teacher performance assessments indicate that teachers in the region have a low ability to conduct CAR. This can negatively impact the quality of classroom learning and, ultimately, student achievement. Therefore, efforts to enhance teacher competence in CAR are essential to improving the overall quality of school education. However, Quranic Science Boarding School (QSBS) teachers, in particular, face additional challenges, such as limited resources and a lack of experience in conducting structured research, which has made it difficult to implement CAR effectively. This situation has further contributed to the gap in instructional quality and learning outcomes in this setting.

Efforts that can be made to improve teacher competence in conducting CAR are through training. Training can give teachers the understanding and skills to design and implement effective classroom action research. Teacher training is required for teacher professional development (Gul, 2021). Professional development helps change teacher thinking and practices and benefits students if certain features are considered in its design and implementation (Kalinowski et al., 2019). The training was carried out in the CAR making training using the POE2WE model to improve the competence of quranic science boarding school teachers. The POE2WE model was selected as the solution for this training program due to its structured approach supporting teachers in each action research phase. This model's interactive and experience-based learning method is well-suited to address QSBS teachers' challenges by providing a concrete, step-by-step process in conducting CAR, thus increasing teachers' confidence and capability in applying CAR to real classroom settings.

Quran School of Boarding School is a boarding school that combines general education with religious education in an integrated and structured environment. This school emphasizes the quality of education, balanced between general knowledge and spiritual education, to form students who excel academically and have strong moral character. QSBS High School's vision is to comprehensively integrate general knowledge with religious knowledge. In addition to general subjects such as mathematics, science, and language, students also receive religious lessons such as interpretation, hadith, fiqh, and Arabic. Religious education is integrated into students' daily lives, including routine activities such as congregational prayer, reciting the Qur'an, and Islamic character development.

One of the challenges in combining general and religious curricula is the difficulty in implementing an effective and balanced curriculum, which may have yet to be fully achieved. Furthermore, to produce a generation of hafiz, intelligent, and globally competitive leaders, schools may face challenges in finding effective learning methods to achieve these targets. Therefore, classroom action research can be used by teachers to find the best approach to integrating the two curricula and assist teachers in exploring and developing methods that best suit students' needs.

The POE2WE model is a learning approach developed to assess students' understanding of a concept using a constructivist method. This model facilitates knowledge construction through a series of processes: predicting problem-solving outcomes, conducting experiments to test those predictions, explaining the experimental results both orally and in writing, providing real-life applications of the concept, documenting the discussion

results, and evaluating students' understanding through both oral and written assessments (Nana et al., 2014).

With the POE2WE model, teachers can invite students to predict the relationship between scientific concepts and religious teachings before making observations. For example, in science lessons, students can be asked to predict how the laws of nature they are studying are by the verses of the Qur'an. After that, students observe natural phenomena or scientific experiments that have been prepared. Through explanations, students can connect the results of their observations to their understanding of the verses in the Qur'an. Furthermore, the POE2WE model encourages more interactive and experience-based learning, which can increase student involvement in the learning process. For example, in biology, students can predict how the creation of the universe can be connected to the verses of the Qur'an, observe scientific data or experiments, and explain their findings in a religious context. This process helps students understand concepts in depth and apply them. According to Nana et al. (2024), training using the POE2WE model has provided significant practical benefits for teachers in adopting this model and integrating the Merdeka Curriculum into learning.

Based on the explanation above, this training aims to improve the competence of Quranic Science Boarding School teachers in conducting classroom action research and determine the effectiveness of enhancing teacher competence in this area. It will measure the increase in teacher competence after participating in the training and evaluate the training that has been held.

METHODS

The implementation of this training program started from the preparation stage, implementation, and reporting activities. Each stage is explained as follows:

a. Preparation Stage
   The preparation stage was carried out before the implementation of the training. At this stage, several activities were carried out, such as:
   a. Literature study to obtain information about classroom action research, teacher competency, and appropriate training methods.
   b. Development of training materials.
   c. Training participants are selected based on certain criteria.
   d. Determination of the place, time, and facilities of the training.

b. Implementation Stage
   The training program was delivered using the PAR method, encouraging active participation and collaborative problem-solving. Some activities carried out at the implementation stage included:
   a. Presentation and discussion on the concept of classroom action research, practical techniques for preparing high-quality research, and the integration of information technology in the creation of classroom action research.
   b. Practice making CAR in stages.
   c. Question and answer sessions and group discussions.
   d. Evaluation and monitoring are conducted by distributing questionnaires for participant satisfaction and competency development. The data collected from these questionnaires serve as a quantitative foundation for assessing the overall progress and effectiveness of the training program. The questionnaires, such as Likert scale surveys and pre/post competency tests, provided detailed insights into participants' skill improvement. The questionnaire data was analyzed using the following equation.

$$P = \frac{f}{n} \times 100\% \qquad (1)$$

c. Reporting Stage
   The final report stage was the stage where Evaluation and Assessment of the training results were carried out. Some activities carried out at the final report stage include:
   a. Evaluation of the success of the training based on indicators that have been determined at the preparation stage.
   b. Assessment of the quality of CAR produced by training participants after participating in the training.
   c. Preparation of a final report containing the results of the Evaluation and Assessment, recommendations for improvement, and suggestions and input for the next training.

RESULTS AND DISCUSSION

This community service activity has three stages: preparation, implementation, and reporting.

Preparation stage

The preparation stage is the planning stage of the community service program. Training planning was carried out comprehensively to cover all aspects needed to develop teacher competency in designing and implementing CAR using the POE2WE model. The community service team collaborated with the school and other stakeholders to set clear goals, adjust the training curriculum, and determine effective teaching strategies. In the preparation stage, several important activities were carried out to ensure that the implementation of the training was effective and followed the plan. The following are the results of the preparation stage:

a. A literature study was conducted to obtain information about classroom action research, teacher competency, and appropriate training methods. Based on the results of the literature study, training materials were developed to focus on improving teachers' practical skills in designing and implementing classroom action research.
b. Development of training materials and designs to improve teacher competency in making classroom action research. Training materials were developed based on the results of the literature study and input from the school. This material was designed to meet the needs of participants, with a focus on classroom action research methods and practical applications in teaching
c. The selection of training participants was based on specific criteria, such as experience conducting classroom action research, motivation to participate in training, etc. The Selection results selected 16 participants who met the criteria and were ready to participate in the training.
d. Determination of the place, time, and training facilities was carried out to ensure that the available facilities support the implementation of community service activities. This training schedule was synchronized with partners, namely the principal of Quranic Science Boarding School. The result of this institutional coordination was to obtain an agreement regarding the time of implementation of the training activities, namely Friday and Saturday, August 23-24, 2024.

Implementation Stage

The training was conducted over two days, each consisting of a mix of theory and practice sessions. Teachers were invited to design and implement CAR based on the POE2WE model actively. The theory session included:

a. An in-depth understanding of the concept of classroom action research.
b. The stages in the POE2WE model.
c. Strategies for integrating CAR into the curriculum and daily learning.

Documentation of the activities can be seen in Figure 1.

Figure 1 Teacher listening to an explanation

In this training, teachers were taught to apply the POE2WE model in designing and implementing CAR in their classes. Each stage of this model was studied in depth by providing relevant case examples and case studies. In addition, teachers were also trained to adapt this model according to the context of physics learning in their respective schools.

Training instructors were essential in facilitating the understanding and application of the POE2WE model. They not only provided theoretical explanations but also demonstrated the use of this model in direct practice sessions. Instructors also provided direct feedback on participants' activities and work results to ensure a deep understanding, as shown in Figure 2.

Figure 2 Instructor giving a presentation about the POE2WE model

Each training session includes practical activities where teachers conduct POE2WE-based CAR simulations. They were allowed to plan actions, observe the results, explain their findings, develop further understanding, prepare reports, and evaluate the results with the instructor and fellow participants. The active involvement of participants in each stage of the training ensures that they not only understand the concepts theoretically but can also apply them appropriately in practical situations. Group discussions, individual exercises, and joint reflection sessions serve as a means to deepen their understanding and improve their skills in designing effective classroom action research.

Reporting Stage

The success of the training was evaluated based on six observed aspects: activeness in discussions, ability to formulate predictions, accuracy in observations, ability to explain findings, report-writing skills, and self-evaluation. These aspects were assessed using an observation sheet instrument. Observations were carried out continuously during the training to monitor the progress and challenges faced by the participants. Data from these observations provide valuable information regarding the response and effectiveness of implementing the POE2WE model in the context of actual practice in the classroom.

Observations also allow the community service team to provide teachers with feedback and make necessary adjustments. Data obtained from observations during the community service can be seen in Table 1.

Table 1 observation results

No	Observed Aspects	Scale 1-4
1	Activity in discussions	3.8
2	Ability to formulate predictions	3.7
3	Accuracy in observations	3.5
4	Ability to explain findings	3.8
5	Ability to prepare reports	3.6
6	Self-evaluation	3.9

The observation showed that CAR training using the POE2WE model improved teacher skills. On a scale of 1 to 4, activeness in discussions recorded an average of 3.8, indicating high participant participation. The ability to formulate predictions and accuracy in observations was recorded with average values of 3.7 and 3.5, respectively, illustrating increased understanding and analytical skills. The ability to explain findings and compile reports received average values of 3.8 and 3.6, respectively, indicating that participants could present results and compile CAR reports well. Self-evaluation received the highest score, with an average of 3.9, indicating participants' critical awareness of their learning.

After the training, a reflection session allowed participants and the community service team to evaluate the results critically. This reflection included an in-depth discussion of successes, challenges, and suggestions for future improvements. The reflection results became the basis for compiling recommendations and further strategies for developing teacher professionalism and improving the quality of learning.

In addition, a participant satisfaction questionnaire was also conducted to measure the extent to which the training met their needs and expectations. Participant satisfaction was measured using a five-scale scale: very satisfied, satisfied, quite satisfied, dissatisfied, and very dissatisfied. This five-scale questionnaire was designed to provide more variation in the assessment, allowing respondents to convey their level of satisfaction more accurately. The absence of data on the fifth scale was due to the lack of respondents who chose that option. The results of the questionnaire related to the satisfaction felt by the participants can be seen in Table 2.

Table 2 results of the participant satisfaction questionnaire

No	Indicator	Very Satisfied	Satisfied	Quite Satisfied
1	Quality of training materials	50%	37,5%	12.5%
2	Skills and competencies of instructors	53.1%	40.6%	6.3%
3	Training facilities and media	56.3%	40.6%	3.1%
4	Application of theory in practice	31.3%	65.6%	3.1%
5	Benefits of training for improving competency	45.8%	41.7%	12.5%

The results of the participant satisfaction questionnaire showed that the teachers highly appreciated the training. As many as 50% of participants felt very satisfied with the quality of the training materials. Teachers who report participating in professional development activities often perceive them as effective and useful, particularly when the content is relevant to their day-to-day teaching needs and challenges (Doan et al., 2022). It indicates that the materials presented are relevant to their needs as teachers. Furthermore, 37.5% of participants felt satisfied with the quality of the training materials, which means that the materials are considered adequate to meet their expectations. However, some things need to be improved. Then, 12.5% of participants felt quite satisfied, which means that a small

number of participants indicated that the materials were relevant to their needs. Still, some things did not fully meet their expectations. Overall, these data show that most participants (100% if combined between very satisfied and satisfied) felt that the training materials were of good quality and relevant to their needs as teachers at QSBS High School.

The instructor's competence received high appreciation, with 53.1% of participants expressing satisfaction in the instructor's ability to explain material, guide practice, and provide feedback effectively. Additionally, 40.6% of participants felt confident that the instructor had met their expectations in almost all aspects, while only 6.3% felt somewhat satisfied, and none gave a poor assessment. This high level of satisfaction reflects the instructor's frequent use of facilitative feedback, which allowed participants to independently solve problems and perform tasks, further enhancing their learning experience (Gan et al., 2021). These data show that over 90% of participants believed the instructor effectively provided guidance, explained the material clearly, and offered valuable feedback.

Training facilities and media were also assessed positively. As many as 56.3% of participants felt very satisfied and assessed the facilities provided as providing support in the training process. In addition, using technology in training supports the learning process, which means that the media used is effective for a long time in helping participants understand the material. Multimedia learning tools enhance engagement and improve comprehension, providing learners with a more dynamic and interactive environment (Almarabeh et al., 2015). As many as 40.6% of participants felt satisfied, which shows that the training facilities and media meet reasonable standards. When used effectively, multimedia in educational settings captures attention and aids in the long-term retention of information (Almarabeh et al., 2015). Only 3.1% gave a reasonably satisfactory assessment, meaning the training facilities and media used need further improvement. However, no participants felt that the training facilities and media were inadequate. Most participants considered the facilities and media used in training effective and adequate."

Applying theory in practice was appreciated, and 31.3% of participants felt very satisfied. Indicates that some participants felt that this training was efficient in helping them integrate theory with practice, especially when applying the POE2WE model in class. As many as 65.5% of participants felt satisfied, which indicates that although the majority of participants felt that this training was successful in providing an understanding of theory and practice, there were still things that needed to be improved or adjusted so that the application of theory and practice was more optimal. Then, only 3.1% of participants felt sufficient, indicating that some participants needed help understanding and applying the introduced theory. However, no participants felt that applying theory and practice was lacking. Overall, this training succeeded in helping participants understand and apply the POE2WE Model, although there was slight variation in the level of understanding and application among participants.

The benefits of training for improving competence were that 45.8% of participants felt very satisfied. Research indicates that effective training programs can significantly enhance teachers' self-confidence and perceptions of professional development (Fernandes et al., 2023). The training effectively boosted self-confidence, encouraged innovation, and strengthened the participants' ability to design and implement CAR using the POE2WE Model. As many as 41.7% felt satisfied, indicating that most participants felt this training was practical, although some aspects needed improvement. A systematic review of Universal Design for Learning training courses highlights similar findings, showing that such training fosters valuable skills and increases teacher satisfaction (Fernandes et al., 2023).

The results of this community service show that training using the POE2WE model effectively improves the competence of QSBS high school teachers in Tasikmalaya Regency in designing and implementing classroom action research. The structured community service steps, from careful planning to in-depth reflection, encourage significant improvements in the participants' conceptual understanding and practical skills.

The use of observation sheet questionnaires and satisfaction questionnaires also provides concrete evidence of the positive benefits felt by participants related to this training. CAR fosters an environment that encourages teachers to become more attuned to and responsive to the evolving classroom dynamics. Educators can systematically identify and address challenges by engaging in CAR and improving their teaching methods (Okyranida et al., 2023). CAR implementation is an important thing that teachers do to overcome various learning problems students face in class (Lukman et al., 2022). By integrating CAR, teachers are empowered to reflect on their teaching practices and equipped with practical strategies to address student needs effectively. This ongoing process of reflection and improvement ultimately leads to enhanced classroom learning outcomes, benefiting educators and students in the long term.

However, implementing this training has several obstacles, primarily related to the complexity of curriculum integration, time constraints, the need for adapting materials, and the limited research experience of some teachers. These obstacles underline the need for further adjustments to the training, both in terms of materials and implementation, to better suit the specific needs of teachers at SMA QSBS who manage an integrated curriculum.

As a recommendation, future training can utilize technology to address the various challenges. The use of a bold collaboration platform, such as a learning management system (LMS), allows participants to access training materials and discuss anytime and anywhere so that it can overcome the time constraints that teachers have. In addition, using digital evaluation applications will help participants obtain real-time feedback, accelerating understanding and improving self-reflection skills.

By integrating technology into training, teachers can learn more flexibly and at their own pace. This technology-based adaptive approach is expected to increase training effectiveness and provide a more optimal long-term impact on improving teacher professionalism and the quality of learning at SMA QSBS.

CONCLUSION

The conclusion of the training results shows that training using the POE2WE model at QSBS Tasikmalaya effectively improves teacher competence. The majority of participants felt very satisfied or satisfied with the quality of the material, instructor competence, facilities, and the application of theory in practice. This training was considered relevant and valuable, helping participants understand and apply the POE2WE Model in designing and implementing CAR. These results reflect the success of the training in supporting the development of teacher professionalism, although several aspects need to be improved to achieve more optimal results. To enhance the effectiveness of this training, future programs could incorporate technology-based tools, such as online collaboration platforms or digital assessment applications, to support interactive learning and more personalized feedback. Additionally, integrating adaptive learning approaches could allow participants to progress at their own pace and focus on areas where they need more support, making the training experience more targeted and flexible.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS STATEMENT

Conceptualization, N; methodology, N and ES; formal analysis, ES; writing—preparation of the original draft and review, ES; review of training materials and evaluation, YSM and DS; project administration, AS; supervision, N; video preparation and documentation, CNS, RF, JI, and NK. All authors have read and agreed to the published version of the manuscript

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