

Management of Continuous Professional Development through Competency-Based Training Model for Junior High School Teachers

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Abstract

One of the strategies to improve teachers' skills and professionalism is the practice of continuous professional development. To fulfill the demands of students and learning in the 21st century, teachers must have a strong foundation and knowledge of ongoing professional development. However, a business-as-usual continuous professional development does not contribute to any significant improvements for teachers of junior high school in Pematangsiantar. The objective of this research was to develop a management model for teachers' continuous development. This is carried out through competency-based training with a heutagogy approach. A development model called ADDIE, which stands for Analysis, Design, Develop, Implementation, and Evaluation was used to develop the management model. The subject of this research was 80 junior high school students in Pematangsiantar. They were divided into 30 and 50 people for the limited trial and the broad trial, respectively. Questionnaires were distributed as the instrument of data collection. The data was then analyzed using a statistical descriptive analysis technique. The research found that the effectiveness of the competency-based training management model was measured by the N-Gain score, in which the G-value was 0.79 and 0.82 for limited trial and broad trial, respectively, which was in the high category. The results of the assessment of the effectiveness of the model obtained an average value of 94%, which was in the "very good" category. The effectiveness of the training program was assessed from the aspects of reactions, learning, behavior, and results, and the results show that the assessment of the classroom action research training program obtained an average score of 92%, or a very good category, which means that the classroom action research training program is very effective in improving teachers' competence. The significance of this model has been proven to give an innovative solution to teachers' continuous professional development.

Keywords:

Continuous Professional Development;
Competency-Based Training;
Heutagogy Approach;
Education Quality;
Education System.

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1- Introduction

The quality of education in Indonesia in recent times is very concerning, and this is due to the existence of several problems in the Indonesian education system that lead to the low quality of education in Indonesia [1]. Some scholars mentioned affecting factors such as drawbacks in the education management sector, gaps in educational facilities and infrastructure in urban and rural areas, less support from the government, ancient mind-sets in society, low quality teaching resources, and weak learning evaluation standards [2, 3]. This study is supported by a survey from Political and Economic Risk Consultants (PERC) stating that the quality of education in Indonesia ranked 12th out of 12 countries in Asia [4, 5]. Furthermore, some studies found that the results of the 2018 Program for International Student Assessment (PISA) in Indonesia have declined when compared to 2015 [6, 7]. There will be a surge in the young population called the "golden generation" in 2045 in Indonesia. This era will be dominated by people of productive age. What is anticipated

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from Indonesia's "golden generation" in 2045 will merely be wishful thinking if education quality does not improve, and this becomes an essential argument to improve Indonesia's educational standards.

Research related to the factors influencing the quality of education has been related to the scarcity of facilities and funds to meet educational needs [8, 9]. The continuity of the educational process is certainly supported by adequate facilities and sufficient funds to comply with the learning process, such as books, buildings, teaching staff, and others. The other studies related to the educational gap concern the high cost of education, which state that as society advances, costs of life, including education, are experiencing a rise [10, 11]. The elimination of tuition fees is usually only available in public schools located in big cities. Another issue raised by some scholars is the inaccuracy of educational outcomes, which they claim prevents students' degrees from meeting community needs in some regions of the world [12–14]. This means that many graduates are unable to apply the knowledge they have learned during their education in the community. This phenomenon then has the relation to education system inefficiency, where the expectations of a time that is rapidly developing are fulfilled by the current educational system [15, 16]. Therefore, there is no balance between the current educational system and the escalating social expectations.

It was reported by some research that educational problems that arise in Indonesian society stem from the failure of the education system [17, 18]. Also, the curriculum change factors cause the low quality of education in Indonesia since the frequent changes to the curriculum do not guarantee the quality of education [19, 20]. If the curriculum, which is the teacher's foundation in the classroom, is continually replaced, it will become deficient [21]. Furthermore, some studies argue that advanced education requires professional teachers [22, 23], which means that every teacher must be able to comprehend instructional materials broadly and thoroughly. There is a dearth of educators with the necessary skills, which represents one of the challenges.

The practice of continuous professional development is one way to enhance teachers' abilities and professionalism. The continuous process refers to a process that is ongoing and includes frequent opportunities and experiences that are planned intentionally to promote professional growth [24]. The school occasionally offers these continuous professional development chances through internal training sessions, workshops, and seminars. On the other hand, teachers take the initiative to create these possibilities by building on their formal and informal experiences. Teachers must have a solid foundation and an understanding of continuous professional development in order to meet the needs of 21st century learners and learning [25]. It is supported by research stating that when teachers have these opportunities for training and professional growth, it fosters a learning culture throughout the school [26]. Teachers and staff regularly advance their knowledge and abilities; they set an example for children by demonstrating the value they place on education; they feel more appreciated; and they see opportunities to advance in their professions. In the best systems, where teaching is also a more prestigious and in-demand profession, intense early support, ongoing training, and professional growth are really encouraged [27].

Regarding continuous professional development, it is arguable that there is no commonly recognized set of supports that distinguishes between a good, helpful early training and ongoing professional development system and a poor, unsupportive system with relation to professional development and continuous training possibilities [28]. Besides, a study found that the best duration, location, and timing for professional development opportunities, as well as who oversees the quality, are all unknown [29]. There is also little information on how teachers are assigned to training and professional development opportunities, whether they have any input into the opportunities that are presented to them, who provides the opportunities, and who offers the opportunities [30]. In addition, we are unaware of how a teacher's profile, including credentials, experience, specialty, and environmental factors, may affect the type of professional development they require (including whether he or she teaches in a high- or low-poverty school, etc.) [31]. Additionally, there is a proof shortage of how these systemic elements influence teachers' productivity and movements inside and outside of the teacher labor markets [32].

An unsuccessful continuous professional development through teacher training was found in Pematangsiantar Junior High School. This occurred due to poor training management. It was found that the training provided for the teachers was not based on a needs analysis. Then, the training design, where trainees are not participants who need training, and the keynote instructors do not fit the qualification as a trainer. In addition, the training implementation was not carried out as planned, with insufficient facilities and infrastructure and without supervision from the Department of Education or supervisor, and training assessment, where the results of the training were not followed up on and given feedback. Teachers tend to order their publications for the sake of promotion, and these observation results indicate the continuous professional development with training is only "business as usual" so that it does not give any significant improvement to teachers of junior high school in Pematangsiantar.

Given these issues and requirements, Pematangsiantar's Junior High School teachers need better management strategies to advance their professional development. Several training models can be implemented to support teachers' professional development [33] such as Four-Step Problem-Solving Model [34], Cascade Model [35], SAMR Model [36], and Continuous Training Model [37]. However, despite the fact that many teachers in the local environment are still digitally illiterate, the training approaches that are widely known did not demonstrate the most significant positive and

negative inequalities in the continuous professional development [38]. Competency-based training is thus one of the improvements required and appropriate to address such issues. This training methodology is a version of competency-based training that integrates digital ICT and a heutagogy approach [39, 40]. Training with a heutagogy approach In heutagogy training, both instructors and trainees are immersed in learning together to become learners so that the role of instructors in training becomes the facilitator [39, 41]. A mediocre educational system can be transformed into an engaging learning environment via the use of effective innovative ICT practices [42]. Educators may employ digital technology to enable the fellow teachers and students to become lifelong learners and innovators [43, 44], resulting in the creation of citizens who are accountable for the global community.

From the aforementioned issues, it was determined that competency-based training, the heutagogy approach could be implemented to provide Junior High School teachers in Pematangsiantar with the necessary continuous professional development. Through the administration of competency-based training, a model for the continuous professional development of teachers was developed as part of this study, and its effectiveness was evaluated. Finally, we expect that our suggested model will contribute to the quality standard of education in Pematangsiantar's Junior High Schools.

2- Research Methodology

2-1- Research Approach and Research Method

The approach of this research was development and the method implemented was Research and Development. The research was conducted in two stages, the first stage with qualitative methods to obtain product design and the second stage of research with quantitative methods (experiments) to test the effectiveness of the product [45-47]. The design of teacher continuous professional development through competency-based training management was carried out adopting the ADDIE model consisting of five stages of development, namely Analysis, Design, Development, Implementation, and Evaluation [48, 49] as is illustrated in Figure 1.

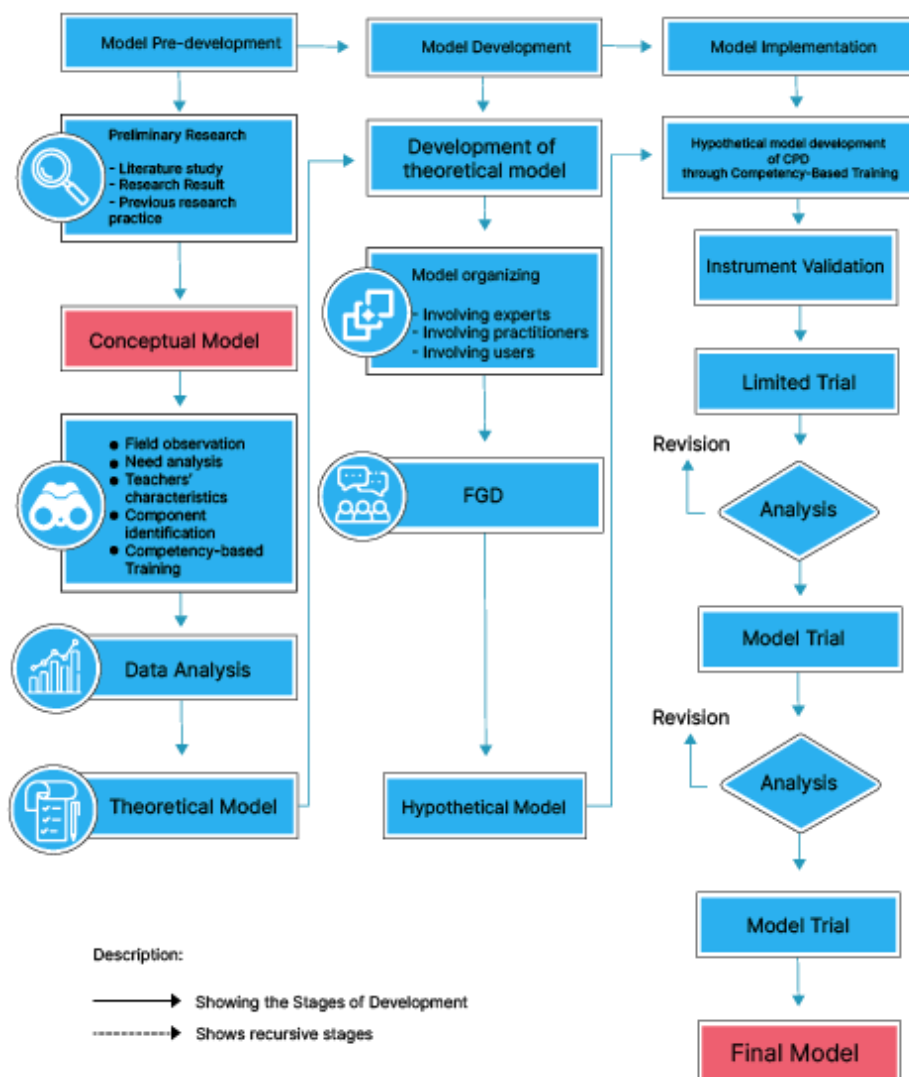


Figure 1. ADDIE model for continuous professional development

2-2- Research Location, Sample, and Technique of Data Collection

This research was carried out in Junior High Schools in several districts in the city of Pematangsiantar from July 2021 until March 2022. The population of this study were all teachers of Junior High School in Pematangsiantar and the sample subjects were 80 teachers proposing the promotion for continuous professional development. The decision to carry out the research at many Junior High Schools was made because those institutions were about to assign teachers for promotion as part of continuous professional development, and those teachers needed the best possible training to be promoted.

The participants in this study were chosen based on the initial and direct competency-based training in Pematangsiantar Junior High Schools. Four individuals participated in the field data collection: the main researcher, one research member, and two field assistants. Three personnel, one head of research and two research members, were involved in the planning, construction of the evaluation model, and revision of the outcomes of the initial trials. 80 teachers from Junior High Schools in Pematangsiantar and two education specialists participated in the initial testing toward the evaluation model design.

Questionnaires were the primary tool used to collect field data and conduct preliminary tests for the assessment model design. In contrast to the 19 questions in the questionnaires for the initial trials, there were only 5 questions in the questionnaires used to collect field data (see Appendix I). The four-option Likert scale [50] was used to calculate the assessment scores for each item included: score-4 (strongly agree), score-3 (agree), score-2 (disagree), and score-1 (strongly disagree) [51, 52].

2-3- Data Analysis

The outcomes of the data analysis generated from the initial trials can be used to determine the excellence of competency-based training for continuous professional development. Quantitative descriptive approaches were used to examine the data from the initial trial results using percentage descriptive calculations. The quality of this management model design was evaluated using the outcomes of descriptive percentage calculations. The following is a formula for calculating descriptive percentages.

$$\text{Suitability Score} = \frac{\text{gained score}}{\text{expected score}} \times 100\% \quad (1)$$

The five-scale categorization was applied to the percentage values that were produced by the formula above. The quality percentage of above 81% is in the excellent category, and 61 to 80% is in a good category based on the five's scale categorization, so there is no need to revise the evaluation model design. The quality percentage of 41 to 60% is in the moderate category, 21 to 40% is in the less category, and 0 to 20% is in the poor category based on the five's scale categorization, so it is necessary to revise toward the management model design.

3- Results and Discussion

3-1- Analysis

The analysis stage was the first stage in developing a model of continuous professional development of teachers through competency-based training management to improve the education quality of Junior High School Pematangsiantar. The analysis phase included problem analysis, teacher self-evaluation analysis, teacher performance and assessment results analysis as is displayed in Table 1.

Based on Table 1, it can be seen that the lowest result of the teacher's performance assessment is 3.64 on the professional competency aspect through reflective action. Despite the good result, it can be indicated that the achievement of teachers in carrying out their continuous professional development obligations requires improvement. This is supported by the performance gap analysis, according to which only 15% of the teachers produce scientific publications by conducting classroom action research. Furthermore, a training needs analysis showed that 87.5% of teachers had never attended training about classroom action research. Then, 91.25% of teachers did not have any knowledge in writing about classroom action research, and the entire group of teachers stated that they needed training in writing classroom action research training.

Table 1. Result of analysis phase

No.	Aspects/Indicators	Average	Interpretation
A. Pedagogic Competency			
1.	Understanding students' characteristics	4.16	Good
2.	Mastering learning theory and educational learning principles	4.14	Good
3.	Curriculum development	4.22	Excellent
4.	Educational learning activities	4.13	Good
5.	Understanding and developing self-potential	4.09	Good
6.	Communication with students	4.16	Good
7.	Assessment and evaluation	4.08	Good
B. Personal Competency			
8.	Behave based on religion, legal, social and cultural norms	4.51	Excellent
9.	Mature and role-model personality	4.37	Excellent
10.	Work ethic, high responsibility, pride as a teacher	4.29	Excellent
C. Social Competency			
11.	Inclusive, objective and non-discriminatory	4.38	Excellent
12.	Interpersonal communication	4.13	Good
D. Professional Competency			
13.	Mastery of structures, concepts and mindsets that support the subjects	4.15	Good
14.	Developing professionalism through reflective actions	3.64	Good

3-2- Design and Development

Design and development phase were a stage for designing and developing competency-based training management model. Competency-based training management was also developed with the ADDIE model which included:

- Design phase included module framework, module template, evaluation tools, and research instruments.
- Development phase included pre-development, drafting of training model framework, training module, questionnaire development, expert validation, and model design revision.

Table 2 shows the overall assessment by topics experts is in excellent category. This states that the model of continuous professional development of teachers through competency-based training management is feasible to implement based on the expert judgement on topic suitability.

Table 2. Expert validation result on training topics

Aspect	Average Percentage	Interpretation
Contents suitability	97	Excellent
Presentation suitability	98	Excellent
Language suitability	98	Excellent
Contextual assessment	98	Excellent

It is clear from Table 3 the entire aspects of module design and development are categorized as excellent. This validation affirms that based on the expert assessment of module suitability, the model of continuous professional development of teachers through competency-based training management is applicable.

Table 3. Expert validation result on module

Aspect	Average Percentage	Interpretation
Module size	90	Excellent
Cover design	94	Excellent
Content design	95	Excellent
Content attractiveness	96	Excellent

The initial competency-based training management model with heutagogy can be seen in Figure 2. This model was designed based on the focus group discussion held with the teachers of junior high school. There are several essential points in this model, such as the classroom action research training that became a major issue in the competency development program. In addition, the training was carried out based on an analysis of the teacher's need for training, and the evaluation could be used to comply with the credit points for teachers' promotion. Then, the competency assessment included knowledge, skills, attitudes, and results (products). Finally, the model that resulted in a training module was suitable for the implementation of teacher competency development.

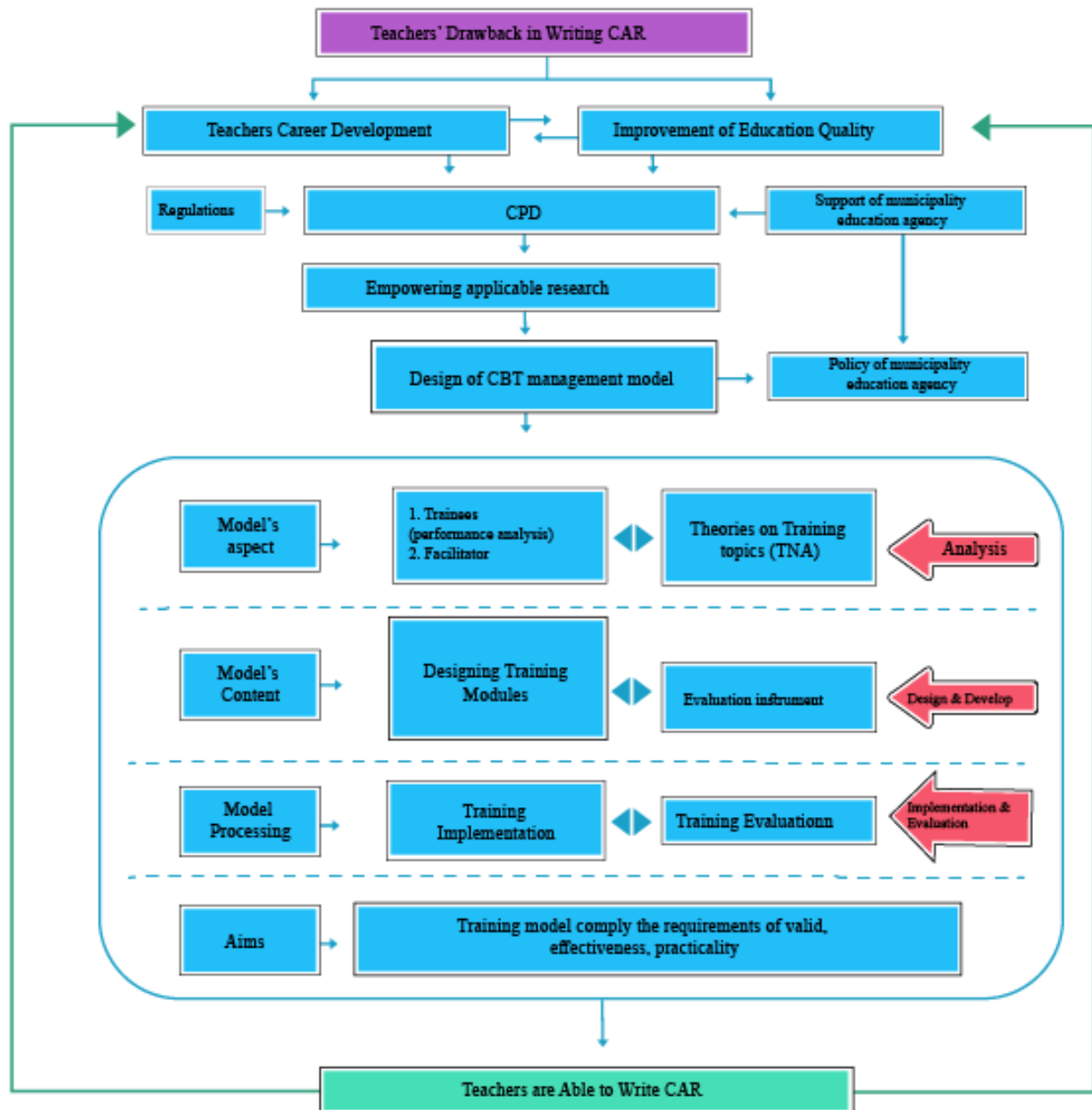


Figure 2. Initial Model of CBT

After the broad testing, some inputs were given to revise of the model design by the Head of the Educational Agency of Pematangsiantar and school supervisors such as the design was not only limited to the teachers' capability to implement the results of classroom action research. After training, the teachers were expected to develop culture of research aiming to improve the quality of learning process and the teachers' professionalism. Ultimately, this purposes to improve the education quality of Junior High School in Pematangsiantar. The final design is illustrated in Figure 3.

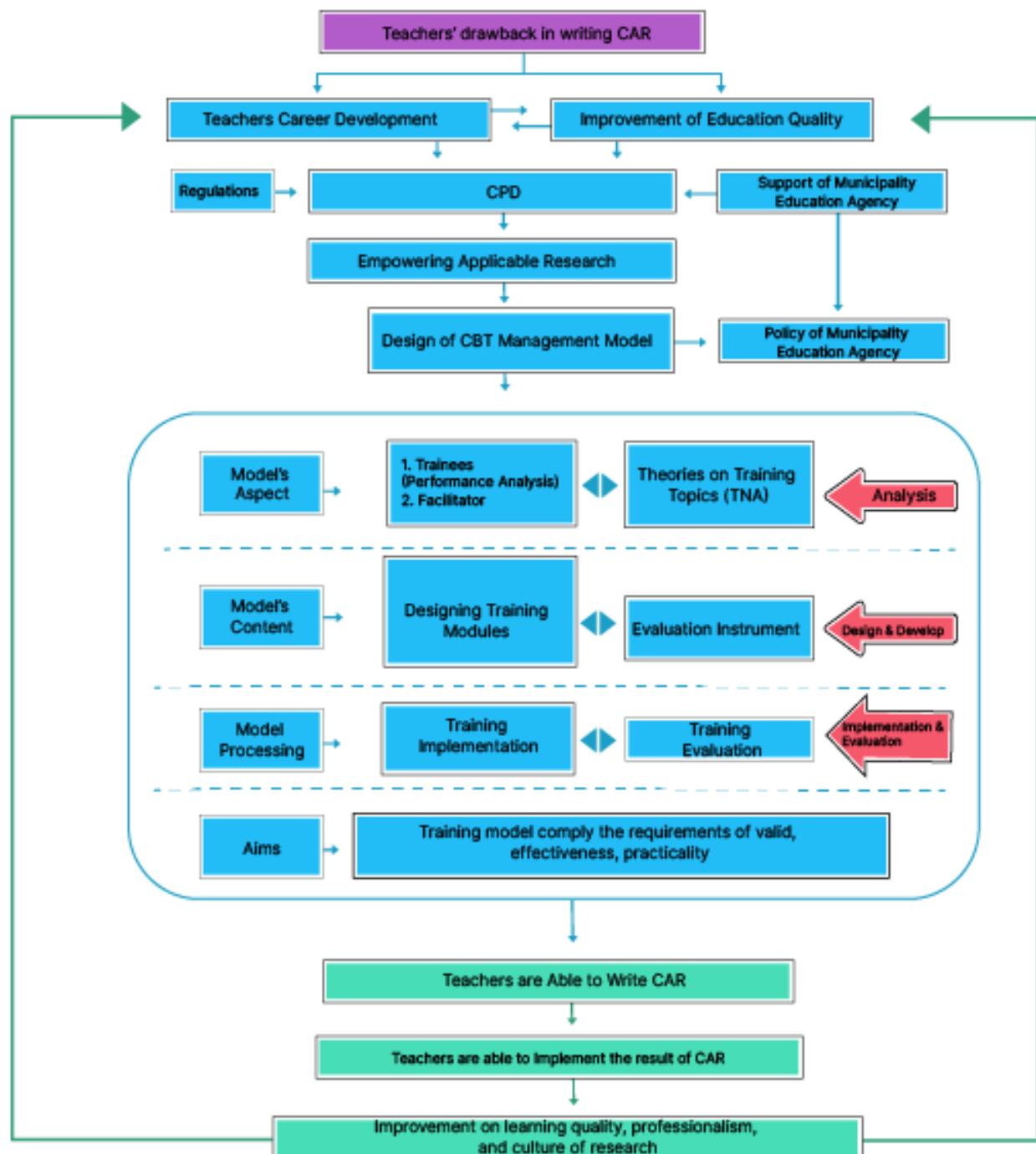


Figure 3. Final model of CBT

The initial model of continuous professional development, as shown in Figure 4, involved collaboration between the municipality education agency, school principal forum, teachers' forum, quality assurance agency, and teacher training universities in order to provide support for teacher competency development through competency-based training. The training was carried out based on the results of observations of teacher performance gaps. In order to perform training need assessment so that the training precisely complies with the objective of improving teachers' competence.

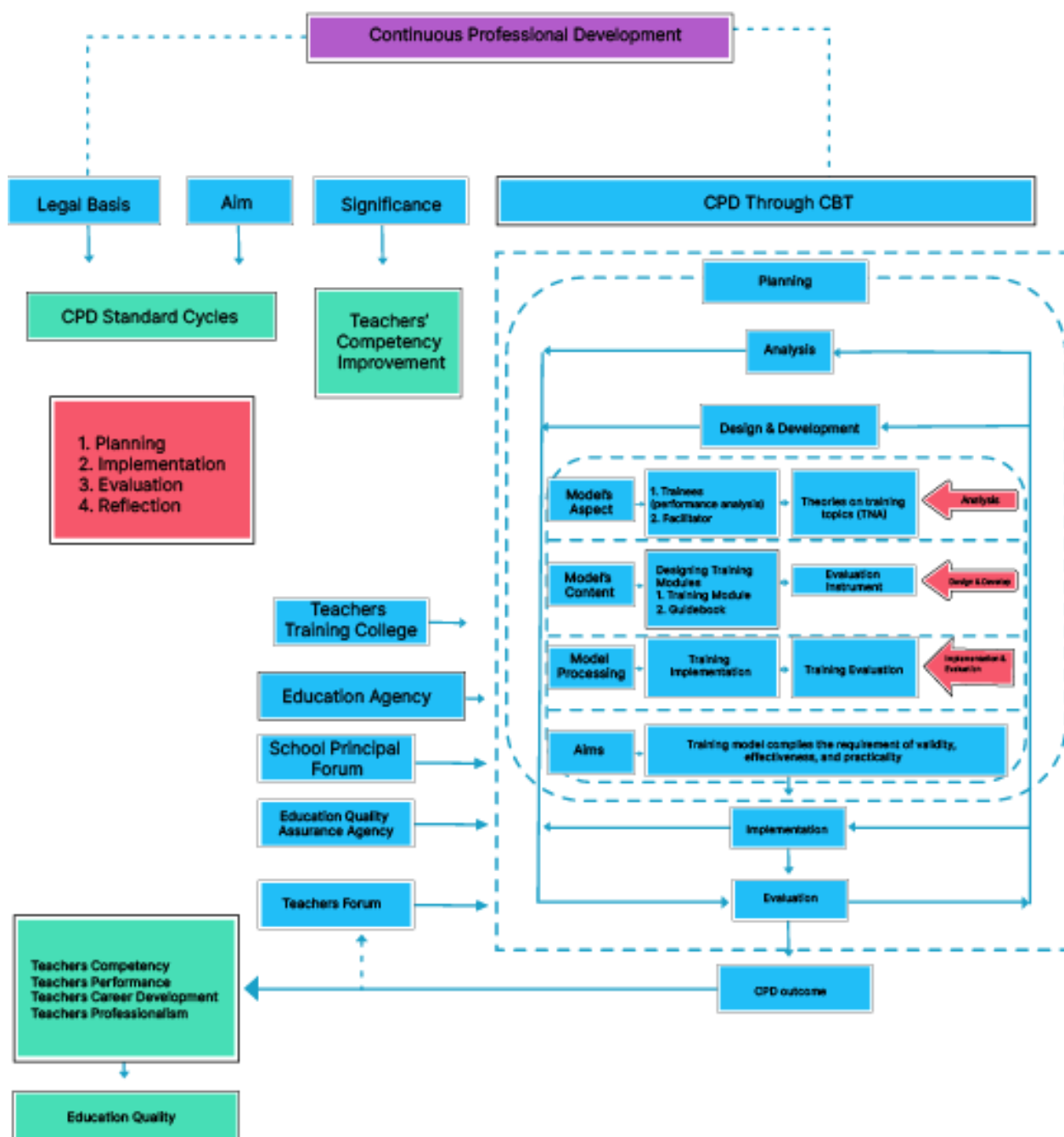


Figure 4. Initial model of CPD through CBT

Figure 5 shows the final model of continuous professional development with competency-based training with heutagogy. From the illustration, it can be seen that the competency-based training management model which was developed has the following additional features:

- The topics in the module motivated the teachers and were closely related to the teachers' work.
- The topics in the module were used as the reference to solve the teachers' problem.
- The delivery of the topics was integrated with ICT using media, methods, and experiential learning.
- The training was carried out to a complete mastery of the topics with heutagogy approach.
- The end product of the training was creating a classroom action research which was beneficial for teachers' promotion as the part of continuous professional development.

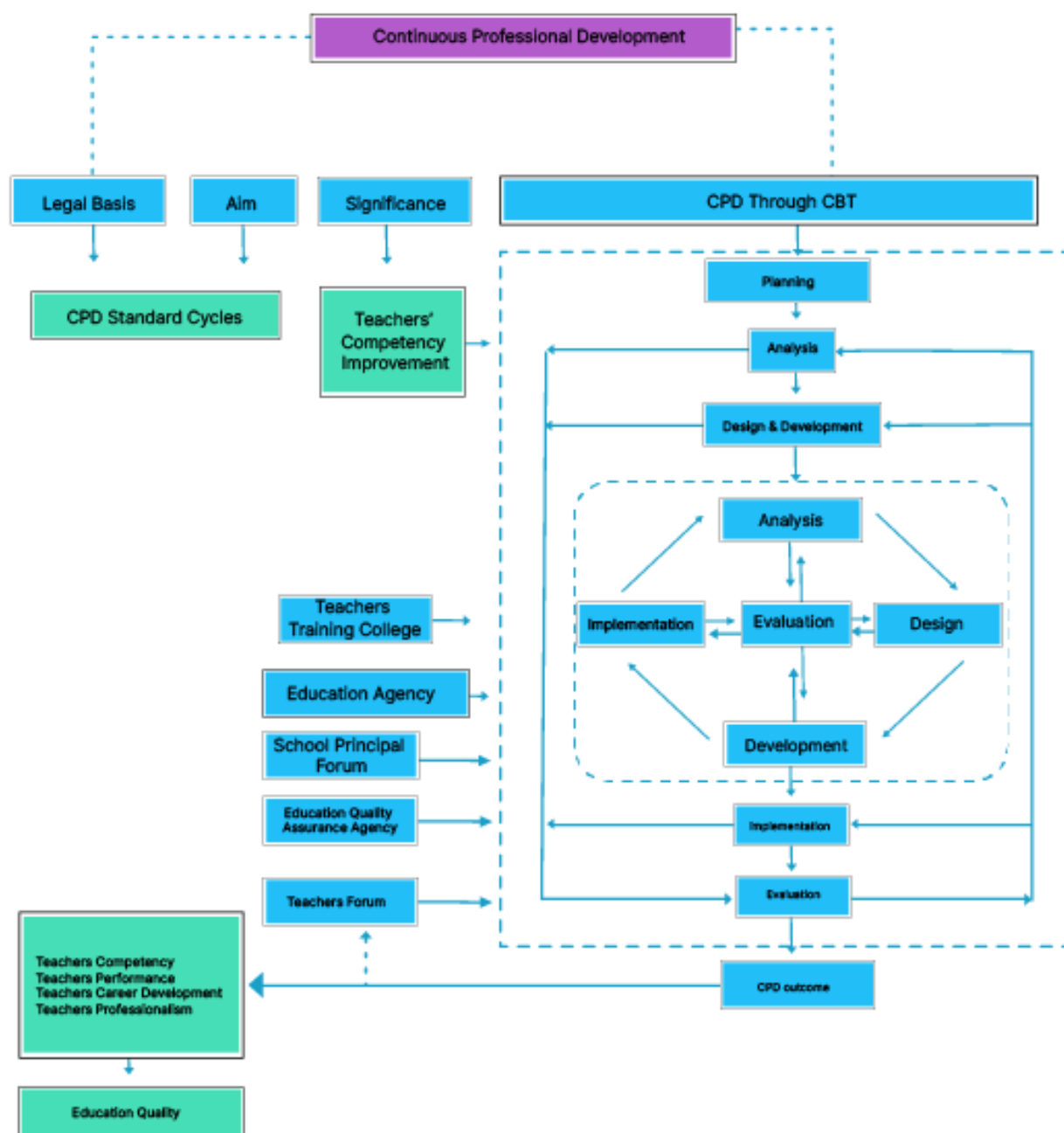


Figure 5. Final model of CPD through CBT

3-3- Implementation

The implementation phase aimed to examine the competency-based training management model. In limited trial stage, this activity involved 30 Junior High School teachers while there were 50 teachers participated the broad trial. In sum, there were 80 Junior High Schools teachers who took part as the participant in implementation stage.

The N-Gain Score or normalized gain score aims to determine the effectiveness of competency-based training management models in increasing the teachers' competence in terms of classroom action research. Figure 6 compares the score achievement and the N-Gain score in the implementation phase. From the chart, it can clearly be seen that there is no teacher achieving score below 40 points. Despite the increasing number of teachers involving in the implementation stage, the chart shows that there is a significant increase of the teachers' achieving score above 75 points in the broad trial while a slight rise of the number of teachers can be found in the limited trial. Further, the N-Gain score comparison experiences a slight rise from 0.79 in limited trial to 0.82 points in the broad trial. The passing grade above 0.7 describes the high category of implementation model effectiveness in which the competency-based training model improves the score achievement both in limited and broad trial.

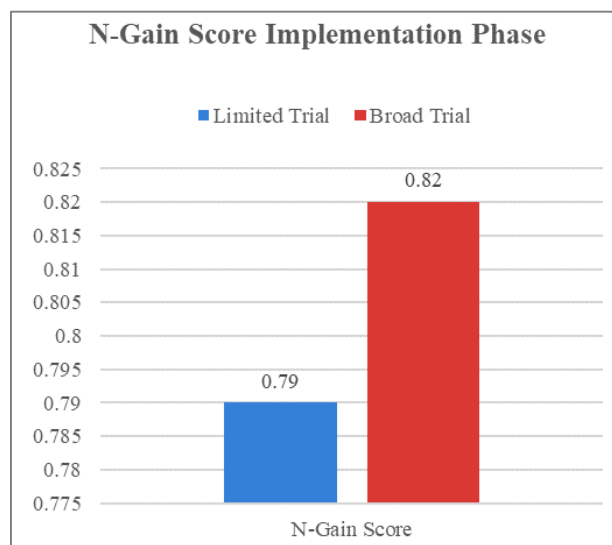
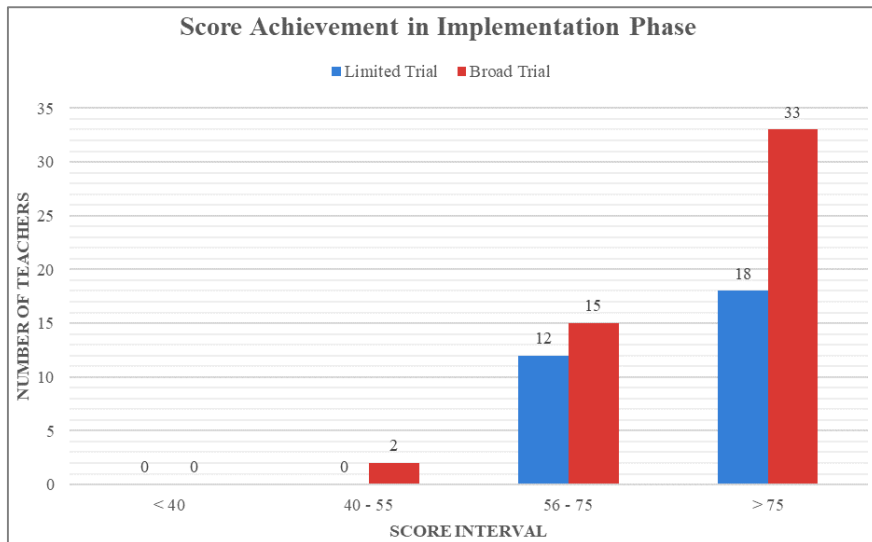


Figure 6. N-Gain Score in limited and broad trial

3-4- Evaluation

Evaluation is the last stage in the continuous professional development based on competency-based training management model and this evaluation was carried out by the researcher by analyzing the research data obtained from N-Gained score as is illustrated in Figure 7.

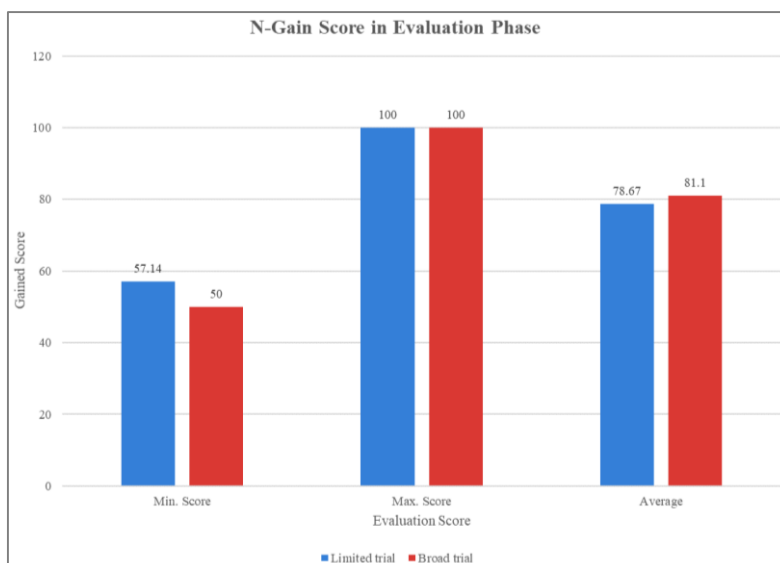


Figure 7. N-Gain score results

Figure 7 displays the N-Gain score result of the teachers' achievement in writing classroom action research (CAR). From the illustration, it is clear that the average of the N-Gain experiences a slight increase. Since the average gained score is both above 70 points both for the limited and broad trials, this is categorized as good level. To sum up, the competency-based training is effectively proven for continuous professional development for teachers of Junior High School in Pematangsiantar.

Figure 8 illustrates the results of effectivity of competency-based training and classroom action research as the part of the training. It can be noticed that the aspect of curriculum, delivery, assessment, competency documentation, and outcome of the training slightly go up for classroom action research. The similar gradual increase also occurs in the reactions, learning, behavior, and outcome of the competency-based training. Overall, there is a slight increase from limited trial to the broad trial of the effectivity evaluation on competency-based training in continuous professional development for teachers.

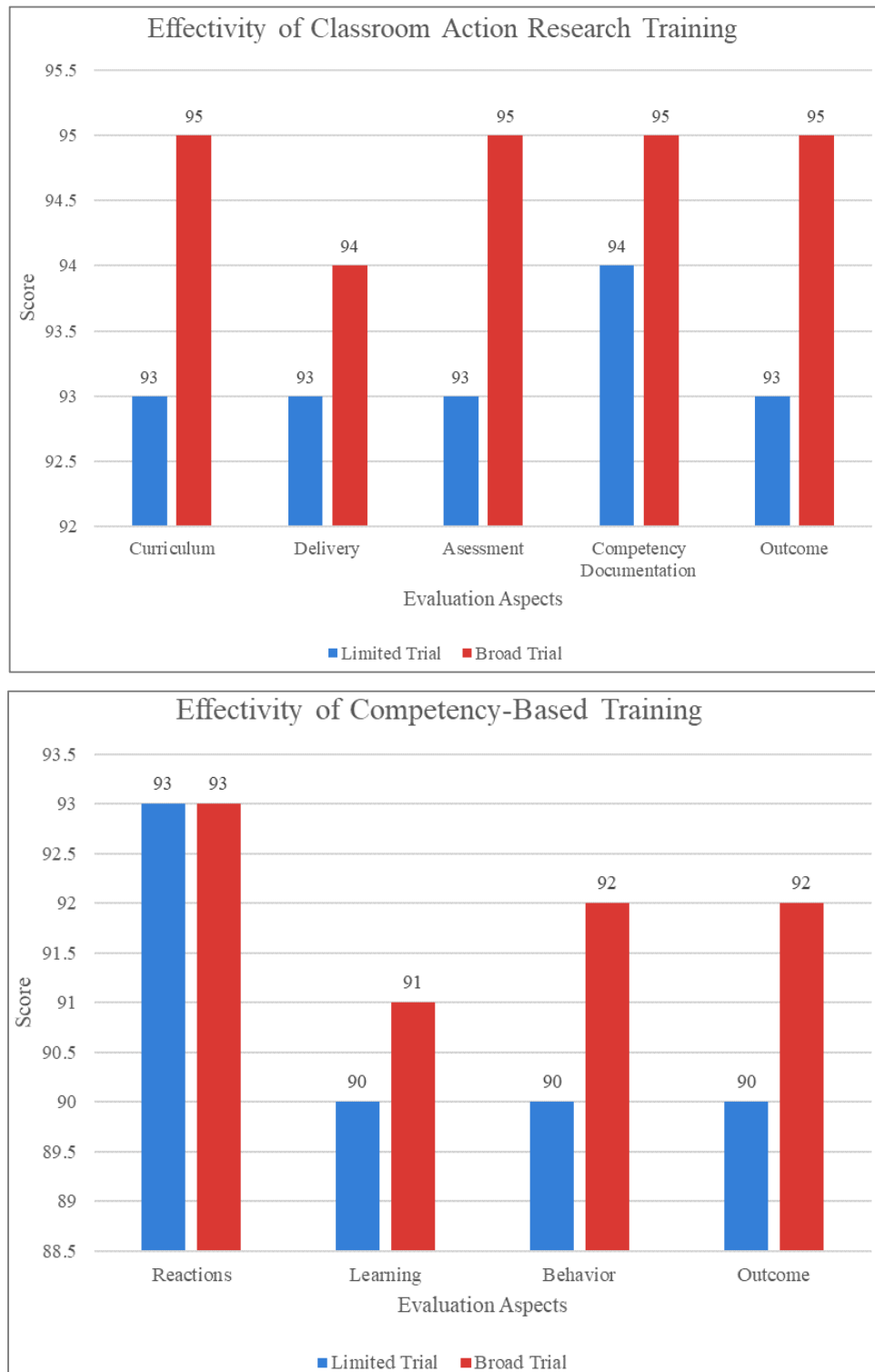


Figure 8. Effectivity evaluation in limited and broad trial

This research exhibits a leading-edge competency-based training model for junior high school teachers' continuous development. The training designed is competency-based training aiming to improve the competencies that must be possessed by the teachers for their career development. Competency-based training management itself was developed using the ADDIE model, which consists of five stages of development: analysis, design, development, implementation, and evaluation. The training is carried out with a heutagogy approach since its self-determined learning results in teachers who are aware of the important role of learning in the era of the industrial revolution 4.0. The ultimate objective is to create a teacher who is a lifelong learner who is always active in learning, actualizing the learning experience [53]. This is supported by a study stating that training with a heutagogy approach is characterized by training conducted face-to-face and online, the existence of a community consisting of instructors as experts in their fields and training participants where, in the community, instructors and students can share knowledge and content, ask questions, and respond to questions and problems in the community [39, 54]. The significance of this model has been proven to give an innovative solution to teachers' continuous professional development.

The research's strength will be apparent when the limitations of other studies are taken into account. The limitation of Khanna and Gupta's [55] study was that no correlation was established based on a bigger sample size or more organizations, which would have given a more accurate picture of competency-based training. Boahin & Hofman's [56] study limitation was that it would have been more appropriate to evaluate the perceived impacts of competency-based training implementation if teachers' opinions had been sought out since convergent and divergent perceptions between teachers and students are likely to be important variables in analyzing the teaching and learning process. The limitation of the study by Wongnaa & Boachie [57] was that, despite the difficulties they encountered in their effort to integrate competency-based training techniques, teachers were also urged to be highly creative in their choice of approach. The study by Ahmed & Sayed [58] was limited by the lack of collaboration between the involving parties to contribute ideas and insight. The limitation of the Hsiao et al. [59] study was that there was no cutting-edge approach in the community system that would allow educators and teachers to communicate, share ideas, and discuss their educational experiences. The limitation of the research by Ahmed & Sayed [60] was that the outcome of effectiveness of competency-based training had not discussed teachers' continuous professional development. It seems that the strength of this research is that it can demonstrate the design of a new competency-based training program, based on some of the studies' limitations. The competency-based training with a heutagogy approach is able to assist the continuous professional development of teachers in junior high school.

Despite its strength, the limitation of this research is the focus on classroom action research while other aspects of sustainable professional development, such as self-development and innovative work, are not included. In spite of this, this research has contributed to the real alternative to teachers' continuous professional development.

4- Conclusion

The continuous professional development of teachers through a competency-based training management model is interpreted as very good category. This model is useful for the reference of cutting-edge competency-based training, particularly for the continuous professional development of junior high school teachers in Pematangsiantar. The effectiveness of a competency-based training management model using a heutagogy approach, especially in increasing teachers' competence in classroom action research, developing a culture of the teacher as researcher, and increasing teachers' motivation to carry out classroom action research. The effectiveness of competency-based training management is measured by the N-Gain Score, in which the G-value is 0.79 and 0.82 for limited trial and broad trial, respectively. Since the threshold number is 0.7, the N-Gain category is high, meaning the implementation of the management model with the competency-based training model improves the score achievement both in the limited and broad trials.

The effectiveness of the competency-based training management model using a heutagogy approach can also be assessed from the aspects of training outcomes, curriculum, delivery, assessment, and documentation. The results of the assessment of the effectiveness of the model obtained an average value of 94%, which is in the "very good" category. The effectiveness of the training program is assessed from the aspects of reactions, learning, behavior, and results. The results show that the assessment of the classroom action research training program obtained an average score of 92% with a very good category, which means that the classroom action research training program is very effective in improving teachers' competence.

A deeper study will be conducted in future work related to the policy of the teacher's continuous professional development model through a competency-based training management model, especially in the aspects of self-development and innovative work of teachers as well as the impact of continuous professional development on improving the quality of education.

5- Declarations

5-1- Author Contributions

Conceptualization, S.; methodology, S.; formal analysis, S., S.G., E.D., and N.; investigation, S.; data curation, S., S.G., E.D., and N.; writing—original draft preparation, S.; writing—review and editing, S. All authors have read and agreed to the published version of the manuscript.

5-2- Data Availability Statement

The data available in this research is presented in the article.

5-3- Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

5-4- Acknowledgements

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5-5- Institutional Review Board Statement

Not applicable.

5-6- Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

5-7- Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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Appendix I

Questionnaire 1 (TNA)

No.	Questions	Option	
		Yes	No
1.	Have you ever attended Classroom Action Research training?		
2.	Do you understand how to write a Classroom Action Research report?		
3.	Do you think it is necessary to develop Classroom Action Research training?		
4.	Do you need a Classroom Action Research training?		
5.	Are you willing to take part in Classroom Action Research training?		

Questionnaire 2 (Model Effectivity)

Please give a *check list* (✓) in the appropriate options below:

SD: Strongly Disagree

D: Disagree

A: Agree

SD: Strongly Agree

Aspects	Indicators	Option			
		SD	D	A	SA
A. Outcome	1. The results of the training (competence) are specific and measurable				
	2. The results of the training are determined before the delivery of the program				
	3. Mastery of results is the criterion to determine the success of participants				
B. Curriculum	4. The instructor gives a clear description to the participants regarding the expected performance, conditions and standards				
	5. The instructor delivers the training objectives				
	6. The instructor analyses work competencies and required competency units				
	7. The lesson is created in the form of modules				
	8. The lesson contains knowledge, skills and attitudes				
	9. The topics in the module is an assessment instrument for the training objectives				
	10. Training topics are prepared for individual				
	11. The topic contains problem solving skills				
C. Delivery	12. Training is carried out participant-centred				
	13. Trainees are able to do initiative				
	14. The instructor roles as a facilitator				
	15. The participants learn by doing hands-on practice				
D. Assessment	16. The assessment is used to measure the performance based on certain competency standards				
	17. The assessment result is the form of options between competent and not yet competent				
E. Competency Documentation	18. The reports on the competencies acquired by the participants are prepared and made available to participants				
	19. The reports in the form of completed modules relating to certain competencies				